



Università degli Studi di Milano-Bicocca

DOTTORATO DI RICERCA IN INFORMATICA
Dipartimento di Informatica, Sistemistica e Comunicazione
Cycle XXVIII

Coordinator: Prof. Stefania Bandini

**TIME ACCOUNTING SYSTEMS (TAS):
INVESTIGATING THE POTENTIAL OF INFORMATION
TECHNOLOGY FOR THE AGEING SOCIETY IN
BANGLADESH.**

TUNAZZINA SULTANA
Ph.D. Thesis

Supervisor: Prof. Carla Simone
Tutor: Prof. Stefania Bandini

A.A. 2014/2015

Acknowledgements

I wish to thank all the people who contributed to this thesis work. At first, I would like to express my gratitude to Professor Stefania Bandini who gave me the opportunity to carry out my research work and to collaborate with international researchers by awarding me the ALIAS scholarship. It gives me immense pleasure to thank my mentor and supervisor, Professor Carla Simone, for her support, continuous guidance, careful suggestions and intelligent criticism during the work phase and for her inexhaustible patience during the correction phase of this thesis. I appreciate all of her comments, input, suggestions and advice that have enabled me to accomplish this thesis in accordance with the timeline.

I would also like to express my sincere gratitude to Dr. Federico Cabitza who has been always played a key role in encouraging and coordinating me in this whole project. I am very grateful to him for his invaluable support, time, suggestions and guidance throughout this period of research.

I acknowledge and value the support of the CARIPLO Foundation and ALIAS project for offering me the Alta Formazione e Internazionalizzazione per L'Ageing Society (ALIAS) Scholarship. My sincere gratitude to all researchers and staff of Sistemi Informativi e tecnologie per l'interazione of the Department of Computer Science, Systems and Communications of the Milano Bicocca University for their cooperation in using the lab during my research.

I am also thankful to Professor Ludivico Ciferri (International University of Japan), Professor Philip Sugai (Doshisha Business School, Japan) and Professor Dr. Shahadat Hossain (University of Chittagong, Bangladesh) for their support to me in this endeavor.

I acknowledge the support from Dr. Angela Locoro, Dr. Alessandra Decataldo, Dr. Giuseppe Vizzarri, Dr. Fabio Sartori, Nunzia, Iade, Cobo, Nami, Sultan, Luca, Andrea and Denise to me on various important occasions. I am indebted to all of my friends and colleagues at the Department of Computer Science, Systems and Communication (DISCO) for their support throughout my doctoral study.

Moreover, I am grateful to the Bangladeshi community living in Milan, who helped me a lot in my field work. My special thanks go to Salim, Taniza, Shirin Apa, Faruk Bhai, Quddus Bhai and Shopna Bhabi and many others for their kind support to me.

I am highly indebted to Firoz bhai and Lucky for their unconditional support, love and inspiration to me and my family during this journey. This journey could not have been completed without their selfless cooperation.

For constant encouragement and support, my heartfelt gratitude goes to my friends Sraboni, Mili, Sabrin and Mehrub back in Bangladesh for being there for me when I have needed someone to listen and care.

I believe that this small piece of work could not have been accomplished without the unconditional love of my family members, especially my mother, sister, brother-in-law and brother who extended their help for me in my need.

I deeply remember my father, father-in-law and boro mama who took immense pride in every little achievement of mine. They are always with me in my thoughts and prayers.

I must mention the contribution and unconditional sacrifice of my husband, Mohammed Jamal Uddin, who has always praised and criticized my work and has inspired and supported me to complete the task within the timeline. My love and affection go to my sons Naveel and Naveed who have experienced the first-hand pain and pangs and tears and happiness of a doctoral student and shown maturity beyond their age with their small but brave hearts.

Finally, I would like to dedicate this thesis to these three persons- Jamal, Naveel and Naveed- for being with me in spirit in every small step to reach this moment of thesis submission.

Contents

Acknowledgements	iii
List of Tables.....	vii
List of Figures	vii
Relevant Publications	ix
Chapter 1: Introduction.....	1
1.1 Research Questions and Objectives.....	4
1.2 Methodological Approach	6
1.3 Research Significance.....	7
1.4 Organization of the Thesis.....	8
1.5 Summary.....	8
Chapter 2: Literature Review	9
2.1. Time Accounting System (TAS) in Developed Countries	9
2.2 Social Media in Developing Countries.....	14
2.2.1 <i>A Literature Survey on Social Media in Developing Countries</i>	15
2.3 Summary.....	17
Chapter-3: The Research Trajectory	18
3.1 Designing for Developing Countries	18
3.1.1 <i>Information Systems for Developing Countries</i>	18
3.1.2 <i>ICT for Developing Countries</i>	20
3.2 The Reference Background	21
3.3 The Adopted Approach	23
3.3.1 <i>Survey</i>	24
3.3.2 <i>Focus Group Discussion</i>	25
3.3.3 <i>Usability Testing</i>	25
3.4 Summary.....	27
Chapter 4: Context Analysis.....	28
4.1 Elderly Population in Bangladesh	29
4.2 Unemployment in Bangladesh.....	31
4.3 ICT in Bangladesh.....	32
4.3.1 <i>ICT and the Elderly People</i>	34
4.3.2 <i>ICT and Education</i>	35
4.3.3 <i>ICT and Women</i>	37
4.3.4 <i>ICT and Health</i>	37
4.3.5 <i>ICT and Agriculture</i>	39
4.4 Summary.....	39
Chapter 5: Field Study (Phase-I) Attitudinal Survey and Exploratory Focus Group	
Discussions.....	40
5.1 Attitudinal Survey	40
5.1.1 <i>Sample Selection</i>	40

5.1.2 Questionnaire Development	41
5.1.3 Data Collection	42
5.1.4 Data Analysis and Findings	43
5.2 The Exploratory Focus Groups (EFGs).....	48
5.2.1 Awareness about TAS	51
5.2.2 Local Culture and Tradition.....	51
5.2.3 Relation with Time.....	52
5.2.4 Issues about Time Accounting.....	53
5.2.5 Conflicting Views on Usefulness	57
5.2.6 The Potential Positive Impacts of Time Accounting.....	61
5.2.7 The Adoption Strategy	63
5.2.8 Organizational Issues	65
5.2.9 Design Space	67
5.3 Discussion of the Attitudinal Survey and EFG Discussions	69
5.4 Summary.....	73
Chapter 6: The Prototypical Solution.....	74
6.1 Requirements of a TAS	74
6.2 Interface Controls and Operations	78
6.2.1 Registration	78
6.2.2 Navigation	78
6.2.3 Managing ‘Offers’ and ‘Wants’	79
6.2.4 Acknowledging an ‘Offer’	83
6.3 Summary	84
Chapter 7: Field Study (Phase-II) Validation of the Prototype	85
7.1 The Confirmatory Focus Groups (CFGs).....	85
7.2. Data Analysis and Findings.....	87
7.2.1. Crucial Previous Requirements	87
7.2.2. The New Requirements	88
7.3.3. Reinforcing Previous Concerns.....	91
7.3 Discussion of the CFGs	93
7.4 Usability Testing of the Prototype.....	93
7.4.1. The Results of Usability Testing	94
7.5 Summary.....	97
Chapter 8: Main Contributions and Future Research Directions	98
8.1 Research Summary	98
8.2 Contribution of the Research.....	99
8.2.1 Theoretical Contribution	99
8.2.2 Contribution at the Application Level	100
8.3 Limitations of the Study	101
8.4 Future Research Directions	101
8.5 A Broader View for the Future.....	102
References.....	103
Appendices	114

List of Tables

Table: 2.1 Summary of TAS in the world	11
Table: 2.2 Benefits of TAS.....	13
Table: 2.3 Impact of social media in different sectors in developing countries.....	16
Table: 4.1 Population distribution based on age	28
Table: 4.2 The use of ICT at the household and individual levels	33
Table: 5.1 Descriptive statistics of the respondents' characteristics	44
Table: 5.2 A summary of the opportunities and obstacles.	47
Table: 5.3 The composition of each exploratory focus group (EFG).....	48
Table: 5.4 The main themes with sub-topics emerging from the EFGs.....	50
Table: 7.1 The composition of each confirmatory focus group (CFG).....	85
Table: 7.2 The main theme with sub-topics emerging from the CFGs	87
Table: 7.3 Seven usability problems out of twenty one and heuristic violation.....	95

List of Figures

Figure: 2.1 Timeline showing geographical diffusion of TAS	11
Figure: 3.1 Three discourses of IS research in developing countries	19
Figure: 3.2 Key human-centered design cycle.....	23
Figure: 4.1 The age pyramids of Bangladesh	30
Figure: 4.2 Mobile phone coverage in Bangladesh	34
Figure: 4.3 Mobile phone and mobile data users in Bangladesh among the Ilderly people.....	35
Figure: 4.4 Online school in the remotest region in Bangladesh.....	36
Figure: 4.5 ICT enabled health service facility for rural communities.....	38
Figure: 5.1 The composition of Exploratory focus group (with permission)	49
Figure: 6.1 Macro process of a TAS mediated transaction.....	74
Figure: 6.2 The main use case diagram	76
Figure: 6.3 The sequence diagram of an 'Offer'	76
Figure: 6.4 The sequence diagram of a request for a 'Want'	77
Figure: 6.5 TAS shows different zones	79
Figure: 6.6 Upload of a new 'Offer'	79
Figure: 6.7 List of 'Offer's	80
Figure: 6.8 Offers in a calendar	81
Figure: 6.9 Management of service reservation.....	82
Figure: 6.10 Managing the status of a reservation.....	82
Figure: 6.11 Reservation provision expired.....	82
Figure: 6.12 Acknowledging 'Offer' by endorsing 'time'	83
Figure: 6.13 Balance of 'time'	84
Figure: 7.1 Example of screenshot of the prototype used for CFGs.....	86
Figure: 7.2 Usability problems by severity rating of a TAS.....	96
Figure: 7.3 Number of usability problems and severity rating by place of occurrences	97

Relevant Publications

1. Cabitza, F., Locoro, A., Simone, C., & Sultana, T. (2016). Moving western neighbourliness to East? A study on local exchange in Bangladesh. Accepted at the *19th ACM conference on Computer-Supported Cooperative Work and Social Computing*, San Francisco, USA. *In Press*.
2. Sultana, T. (2015). Social media in developing countries: A literature review and research direction. In *Procs of ItAIS2015: XII Conference Of The Italian Chapter of AIS*, 2015.
3. Sultana, T., Locoro, A., & Cabitza, F. (2015). Investigating opportunities and obstacles for a community-oriented social media in Bangladesh. In *International Reports on Socio-informatics* Vol. 12(1), pp. 15–24. Limerick: IISI - International Institute for Socio-Informatics.
4. Avento, N., & Sultana, T. (2013). Potentialities of E-health in Bangladesh: Cooperation from Japan. In the *Procs of The Challenge of Ageing Society: Technological Roles and Opportunities for Artificial Intelligence*. Available at <http://ceur-ws.org/Vol-1122>
5. Sultana, T. (2013). Technology for the health services of ageing societies in developed countries: Lessons for developing countries. In the *Procs of The Challenge of Ageing Society: Technological Roles and Opportunities for Artificial Intelligence*. Available at <http://ceur-ws.org/Vol-1122>

Chapter 1: Introduction

The impacts and consequences of Information and Communications Technology (ICT) offer to Information Technology (IT) designers and researchers a number of interesting aspects to study: on the one hand, technological innovation opens the opportunities for collaboration on a societal level which help people to collaborate in “coordinated, efficient and reciprocal service transactions to improve the quality of life for all” (Bellotti, Carroll, & Han, 2013); on the other hand, in contrast to developed countries, a large number of developing countries, particularly low-income countries failed in availing themselves of the benefits of ICTs: this contributes to the “digital divide” between the developed and developing countries.

In the developed countries, ICTs have been growing rapidly over the last five decades as these countries consider ICT as a crucial factor for their socio-economic development (Gunatunge & Karunanayake, 2004) and use it accordingly: ICT has changed the way of living and working in these countries as they have harnessed the benefits of ICT in administration, governance, education, business competitiveness and global operations. Entire industries have been transforming and emerging through the adjustment to the new economic, social, and technological environment where products and processes are redesigned around IT (Talero & Gaudette, 1995). Substantial progresses in technology innovation have introduced new efficiencies in old services (Osterwalder, 2002). However, developed countries are presently passing the era of scarce governmental resources, population ageing, and declining social capital (Collom, 2008). For these reasons, there are initiatives trying to take advantage of technologies to tackle those problems: these initiatives help to create and maintain the social network of interaction, trust, and exchange among different units of the society (Carroll, 2013): one of these initiatives aims to develop systems like Timebanks, Community Exchanges, and Local Exchange Trading Systems (LETS) (Bellotti et al., 2013) where community members provide each other small services according to their skills and availability and by relying on the reciprocity within the whole network of members within the system by using local currencies. Among these alternative or local currencies Time Bank is spreading quickly in many developed countries within very short time (Carroll, 2013): for this reason it draws the attention of the researchers to better understand and support this phenomenon.

In (Bellotti et al., 2013), the authors reported that in western countries the condition where an increasing number of people have got greater availability of time, caused by job loss or retirement, and do not have sufficient money to meet some basic needs, seems to be correlated with an even large amount of people who engage in mutual service exchange patterns in their local communities, and especially in Time Banking patterns.

The success of different ICT applications in the developed countries has an important influence on the technology adoption and usage behavior in the developing countries. However, developing countries are lack behind to enjoy the full benefits of ICT that result in very slow growth in case of socio-economic development

(Gunatunge & Karunanayake, 2004). Some developing countries have used ICT to improve results in productivity, increase efficiency of operations and effectiveness, strengthen management and administrative functions, improve market performance and increase business competitiveness (Avgerou, 1996). However, the ICT usage and diffusion effort of a country depends largely on its technology infrastructure, the telecommunication policy of its government, and the access and speed of the available internet infrastructure. Though ICT is recognized as a means to achieve more efficient socio-economic development in the developing countries (Meso & Duncan, 2001), most of the developing countries are characterized by lack of infra-structural supports, power supply, low teledensity rate, and low Internet penetration rate. Fortunately, the Internet growth rate in these countries in the last few years, particularly from 2000 to 2013, is higher than in the developed countries. This phenomenon has created the ground for different use of ICT in these countries and drawn researchers' attention towards the utilization of ICT in the least developed countries (LDCs).

This process is not simple and requires a careful approach. In this regard, IS research for developing countries (ISDC) develops discourses on ICT innovation and its implications for societal change (Avgerou, 2008) along three main viewpoints: the process of more or less uncritical emulation of the western settings and technology transfer to steer IS innovation towards the same organizational paths; the process of "social embeddedness", that is of critically attempting to "construct new techno-organizational structures within a given local social context and explore local meanings to work out locally appropriate techno-organizational change"; and finally the fatalist process of assimilating "local to global socioeconomic assets" in order to amalgamate all (possibly discordant) voices into a higher-order "transformative" socio-economic progress.

With respect to the above mentioned three possibilities of IS as innovation carrier in developing countries this thesis aims at evaluating the usefulness and acceptability of a Time based community exchange system or a Time Bank and at designing a prototypical solution that comply with the second viewpoint, that is to focus on considering to the local social context to envisage a new and the most suitable empirical solution. Moreover, following the wariness of (Bellotti et al., 2014) in adopting the bank metaphor (which is so ingrained with the concept of interest on assets, consumable capitals and saving as an end in itself), in this research we have adopted the expression "Time Accounting System" (TAS) to explicitly avoid the unintended affinities with the bank concept and also emphasize what follows: i) the local currency allowing to extend to a community the one-to-one relationship typical of barter or work provision is "time", under the assumption that everyone's time is valued equally ("one hour equals one hour" is the typical motto); and ii) the main activity that enables a network of fair exchanges is accounting, that is the artifact-based record keeping that is necessary to account for (i.e., report) what each member of the system has received (spent) and given (earned) and the related balance; iii) what is exchanged is time devoted to work, and the system, seen as a socio-technical ensemble of actors, regards the articulation of this exchange (not only in terms of mere accounting)(Cabitza, Locoro, Simone, & Sultana, 2016).

In the light of the recent interest in computational online accounting systems for service exchanges (Bellotti et al., 2013; Bellotti et al., 2014; Han, Shih, Bellotti,

& Carroll, 2015; Shih, Bellotti, Han & Carroll, 2015), we are motivated to know how a TAS could be received in developing countries, where strong urbanization, high levels of unemployment (especially among the younger) and low-income households are phenomena intertwined and connected to their progressive adoption of the western model of “civilization” and to their appropriation of the related “way of life”. The renovated interest for this (not new) form of favour-exchange based on time as a unit of measure and value is motivated by three main contingencies: global ageing that demands for care for the growing numbers of frail older people and also their involvement in social activities, the massive lack of employment of vast proportions of the population, and the pervasive presence of mobile devices as a means to connect and empower networks of people and communities at large. In this light, we focus on Bangladesh, by many respects the most densely populated country in the world, which is approaching into an ageing society at a faster rate, where approximately half the population is young, un- or under-employed and where mobile phones are used by almost two third of the population.

This south-Asian country has a 165 million population which since its independence (in 1971) has increased more than twofold and keeps a 1.3% growth rate. Unfortunately, the 35% of its total population lives below the poverty line; moreover, while unemployment rate is relatively low (4.8%), Bangladesh presents a very high proportion of people, i.e., 40%, who are underemployed, especially women: indeed only 2 workers out of 10 are female. Underemployment, that is the condition where many participants in the labor force work only a few hours a week at low wages, is among the reasons why per capita income as of 2013 is US \$1,044, that is quite low compared to the world average (\$8,985). In Bangladesh, 6.9% are aged 60 years and over among the total population and the size and share of the elderly population are increasing over time. It is estimated that the elderly population is going to rise from 6.05% in 1970 to 9.30% by the year 2025. It is also projected that the growth of the elderly population will be over 200%, going from the current 7 million to over 17 million by 2030. This change in demographic profile is taking place along with many other changes in society, for example modernization, urbanization, change in family structures i.e. from extended to nuclear type. In the urban areas, women’s participation in the labor force is increasing which results in a serious problem in the field of elder care and, in general, in family support, due to the changes in social and cultural values (Jesmin & Ingman, 2011).

In spite of various economic and social problems, the country has made progress in different sectors over the past decades; and IT is one of these sectors. The number of Internet subscribers as well as Internet users is also rapidly growing in the last few years due to mobile Internet. The vision of the present Government for the “Digital Bangladesh” (Walsh & Power, 2011) as well as large scale initiatives from Non-Government Organizations (NGOs) is fostering the use of ICT in the country (Osterwalder, 2002). According to the report of Bangladesh Telecommunication Regulatory Commission (BTRC), there is an increase of 1.8 million internet user in the countries alone in September, 2015. The number of Internet subscriber is around 54 million now, which was around 52 million in August, 2015. Among

the Internet subscribers, 52 million are using mobile Internet. This number was 50.7 million in August 2015¹.

The infrastructures, the growth indices, the development initiatives of Bangladesh are similar to those that are typical of developing countries. The characteristics of this country in terms of increasing life expectancy, unemployment rate, decreasing social capital and its move towards establishing an ICT-based society are the rationale behind undertaking the research presented in this thesis: to investigate the opportunity of the adoption of ICT-based service exchange systems in Bangladesh in the aim to seek for reliable and valid research outcomes that can be leveraged in future studies of this kind in other developing countries too.

In this regard, I acknowledge the support from ALIAS (ALta formazione e Internazionalizzazione per l'Ageing Society-Higher Education and Internationalization for an Ageing Society) that has the main objective of creating new generation of researchers, educated in an international, a multidisciplinary and multicultural context with the capability of developing innovative methodologies and studies for increasing the awareness of Ageing Society topics in Government, Industries and educational sector. This project provided me the opportunity to address the problem of an Ageing Society from the developing countries perspective and shed light on a new path of research in Information System for the developing countries at a frontier level. Moreover, I express my heartfelt gratitude to all researchers and staffs of SITI (Sistemi Informativi e tecnologie per l'interazione) of the Department of Computer Science, Systems and Communication of the Milano Bicocca University for their cooperation in using the lab during my research.

1.1 Research Questions and Objectives

The success of the use of ICT based peer to peer service exchange tool like Time Accounting System (TAS), Community Exchange System, and Local Exchange Trading System for increasing social inclusion, social awareness, and informal employment in developed countries is one of the main driver for the new adopters: indeed, the uniqueness and benefits of such systems motivate users in exploiting the system for their personal benefit (Boyle, 2014; Carroll & Bellotti, 2015; Colom, 2007; Seyfang & Longhurst, 2013a; Seyfang, 2004a).

Despite many analogies between western countries, which are mostly affected by an unprecedented economic default, and developing countries, which are experiencing an economic growth and an unprecedented social well-being, the adoption of such systems in developing countries is negligible.

This crucial gap provides a good motivation to explore whether a TAS would be useful and acceptable in developing countries and how can this technology be introduced there.

¹ <http://www.prothom-alo.com/bangladesh/article/660568/> (October 20, 2015)

Existing studies have concentrated on Social Media by investigating how they have been widely defined and characterized (Kaplan & Haenlein, 2010), tracked in their adoption trajectories (Ellison & others, 2007), and their technological, political and socio-economic impact for developing countries has been carefully considered (Ali, 2011; Joseph, 2012; Wulf, Aal, et al., 2013). Some studies narrow the analysis of perception, adoption, use and appropriation of ICT focusing more on age (Kumar, 2014; Wyche, Schoenebeck, & Forte, 2013), gender issues (Melissa, Hamidati, Saraswati, & Flor, 2013), and the peculiarities of local communities (Dey, 2013). Of particular interest from our perspective it is the case of micro-finance and of its supportive technology. Two case studies from Azerbaijan (Adeel, Nett, Gurbanova, Wulf, & Randall, 2013) and Pakistan (Adeel, Nett, & Wulf, 2010) analysed microfinance from a critical perspective: if not carefully adapted to the local situation, the micro credit activities risk to be transformed from helpful initiatives to a further and farther source of disequilibrium and uncertainty. Moreover, as outlined by Sautet (2013), entrepreneurship is not synonym of economic development, as in subsistence economies development failed to become a “systemic economy of scale”. This happens because “in the small scale of communities and high stratification [of developing countries], social exclusion can be strong [and] individuals have limited access to new technical knowledge and limited internal information-processing capacity”. As a consequence, “they cannot [easily] absorb innovations involving inter-dependencies extending beyond the communal boundaries of trust (Kilby, 1971)”. According to Avgerou (2008) “ISDC research has the potential to make significant contributions: (a) on understanding [. . .] cultural, economic, political and cognitive dimensions implicated in the IS innovation process and (b) on understanding how IS innovation is implicated in interventions for changing people’s life conditions”. Yet, the chance to assess the readiness of a social local developing context for the inception of a service exchange system based on ICT gives a privileged point of view: that of observing the interaction between social actors, organizational paths, and possibly technology adoption, appropriation and development since the outset (Avgerou, 2008).

Taking into consideration the idea of IS as supporting innovation, the recent high ICT usage growths in developing world and the social and economic significance of service exchange systems, the study reported in this thesis examines the potential of a TAS in a developing country as a mean to deal with the challenges that an ageing society is called to face. Considering Bangladesh as a sample, this study, thus has attempted to answer two main research questions:

RQ1- *“Is a time-based service exchange initiative (TAS) useful and appropriate for Bangladesh?”*

RQ2- *“In the positive case, how can a time-based service exchange initiative (TAS) be introduced in Bangladesh?”*

The study has also raised the following primary sub-questions:

SQ-1: What is the degree of familiarity of the Bangladeshi people with the main logic of service exchange?

SQ-2: What is the attitude of the Bangladeshi people towards the adoption of an IT based money free service exchange system?

SQ-3: What is the degree of e-readiness of the Bangladeshi people towards the adoption of a technology supporting this kind of transactions?

The main objective of this study is to assess the introduction of a TAS: then the specific objectives of the study are to

RO-1: Identify the best method for eliciting requirements and designing the solution that supports a specific TAS in an uninvestigated application context.

RO-2: Acquire the necessary information about the socio-economical conditions in Bangladesh and assess the attitude of the prospective users toward a TAS.

RO-3: Validate the design of the specific TAS against the identified requirements.

1.2 Methodological Approach

In order to reach the objectives mentioned above, we looked for a methodological approach that would help us from both social and technological perspectives. Basically, western experiences with such service exchange system suggests some social (Seyfang, 2004b; Shih, et al., 2015) challenges to be aware of, as well as some technological (Bellotti et al., 2013) lessons learnt to achieve the actual sustainability of the technology. Among the social challenges, for instance, the importance to keep a clear distinction between the concept of volunteering and that of a TAS is considered critical (Seyfang, 2004b), as well as the need to “differentiate across different service categories” so as to possibly smooth the perception of unequal value in incomparable services (Shih, et al., 2015), and to foster the commitment of full-time leaders or to conceive “help desk” services on a constant basis. Among the technological challenges, relevant requirements include the provision of intelligent and context-aware services (Bellotti et al., 2013) to allow for the matching between real-time requests and offers and for services of localization, online profiling updates, and the automatic recording of time balances just after the provision of a service, that is without the need to log into the system and manually adjust the provision or consumption of time. Moreover, capitalizing the opportunities of ICT depends not only on the existence and access to a suitable infrastructure also on the ICT related human capacities. Among these latter, the capacity to understand an application and to use an application by the users is a vital precondition (Osterwalder, 2002). Hence, in the light of these high level recommendations and design principles we use a socio-technical approach by specifically referring to the ‘user-centered design’ (Chapter-3) (Norman & Draper, 1986) process for conceiving a prototype of a TAS. On the one hand, this process involves the end users from the very beginning of development process for identifying their requirements for the system. On the other hand, the techniques that are proposed for this process (e.g., survey, focus group discussions) are helpful to assess the familiarity with and attitudes towards a TAS and to measure the degree of e-readiness of the sample popu-

lation. Moreover, the interactive nature of the process would help us to receive feedbacks from and validate the system among the prospective users.

1.3 Research Significance

This research has been devoted to the broad study of the IT based service exchange system and its feasibility in the developing countries assuming its long term impact on socio-economic development. In its design, the study has extended beyond the traditional innovation diffusion theories and has considered the readiness of the local social context for the inception of a TAS system. The study has employed a mixed-method research approach to overcome the limitations of a mono-method application. Both the quantitative survey and qualitative study elicited some unique requirements that helped the design of a prototype and its validation. Hence, the significance of this research lies in its contribution at different levels.

The study has provided a unique contribution in addressing design issues in developing countries as it examined the usefulness and acceptability of a TAS in a new context which has never been accomplished before. Moreover, to examine the usefulness and the acceptability of a TAS in developing countries this study used and validated a user-centered approach in a complex and unusual situation. Usually, the user-centered approach is used in a small and limited area and among limited number of users. In this study we used the people from the same developing country, Bangladesh, but living in two different socio-economic-technological and cultural environments.

Moreover, we came up with a new knowledge that combines western experience with local culture and requirements for addressing the problems typical of the ageing society. The field study explored the fact that although the idea behind a TAS was totally new to the sample of participants (and likely to the reference population), it apparently hit on a problematic issue that is of a great relevance for them: it was as if people living in a society in the middle of a "development" process towards a (western?) maturity, would feel the need to maintain a strong liaison with the "good old times", while still living the present and preparing for their "best of all possible worlds" to come.

Finally, in this study we defined a survey questionnaire that can be used in other similar experiences or situations and constructed a prototypical solution on the basis of the requirements that were collected during the field study. This prototype is potentially suitable for investigating similar issues in other developing country contexts.

1.4 Organization of the Thesis

The thesis consists of eight chapters followed by references and appendices.

While this first chapter presented an introduction and overview of the study by identifying the research questions and general and specific research objectives the second chapter deals with the review of the literature that includes the current diffusion of TAS in the world and the role of social media in developing countries.

The third chapter deals with the research trajectory of the study. It first introduces issues about the design of technology in developing countries and then describes the approach that has been adopted in this study.

The fourth chapter deals with the analysis of the situation where the proposed idea of a TAS will be introduced. This chapter presents the detail of the social, economical and technological environment of Bangladesh as a sample country for the research.

The fifth chapter deals with the first phase of field study and present the analysis of the data collected through the survey and the focus group discussions that were done for identifying users' requirements and assessing local social context for the proposed idea.

The sixth chapter discusses a TAS at the conceptual level by presenting its main functionalities, through use cases and sequence diagrams. This chapter also describes the user interface of the TAS with the main operations available.

The seventh chapter deals with the second phase of field work that includes the validation of the prototype and the confirmatory focus group discussions which were done to evaluate the prototype against the elicited requirements.

The final chapter (Chapter 8) presents the contributions and future research directions. This chapter provides an overview of the study and presents its contributions, points to the limitations of this study and concludes with a brief discussion of the possible future research directions in the subject area of this study.

1.5 Summary

This chapter has provided the background information and an overview of the research approach documented in this thesis. This chapter has also provided the motivation behind the research and has formulated the research questions which provide the basis for determining the objectives of the study. The methodological approach and the significance of the research have been discussed. Finally, the organization of the thesis structure was outlined. The next chapter presents the literature review which was at the basis of this research.

Chapter 2: Literature Review

This chapter focuses on reviewing the literature on Time Accounting System (TAS) in the world and Social Media (SM) in developing countries respectively. The review is done in two steps: first, to report the gradual development and the state of the art of TAS in the world; second, to analyze the nature of usage of SM in developing countries.

The objective of this review is twofold: on the one hand, reviewing the literature on TAS would help us to justify the rationale of studying the usefulness and acceptance of a TAS in developing countries. On the other hand, since SM support collaborative work and TAS is a collaborative technology that supports the completion of a task within a community, reviewing the nature of the usage of SM in developing countries would help us to acquire an initial estimation of the degree of their readiness to accept a TAS in terms of using collaborative technology for accomplishing a task.

2.1. Time Accounting System (TAS) in Developed Countries

In the developed countries, the occurring of an unprecedented economic fault and the general civic push to overcome social exclusion have recently led to reconsider alternative or complementary systems to the leading monetary-based system, like ‘Time’ based service exchange system or Time Banking (Bellotti et al., 2013; Marks, 2012; Seyfang & Smith, 2002; Seyfang, 2004a), which we call Time Accounting System (TAS).

A TAS is defined as “community based volunteer schemas whereby participants give and receive services in exchange of time credits” (Seyfang, 2002) and the main claimed aims are to foster “personal development, confidence-building, forging social networks and gaining skills for aiding job-readiness”, as well as “building community capacity and self-help, as well as social inclusion” (ibid.). According to Marks, a TAS is based on the notion of co-production, as means to “value the work of everyone and to let people help others as well as themselves, in order to ameliorate the condition of each participant”. A TAS is an unique transaction based system for mutual aid and assistance that fosters economic opportunities, social inclusion, community self-help and enhances civic engagement among often marginalized community members (Marks, 2012).

The concept of ‘Time Accounting System’ was first coined by Edgar Cahn, that he called Time Dollars, as a system that formalizes community based volunteering by tracking service transactions among community members in terms of the time taken to perform the service (Cahn, 2000). This kind of system works as a community development tool that facilitates the exchange of skills and experience within a community.

In 1973, Teruko Mizushima started the world's first time based service exchange system in Japan. The basic idea of this initiative was to spend the time credit at any time during the life time of the participants, i.e. a person could earn time credit at his young age and could spend or used them at any time of his life even at his old age². The basic idea of her system was based on the fact that the 'time' given as services to others could earn equal 'time' of services for the service provider at some stage in the future, particularly in the old age. The emerging problems of an ageing society as it is seen today had rightly been anticipated by Mizushima long time ago (Miller & others, 2009).

In the 90s, this concept was introduced in the USA by Edgar Cahn and in UK by Martin Simon in the name of Time Bank. This system got popularity over other community exchange systems in a short time due to its simple features: it is simpler in terms of transactions as member service exchanges are recorded in an online database system which makes the services and balances visible to members; the value of services provided and requested through this system is adjusted purely on the basis of time rather than on evaluation of monetary value which makes the system easy to manage and to participate in and more independent of the monetary economy; it systematically leverages existing social service institutions and focus on reinforcing support networks among socially and economically relegated members of society (Bellotti et al., 2013).

A TAS, in the name of Time Banking, has spread rapidly in recent years; there are 276 time banks in North America which are facilitated by TimeBanks USA. TimeBanks USA also facilitates time banks in other countries e.g. Australia, Canada, Costa Rica, Italy, the Netherlands, New Zealand, Portugal, Russia, Saint Martin, Ukraine, the United Arab Emirates, Uruguay, and Vietnam. In UK, there are about 300 time Banks (Carroll, 2013). During the past few years the number of TAS in Spain has doubled, to about 300 (Moffett & Brat, 2012).

In recent days, TAS has got the attention of the researchers for its role in community development and social care (Bellotti et al., 2014, 2013; Seyfang & Smith, 2002; Seyfang, 2004a) .

In (Seyfang & Longhurst, 2013b), the authors studied TAS in case of sustainable development along with other community currencies. To serve our purpose, the next table (Table: 2.1) gives the information related to TAS which has been abridged from the work of (Seyfang & Longhurst, 2013b). This table provides a snapshot of overall status of TAS with respect to their number, geographical position and development in the world.

² https://en.wikipedia.org/wiki/Time-based_currency

Continent	Country	Number	Status	Development
North America	USA	260	Growth	Initiated 1986, steady growth followed by strong growth in recent years
North America	Canada	5	Growth	Started in 2002; slow growth since then
Europe	UK	250	Growth	First one 1998, slow growth through 2000s, recently renewed interest
Europe	UK	13	Growth	Adaptation of Time Banking started 2008, slow growth
Europe	Italy	391	Stable	First one established in 1995, rapid growth during 1990s, apparent stable since then
Europe	France	5	Stable	Started 2007, Undergoing a period of consolidation following the initial experiment
Europe	Germany	70-80	Growth	Launched in 1990, steady growth since then
Europe	Spain	250	Growth	Instigated in 2001, growing particularly in last few years
Europe	Finland	20	Growth	First wave peaked during 1990s, second wave currently growing
Europe	Portugal	31	Growth	First one in 2001, slow growth throughout 2000s
Asia	Japan	391	Growth	First established in 1973, then reinvented as Fureai Kippu, rapid growth in 1980s and 90s, decline in early 2000s and recent resurgence
Australia New Zealand	New Zealand	24	Growth	First one in 2005, recent growth

Table: 2.1 Summary of TAS in the world Source: (Seyfang & Longhurst, 2013b).

The table shows that around 1715 projects of TAS are spread across 11 countries and 4 continents. The highest number of projects is found in Europe. In the USA, TAS was initiated in the name of ‘Time Dollars’ in 1986. This was then spread across over Europe. Since then UK and US networks have developed best practice and support for new projects, with international adaptations in Italy, Spain, Portugal, Finland, Canada and Japan. With an exception in Italy, there is a growth in all other countries. Strong growth has been observed in the USA, UK, Spain and New Zealand in the last few years. Figure: 2.1 shows a timeline for TAS, showing how it has been taken up within different countries.

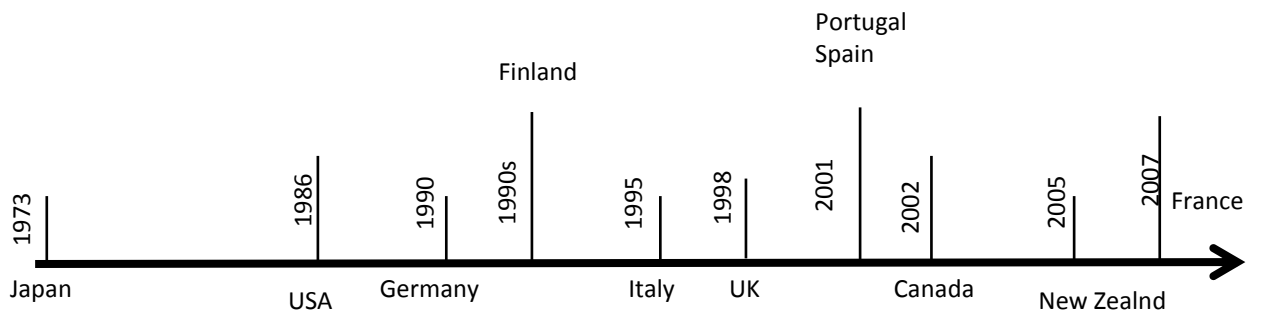


Figure: 2.1 Timeline showing geographical diffusion of TAS Source: (Seyfang & Longhurst, 2013b).

Researches on TAS surround around the main objective of sustainable community development, though the contexts are discussed basically from two viewpoints: social aspect and technological aspect or design aspect.

A TAS is considered as a network of people using ‘time’ as currency to exchange services mutually that strengths social ties and social capital repeatedly in the literature and enhances personal dignity in a non-traditional way (Coleman, 1988; Collom, 2007, 2008b; Ozanne, 2010; Putnam, 2001; Seyfang & Longhurst, 2013a, 2013b; Seyfang & Smith, 2002; Seyfang, 2005, 2006, 2002, 2003a, 2003b, 2004a, 2004b). TAS are also considered as a social movement because they are proposed as an alternative model for economic exchange and social service provision which demands new information structures (Carroll, 2013). Actually, a TAS is different from traditional social service model since it gives value to each member’s work and the members of a TAS can help others as well as themselves (Lasker et al., 2011).

Moreover, a TAS is seen as a mechanism helping to solve the problem of social exclusion among the underprivileged in a society (Seyfang, 2002, 2003a, 2004b, 2005) and to involve low income people who are not in formal employment (Collom, 2007, 2008a, 2008b; Lampinen, Lehtinen, Cheshire, & Suhonen, 2013; Seyfang, 2003b).

Besides benefitting the socially excluded and low income group, this kind of system is also appropriate in other domains. A number of researches have emphasized its role in promoting both physical and mental health of the participants, particularly those who live alone and who are elderly (Boyle, 2014; Collom, 2007, 2008b; Gregory, 2012; Hayashi, 2012; Lasker et al., 2011; Miller & others, 2009; Seyfang & Longhurst, 2013a; Seyfang, 2004b, 2005, 2003a, 2003b, 2004a). In the context of employment, a TAS plays its positive role both directly and indirectly. It also makes training (learning-by-doing) available to the involved people, helps them to find jobs or paid work and supports them when they have been in depression or other disability, or when they have become isolated. Moreover, it seems helpful for the people to get job after problems of mental ill-health (Boyle, 2014). Besides, this system is found successful in making greater economic sense for the unemployed people since they do not need to spend cash for availing any service through this system (Collom, 2007; Lietaer, 2001; Seyfang, 2009).

Recently, the researchers focus on the design of a TAS in order to get the full benefits of it (Bellotti et al., 2014, 2013; Carroll & Bellotti, 2015; Carroll, 2013; Han, Shih, Bellotti & Carroll, 2015; Shih, et al., 2015).

In (Carroll, 2013), authors analyzed co-production scenarios as part of a requirement analysis for a TAS for mobile with the objective of contributing to the social movements of co-production of social services and of TAS that would ultimately help the “alternate economy” of people helping people.

In (Bellotti et al., 2013), the authors highlighted the possibilities for the researchers and innovators to accelerate community collaboration by developing the required technologies for a TAS. They guided the way “to develop more intelligent and context-aware systems to support on-the-fly service brokering that will greatly

increase the scope and efficiency of acts of reciprocal altruism” through a TAS. They emphasized the personal and social benefits of participation in TAS and avoided the unappealing concepts like debt and neediness in the design of the system.

Opportunities for TAS to increase community participation and fostering social interactions among the community members is repeatedly linked to smartphone in the literature (Bellotti et al., 2013; Carroll, 2013; Han, Shih, Rosson, & Carroll, 2014; Han et al., 2015).

Hence the benefits of TAS in different countries can be summarized as follows:

Benefits	Who	How	Where
Psychological wellbeing	Elderly people, people with mental health problems	Helping them in finding friends or associates and feel useful	Developed countries (mostly in UK, USA and Japan)
Physical wellbeing	Elderly people	Helping them in remaining active through participation	(mostly in UK, USA and Japan)
Social Inclusion	Elderly , isolated, socially and economically marginalized people	Helping them in remaining active through participation	(mostly in UK, USA, and Japan)
Security	Elderly people	Giving them a sense of confidence that they can live independently and safely in the community	(mostly in UK, USA, New Zealand and Japan)
Employability	Unemployed people	Helping them in getting training and contributing	(mostly in Greece and Spain)

Table: 2.2 Benefits of TAS

Researches on TAS are mostly limited to studying the impact of TAS involvement on participants in general and on policy issues for social capital development. This limitation is especially apparent in studies of elderly-focused TAS. However, our attempt of the literature review allows for considering TAS more intensely as a supporting tool for the elderly people in active ageing. TAS is found supportive to the elderly people in respect to the pillars of active ageing, i.e. health, social inclusion and security in the developed countries (Table:2.2). However, we did not find any experience of TAS in Italy in the literature. Probably, there is no work or work is not well reported in Italy.

This review provides a comprehensive picture of the role of TAS in the world that led us to claim TAS as a supporting tool for the elderly for active ageing. Moreover, it identifies the absence of TAS in the developing countries where “measures” to help older people to remain healthy and active are considered as a necessity rather than luxury (Organization & others, 2002).

Western countries show a renovated interest for the TAS and in their computational counterpart (Bellotti et al., 2014; Bellotti, Carroll, & Han, 2013; Han et al., 2014; Shih, et al., 2015). This interest is motivated by three main contingencies: global ageing that demands for care for the growing numbers of frail older people and also their involvement in social activities, the massive lack of employment of vast proportions of the population, and the pervasive presence of mobile devices as a means to connect and empower networks of people and communities at large.

The above literature indicates that despite many analogies between the western countries most affected by the financial crisis and the developing countries, the adoption of TAS in these latter countries is negligible, as it is also reported in institutional publications³.

Hence, to our knowledge no research has been accomplished before to examine the usefulness and acceptability of TAS in developing countries and to study whether this kind of initiatives could be experimented in the context of these countries, that is in the urban neighborhoods within the steadily growing megalopolis typical of many developing countries, where some of the notorious alienating factors of western cities (Kunzmann & Wegener, 1991; Seyfang, 2002) could soon arise or are already manifest (Cohen, 2006).

As anticipated, in the following section we reviewed the nature of usage of Social Media (SM) in developing countries.

2.2 Social Media in Developing Countries

Social media (SM, also called social networking sites) platforms are the most common terms for ICT based communication platforms such as Twitter and Facebook (Spier, 2011). They enable human relationships through technology. SM have become a growing phenomenon with many and varied definitions in public and academic use. Some authors considered SM and Web 2.0 as an alternative to each other (Ahmad et al., 2012) and some did not (Kaplan & Haenlein, 2010). The Merriam-Webster dictionary defines SM as “forms of electronic communication (as Web sites for social networking and blogging) through which users create online communities to share information, ideas, personal messages, and other content (as videos).”

Barker et al. (2013) define SM as “the use of portals such as social networks, online communities, blogs, wikis or other online collaborative media for

³ Directory of current Time Banks in the world: <http://goo.gl/s7ciQ7>

marketing, sales, public relations and improving customer service”(Barker, Barker, Bormann, & Neher, 2012).

According to Howard and Parks (2012) “SM consists of a) the information infrastructure and tools used to produce and distribute content that has individual value, but reflects shared values; b) the content that takes the digital form of personal messages, news, ideas, that becomes cultural products; and c) the people, organizations, and industries that produce and consume both the tools and the content” (Howard & Parks, 2012).

According to (Ahmad et al., 2012), SM or Web 2.0 are Internet based applications that enable additional applications through user generated content. They have changed forms of communication and interactions among individuals. The applications leveraging user generated content have transformed the users from content consumers to content producers, thus facilitating the democratization of knowledge and information. Basically, SM come in the form of podcasts, social blogs, weblogs, news portals, internet forums, Facebook, Twitter; or of company-sponsored discussion boards, chat rooms, consumer-to-consumer emails, consumer product or service ratings websites and Internet discussion forums (Kaplan & Haenlein, 2010); altogether these tools create a public sphere to communicate (Ahmad et al., 2012).

SM are increasingly becoming part of the infrastructure that constitute the Information Systems (IS) supporting different kinds of organizational settings: SM support forms of collaborative work as they simultaneously offer a space for the aggregation, contextualization and discussion (in a word, the co-production) of the shared information; moreover they serve as networking platforms, shared asset repositories, and possibly activity management systems. For this reason, we interpret SM in a broad view as ICT enabled means for collaborating and sharing information, and communicating with the people of different communities.

2.2.1 A Literature Survey on Social Media in Developing Countries

In the aim to investigate the nature of usage of SM in developing countries a systematic survey has been conducted (Sultana, 2015). The Google Scholar engine was queried in December 2014, with the following keywords: “Impact”, “SM”, “Social Networking”, “Developing Country”, “Developing World” and “Developing Nation”. Since, SM received a great raise with the emergence of many social networking sites in 2000 (Edosomwan, Prakasan, Kouame, Watson, & Seymour, 2011), we limit our search within the time frame from 2000 to 2014. We continued the search till we did not find new articles in the collected articles set in order to confirm that we reached a relatively complete census of the relevant articles.

Initially we collected approximately 279 papers. As the first step of selection, we selected 105 papers by examining the titles and keywords of them. We discarded articles if the titles and keywords seem irrelevant to our objective. Then, after another screening (exclusion criteria included editorials, book reviews, panel discussions, paper less than 4 pages, inadequate information), we fell to 92 papers in the third phase. After that, a second and more in-depth document analysis was performed by examining the abstracts and key findings of the selected articles:

this took us to the fourth phase with 58 articles for the final analysis. Among these articles, 21 articles focused on social sectors, 20 articles focused on political sector, 7 on economic sector, 8 on education sector and the rest focused on health sector. We found few papers that focused more than one sectors, for example, social and political ((Muniandy & Muniandy, 2013))or political, social and economic (Kuzma, 2010) and social and economic (Wyche et al., 2013). The findings of the analysis have been reported in the following table.

Sector	Impact	References
Political	Empowerment of individuals, Political transformation, Democratization, socio-political movement, Vectors for rumors and state repression	(C. Fink, Kopecky, Bos, & Thomas, 2012); (Starbird & Palen, 2012); (Kavanaugh et al., 2012)(Kuzma, 2010); (Tufekci & Wilson, 2012); (Hussain & Mostafa, 2014); (Kamel, 2014); (Murti, 2012); (Wulf, Aal, et al., 2013); (Ali, 2011); (Wolfsfeld, Segev, & Sheaffer, 2013); (Mäkinen & Kuira, 2008); (Lotan et al., 2011)(Al-Ani, Mark, Chung, & Jones, 2012); (Muniandy & Muniandy, 2013); (Comunello & Anzera, 2012); (Sorour & Dey, 2014); (Wulf, Misaki, Atam, Randall, & Rohde, 2013).
Social	Socialization, Information dissemination, Interconnectedness of members in geographic regions, Catalyst for social capital development; reducing digital divide, Cybercrimes, Anxiety, Addiction	(Qu, Huang, Zhang, & Zhang, 2011); (Kaisara & Bwalya, 2013); (Donaldson, Duggan, & Maitland, 2013); (Kuzma, 2010); (Liu, Boden, Randall, & Wulf, 2014); (Mutula, 2012); (Kumar, 2014); (Wyche et al., 2013); (Gupta, Medhi-Thies, Ferreira, O'Neill, & Cutrell, 2015)(Bidwell et al., 2011)(Ali, 2011); (Wong, Lean, & Fernandez, 2010); (Al-Ani et al., 2012); (Muniandy & Muniandy, 2013)(Madu & Moguluwa, 2013);(Reda, Shah, Tiwari, Lillie, & Noble, 2012); (Ali, 2011).
Education	Immediate dissemination of information.	(Alaa & Hussein, 2009); (Bowen et al., 2012); (Bajjnath, 2013); (Amgad & AlFaar, 2014); (Hamat, Embi, & Hassan, 2012); (S. Ahmed, Shuja, & Chaudhry, 2014); (Celik & Schoreels, 2014); (Pimmer, Linxen, & Gröhbiel, 2012).
Economic	Sustainable business, involvement of low literate people, Poverty Reduction Strategies, Business growth, Increased expenses	(Kuzma, 2010); (Wyche et al., 2013); (Ullah, Ahmad, & Khan, n.d.); (Jayanthi, 2014); (Gupta et al., 2015); (Apenteng & Doe, 2014).
Health	Youth and less-affluent people's participation	(Amrita, 2013); (Thomas, Adeniyi, & others, 2013); (Mahakud & Bholra, 2014); (Park & Lee, 2015).

Table: 2.3 Impact of social media in different sectors in developing countries.

We reviewed different sectors where SM is used and the impacts of SM on those sectors. We have identified five sectors- social, political, economic, education and health -which analyzed the use of SM in developing countries. Both positive and negative impacts of SM have been found in the reviews. In the above table (Table:2.2), we have summarized both the positive and negative impacts of SM in developing countries where we have highlighted the negative impacts in red color; however, negative impacts are very insignificant compared with the positive im-

pacts. The result of the review reflects the fact that compared to the low internet penetration rate in developing countries, the internet users in these countries are relatively advanced in their use of SM (Rainie & Poushter, 2014). The results indicate that SM contribute positively to different sectors, particularly in the social and political ones, through socialization, democratization and ubiquitous participation.

SM offer the opportunity for people to socialize. It facilitates socialization through establishing connection with friends and acquaintances. Moreover, it helps in making new virtual networks to share contents, ideas and images, and other activities. SM have changed political platforms in many developing countries. In the political sector, the Arab Spring testifies to the power of SM as a tool for political change.

In case of economic, education and health sector, the impacts of SM have also been identified to a limited extent. The potentials of SM in the health and education sectors have been identified in the studies, though there have been very few studies in these sector. In case of economic sector, the impacts of SM have also been identified in terms of sustainable business, poverty reduction strategies and business growth.

Hence, we can infer that the adoption of SM has changed the methods of operation in virtually all facets of life in some parts of the developing world. They have become the preferred tool for social and political exchanges. So, using collaborative technology to achieve a goal or complete a task is not new to the people in developing countries. SM have created highly collaborative virtual environment where individuals and communities share, and modify user-generated contents. Considering this review on the nature of the usage of SM in developing countries, it would be sensible to examine if a TAS could be introduced in developing countries assuming that it would bring some social changes in terms of including unproductive segment of population of the society in the system.

2.3 Summary

This chapter has presented the literature review, which addressed various aspects of ‘Time Accounting System’ and ‘Social Media’. The review on SM indicates that that compared to the low internet penetration rate in developing countries, the internet users in these countries are relatively advanced in their use of SM. Moreover, this review has identified the lack of study on the feasibility of ‘Time Accounting System’ in developing countries. In the next chapter, we discuss the research trajectory for this thesis work.

Chapter-3: The Research Trajectory

This chapter illustrates the approach taken by our research in the light of the discussion about a central issue in relation to the research questions defined in Chapter 1: how design has to be interpreted and conducted when some technology is going to be introduced in a developing country. This is especially crucial when the aims and functionalities of this technology have been conceived within the culture and design tradition of the developed countries, as it is the case of TAS.

3.1 Designing for Developing Countries

The issues about the design of a technology for developing countries are part of the concerns of two main research streams that cover most of the technologies that aim to support the users in their private and working life: on the one hand Information Systems (IS for Developing Countries, ISDC)(Avgerou, 2008) and on the other hand Human Computer Interaction and Computer Supported Cooperative Work (ICT for Developing Countries, ICT4D) (Philip, Irani, & Dourish, 2012). In the following the main outcomes of two surveys referring to these two research streams are reported.

3.1.1 Information Systems for Developing Countries

Until recently the recurrent concerns of the ISDC research stream were about the issue of the so called digital divide that characterizes the developing countries: it can be articulated in terms of severely limited financial resources, technology, and skills in most developing regions. The goal is to understand the impacts of the digital divide on the technological diffusion and how the situation is evolving towards its reduction. A parallel and increasing line of research is concerned with the challenges of the engagement with IS development and management in all organizational fields of developing countries in consequence of the continuous decrease and change of characteristics of the digital divide: in this case the focus is on the potential innovation that an IS can bring from both the technological and the organizational perspectives rather than on the resource limitations that inhibit the target context.

The survey reported in (Avgerou, 2008) identifies three “discourses”: the term discourse is used “to refer to a combination of assumptions on the nature of the IS innovation processes in developing countries and relevant conceptual constructs in the study of these processes ... these assumptions and constructs of the ISDC research field form particular ways of representing (a) what IS innovation in developing countries is primarily for, and (b) what kind of effort it involves.”(ibidem, p.135).

Three salient discourses in the ISDC literature are identified: we report faithfully their definitions that are synthesized in Figure 3.1.

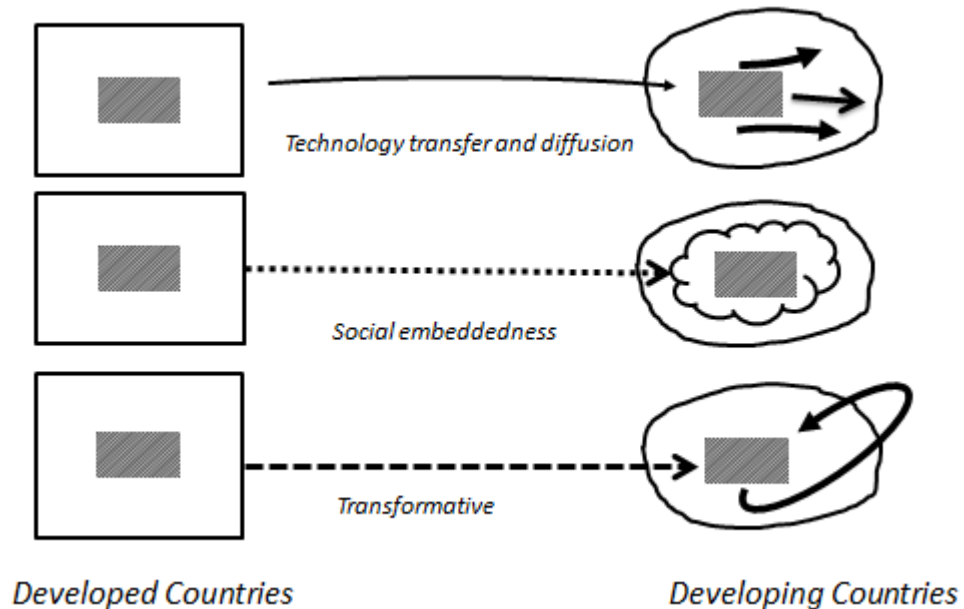


Figure: 3.1 Three discourses of IS research in developing countries.

“The first discourse, called *transfer and diffusion* discourse, is rooted on the assumption that IS innovation in developing countries is mainly concerned with catching up with the technologically advanced rich economies through transferring their technologies and emulating their institutions. It examines IS innovation as the diffusion of IS knowledge transferred from advanced economies and adapted to the conditions of developing countries.

The second discourse, called *embeddedness* discourse, assumes that IS innovation in developing countries is about constructing new techno-organizational structures within a given local social context and places research emphasis on exploring local meanings and working out locally appropriate techno-organizational change. It thus focuses attention on the social embeddedness of IS innovation in the context of developing countries.

The third discourse, called *transformative ISDC* discourse, takes IS innovation to be primarily concerned with creating possibilities for the improvement of life conditions in a particular locality amidst the global socio-economic order and is interested in the processes through which IS innovation leverages large-scale and deep socio-economic change. It therefore considers IS innovation as a transformative socio-economic process.” (ibidem, p.135)

After the criticism of the *transfer and diffusion* discourse, Avgerou emphasizes the relations of an IS (as a conveyor of innovation) not only with the local

context (*embeddedness* discourse) but especially with the more general and world-wide socio-technical context in which the IS is able to bring some innovation in relation to the problematic notion of development. The author stresses the need to investigate deeper these two relations to better inform IS design in developing countries. In our opinion, ISDC offers interesting reflections about the need to take a broader view than the single situated application but does not reconsider the methodologies that are usually adopted within IS to construct those applications. The many failures that are documented in the developed countries (see e.g., Lyytinen & Robey, 1999) risk to be exported in the developing countries, possibly with more severe consequences. Indeed, the *embeddedness* discourse is in any case conducted by a minority among the researchers and practitioners in IS development.

3.1.2 ICT for Developing Countries

The survey reported in (Philip et al., 2012) deals with the issue of ICT4D from the perspective of the role and attitude of the designer in the conception and deployment of ICT in general, and therefore of ICT4D too. The focus on computational technology is motivated by fact that “computing [is] a tool to enter” (p.4) in the knowledge economy. In so doing the survey is more about research areas (such as Science and Technology Studies, Postcolonial Theory (Gandhi, 1998) and Human Computer Interaction) than on the specific literature on these themes, and about a critical view of what they have proposed in the aim to delineate a step further toward a better design approach for Postcolonial Computing. While recognizing the benefits brought in by these research areas as they “take on the bastion of objectivity ... However, much of the mythos of the Western origin stories of science and rationality, while being demolished in theory, manifested itself in practice, in a locational focus on Euro-American spaces of science.” (ibidem, p.4). Then, the authors propose a redefinition (“rereading, rewriting or reimagining”, p.3) of Postcolonial Computing on the basis of the following concerns.

“Postcolonial Computing is not simply about the failure of good intentions via inadequate design” (p.5). It is about challenging the dichotomy between “here” and “there”, between “West” and the “Rest”: it claims that “As similarities and differences cross cultural boundaries [between “West” and the “Rest”], the boundaries themselves are called into question.” (p.5). In addition, Postcolonial Computing is not interpreting design as a translation in the geometrical sense, thus preserving structure and semantics, rather as the “purposeful, partial, and situated work that legitimately translates ways of life into technological needs and mandates.” (p.5-6). And finally, similarly to Science and Technology Studies that “highlighted the need to examine the socially situated and contingent nature of scientific practice, [Postcolonial Computing pays attention to] the dynamics and contingencies of design methods, in order better to understand how they might be subject to new forms of translation, transformation, and reconfiguration.” In conclusion, Postcolonial Computing understands “design as always as processes of *hybridization*” (p.6) among the involved parties, wherever they are physically or culturally located. This interpretation disrupts traditional design practices and requires a road map that the authors articulate in a few *tactics* putting to practice the above tenets of Postcolonial Computing. They can be summarized as a specific attention to: the local conditions but also the “infrastructures, assemblages, and political economies that are the conditions” that make a techno-scientific object possible; to the differences, that is the

“work that is out of the bound” of the traditional techo-scientific perspective or what inverts the flow direction of techno-scientific knowledge from higher to low concentrations; to the “impure crossing” between technology and culture; and finally to “the context and particulars” as they are constitutive of any socio-technical system.

The interesting point of the issues raised in (Philip et al., 2012) in proposing a stronger reading of Postcolonial Computing is that the occasion to consider the theme of design for developing countries leads to a radical change of perspective in design “tout court”. Indeed, what is radically questioned is the asymmetric role of the designer in relation with the other stakeholders, especially the users: the notion of hybridization creates, at least in principle, a more symmetric interpretation of this relationship as both sides can and should learn one from another with the full recognition of the other’s competences and experiences. Postcolonial Computing radicalizes the assumption underlying other approaches, i.e. the emphasis on the role of the users and their context in conceiving computational artifacts for them. These approaches however contributed to make this more radical position possible and offer an experience in the field that cannot be neglected: they are shortly described in the following section.

3.2 The Reference Background

There are three closely related but independent approaches that focus the users and context of uses while considering the system design. Each approach considers both the human factor and technological factor for an adaptable design in terms of the users and context where it will be used.

i) Sociotechnical approach: The “Socio-technical” approach refers to a method that considers both social and technological aspects of an organization in terms of its effectiveness and efficiency. This term was first introduced by Trist who emphasized the relationship between social factors and technological factors in understanding an organization (Trist, 1963).

According to this approach, an organization consists of people and technology subsystems that affect each other in the production and business process (Pasmore, Francis, Haldeman, & Shani, 1982). The interrelationship between the people and technology results in enhancing the productivity as well as the quality of the working life in the organization. The social system considers the relationship among people and their qualities like skills, values, outlooks, etc. and the technical system considers the processes, tasks, and technologies to produce the expected output: the conjecture is that an organization can only produce to an optimal level if both human factors and technical factors work mutually (Bostrom & Heinen, 1977). The goal of the socio-technical approach is based on the principle of ‘joint optimization’ which states “an organization will function optimally only if the social and technological systems of the organization are designed to fit the demand of each other and the environment”(Pasmore et al., 1982). In other words, at the time of introduction of a technology in the organization, the human factors or human needs

should be taken into consideration by giving equal importance to technology and human needs (Mumford, 2006). In this case, how the employees could be affected by the introduction of a technology and changing working environment needs to be considered.

ii) Participatory Design: The Participatory Design (PD) approach the technological and organizational systems are jointly, designed, developed and assessed. In this approach, the potential or current users get involved in the design and decision making process about the system: that is design is done with the users rather than for the users (Iivari, 2004). In this approach, participants' interpretation regarding a design and its use is very vital and taken into consideration seriously. In order to involve the various stakeholders different methods, e.g. ethnographic observations, analysis of artifacts, interviews etc., are used during design. Participants' interpretation of the system and its use help designers to understand users' activities empirically and envisage how to support them in ways that the users find to be positive. In this approach, the participatory designers consider themselves facilitators since they help the users to be empowered in making their own decision (Clement, 1996). There are three basic stages in almost all participatory design research: Initial exploration of work, Processes of Discovery, and Prototyping. In the first stage, the designers meet the users and inform them how they will work together. This stage helps the user to understand the technologies that are going to be designed and used in relation with different aspects of the work. In the second stage, both the designers and users agree on the anticipated result of the design by clarifying the user's goal and values out of the system. In the third stage, both the designers and users iteratively construct the technological artifacts so that it fits into the workplace anticipated in the second stage. This stage involves can be iterated several times (Spinuzzi, 2005).

iii) User-centered Design: The concept of User-centered Design (UCD) was first introduced by Donald Norman in the 1980s: it focuses on the needs of the end users while designing a system (Norman & Draper, 1986) with a special emphasis on usability issues. In UCD, end-users influence how a system takes shape and are involved in the design process with a different intensity: in some instantiations of UCD, users are consulted about their needs and involved at specific times during the design process, mostly during collecting requirements and usability testing. In other cases, UCD methods let users have a deep impact on the design by getting them involved as partners with designers throughout the design process (Abrams, Maloney-Krichmar, & Preece, 2004). Often UCD is adopted in research work: in this case the researcher and the designer become dependent on one another though they have their distinct role. The researcher plays the role of a connector between the user and the designer; the researcher collects and interprets information regarding the needs of the users for the design criteria and the designer interprets the design criteria and focuses on design development (Sanders, 2002).

This system development process is a collaborative and iterative process that flexibly goes through various phases that are depicted in Figure: 3.2.

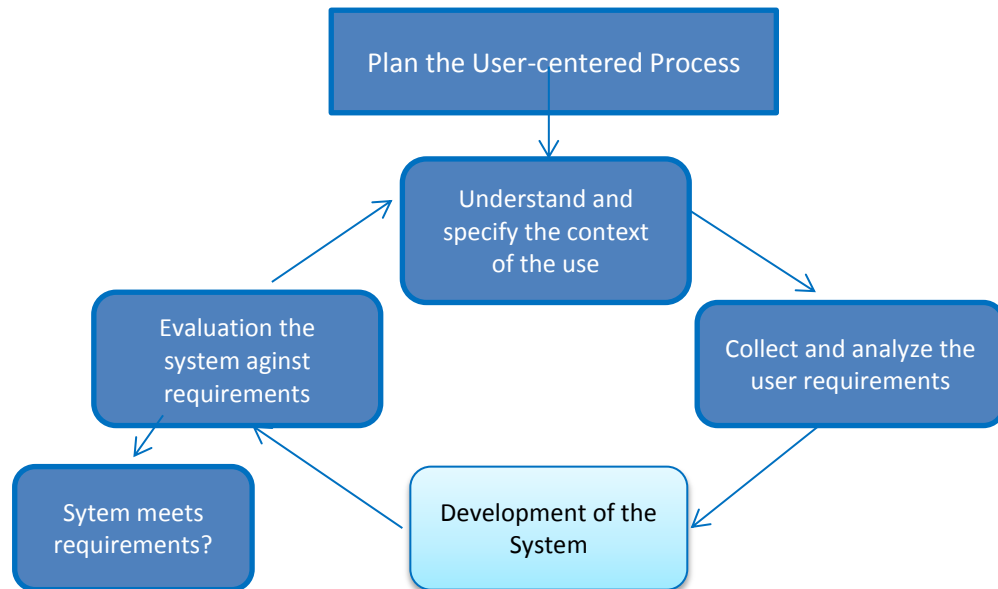


Figure: 3.2 Key human-centered design cycle (Maguire, 2001).

The UCD process is based on a number of user feedbacks such as needs assessments, evaluation of the prototype and iterative usability testing; moreover, the iterative (and sometimes informal) nature of the design process helps designers to change the design to meet users' needs. by following their evaluation of early design solutions which ultimately helps to anticipate usability issues from the very beginning (Maguire, 2001).

3.3 The Adopted Approach

The design approaches illustrated in the previous section offer to our goal (that is, to potentially design ICT for developing countries) a series of design tools that are the only ones currently available for two main reasons: first, the issue of the ICT design for the developing countries has been dealt with mainly from the western perspective from both the western designers involved "there" in different projects and by the local designers that are too often educated from this perspective, or at least deeply influenced by it. Second, Postcolonial Computing offers until now only "tactics" to achieve the claimed hybridization and suggests that new tools will possibly emerge from this new approach. Then, the only strategy that we can apply now is to keep in mind the critical considerations brought upfront by ISDC and ICT4D and use the available tools in the light of their suggestions. This is one of the reasons why we could not adopt any of the proposed approaches "tout court":

the additional one is related with the condition under which the study had to be conducted. On the one hand, Participatory Design requires a continuous interaction with the potential users in order to align the incremental development of the application with the clarification and interpretation of the problem at hand. This condition was impossible to be met in our study due to the geographical distance of the prospective users in Bangladesh and to the difficulty of engaging the small community of Bengali people in Italy in a long lasting process. On the other hand, the full UCD approach is oriented to a usability study of a technology more than to an understanding of its acceptability and usefulness in a given context. This fact, together with the logistic problems mentioned above, led us to consider only the main iterative loop linking the various steps together as a reference point to describe how our research activities have unfolded. More in detail, these activities are described in different chapter of the thesis as follows:

- i) Plan the User-centered process (in this chapter)
- ii) Understand and specify the context of the use (Chapter 4)
- iii) Collect and analyze the user requirements (Chapter 5)
- iv) Development of the system (Chapter 6)
- v) Evaluation design against requirements (Chapter 7)

In the various steps (except Development of the System), three are the main tools that have been used: the survey, the focus group and usability testing. In the following their main characteristics are reported while in Chapter 5 and Chapter 7 their specific instantiations will be illustrated.

3.3.1 Survey

Surveys are considered as one of the popular methods for data collection for the Information System communities due to their advantages. Usually surveys are easy to administer, they can be used to predict behavior and survey responses can be generalized to the population studied and similar population (Newsted, Huff, & Munro, 1998). There are different types of surveys: questionnaire survey (based on the more or less structured shape of the questionnaire) and cross-sectional or longitudinal survey (based on the span of time used for the survey); there are several ways to administer them: through email, telephone, face to face (based on how it is administered); and there are different methods of sampling: simple random sampling, cluster sampling, stratified sampling and non-random sampling (based on how the sample is selected from the population) (Kothari, 2004).

In this research, we adopted a Computer Assisted Telephoning Interview surveying technique in May 2014 in Chittagong division of Bangladesh as sample area which consists of 20% of the total population of the country with homogenous characteristics of the population. The detail description of the survey which was used in this research will be given in chapter 5.

3.3.2 Focus Group Discussion

A focus group is defined as “a moderated discussion among six to twelve people who discuss a topic under the direction of a moderator whose role is to promote interaction and keep the discussion on the topic of interest” (Stewart, Shamdasani, & Rook, 2007). Here, the term ‘focus’ is used to emphasize on the fact that “the discussion is limited to a small number of issues”. This method has been used to study the ideas in a group setting for a long time in social research (Morgan, 1988) while the use of focus groups in design research for refining and evaluating a system is relatively new (Mantei & Teorey, 1989). Usually open ended questions are used in this method in order to encourage the discussion; however, these questions are specified carefully keeping the objectives of the discussion in focus. Usually a person who is knowledgeable about the issue of discussion plays the role of a moderator in the focus group discussion. The moderator plays an important role in supporting the discussants participation during the discussion and in keeping the discussion in the track of the main objective (Krueger & Casey, 2009). A typical focus group lasts about two hours and is usually tape recorded with the consent of the participants.

Usually, two types of focus group discussions are used: Exploratory Focus Group (EFG) and Confirmatory Focus Group (CFG). EFG are used to explore the requirements for defining or improving the system while CFG are used to confirm its compliance with the specified requirements and are mostly used to demonstrate the utility and usability of the design. Moreover, at least two EFG and at least two CFG need be run in order to receive adequate information for improving the design and confirming the design. The participants of both groups should be taken from population of the environment where the system will be used so that they can provide adequate information for the refinement and evaluation of the system. Moreover, participants of CFG need to be taken from the pool of participants of EFG so that CFG can confirm the prototype or final design (Chiarini, Hevner, & Berndt, 2010). Regarding the number of participants, Morgan suggested to have at least 4 participants and at most 12 participants in each focus group (Morgan, 1996).

In our research, we conducted Focus Group Discussions in two phases. In the first phase, we conducted a pilot focus group consisting of eight members, four males and four females, in order to predict and manage the timing of the focus groups. Then we organized eight EFGs in order to explore two types of information: attitude towards a technology mediated service exchange tool, more precisely attitudes towards a TAS in Bangladesh and elicit requirements for developing a prototype for a TAS. The details of the discussions will be reported in Chapter 5. In the second phase, we conducted two CFGs to evaluate the prototype of the TAS and the details of the discussions will be reported in Chapter 7.

3.3.3 Usability Testing

Different types of methods are used to evaluate the usability of an interface of a system or prototype. Usability evaluation or inspection is usually referred to as a method in which evaluators evaluate usability related aspects of an application and judge its usability based on their knowledge and expertise. Among many, Heuristic Evaluation is considered as one of the most commonly used usability inspection

methods(Nielsen, 1992, 1994a, 1994b). According to this method, a small set of experts inspect the system and evaluate its interface against the set principles for the usability. In this case, experts could be usability specialists, expert of the specific domain of the application which is going to be evaluated or expert of both usability and domain experience. This method is useful as a fast and easy method for usability testing. It usually does not require special equipment or lab facilities and require small number (3-5) of evaluators for the evaluation and takes 1 to 2 days to complete the procedure. Following are the Heuristics that have been suggested by (Nielsen, 1994a) for testing the usability of a system:

1. Visibility of system status (The system should always keep the user informed about what is going on through appropriate feedback within reasonable time)
2. Match between the system and the real world (The system should speak the user language with words and concepts that the users familiar with)
3. User control or freedom (The system should provide the user clearly marked “out” to leave an unwanted state without having to go through an extended dialogue in case he chooses system functions by mistake)
4. Consistency and Standard (The system should follow the platform conventions so that the users should not have to wonder whether different words, situations, or actions mean the same thing)
5. Error prevention (The system should provide error message when needed)
6. Recognition rather recall (The objects, actions, and options should be visible so that the user should not have to remember information from one part of the dialogue to another and instructions for use of the system should be visible or easily retrievable whenever appropriate)
7. Flexibility and efficiency of use (The system should have accelerators which are unseen by the novice user and may often speed up the interaction for the expert user so that the system can cater to both inexperienced and experienced users)
8. Aesthetic and minimalist design (Dialogues should not contain information which is irrelevant or rarely needed since every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility)
9. Help users recognize, diagnose and recover from errors (Error should be expressed in plain language, precisely indicate the problem and constructive provide suggestions)
10. Help and documentation (Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation; help information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large) (excerpted from Nielsen, 1994a)

In this research, we used these Heuristics in order to test the usability of our prototype which will be reported in chapter 7.

3.4 Summary

This chapter has discussed the different issues about the design of a technology for developing countries, different approaches in conceiving computational artifacts for the users of the developing countries and the approach that has been adopted for this research. According to the process illustrated in Figure: 3.1 in the next chapter we analyze the socio-economic and technological environment of Bangladesh, by many respects is the most densely populated country in the world that is undergoing a rapid socio-economic and demographic change in order to understand and specify the context for introducing the concept of a TAS and to study how (and primarily if) this kind of system could be received in this country. The subsequent activities will be reported in the following chapters.

Chapter 4: Context Analysis

This chapter discusses the socio-economic and technological environments of Bangladesh in order to study how the proposed idea of a Time Accounting System (TAS) could be received in this country as an example of developing country. Developing countries offer to Information Technology (IT) designers and researchers a number of interesting aspects to study: on the one hand, larger and larger portions of the population adopt digital devices to communicate and get entertained at a steady pace (Newman, Rawlings, & Gertler, 1994); on the other hand, the generally low purchase power of customers in those countries orients their choice on devices with few features and low computational power so that actual possibilities remain often relatively untapped (Nag, 2011). Moreover, the so-called digital divide impedes the people of developing countries to harness the actual benefits of Information Communication Technology (ICT). However, the increasing diffusion of ICTs allows considering whether these technologies can have a positive impact on the socio-economic development of these countries or in the solution of the still present contradictions in terms of social welfare and wealth. In this research, we address this general matter in the case of Bangladesh. Bangladesh has undergone rapid socio-economic and demographic changes. Its economic growth (an average of 5.5% per cent a year during the past decade), coupled with investments in education, health, food security and disaster mitigation, has led to a rapid reduction in poverty. Nevertheless, around 33% of the population – nearly 45 million people – lived below the poverty line in 2014⁴. In Bangladesh, while unemployment rate is relatively low (4.8%), it presents a very high proportion of people, i.e., 40%, who are underemployed, especially women: indeed only 2 workers out of 10 are female. Underemployment, which is the condition where many participants in the labor force work only a few hours a week at low wages. With regard to the labor force, 45% are engaged in agriculture, 30% are employed in industry and the rest in the service sector. The 78% of the total labor forces are males and only 22% are females, though women constitute about 50% of the total population. The population distribution (based on age) of the country is as below:

Age	Number in million	Percentage
Less than 25 years	84.171.267	55.71%
25years-44years	40.190.879	26.60%
45years -65 years	20.125.734	13.32%
More than 65 years	6.601.260	4.37%

Table: 4.1 Population distribution based on age.

At present, 55.71% of the total population consists of very young people who are below 25 years of age and only 4.37% consists of the people more than 65 years (Table:4.1)(BBS, 2012). Despite the fact that young people constitute a very large portion of the total population, population ageing is considered as one of the emerging problems in Bangladesh as this process of ageing is expected to accelerate

⁴ www.ruralpovertyportal.org/country/home/tags/bangladesh

in the near future and the country has a shorter time to adapt to the changes associated with population ageing (United Nations, 2007b). Hence, it can be inferred that in near future Bangladesh is going to face the challenges that are associated with ageing population in parallel with its existing unemployment problem which is considered as one of the main barriers in its development.

This study examines the potential of Information Technology, and TAS in particular, for the ageing society in Bangladesh, and western countries show a renewed interest for TAS due to three main reasons: population ageing, the massive lack of unemployment and a pervasive presence of mobile devices as a means to connect networks of people. In what follows we first give some brief information on the ageing scenario in Bangladesh, which is then followed by unemployment situation in Bangladesh. Then we introduce ICT practices in Bangladesh in terms of different socio-demographic context. This discussion will help us to understand the context where a TAS would be experimented to assess its usefulness and acceptability.

4.1 Elderly Population in Bangladesh

Bangladesh is experiencing the growing number of older populations (Hossain, 2005; Khanam et al., 2011; Uddin, Islam, & Kabir, 2012) and now it is passing through the third stage of the demographic transition (Khan, Mondal, Hoque, Islam, & Shahiduzzman, 2014).

In (Islam & Nath, 2012), the authors described the scenario that confirmed the fact that the population of Bangladesh is ageing and it will be an aged nation within this century. In Bangladesh, population was young up to the 20th century and at the beginning of the 21st century, its population arrived to the intermediate level of aging. At the middle of this century, young-old ratio will be unity, and then there is a tendency to outnumber of the aged to the children up to the projection period 2071. At the end of the 21st century, half of the population will be aged above forty.

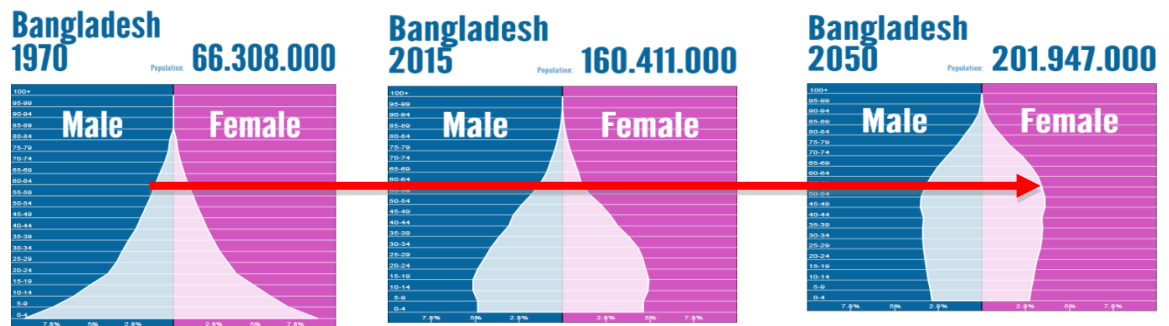


Figure: 4.1 The age pyramids of Bangladesh.

(Source:<http://populationpyramid.net/bangladesh/1970/>,<http://populationpyramid.net/bangladesh/2015/>, <http://populationpyramid.net/bangladesh/2050/>)

The demographic transition shows a change in the age composition of the population which is shown in figure: 4.1. We observe that Bangladesh had a larger younger population at around the time of its independence in 1971. However, this younger portion of population is shrinking over time, and by 2050, it is estimated to be less than the elderly people who are more than 60 years of age⁵. So, the population is in middle part of the demographic transition which is potentially in a particularly favorable position as regards the economy, because it has the a relatively large working age population. However, this situation is transitory because this population will change to the type in right pyramid i.e. a reduced proportion of working people and an enlarged proportion of elderly people. Hence, this change in population structure may affect society’s political, social and economic structure (Jackson & others, 1998; Walker, 1990).

The tendency of population ageing in Bangladesh is also supported by other literatures. Other researches also showed that the population aged over 60 years will reach surprising proportions by 2051. By 2021, there are expected to be around 14 million people aged over 60 – and that figure will reach nearly 30 million by the end of 2051 which also indicates that Bangladesh is entering a new phase of rapid growth of elderly population, with all its associated challenges. It is also estimated that the population will continue to get older even after reaching replacement level fertility (Rahman & Ali, 2007). In Bangladesh retirement age is extended to 60 years from 57 years considering that people’s average life expectancy had increased to 67 which was only 46 years in the post-independence era⁶. Hence, people who remain engage in institutional job in their early lives, get around 7 years of unemployed period after their retirement.

The support facility to the elderly has become an important concern for the individuals, society and Government in Bangladesh like all countries. Unlike developed countries, Bangladesh does not have social security program for supporting

⁵<http://populationpyramid.net/bangladesh/1970/>,<http://populationpyramid.net/bangladesh/2015/>, <http://populationpyramid.net/bangladesh/2050/>)

⁶ <http://www.dhakatribune.com/bangladesh/2013/dec/30/extension-retirement-age-shelved>

the elderly people. In Bangladesh, there are three types of social supports for the elderly people: formal support (which are available through public program), informal support (supports provided by the family members and relatives) and semi-formal supports (supports from religious organizations, local clubs, non-government organizations etc.)(Jesmin & Ingman, 2011). Moreover, formal supports programs are also very limited due to resource capacity. As a result, they are not adequate to support all who need them. Again, informal supports are also not adequate and at risk due to the reasons like financial hardship of the family members, the changes in traditional family structure and the increase of women's participation in workforce. Since women's participation is increasing in the job market, family support for the elder care is becoming a serious problem in the urban areas. Like other South Asian countries, adult children are traditionally obliged to take care of their old parents in Bangladesh. However, this tradition is now becoming weaker gradually. These changes in the society place the elder in social, health and economic insecurity to a large extent (United Nations, 2007a). Hence, it is very important to ensure a quality of life to the elderly people.

In order to keep the elderly engaged as long as possible for a better quality of life, innovative employment opportunity, supports from the neighborhood, inter-generational linkages and older people associations are suggested for as solutions by different researchers.

In a cross-cultural study between Japan and India by Ramachandran & Radhika (2013), lifelong education and community-based employment opportunities for elderly local residents is identified as a crucial factor for developing countries for encouraging their active participation in the society. Moreover, in order to keep the elderly as active citizens elderly crash courses on learning along with skill training is also suggested (Ramachandran & Radhika, 2013).

With regard to support to the elderly in Bangladesh, Rahman & Ali (2007) argued that the elderly have a right to certain extra facilities because of their extra needs, but they should not be encouraged to be dependent. They suggested for provision that will create inter-generational linkage to address the needs of the elderly people in the country. Moreover, they suggested for establishing associations to get together, talk, share their feelings, have fun, and even generate some sort of income for themselves (Rahman & Ali, 2007).

4.2 Unemployment in Bangladesh

Increasing life expectancy is approaching as a new challenge for Bangladesh on one hand; on the other hand, unemployment is one of the main reasons of its weak economy. In many developing countries, underemployment rate is much higher than unemployment rate; Bangladesh is not an exception where underemployment rate is around 40% where unemployment rate is only 4%(The World Factbook, 2015)⁷. Usually, unemployment occurs when a person who is actively willing and

⁷ <https://www.cia.gov/library/publications/the-world-factbook/geos/bg.html>

searching for employment is unable to find work. In Bangladesh, underemployment is also a main reason for lagging behind from development. Underemployment is the condition whereby a person's employment is considered inadequate in terms of time worked, income earned, productivity or use of his/her skills and the person is looking for additional work in conformity with his/her education or skill to augment income. While economists and researchers are suggesting different ways and strategies for unemployed persons to increase their chances for finding employment through activities like acquiring additional training or education and more industrialization, both population growth and ageing are posing new challenges to existing unemployment problem in Bangladesh. However, there is not enough empirical work on volunteering as a solution for economic opportunity for the unemployed people in the society, though media promotes volunteering as a way to increase one's employment opportunities (Spera, Ghertner, Nerino, & DiTommaso, 2013).

At the same time, volunteering is identified as a technique for the job seekers by the Government and non-government professionals (ibid). Moreover, volunteering is considered as complement for job training rather than substitute since volunteerism can be a way to help unemployed workers expand their network of contacts, improve their résumés, and make a positive impression in a competitive job market⁸. According to Spera, Ghertner, Nerino & DiTommaso (2013), volunteering is especially advantageous to the job seekers. Though the research is based on the most developed country, the USA, they argued that irrespective of economic conditions, the relationship between volunteering and employment is stronger for the individuals who have low educational attainment and who live in rural areas (Spera et al., 2013).

4.3 ICT in Bangladesh

In today's world, ICT is considered as the most effective media for the development of a nation. In order to ensure national development in Bangladesh, it is necessary to harness the benefits of Information Technology in every conceivable area to increase productivity and efficiency⁹. However, like other developing countries, ICT infrastructure in Bangladesh is not so strong. In 2002 Bangladesh identified ICT as a "thrust sector" as "it represents potential for quick wins in reforms, job creation, industry growth, improving governance and facilitating inclusion, and it has high spillover effects to other sectors"¹⁰.

Bangladesh Bureau of Statistics sought information on the use of ICT (use of computer, email, internet, telephone, mobile phone etc.) at the household and

⁸ http://www.dol.gov/_sec/media/speeches/20120419_WH.htm

⁹ Outline perspective plan of Bangladesh 2010-2021, making vision 2021 a reality, General economics, General Economics Division Planning Commission Government of The People's Republic of Bangladesh, June 2010

¹⁰ <http://www.digitalworld.org.bd/digital-bangladesh-and-ict>

individual levels by administering a survey. The survey reports that there has been modest use of ICT in the country and its use is gradually increasing.

Types of Facilities	National		Rural		Urban	
	2010	2005	2010	2005	2010	2005
Telephone	2.07	2.87	0.70	0.33	5.79	10.36
Mobile Phone	63.74	11.29	56.77	6.05	82.74	26.73
Computer	3.01	1.36	0.97	0.17	8.58	4.88
E-mail	1.39	0.20	0.39	-	4.10	0.81

Table: 4.2 The use of ICT at the household and individual levels.
 (Source: Household Income and Expenditure Survey 2005&2010, BBS in A. Rahman, Abdullah, Haroon, & Tooheen, 2013)

Along with the Bangladesh Telecommunications Company Limited (BTCL), many private companies such as Grameen Phone, Telekom Malaysia, Robi –Axiata etc are expanding their ICT services throughout the country.

Before 1989, Government owned Bangladesh Telegraph and Telephone Board (BTTB) was the only telecommunications service providers in Bangladesh. The mobile phone, which is considered as one of the vital ICT tools for the country’s socio-economic development, was introduced in Bangladesh in 1989. There were only two operators (one public and one private) at that time, and initially, mobile phone was very expensive and its usage was very limited. However, the usage of mobile phone has increased incredibly in a very short time.

At present, six operators (five private and one public) are providing the services to the subscribers. The total number of Mobile Phone subscribers has reached 125.971 million and the total number of Internet subscribers has reached 47.421 million at the end of May 2015 in Bangladesh. There is increasing trends in both mobile subscribes and Internet subscribers in Bangladesh for last few years (BTRC, 2015). According to the report of Bangladesh Telecommunication Regulatory Commission (BTRC), there is an increase of 1.8 million internet user in the countries alone in September, 2015. The number of Internet subscriber is around 54 million now, which was around 52 million in August, 2015. Among the Internet subscribers, 52 million are using mobile Internet. This number was 50.7 million in August¹¹. Hence, it is very clear that the mobile and Internet users are increasing at a very fast rate in Bangladesh. Low priced feature phones are very much popular in Bangladesh due to low purchasing power of the people. In Bangladesh Smartphones are available with small user base. Moreover, there is an increasing trend in the number of Smartphone users in the country. The growth in

¹¹ <http://www.prothom-alo.com/bangladesh/article/660568/>, (October 20, 2015)

Smartphone purchases indicates the market potential for Smartphone (Ghorai, Jahan, Ray, & Chylinski, 2013). Recently, a non-profit group internet.org allows free online browsing through mobile phones which is launched by one mobile operator ‘Robi’ in Bangladesh. Through this internet.org service, users will be able to browse over twenty websites for educational, medical, news, job and government services free of cost¹². Usage of mobile phone is not limited to the people in urban areas and only for communication; they are used in rural area and for socialization and business purpose as well (Rahman, Abdullah, Haroon, & Tooheen, 2013). As a result mobile phones have diffused throughout the country at a very fast rate within a short time.

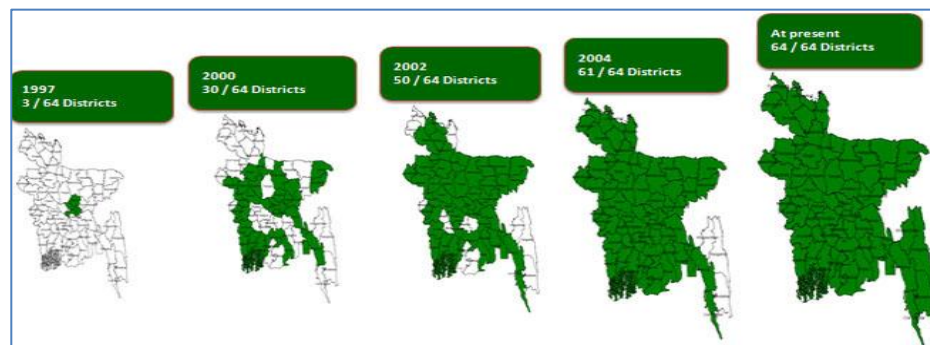


Figure:4.2 Mobile phone coverage in Bangladesh

Figure: 4.2 shows that mobile phone has diffused from 3 districts to 64 districts out of 64 in around 20 years in Bangladesh. In the following subsections we discuss the role of ICT in the different contexts of the country.

4.3.1 ICT and the Elderly People

This is obvious that many socioeconomic benefits can come from greater access to ICT for the elderly people. On the one hand, the communication and information provided by the Internet can help to reduce social isolation among older adults (Lansdale, 2002; Rice & Katz, 2003; Swindell, 2000; Xie, 2008), on the other hand, services such as search, online banking, and shopping can improve the daily life of older adults by fostering an active aging (McMellon & Schiffman, 2000; Rice & Katz, 2003; Torp, Hanson, Hauge, Ulstein, & Magnusson, 2008). However, in Bangladesh very few elderly people are enjoying the benefits of ICT. Access to ICT and use of ICT particularly, the use of computer, email, internet, telephone, mobile phone, etc. is mostly limited to the younger population of the country (Rahman et al., 2013) and ICT for elderly people is basically limited to the use of mobile telephone services and the number of users is also not very significant.

Similar results were also found in Telenor’s report on ‘Unconnected senior citizens of Asia’. According to the report, in Bangladesh, only about one million of

¹² <http://en.prothom-alo.com/bangladesh/news/65949/internet.org-launched-in-Bangladesh>

52 million customers of Grameenphone (the market leader mobile operators) are above 60 years of age. According to the report the situation is even worse in case of mobile data use, as reported “data volumes fall half of those over 60 compared to the overall customer base, with older women even less well-represented than men – only 4.5% of women over the age of 65 use data, in contrast to 7.5% of men the same age. Overall, less than 1% of Bangladeshis surveyed over the age of 65 uses a smartphone, and the vast majority of the elderly use basic and feature phones”¹³ (Figure:4.3). This finding indicates that elderly people in Bangladesh are deprived of reaping the benefits of ICT in their daily life. However, Japan, as a forerunner of ageing society, considers ICT as a very vital tool for the elderly people that can help in enhancing their lifestyle. Particularly, four areas have been identified in which ICT that can play a very crucial role for elderly people and these areas are infrastructure; lifelines; communications; and enhancement of the richness of daily life (Obi, Ishmatova, & Iwasaki, 2013).



Figure: 4.3 Mobile phone and mobile data users in Bangladesh among the elderly people. (Source: Telenor Report On ‘ Unconnected Senior citizens of Asia’)

In fact, the basic needs of the elderly people i.e. income security, health, recreation, recognition, and inclusion, are similar in both developed and developing countries. Hence, considering the ageing trend and ICT diffusion in the country, it is necessary to consider how ICT can fit in a best way in the daily lives of the elderly people to tackle the future challenges of ageing.

4.3.2 ICT and Education

ICT has the power and capabilities that create a significant change in educational environment (Pajo & Wallace, 2007). Being a developing country, the impact of ICT on education is very significant in Bangladesh. Allocations in the education sector are now about 2.3% of GDP and 14% of total government expenditure,

¹³ <http://www.telenor.com/media/articles/2015/the-unconnected-senior-citizens-of-asia/>

which indicates the fact that education is being received the highest priority in the public sector's investment of the country¹⁴.

Both Government and non-government organization (NGO) have taken some initiatives for ICT-enabled education and computer-aided education at the primary level of the education in Bangladesh. The main objectives of the Government's ICT in Education policy are ICT-Trained and Qualified Teachers, ICT access to all schools, Bridging the Digital Divide, Larger Pipeline of ICT Professionals.

Among the initiatives of NGOs, initiatives taken by BRAC (Bangladesh Rural Advancement Committee) and Grameen Bank, particularly in the field of ICT in human capacity building are remarkable. Among those initiatives 'In-Service Secondary Teacher Training Program, Multi-purpose Community Learning Centers, Computer-Aided Learning, Grameen Communications, Relief International, Schools Online' are very significant. The common objectives of these initiatives are to ensure quality education to the less privileged people through ICT.

Besides these initiatives, in order to increase the online education for less privileged children in the remote areas of Bangladesh, Grameen Phone, one of the mobile operators of the country, has taken an initiative under its 'Internet for All' project. Under this project video conferencing technology is used to conduct a class from a distant location in actual classes. Five schools in five districts have been taken under this program to facilitate education service for the less privileged people¹⁵.



Figure 4.4: online school in the remotest region in Bangladesh.

Hence, we can safely conclude that the role ICT in the development of education sector is remarkable in Bangladesh and with the successful implementation of National ICT policy for education will help the country to develop people more with IT knowledge in future.

¹⁴ https://www.infodev.org/infodev-files/resource/InfodevDocuments_890.pdf

¹⁵ www.grameenphone.org

4.3.3 ICT and Women

Women constitute 50% of total population in Bangladesh. ICT tools, particularly computers, the Internet and mobile phone, have been identified as crucial for the development and the empowerment of women in social, economic and all other levels of human life in Bangladesh (Laizu, Armarego, & Sudweeks, 2010). The impact of ICT intervention on women's empowerment in Bangladesh has been repeatedly discussed in literature. A study by Ahmed, Islam, Hasan, & Rahman (2006) described that, in Bangladesh, women's involvement in ICT industries and ICT-based government organizations and non-government organizations has a positive relation with the behavioral aspect of women's lifestyle that ultimately affects the society as a whole (Ahmed, Islam, Hasan, & Rahman, 2006). In another study on the impact of ICT intervention towards the development in third world countries, Ashraf, Hanisch & Swatman (2008) discovered that there are prospects in Bangladesh in terms of ICT use by women for their empowerment (Ashraf, Hanisch, Swatman, Kommers, & others, 2008).

Mobile phone played a significant role in women empowerment in Bangladesh (Sultana, 2005). Basically, in Bangladesh, rural women do not have access to any telecommunication services. Grameen Telecom took an initiative to diffuse the advantages of the mobile phone to rural women. Under this program, women become owners of a mobile phone and start a small enterprise by renting it to others which ultimately changes the power relations among men and women and brings both economic and social benefits to the community (Hultberg, 2008).

In Bangladesh, there are many non-government organizations that are working for women empowerment and are also facilitating ICT usage for them. Study of Ahmed, Islam, Hasan, & Rahman (2006) showed that ICT has direct impact on women's life in different perspectives like women's increased access to job market, increase of average household income in villages, empowerment, shrinking information asymmetry, improved governance, indigenous knowledge, and increased social awareness (Ahmed et al., 2006). Hence, despite the fact that the participation of women is very low in work force compared with their male counterpart ICT intervention changes the position of women in terms of empowerment in Bangladesh.

4.3.4 ICT and Health

Around 80% of the total population of Bangladesh lives in rural areas. As discussed before, Bangladesh is approaching to an ageing society by 2050. It is predicted that Bangladesh is one of the developing countries where life expectancy at birth is expected to reach 75 years by the end of the next half century (Rahman, et al, 2009). Health will be one of the key concerns for all in future than before. We need to think for the new ways for facing the challenges of ageing problem regarding the health in the developing countries (Sultana, 2013). In Bangladesh, mobility in terms of movement is not a major problem now, however, it is estimated that mobility would be one of the major problems for the elderly in future. This situation directs the way for such a service that might be possible from the distant location with trained people and adequate facilities for improving the health condition. Under this circumstance, e-health could be an easier, cheaper and convenient way to disseminate healthcare facilities to the rural areas (Avento & Sultana, 2013).

Regarding health, in addition to the ‘National Health Policy’ published in 2011; ICT policy has also emphasized better health through integration of communication technology in order to improve the health condition of the people of the country. The basic objective of ICT policy is to ensure quality health care to all citizens by innovative application of ICT that covers improve management of healthcare delivery system. Both Government and non-government organizations have taken different initiatives in order to integrate ICT in health sector for ensuring better health though one of the most challenging jobs for the government and the NGOs in Bangladesh is to cover maximum portion of the rural community around Bangladesh under healthcare facilities.

Mobile phone and ICT facilities have also made medical care possible at doorstep through fast communication and over the phone support in primary treatment. A recent study by Rahman et al (2013) showed that telecommunication itself has helped save money and time during taking doctors’ appointments and seeking service availability. The research also stated that mobile phone alone improved the availability of health care service at a great extent in rural areas. Villagers are now well aware of availing a better and cost effective service for them. Seeking a good doctor or getting primary treatment without visiting to a healthcare facility has become possible due to mobile health service system in the rural areas (Rahman et al., 2013).

Among other private level initiatives that offer a range of services aimed at development and promotion of ICT based information and services in Bangladesh, e-Clinic offers quality health care, information and advisory services for the underprivileged communities in rural settings. In October 2010, Bangladesh Institute of ICT in Development 2010 (BIID) launched e-Clinic service as pilot basis in different districts of Bangladesh. e-Clinic provides an internet based telemedicine service for the poor people of rural and remote areas of Bangladesh where graduate doctors or quality medical service is not available. This initiative is expected to bring a tremendous change in the health services in Bangladesh¹⁶.

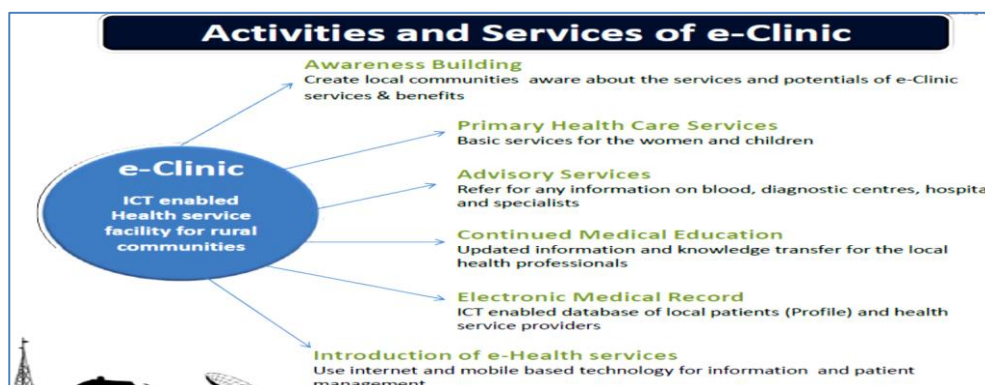


Figure 4.5: ICT enabled health service facility for rural communities.

¹⁶ www.biid.gov.bd

Figure 4.5 shows the activities and services of e-clinic; it is expected that these activities will bring radical changes in the health sector of the rural Bangladesh.

4.3.5 ICT and Agriculture

Bangladesh is an agro-based country. Agriculture provides employment to almost half the workforce of the country and it contributes around 20% towards national GDP (Kashem, Faroque, Ahmed, & Bilkas, 2013). For gaining productivity in agriculture, flow of two-way information (farmer and other stakeholders) is a must. In the agricultural sector, up-to-date market information is a vital. However, there is a lack of timely and appropriate information in agriculture sector which results in low production. In Bangladesh different initiatives have been taken in order to reduce this problem. Rapid diffusion of mobile phone coverage provides the opportunity to help technological adoption through ICT based agricultural extension program. Basically, farmers can use mobile phone to get up-to-date market information.

Besides, the e-Krishok initiative is a new addition in terms of ICT in agriculture in Bangladesh. This initiative has been taken by the Bangladesh Institute of ICT in Development (BIID) in collaboration with Katalyst (a multi donor development initiative) and Grameen Phone in 2008. It helps to reduce the information gap between the farmer and the market and build awareness and capacity of farmers to use ICT-enabled information and advisory services. e-Krishok offers information and advisory services through mobile phone and email; it collects and disseminates required information to the farmers which helps the farmers to get information in time and solve their problems which ultimately helps in productivity¹⁷.

Hence, we can infer that a number of good initiatives have been taken by both government and private sectors in grasping the potential of ICT in Bangladesh. These initiatives are obviously playing a supportive role in increasing the growth rate and reducing the poverty in the country. We can also infer that diffusion of mobile phone has a significant role in adopting different ICT based services in different sectors.

4.4 Summary

The socioeconomic and technological situation in Bangladesh portrays that the country is approaching to an ageing society in near future where traditional extended family structure is diminishing day by day. On the good side, the country is developing in terms of ICT usage and grasping its benefits. This situation analysis convinces us to proceed further to assess the potentiality of the Information Technology and TAS in particular for the elderly people, and to address the existing problem of unemployment and underemployment in the younger strata's of Bangladeshi population. In the next chapter, we will discuss the first phase of the field study which has been conducted in this research.

¹⁷ <http://wp.ekrishok.com/>

Chapter 5: Field Study (Phase-I)

Attitudinal Survey and Exploratory Focus Group Discussions

This chapter presents the procedures and the results of the attitudinal survey and exploratory focus group discussions that were done to assess the acquaintances of the Bangladeshi population with a TAS, their attitude and e-readiness towards the adoption of a technology supporting a TAS and to elicit the specific requirements for developing a TAS prototype. The following sections show how the two procedures have been designed and discuss their results.

5.1 Attitudinal Survey

A survey is a system for collecting information from or about people to describe, compare, or explain their knowledge, attitudes, and behavior (Fink, 2002). Moreover, it is referred as a useful technique for exploring the needs and expectations of the users in the User Centered Design (UCD) at the initial stage of the development cycle of a prototype (Chapter-3) (Maguire, 2001). In that chapter we discussed the logistic problems of our study: hence, we decided to perform a survey as a fast and affordable technique for data collection to reach our objectives.

5.1.1 Sample Selection

Recall that to reach the research goal and to address the research question mentioned in Chapter 1, we select Bangladesh as a research area, one of the developing countries (World Bank, 2013)¹⁸ situated in South Asia. As known, the population and housing census provide the unique source of reliable and comprehensive data about the size and major socioeconomic and socio-demographic characteristics of the population of a country. The essential features of a population census are its individual enumeration and universality within a defined territory. Therefore, due to the reliability and accessibility of the census data and its true representation of the population, we considered the latest census report of Bangladesh Bureau of Statistics for the year 2011 for selecting a suitable sample (BBS, 2012).

We have to acknowledge a limitation of our investigation: being aware of the differences that characterize the population of developing countries (and then also Bangladesh), we focused our attention on the urban context for mainly two reasons: first, the high density of population in the urban areas is an opportunity for a TAS since it makes it easier for people to interact within these areas and to provide the services required through a TAS; second, this condition allows for a more direct comparison with other studies undertaken in the western countries (Cohen,

¹⁸ <http://www.isi-web.org/component/content/article/5-root/root/81-developing>

2006; Kunzmann & Wegener, 1991). We select the Chittagong division as sample area since it consists of 20% of the total population of the country and reflects some basic characteristics of its urban population: density, education, income, life expectancy, birth rate etc. of the overall population of Bangladesh.

5.1.2 Questionnaire Development

The questionnaire that was used for this survey was basically adapted from the instrument used by (Zimet, Dalhem, Zimet, & Farley, 1988) as that was tested for validity and reliability of the scale for measuring the attitudes towards social support. Here social support was considered as a multidimensional construct which consists of both structural component like individual's social network, frequency of contact with members of the network, the size of social network, reciprocal support and quality of the support; and functional component referred to the perceived level of the support received, such as emotional support, affirmative support and tangible support. This 40-item instrument includes a variety of indicators of attitude measurement, social support and e-readiness. 'Attitude measurement' indicators are identified as effective for measuring individual attitudes to an object in (Ajzen & Fishbein, 2000) and the indicators related to the 'degree of e-readiness' are identified as effective in (Dada, 2006).

We developed the questionnaire considering the characteristics of the target audience, their background, especially their educational/readability levels, access, and the process that is planned to select them. During the development of each question, a link between the objectives of the study and the translation of each question into contents has been established, i.e., the questionnaire has been designed in a way that encompassed all the issues which would help to find the data to reach the objectives.

The questionnaire was divided into 3 sections according to the following dimensions: the profile information of the respondents and their e-readiness; their attitudes toward cooperation and socialization, and finally their awareness about a TAS and attitudes towards a TAS along with the factors that help determining the requirements for a TAS. Each section encompassed a number of questions relating to each dimension. The 'Relevant Information' section asked questions about demographic information that includes age, gender, etc. Besides, this section included a variety of indicators of E-readiness, e.g. familiarity with the usage of Information Technology tools, possession of electronic devices, the quality of the Internet connection, the frequency of Information Communication Tools and Digital devices use and the emotional attachment to them. The 'Socialization' section asked questions about the involvement of the respondents in social work and the type and nature of their personal interaction with the people living in their area. Finally, the questions in 'Time Accounting System (Time Banking)' section investigated the awareness and attitudes of the respondents towards a TAS.

The degree of e-readiness, nature of cooperation and attitude towards a TAS was taken as dependent variables and age, gender, ICT familiarity, hardware availability, mobile budget and employment was taken as independent variables. For the assessment of the dependent variables, an ordinal and visual six-point scale was proposed, with an explicit indication of the extreme anchors (from “-3”, to “+3”). A

scale was adopted with an even number of choices in order to reduce the risk of “diluting” the results due to the central tendency bias, which otherwise would have had a significant impact in the subsequent analysis.

Then the questionnaire was translated from English into the target languages (i.e., Bengali). We took effort to ensure that the translated version were culturally adapted to the local language so that they could be easily understood by the participants. To this end, we took the advantage that the author of this thesis belongs to the same community as the research participants. We also took the efforts to ensure that the translated meanings remained as close as possible to the original meanings. For instance, the item ‘Would you find it weird or inopportune to claim (time) credit for having helped a relative or a friend of yours that is registered to the same TAS?’ (Item 26 in the questionnaire) was translated as ‘Would you find it inappropriate or wrong to claim (time) credit for having helped a relative or a friend of yours that is registered to the same TAS?’, because there was no similar meaningful translation for the word ‘weird’ in the targeted languages.

Two large pilot tests were undertaken in August and December 2013: they involved respectively 55 and 221 people among the students and faculty members of the University of Chittagong. In this pre-testing of the questionnaire we used an online questionnaire platform, Limesurvey v. 2.0. The preliminary results coming from this pilot phase were used to fine-tune the definitive version of the questionnaire to be administered to a sample of the Bangladesh population that we wanted to be as random as possible and vast enough to bring representative findings. The questionnaire is reported in (Appendix-1).

During this pilot phase, we experienced the challenges of conducting the survey from a distant location due our financial and time constraints. Initially, we attempted to conduct a telephoning interview by ourselves and after a certain time, we realized that it would be difficult to reach the expected number of recipients in a limited time; moreover, we found it very expensive. Then we decided to adopt an online survey: when we invited the above mentioned target sample of participants, we allowed them to complete the survey in three weeks. However, after 2nd reminder, when we closed the survey, we came up with above mentioned limited numbers. Then, we decided to involve a specialized firm for conducting the final survey so that we could complete our task within a reasonable time frame.

5.1.3 Data Collection

The definitive version of the questionnaire was conceived to be completed in approximately 12-15 minutes, in order to minimize fatigue bias and make it suitable for short interviews, either by phone or on the road, as well as for self-interviews, mainly through online forms. In order to maximize the representativity of the results, we adopted the surveying technique of the Computer-Assisted Telephone Interview (CATI) (Berg, 2007) involving a specialized firm established in Bangladesh that employed local interviewers. These received a brief training on how to ask the questions, how to propose the alternative options to respond the closed-ended items of the questionnaire, how to fill in the electronic forms that we prepared, and also how to possibly clarify some passages and statements in the questionnaire to the interviewees, if necessary.

In May 2014, the CATI phase was aimed at getting a random sample of respondents from the owners of either landlines phones or mobile phones in Chittagong¹⁹. Responses were collected by the interviewers for 5 weeks. The respondents were contacted through telephone. The interviewers registered the information on hardcopy and later recorded the data by using the online questionnaire platform on Limesurvey v. 2.0 mentioned above. Since, in doing so, the appointed firm had difficulties in reaching elderly respondents (that is respondents older than 64), some interviews were also carried out on the road (these respondents were also selected randomly) and the collected responses were later reported on the online forms.

In order to keep the margin of error below the conventional threshold of 5%, we completed the collection phase when we got 445 questionnaires. However, at a closer analysis by us, some of these questionnaires had to be discarded for data quality problems, so that we finally got 414 complete cases, associated with a 4.8% margin of error (at a confidence level of 95%).

5.1.4 Data Analysis and Findings

Data collected in this study were analyzed according to the already mentioned main goal to gain a better understanding of the attitudes of the respondents towards TAS, their state of being familiar with TAS, e-readiness and their attitude towards cooperation and voluntary work that will have an impact on adopting the mechanism of a TAS in developing country's setting and to elicit the requirements for the prototype. The independent variables age, gender, ICT familiarity, hardware availability, mobile budget and employment were categorized into different groups based on the available options (Table: 5.1). Survey data were weighted by the auxiliary variables "age" and "gender", according to the 2011 population and housing census (Bangladesh Bureau of Statistics, Statistics and Informatics Division, Ministry of Planning, Government of Bangladesh), so that the weighted responses and related results are representative of the Bangladeshi population along these dimensions.

To analyze the data that were collected through the survey, we used the software called Statistical Package for Social Sciences (SPSS). Spearman Correlation was applied to identify the relationship or association between the variables so that the impact of the indicators on the constructs can be measured. In order to ascertain the respondents' attitudes towards a TAS i.e. how they perceive the opportunity to take advantage of mutual volunteering through a TAS, a series of binomial tests was done to identify any strong polarization in the responses by considering the scale ≤ 3 as group 1 and > 3 as group 2. Mann Whitney *U* tests were also done to understand whether items that were measured on ordinal scales, differ based on independent variables which were dichotomized. The code we used for the analysis for every single question in the survey is attached in Appendix 2.

Table 5.1 summarizes the categorical variables that were used in the survey and the related percentage of response (value).

¹⁹ Chittagong metropolitan area counts almost 7 million inhabitants, but just 300,000 distinct landlines. For this reason we also contacted a number of mobile phones

Categorical Variable	Options	Value
Age	Below 25	56%
	Above 25	44%
Gender	Male	50%
	Female	50%
ICT Familiarity	Low Familiarity	28.4%
	High Familiarity	71.6%
Hardware Availability	With Hardware	89.6%
	Without Hardware	10.4%
Mobile Budget	Below Tk 500(€5)	43.4%
	Above Tk 500(€5)	56.6%
Employment	Employed	42.1%
	Unemployed	57.9%

Table: 5.1 descriptive statistics of the respondents' characteristics.

The survey result (Sultana, Locoro, & Cabitza, 2015) showed that a very high proportion of respondents (90%) claimed to use at least one digital device connected to the Internet for personal purposes; notably, exactly 2 respondent out of 3 (66%) declared to possess a smart-phone; moreover almost 1 out of 2 respondents (43%) claimed to use both personal computers and a smart-phone. More than 83% respondents have an Internet connection, which is considered fast and reliable enough for their needs, and almost half of them have a flat connection. With respect to the degree of familiarity with ICTs and services accessible through the Internet: we evaluated the degree of familiarity with ICT and services accessible through Internet in subjective terms on an ordinal scale, where 1 denotes no familiarity at all, and 6 denotes high familiarity. In this respect, we found that 72% of the respondents declared a good familiarity which means a value greater or equal to 3, of which 42% chose the highest degree of familiarity. Since ICT familiarity is a precondition for considering the substantiality of TAS system, this could be inferred that Bangladesh has a solid ground or foundation for considering the feasibility of a TAS system in terms of ICT familiarity.

ICT familiarity was not dependent on age or gender, partly counter-intuitively. Conversely, it was found to be positively correlated with ICT use: in particular ICT familiarity is moderately correlated with the (perceived) frequency of messaging through mobile phones ($r=.394$, $p<=.001$). We found this practice to be common in Bangladesh: half of the respondents claimed to text at least one message per day to their contacts, and 1 out of 8 said to send more than five messages per day. This confirms the evidence regarding other uses of mobile phones than simply calling and texting: 76% of the smart-phone users claimed to use different applications like home banking, weather forecasts and news reading, and an even higher percentage, and 89% use a free messaging service (like e.g. Whatsapp, Wechat or Facebook Messenger). These elements are useful to conjecture on the degree of

readiness of the prospective users of an online platform that could put them in communication and mediate information exchange. We also collected information on the economic sustainability of a TAS service, as potential users might need to avail the service through exchanging more SMS on payment: in particular, we detected that the 43% of the total respondents said that their budget for mobile phone was less than 500 Bangladeshi Taka (approximately 5 Euro in 2015) per month and that 57% spend more than 500 Bangladeshi Taka as their mobile budget²⁰. Since, the result did not show any significant correlation between the age and the mobile budget or between the employment status and the mobile budget, this can be inferred that irrespective of their age and employment status people are habituated with texting message and people's income does not have any effect on their text message behavior as text message service is usually considered as one of the cost effective and expressive modes of communication through mobile phone.

In regard to the readiness of the sample to espouse the tenets of TAS, we detected both facilitating factors and potential obstacles. In regard to the latter ones, we found that very few people knew of initiatives of time accounting and complementary currencies (96%) or were familiar with these concepts (if not of the various names by which these systems are usually denoted, like Community Exchange Systems, Local Exchange Trading Schema (LETS), Time Banks and the like). Many respondents from the sample expressed a strong feeling of belonging to a religious community established in their city, i.e., the mosque parish or the temple community (85%); this feeling was found to be negatively (yet weakly) correlated with the attitude to become a TAS member ($r=-.16$, $p=.001$). Moreover, the respondents expressed a significant wariness towards asking for help to strangers for the typical services provided within a TAS, e.g., small errands (Binomial test proportions: .28 vs .72, $p=.000$).

The findings indicate that the samples are not only unaware or unfamiliar about technology mediated service exchange system like TAS but also they are uncomfortable about asking help to strangers for the typical services through a TAS. Since these kinds of systems exist in the western countries and are spreading steadily over there, and they are formed basically for mitigating the social exclusion problems in the western society, it is not contrary to our conjecture that the most of the people are unaware about such systems. Moreover, in a society where community feeling is stronger comparing with the western world, it is also not surprising that people might have a moderate attitude towards an unknown system. Hence, we can summarize the opportunities and obstacles that a TAS may encounter in case it is introduced in Bangladesh.

In regard to potential facilitating factors, we detected that a high percentage of people (75%) expressed a strong feeling to belong to their community of place (be it the city block or neighborhood), and a clear tendency in the responses was found about a positive attitude in giving help to neighbors (prop. .98 vs. .02, $p < .001$) or strangers (prop. .65 vs. .35, $p < .001$), if they needed or asked for it. To this regard, it is noteworthy that respondents with a higher ICT familiarity ex-

²⁰ In Bangladesh, 500 BDT is approximately less than the 2% of the median monthly gross salary, which is estimated to be approximately 35,000 BDT (around 350 euros), as indicated by online services like Salary Explorer (www.salaryexplorer.com, accessed on the 2nd of February).

pressed a stronger willingness to help (Mann Whitney test, $U(399)=4563$, $p=.009$). Moreover, although it was clear (and reasonable) that the respondents trusted friends more than any online system recommending the abilities and virtues of strangers (prop. .89 vs. .11, $p=.000$), we also detected a general trust in a system where the members are specifically requested to provide a feedback for each interaction occurred within the network and this feedback is used to build a reputation of each member (prop. .59 vs. .41, $p=.001$). Then, the TAS idea can be seen as a way to increase personal acquaintances, give hence more visibility to one's own skills and competencies and also to ask availability (i.e., time) to other experts to learn from them either the essentials or some of the secrets of a manual craft or, e.g., digital competency. In this regard we detected a general belief among the respondents that manual competencies can be acquired much better through imitation rather than study on written resources (prop .01 vs .99, $p=.000$), and that knowing a large number of people personally and having had some kind of interaction with them can help job seekers find an occupation (proportions .17 vs .83, $p=.000$); either these beliefs were significantly stronger in the younger respondents (younger than 25) than the older ones ($U(403)=18592$, $p=.008$ and $U(403)=16958$, $P=.001$, respectively). On the other hand, the condition of being employed and the declared willingness to receive help from the younger was found to be moderately correlated ($r=.441$, $p=.01$). In this light, a TAS has a potential in facilitating the unemployed or underemployed²¹, who are mostly young and about the 42% of the respondents, in creating a contact with those who already belong to the world of work.

In addition, we found that the respondents with high familiarity with ICT scored lower, on average, than the other respondents (low familiarity) (Mann-Whitney Test $U(400)=4654$, $p<.05$) about feeling weird or inopportune to claim time credit for having helped a stranger, i.e. the higher the familiarity with ICT, the more positive the attitude towards the core idea of TAS, i.e. towards adopting with exchanging service to strangers. This could be explained in terms of a stronger familiarity with a sort of virtual connection that makes whom one is in contact with less "stranger": in a way, who writes emails to someone she does not know, or sees someone as a professional contact of hers on a social network (e.g., LinkedIn), or as either two- or three-grade apart node in her network of acquaintances (e.g., in Facebook or LinkedIn, as friend of a common friend) could perceive a stranger in a different way than people not using those social media or communication tools, perceiving strangers as more connected than those actually are, thus creating a sort of illusion of proximity. This illusion could facilitate the idea of being helped by people that are not known but that yet are members of the same virtual community, as a TAS would be. This means that social media, in creating virtual social networks (on the Web) and sort of virtual (yet weak) ties between its members, could actually foster human social networks, by tearing down the barrier of natural diffidence between strangers.

All in all, then, after that the main tenets and mechanisms characterizing a TAS had been briefly explained to the respondents, a high majority of them felt to subscribe to the main idea underlying those initiatives, that is "helping others does help yourself in the long run" (97%). Lastly, general attitude toward TAS was sig-

²¹ To this aim, we considered regular employment when one works more than 20 hours per week on a regular basis.

nificantly positive (both the median value and the most frequently chosen one was 4) and the 74% of the sample declared they could join one if it were established in their community ($p < .001$); notably, this positive attitude was stronger in stronger ICT users ($U(404) = 3837, p = .001$). Hence, we can summarize in the Table 5.2 the opportunities and obstacles that a TAS may encounter in case it is introduced in Bangladesh.

Opportunities	Obstacles
- Connectivity	- Unawareness of TAS
- Convenience in mobile phone texting	- Wariness to stranger's help
- Younger inclusion	- Religious users untrust
- Social integration	
- Conformity with TAS transaction	
- Positive attitude to system friendliness	

Table 5.2: A summary of the opportunities and obstacles.

The results of this study indicate that a TAS system is feasible to some extent, as the identified obstacles can be counterbalanced by the opportunities. The survey results indicate that the sample respondents are inclined to a mobile compatible TAS that ensures the identity of the user. These findings give us a positive picture of the attitude of the Bangladeshi people towards the idea of a TAS and the degree of their e-readiness towards the adoption of a supporting technology. However, in order to take a precise decision on the usefulness and the acceptability of a TAS in a developing country context, more comprehensive data towards our goal was required (Sultana et al., 2015).

Hence, we conducted eight focus group discussions by grouping the respondents according to different areas of the metropolitan city of Chittagong and by carrying out a series of focus group discussions, to help us getting a deeper understanding of the particular feedbacks of the key themes, and of the issues of controversy related to the feasibility of a TAS in Bangladesh. A short report of this experience can be found in (Cabitza et al., 2016). In the next section the conducted focus groups are described in detail.

5.2 The Exploratory Focus Groups (EFGs)

We organized and moderated eight focus groups in Summer 2014. We conducted these focus groups in two phases, the first phase was done in Milan and the second phase was done in Bangladesh. At the first phase, we completed four focus groups in Milan in June 2014 among the Bangladeshi people who had been living in Milan at least for two years at the time of the discussions. We tried to involve those people in our discussions who were more accustomed with the culture of a developed country. We assumed that this segment of people could explain us better if there is any potential for a TAS in their home country, and they could help us in getting the requirements for a TAS considering their own country's context. When we started to analyze the data of these focus groups in collaboration with an expert on Focus Group Discussion, we were suggested to conduct four more Focus Groups in Bangladesh which would help us to get more in depth information. Moreover, this will help us to know if there are any differences in perceptions and requirements regarding a TAS due cultural differences. Here came our second challenge at the phase of data collection as it was not in our plan before. Then we had to go back in Bangladesh in July 2014 and conducted four more focus groups in Chittagong, during July and August 2014. The group discussions were conducted adopting the methodology proposed by (Chiarini et al., 2010) to evaluate the TAS concept and extract ideas on which to ground our understanding of how the technology could arise "as a contingent, processual and dynamic materialization" from everyday life practices (Philip et al., 2012) and to elicit the requirements for developing a prototype for a TAS.

The overall focus groups involved sixty-four participants, lasting fourteen hours altogether. The participants were divided in 8 focus groups of 8 participants each, so that the groups were all homogeneous with respect to gender, age, employment condition, and use vs.no use of mobile phones, as summarized in Table: 5.3. Figure 5.1 shows the composition of the conducted Focus Groups. We denoted the participants based on the country from where they have been selected (we will use this coding in the following subsections): PBD refers to participants from Bangladesh and PI refers to participants from Italy. Each participant has been given a unique number as their identity, e.g. *PBD1*, *PII* etc.

Gender	1 Male	1 Male	1 Male	1 Male
	1 Female	1 Female	1 Female	1 Female
Age	<25	25-44	45-64	65>
Smart Phone User	User	User	User	
	Non-user	Non-user	Non-user	Non-user
Employment Status	Unemployed	Employed	Employed	Unemployed
		Unemployed	Unemployed	

Table: 5.3 The composition of each exploratory focus group (EFG).

The eight participants in each focus group were selected partly on a convenience basis and, to minimize the biases inherent in relying on convenience sampling alone (Ritchie, Lewis, Nicholls, Ormston, & others, 2013), also by using snowball sampling, that is members invited to a focus group helped to enroll participants for another. However, we eventually chose the members also to maximize variance in regard to education and income: to this aim, the focus groups were animated by government and non-government service holders, retired service holders, businessmen, bankers, professionals, educated unemployed, uneducated unemployed, educated housewives, less-educated housewives and students. In these discussions, we had the opportunity to interact with potential users of the TAS application in a more informal manner than traditional interviews and pursuing relaxed sessions was a priority of ours to get frank opinions without hesitation or plain compliance (Kitzinger, 1995).

All figures exclude the group moderator and the researcher who has in depth knowledge about TAS activities and the design. In order to encourage any kind of feedback, positive or negative, the moderator were highly receptive to criticisms and suggestions. Moreover, she controlled the discussion in the track of the research objectives. A person, who has in-depth knowledge about the concept of a TAS, was also enrolled as silent observer of the focus groups; his task was to take careful notes of any exchange between the participants, as suggested in the specialist literature (Stewart et al. 2007), with special focus on what could not be tape-recorded, like non-verbal reactions (e.g., facial expressions and personal attitudes).



Figure: 5.1 The composition of exploratory focus group (with permission).

The discussion was initiated by describing the basic idea and mechanism of a TAS and asking pre-specified questions for evaluating the needs for TAS in Bangladesh and for evaluating the existing system for eliciting the user requirements that will be suitable for developing countries. These questions were developed by following a standard way of questionnaire development for focus group discussion that helps us getting information related to objectives of our research. More specifically,

these questions were developed with respect to the knowledge of the respondents about TAS system, its necessity, and its perceived benefits in Bangladesh. Moreover, the willingness of the participants to become a member of such system was also assessed. The discussants were also aware that they were not called to evaluate an existing system, but also to think of how this system can be improved so that this can be introduced in developing countries. The questions scheme is reported in Appendix-3.

The discussions were recorded with the permissions of participants, and then we conducted affinity clustering with paper copies of their transcripts. We applied a hybrid approach (Fereday & Muir-Cochrane, 2008) combining inductive analysis to yield preliminary themes, with deductive thematic analysis to reflect on the detected themes with respect to prior findings.

Table: 5.4 summarizes the main themes that contain sub-topics as they emerged from the analysis of the group conversations. Most notably, we did not find any significant difference among the responses of the respondents from Italy and Bangladesh; rather we found interesting similarities among the responses. This could be explained in terms of core cultural values and beliefs that people hold regarding their native place might remain unchanged even they do not live in the same places. The detailed analysis of the discussions has been reported in the next sections.

Issues about Time Accounting	Conflicting Views on Usefulness	Potential Positive Impacts	Design Space
- negative time balances	- digital divide & e-literacy	- real sense of reciprocity	-visible user profile for security purpose
- one hour equals one hour?	(e.g., rural areas)	- value to “humble” activities	-reservations of services (offer) for future needs
- occasional vs routine work	- social network for younger	- engagement of skilled people	-location based search of service
- people may opt for a paid job	- less dependency for elder	- who has less time gives it	-mobile-based system
- frustration for lack of	- security issues	on holidays	- incentives for retaining the members
service when needed	- asking favors	-redemption for bad people	-reward system
- offline vs online	in urban isolation		-notifications of service limit
			-code number for less educated people
			-online service option

Table: 5.4 The main themes with sub-topics emerging from the EFGs.

5.2.1 Awareness about TAS

All participants, both in Bangladesh and in Italy, agreed on the fact that they are not knowledgeable about TAS activities, even most of them never heard of it. Yet, some of them, more precisely among the age group above 45 of years, agreed that the name and idea is new but the concept is not new to them at all, rather they said unanimously that this kind of exchange was part of their local culture and tradition which is diminishing now gradually. We discussed elaborately on this issue in the following section.

5.2.2 Local Culture and Tradition

The socio-economical situation of Bangladesh described in Chapter-3 shows that this country is undergoing an evolution that is driven by a mix of internal and external factors as a consequence of the so called globalization. This deep change is recognized by the participants with a sad feeling about what has been lost and with the worry of its consequences especially on the frailest part of the population that is the people that need assistance like the elderly, the children and the sick. This feeling generated a positive attitude toward TAS.

PBD20: “We need this. Family members do not have time for us any longer. They are busy with their work. I think we are also entering times where respect, love, affection, bonding is not as good as it was before. . . ”

PBD4: “This kind of system is highly needed for the elderly, like my mother. She remains alone at home a lot [. . .] while my mother-in-law is sick so she cannot walk at length. I always think that there should be a senior club . . . ”

Similar feeling was also resonated from the participant from Italy:

PI9: I think, this kind of initiative is needed, I must say, we need something which is reliable for helping our relatives in the country. It seems that this could be something that can fulfil our need. I am not sure if it will work or not. You see, we all are living here for long time. My mother in law lives in the country; she does not want to come here. When she needs to visit a doctor she looks for someone to take her to a doctor, we call our relatives from here, request someone to go with her, you see, we search for person to help her, we need to pay him 200-300 taka just to make him happy, otherwise, next time we will not get him. So it is necessary no doubt.

Nevertheless, solidarity is still part of the background of the Bengali people: the term volunteering occurred very often in the talks of the participants as something that resists despite the individualistic trend mentioned above and that is found compatible with, if not reinforce, the TAS rationale.

PBD32: “It exists in Bangladesh, I suppose. When I come back from my native village, I usually pick up in my taxi one or two people walking along the roadside without claiming any money for it [. . .] so, if I do the same thing in this system [. . .] I will also get “time” in my account [. . .] I understand

this will eventually turn to be useful to have some favor back sooner or later.”

PI7: We do the same thing every day...like we say... ‘dosto’(friend) I cannot go for shopping today...please do for me today...I will do on your turn.....or I cannot attend today’s lecture, give me your class notes , I will do for you some other day....we do the same thing for cooking as well.....we do such activities very frequently, but I did not have any idea of banking of sharing time for each other.....we are giving our time...we are helping each other.....that you talked about...but we never thought of getting credit.....it seems very interesting if I get chance to use those credits for our needs.....

On the other hand, TAS is perceived as something that “formalizes” habits that already exist or were common practice in the near past. As reported also by (Bellotti et al., 2014) , this might be the cause of a wary or skeptical attitude towards the TAS if it is not understood for what it is intended, and pursued for its potential benefits. This risk notwithstanding, participants convened that this is not a sufficient reason to refuse the whole mechanism for the positive counterparts it can bring. Indeed, TAS was also perceived as a means to awaken a progressively fading habit and for this reason been advocated and accepted.

PBD7: “The concept is new to me, but these kinds of exchange activities are not at all new in Bangladesh. Many places do it on a regular basis even nowadays. In the village, if there is a celebration in a household, women who are expert in delicacies and traditional food (patty) come up and help in preparing them. Again, when people need any help from the community, they just get it. This is reciprocal. There is no monetary transaction in this. The fact is that their skills are well known, and this kind of cooperative attitude is common there.”

Analogous views were also found from the participants from Italy:

PII: Actually, this concept is not new to me at all.....actually what I want to mean...the word you have used ‘Time Banking’ is new to me...but the philosophy behind this is very very old.....Specially in village, people usually help each other in almost all tasks...at least as I have seen 30 years back in Bangladesh.....This is a very common phenomenon that one helps other.....You can rather say, this is a characteristic of our village culture...You know...I usually tell my friends here that ...you pay to the funeral company here...in my country....it never happens...if someone dies, people from many villages come willingly....someone cuts the bamboo...someone does other job.....neighbors bring food for two three days...nobody tells to do these...but this is also true that time has changed...this kind of helping attitude is diminishingmy village is not as it was 30 years back

5.2.3 Relation with Time

The loss of a condition where the relatively low pace of life allowed for more intense social relationships with relatives and neighbors brings with itself an uneasy relation with time that is increasingly deemed as a scarce resource. Indeed, working

time is prolonged to earn more money and build a career, as well as commuting time since work is often found away from home and traffic jams are habitual in heavily urbanized areas. All of the participants acknowledged that there is little time for themselves and for the family: they referred to several cases in which women have had to quit their job to care for their family and parents. As for any scarce resources, the value of time is inestimable and in some circumstances it can surpass that of money:

PBD6: “The point is not that people who need money will be more interested or will need this system more; rather it is that people who have money do have less time, as they spend more time to earn more money, the unit here is time. So, people who are “poor in time”, they will be more interested. In such cases, a system as you described can help. [As] the “needy” can always get in touch with someone who can solve his problems....”

“A lady left her job because she could not manage time for few hours. The day care center remains open till 6 pm but she comes at 7:30 pm, so she had to leave her job. Due to traffic jams she could not come in time. I personally believe that without the help of my mother, I just could not keep my job; and you will find thousands of women like me, who are depending on others for their job. I do not know if it also happens abroad for the sake of family [. . .] but here many women leave their jobs for that.”

PI10: Now, husband-wife both work outside, I think need for this kind of system will increase day by day...Even when I think to call my relative in Bangladesh, I need to think whether they are free or not...I think this kind of system will be useful for the people who are very busy.....

Therefore TAS can be helpful as it allows people to somehow gain/acquire a precious resource like time from other people to cope with these problematic situations.

5.2.4 Issues about Time Accounting

As the participants did not know anything about the TAS concept, the preliminaries of the focus groups were aimed at explaining its essentials and at collecting the related concerns: however, these worries were expressed to better understand the characteristics of TAS and not as a kind way to assert a negative preconception toward this new mechanism. The issue of negative balances and the related theme of reciprocity were the first concerns raised in all of the focus groups. The fact that people could get some service from the network without giving back anything was faced but easily re-dimensioned when some participant proposed some simple rules to reduce this risk:

PBD-9: “In an association, if any member does not give the subscription fee in time, he is fined. Likewise, if a member only takes, you need to motivate him to give in his turn, or you can set a rule to block him from receiving help until he has given back his one. There should be something specific, so that this problem could be minimized or controlled.”

PI-14:I am the first user...I have received help from someone for 3 hours....I will have -3 in my account, if I understood correctly, Then I received help again for 2 hours...my balance will be -5, in this case you must fix a maximum level of negative balance, otherwise you cannot protect the abuse of the system....what he said is right..

Furthermore, the fact that money is not involved in the mechanism was a reasonable guarantee for the participants that antisocial behaviors would not occur that often, like the case of other no-profit initiatives they were aware of.

PBD-9: “In our country there are different kinds of social organizations. Not all of them are working well, some of them are making money under the name of social work [. . .]. I think [for TAS] it is better as there is no money put at stake, and at the same time you can engage some people for developing their own area. Good initiative!”

Another concern regarded the “one hour equals one hour” idea: this was generally appreciated by the participants but some were also wary of the fact that it could become universally accepted, especially in case of high-valued professional services. As reported also by Shih et. al. (2015) the limitations of the ‘equal time equal value model’ in serving instrumental ends particularly for certified skill members who will tend to prefer currencies.

In this case, the relation between the two parties would be perceived to be more stable and recurrent and hence require the mediation of real money.

PBD-14: “It seems interesting to me [. . .] There is discrimination everywhere, but I don’t think that it will be easy to evaluate all services equally. Professional people may not be willing to join for that. This could be a problem. I don’t think that a lawyer will agree to give hours of free legal services in a community without payment. . . ”

In this regard similar opinions have been found from the participants from Italy:

PI-14:In Bangladesh you cannot give equal importance to the service of a doctor with the service of a farmer, because mentally we are not that much open. A farmer may feel good to do something for someone who is superior to him, but in case of a doctor or a renowned businessman

On the contrary, the time-based exchange of services was perceived as more appropriate for occasional negotiations of services that would fit sporadic needs of the requester.

PBD7: “If the help is like a routine work, like, say, keeping children at a neighbor’s place, there could be problems. Only services that are needed occasionally can be brought into this system.”

Here again, the issue of money was a primary concern for most of the participants (both the employed and unemployed ones, although for opposite reasons) and thought to affect the perception of the TAS scope and adoption.

***PBD-9:** “If we consider the unemployed people who have enough time and some skill, they could not want to join in just because they are looking for a permanent job. When they see something new, they try to know whether their basic needs are fulfilled or not [. . .] In any case it is a matter of money. The people who give health tips or legal tips on TV or a magazine are paid for that. . . ”*

***PI-20:** “unemployed people will not be interested to join as there is no money...”*

Usually, a TAS is considered as a system where money is not required for receiving any service available in the system. However, this system was found helpful for saving cash or for receiving indirect financial benefits. These facts were reflected during the discussions:

***PI-21:** You said, money is not there, but this is not right, financially, I am getting the benefits in the sense that I am supposed to pay money if I need same service from someone else outside this system.*

***PBD-25:**I think monetary benefit is there...I think there is two types of profits...one is visible...the other one is invisible.....if you are able to get taxi service from your neighbors....you are saving your cash money....one...second is...on the other hand...if you have money...if you do not get the service...there is no value for your money...*

Different dimensions of potential benefits of TAS have also been identified by the respondents during the discussion:

***PI-27:** I have many friends who passed from national universities, in session jam they lost 6 to 7 years for completing their bachelor degree, and after passing they are not getting job....because of competition...so they can get involved in a constructive activities through these activities.. it is better to get involved in some constructive activities...otherwise they get involved in social crimes...they get frustrated...get drug addicted...I know some people of my area....who were very good students....we were in the same school...but now they are drug addicted....the only reason they had idle time in their hand...but they did not have any work to do...*

As also devised by (Bellotti et al., 2013), a TAS has to define policies that guarantee an adequate correspondence between the services that are requested and those that can be provided to avoid the frustration that is generated by the lack of support when those services are (urgently) needed.

***PBD-6:** “I need one service. I am looking for this, but that service is not available at that moment. Obviously, I will be discouraged or frustrated. I used it, but I don't have my need met. . . ”*

This concern was also found from the participants from Italy as well, as it was put by one participant:

PI-8: .if I want a facial service, but it is not there, then?

An additional concern regarded whether TAS should be available online only or also with other means (i.e., offline). Apart from the digital divide we hinted at in the chapter 4, the two modes were perceived as equally important for different purposes. An offline TAS could bring the less literate people from their usual practices of mutual assistance to a more established mechanism that could make those practices more rewarding:

PBD-14: “If you start with online at the beginning, a large group of people may assume that this is not for them. Then, it will be difficult to involve them in. If it is possible to make the activity popular offline, it will not be a big problem to make it also online. If the system gets acceptability, then you can go online, not before. . . ”

We found similar response from the participants from Italy which is contrary to our conjecture that people who are living in a high-tech society usually get used with technology:

PI-32: ...why are you thinking the system based on technology? Why not paper based.....

Participants also observed that transition to an on-line TAS would be facilitated from the fact that the technology is already perceived as friendly enough. On the other hand, it was clear that an online TAS would offer more possibilities to find either requests and offers of solutions since it would naturally support distributed interactions within and across local communities: an online TAS could increase the number and types of the available services and make them accessible also to people who are (occasionally) outside their own neighborhood.

PBD-26: “If it is online, it is more convenient for me to see what people are asking for and if I am able to give my help. [. . .] It worked at the individual level before, now it will take place in an aggregated way. I think that people who live in a city where nobody knows each other [. . .] and who live far away from their relatives will need this more. . . ”

Indeed, it was also discussed the point that a computational system could allow to publish help requests also on-the-go, so that users could be supported not only by their neighbors but also by TAS members (not necessarily of the same community) that are near on a contingent basis. This opportunity was valued by the discussants also irrespective of the technical difficulties that this would entail, since mobility in vast urban areas is part of the daily experience of the Bangladesh people.

5.2.5 Conflicting Views on Usefulness

The fourth theme that emerged, just after that the TAS mechanism had been thoroughly discussed, regarded its usefulness as a necessary precondition for its adoption. Four opposing conditions of people have been spontaneously taken into account: the young vs. the elderly; urban vs. rural; employed vs. unemployed; members of a community vs. isolated persons. None of these conditions was excluded from the potential benefits, rather some pros and cons have been found for each of them. The theme of the digital divide and e-literacy were mentioned when considering the age-related opposition as (online) TAS is likely to require a basic familiarity with ICT.

PBD16: “The online system could be a problem for the elderly. Thus, you should think for an application which fits senior citizens better. On the other hand, this could be an opportunity, specially for the young [who] are very interested in social media like Facebook, Twitter, LinkedIn [and] want to be always connected [. . .] they could exploit it for the same reasons, although your system is a different thing. . . ”

As it was put by another participant in Italy:

PI31: How people like me I mean of my age get involve with the system...you know, I have my face book account,....because my son opened this account for me...I do not have any email account...Now, I am planning to apply for Italian passport...I am a bit worried...because the authority will ask me for a valid email address... when a system’s basic is technology, then I think this could be a big problem for implementing a technology based system...where most of the people are not good in technology...

The usual problems identified in other studies (e.g., Dey, 2013) have also been raised, but the problem of e-literacy was shortly dealt with by mentioning the increasing diffusion and usability of current mobile devices as a vehicle for an affordable use of the services available through the Internet.

PBD20: “Our social environment is changing rapidly. In the urban areas I am sure that there is one smartphone in every family. Fifteen years ago, we did not think about a simple mobile phone. Now my maid has mobile phone, street vendors have mobile phone [. . .] because they are affordable. [. . .] Now we use Skype for international calling. We didn’t even just three years ago. Technology is easier now, and people can afford it as well. Mobile Internet is one of the main reasons for this[. . .] while now having SIM means having the Internet. . . ”

PI23: It seems very strange to me...when we go to Bangladesh in our native, we have a fix rickshaw puller, we used to travel on his rickshaw...they are illiterate...but he has mobile phone, I do not understand how he operates...

An interesting way to overcome the literacy problem was also proposed as a resource to be tapped in from within the TAS itself: younger people could help and train the older ones who are motivated enough, because this makes the young earn

time and the elderly feel “useful” again as they can make their competence and experience available.

PBD27: “My grandson or daughter-in-law help me[. . .] they help me to save phone numbers, make calls [. . .]” “In our country very few people live alone, so you will always find people to give a help about technology.”

PI14: Now, if I talk about those age group who are not familiar at all with technology, or not comfortable, like who used computer in office because of compulsion, after retirement they did not have any interest in this, they will have someone like children or grandchildren for helping them. Or the club where they usually go for passing time or their accompanying person can help them; at the same time this segment is very small , hardly 10 to 15%...I think 80% will be able to use it, no matter he is a tailor or a maid...50 to 60% people can do this easily and the rest can do if someone help them...in my opinion...nowadays, maid, driver all have mobiles...they can call to the person whom they need, they are not literate...but they know how to call, whom to call....

The discussion quickly moved to the opportunities related to all of the opportunities mentioned above. The young people are familiar with mobile and digital technologies or simply with the practices that create and sustain the relationships among people: they have time for this activity. For them TAS can be just another means that enhances their social capital and facilitates the opportunity to get new acquaintances and find an employment.

PBD6: “You can think that this kind of exchange can help to know the skills of the people in a neighborhood [. . .] this may create a job opportunity even if it is not the objective of TAS. I think this exchange of time will help to develop our relationships, which is also very important in the view of being employed. This is good for the community as well.”

PI23: Many people have many skills or potentials, all do not get chance to show their potentials....say I can prepare our local pie....as I have scope to work as volunteer I can express this skill...I mean interested people will get an opportunity to show or express their skills, so other members will be aware about my skills...this may give them an opportunity in the real job market...I have this experience...I know one person who used to provide voluntary services for the commune, play football and other works, now he works in the commune.....this voluntary activity gave him a chance to have contact with many people, ultimately he has got a job....

Moreover, the young of today will be the employed adults of tomorrow: they will appreciate TAS when at that time it will become more difficult for them to keep these relationships (for the reasons illustrated in the previous points) and the mechanism will be there.

PBD16: “Indeed, those who are now 20 or 25, when they will be 40 or 50 [. . .] by that time their social ties will be looser[. . .] there will be an infrastructure for the system.”

On the other hand, TAS can help the elderly who is in need not only to get help or a work done but also to avoid asking always the same people (their relatives or close neighbors) so that they can then feel less dependent on them.

***PBD29:** “Actually, we need help from others for very simple and easy tasks but we cannot do them, like changing a light bulb in a ceiling light. Your system may help for this kind of small errands. I may call my neighbor for this, but asking for the same thing repeatedly doesn’t make me feel comfortable. So, if I get help through the TAS, where I will have the opportunity to help others in my turn, I will feel better to ask for help, and I will do it!”*

In this regard, security was also a concern, especially in the urban areas, but it was not considered a sufficient problem for a neat rejection: on the one hand, it is already the case that strangers enter the houses of people to provide paid services; on the other hand, in the case of a TAS, strangers belong to a closer community and their reliability can be checked within the system through their profile or through the word-of-mouth within the community if it is offline.

***PII:** Whatever...when I do not the person or when I do not rely on that person...no matter if he is from my same community or my next door neighbor....and my main concern is when he will enter into my house...when I am on the road...or I need something to be brought by someone to my house...I do not have any problem.....and when you think for Bangladesh I think the problem will be severe there.....*

***PBD20:** “ Ain’t we already allowing an unknown plumber in our apartment to fix a problem? [The TAS case] is better, because you can get information about that person before you have to deal with him, he’s someone from your area, that others whom you know may know. You can choose someone according to her profile as in social media.”*

Mutual support is more diffused in the rural areas where the social changes mentioned in the first theme are less relevant. However, also in these areas the TAS was found to be useful, as farmers cannot always afford assets or goods they need or to pay people who can help them in performing the activities they are in charge of at the same time.

***PBD31:** “The concept you are talking about will be really helpful, but the problem is it will be easily understood by one group, [while seriously needed but more difficult to understand by] another group. For example, if you consider the farmers, this concept will really be helpful for them, because one farmer has to do many tasks at the same time. So, if he gets someone to bring his crops to the market, it will help him to get a good price as well. He does not have the ability to hire a person for doing this, so, it is needed by many people”*

In the rural areas the issues of connectivity and e-literacy are more relevant although the diffusion of mobile banking, e.g., for money transfer, suggests that actual practice can help to overcome this difficulty:

PBD30: “Nowadays, even the less educated people get involved in modern systems and technologies; I think that they will also join gradually. If we consider the ‘mobile banking’ thing [. . .] rural people are getting involved because of the clear benefits [. . .] It is a matter of promotion, training and inclusion. I think that in case of the system you are talking about it is just the same.”

The usefulness of TAS was questioned in regard to the employment condition: unemployed people, usually the young, are focused on earning money and have usually free time, while employed people have more money to spend but they lack time (as discussed in regard to the second theme). The issue of money in either condition is likely to reduce the usefulness and then the adoption of TAS: in one case, the system could be not attractive, in the other case potentially irrelevant. This negative perspective was balanced by the a more positive view: TAS can be perceived as useful by the young people to find a job (as hinted above); but more surprisingly TAS could be useful for employed people as well, as it would allow them to acquire services for which paying money is not the main issue.

PBD7: “Money will not be a big matter here. Here the big issue will be to get those who provide the service on time. I need someone to fix a small but important problem then the problem will be to find the right person to fix it [. . .] because he can charge only few Taka. In this case your system may work. And, in my opinion, people will not be interested in it because it can make you save money; but rather, because it can avoid you some hassle.”

PI2: *If you think for opportunity or benefit of this system, you will find that we need this in our country than that of Italy. You see, most of the people of our country do nothing...you will find that on an average, each family that consists of five members has only one earning member...like me....whenever you discussed on TB, I am thinking this could be an alternative for evaluating time...funding could be one problem, that’s true...what you can do...not for funding...for involving people in the system...you need to motivate them that they should help others which will ultimately help him...if he shares his skill, it will not reduce...rather he will be honored to others for his altruistic attitude, on the other hand he will also be benefitted...that is there is an option of give and take...he will give something to someone , he will get something from him...*

A final concern regarded whether TAS would be more suitable for people belonging to a community than for more isolated people. In the first case, TAS would be facilitated by a mutual acquaintance and trust, but it could become less relevant as solidarity is a typical habit within tight communities.

PI9: *I think, this kind of initiative is needed, I must say, we need something which is reliable for helping our relatives in the country. It seems that this could be something that can fulfil our need. I am not sure if it will work or not. You see, we all are living here for long time. My mother in law lives in the country; she does not want to come here. When she needs to visit a doctor she looks for someone to take her to a doctor, we call our relatives from here, request someone to go with her, you see, we search for person to help*

her, we need to pay him 200-300 taka just to make him happy, otherwise, next time we will not get him. So it is necessary no doubt. Is it possible that I will be a member of Time Bank here; I can use my time for receiving any service in Bangladesh?

PI16: *nowadays, people are becoming urban centric in Bangladesh. Family head lives in town for the job, rest of the family members live in village, if people can earn time at town and can use this time at village, sounds good.*

PBD26: *....I think...people like us...who live in a city where nobody is known to us...I mean I have very few relatives in Dhaka...and they live far away of me...so what we usually do...sometimes I bring my daughter and her friends from school and sometime her friend's mother bring them from school.....so I think it is needed more in town area....in village area most of the people are known to each other...*

However, the common feeling was that people become more and more isolated in urban areas, they lose contact with their community when they move to accept new jobs or when they are old and the family is not able to help them any longer. Knowing about possible skills and services that are available within a community and being able to mobilize them was perceived to be useful, also in the case their own community is not offering what is needed and the help has to be searched outside of it.

5.2.6 The Potential Positive Impacts of Time Accounting

The reflections triggered by the ambivalent views on the usefulness of TAS illustrated in the previous point let issues emerge that confirm the findings of previous analyses on this exchange scheme; but they also suggest a new perspective on its potential value. The reluctance of people to make their needs for help explicit in a context outside of the family or neighborhood (e.g., as raised in (Bellotti et al., 2013) and (Seyfang, 2004b) is confirmed by both our survey and the focus group, but the basic tenet of TAS, that is reciprocity, could alleviate this negative attitude. In fact, TAS offers a space where needs and supports can be considered on the equal foot:

PBD26: *“Mechanisms like two-way-exchange makes the thing interesting to me. It may happen that I may hesitate to ask for help from any person even if I know him personally, but here I have the option to give as well. So, I will not hesitate to take help from others. Again, this may happen that soon I will face a problem: if I can express this need in advance, I may get some solution on time.”*

PI22: *I think, this platform can be treated as market for job placement...like protomalo.job ...if this system is able to involve young, unemployed and also other people of the society...this can act as a platform like talent hunter , for example, I am in a network, I came to know from this network that Safa-yeet is very good in one particular service, if I need his skill professionally, I can hire him....or.....there is one mechanical engineer who has 15 years of experience in the system...he came to know that there are 5 persons, who*

are also members of the system, have some mechanical knowledge, now this mechanical engineer can help them by giving a training...here both parties will be benefitted, the engineer can build a strong team for his project, on the other hand these people are getting a training scope....or even we do not consider this training... this interaction will make bridge between potential employer and potential employee....you see...they are getting experience in exchange of time...and if we consider these 5 persons in the real job market, they are not without experience..

Instead when voluntarism is concerned, the exchange between the two parties is uneven and cannot, in general, be balanced as the receiving party is the “weaker” one. On the other hand, there is a strong feeling that TAS might be useful not only for the marginalized people, but also for the integrated ones (as described above): this makes reciprocity more likely to happen.

TAS is seen as a mechanism that allows people to make a better use of their free time: employed people can use weekends and holidays to reciprocate the services that they have received, while unemployed people, who may have more time available, can use it for their advantage or simply to avoid to lose time in totally unproductive (or counter-productive) ways.

***PBD7:** “. . . those people have nothing to do, they are unemployed [and] wasting their time. So, if they can spend their unused time for a constructive work as you mentioned [. . .], it is better [. . .] also [. . .] these people may have some sorts of skills. The system seems very constructive. On the other hand, a person who remains very busy during the weekdays will try to give time to others to earn some time in his account whenever it is possible for him, for example, on holidays.”*

Last but not least, TAS was seen to stimulate collaboration and not only a generic sense of community: rather the task coordination and the value co-production among peers that are necessary to organize the request of a service and the negotiation for its provision. On the contrary, voluntarism was perceived as a more individualistic and unidirectional activity. The belief that TAS can help increasing the social capital and enhancing the chances for unemployed people to find a job is linked here more to the possibility to give value to activities that are usually considered humble and to make hidden skills visible, than to a more quantitative establishment of relations that enhance the probability to meet the “right person”.

***PBD15:** “There are many educated housewives [. . .] they have many skills [. . .] they do not have any job to show their skills [. . .] they do not have any way to find a job [. . .] but this initiative will help them to get satisfaction.”*

In other words TAS is viewed as a means to re-acquire dignity for both those people who have acquired an experience that can be “exploited” (for the better) by the others and those people that simply refuse the (capitalistic) rules governing regular and institutional workplace relations.

A surprising argument was linked to the issue of security: the space defined by a TAS mechanism can also shelter “bad people” who exploit assumed trust to commit crimes, or simply have deplorable behaviors, like to acquire debits and then quit before giving back in their turn. The definition of ways to “filter those out” was confronted with the possibility to “give anyone a second chance” to take a more correct behavior within the community, thus giving to the TAS an unintended yet positive educational role.

5.2.7 The Adoption Strategy

The rich and articulated argumentation illustrated in the previous points generated a spontaneous concern about the need for an effective strategy to promote the adoption of TAS systems in Bangladesh. The group discussion identified a number of strategic steps that could be profitably put to work in a synergistic way. It was found important to leverage the initial curiosity of the people, especially the younger part, for novel initiatives.

However, the initial interest should be kept alive especially during the initial phases: the energy spent in being involved in the new initiative is likely to decrease before its potential advantages can be fully perceived. In any case, the process will take time and it is necessary to immediately activate a sort of “snowball effect” by targeting the potential champions, that is leaders of existing communities and non-profit associations, which could also offer a concrete support during the start-up phase. In seemingly slight contradiction with a finding of the survey, the sense of belonging to a religious community, and hence being a devout follower, were mentioned as a facilitating factor for the involvement in a TAS: this is then an aspect that should be further investigated.

This continuous promoting action should be flanked by dissemination activities that could clarify and explain the tenets of the proposed exchange mechanisms and its differences with regular “banks” and accounting systems (Bellotti et al., 2014). The uses of attractive demonstrators or hands-on workshops were proposed as a possible mean: narratives (like demos) are a usual way to promote awareness about new “things” (be they tools or social initiatives).

***PI23:** Actually what he said is correct; we have this tradition of exchange in Bangladesh, this is not online based though, but you will find similar exchange system to a big extent in the rural areawhat we see during Eid-ul Azha..many people come to help us in our work, there is no contract for doing these works, at the end of the day we just give them meat...that's it...but as there is two basic and unique features in these voluntary system...what you need to do...I think...to organize few seminars in the district levels...try to do one or two in the capital so that it gets a national focus...and you have to go to sub-district and mofoshshol (semi-rural) area. And seminar will not work there, you have to talk to your target people one to one, you have to teach them, convince them, motivate them...your task is to make them self-motivated, they need stimulation from their own, then they will be involved and remain involved...you need to make them interested to the activities of the system....seminar, TV ad will not work for the people who really need this...you have to talk to them one to one...*

We mentioned in section 5.2.4 that the survey sample expressed a strong feeling of belonging to a religious community established in their city, i.e., the mosque parish or the temple community and this feeling was found to be negatively (yet weakly) correlated with the attitude to become a TAS member. However, this result of attitudinal survey can be understood as the consequence of wrong wording of the survey question that did not express or anticipate the benefits of the system. The discussions revealed the fact that a TAS would be preferred more by the religious people and the idea of a TAS is also good from religious viewpoint:

***PBD29:** This can be done in two ways...one is motivating people...you see...in our country.....people are highly religious....and the idea is also very good from religious point of view...so if you can involve religious people ...I think people will be motivated....and as she said....widespread promotion I mean advertisement is also needed....when we deposit money we do not see the other activities of bank with our money.....but here how my deposited amount is spent I know thatso widespread promotion is highly required...so that people understand.....*

***PI2:** To me, the best benefit we may get is people will learn to evaluate time...now you will find people who are chatting here and there...and people can get an opportunity to express their potentials...you can do one thing...you can use the bindings of religion here...like, in our religion it is stated that we should help each other...so you can say that this is kind of worship...because they are not taking money for helping other*

Furthermore, pilot testing was proposed as a fruitful approach together with the indication of possible areas in the capital city Dhaka, where the experimentation of the TAS mechanism could start. It is interesting to note that the experiences of the western countries have been mentioned as a possible source of information to learn from their mistakes and to take inspiration to invent effective solutions. Of course, the participants were aware of the deep differences between the two contexts but they all shared the feeling that the contextual conditions will become closer in the future.

***PBD1:** “If we know how developed countries are using the system, how they are getting benefits, then we can assume whether this is fine for Bangladesh or not. You can go for a pilot project within a very short time [. . .] you can even try this in your apartment as a pilot project, because these people are very busy, you can target them and check if it works. You have to find out in which community this system works better, then you have to see which community is more similar to that community here, [. . .] you have to find out the right area for this, as you have to start with wealthier areas not with slums.”*

***PBD6:** “I think developed countries already went through all these. They faced the problems, so, they are developing this kind of new ideas to make more interactions with each other. So, I think it is better to get an opportunity for the refinement earlier. . . ”*

In a way, they wanted to know a story anticipating the problems that they feel will soon arise in their reality, and they want to be prepared in advance to envisage the appropriate solutions.

5.2.8 Organizational Issues

Some of the participants were concerned with the management of the TAS mechanism once it is started. Although this was not a primary concern, the discourse highlighted three issues that could have an impact on the design of a supportive technology. The first issue was about the sustainability of the management costs of a TAS system: the envisaged solution was to put this management as one of the possible action that the TAS staff offer in exchange of some services available from the TAS members.

PBD6: "There must be a coordinator or administrator for controlling all these activities, is he paid? If he is paid, who pays him?" "This can be done under time exchange also, the initiator or the member who works voluntarily for the organizational activities will get time for his services or the community member can pay as they are getting benefits."

PI2: ...funding could be one problem, that's true...

A second issue regards the need to manage real currency/money to support the "direct costs" of the execution of a helping action that might arise beside the time spent. The issue was about how to mix these two currencies without disrupting the idea that money is not involved in TAS and at the same time these costs cannot be paid in advance by the offerer: a mix of technical and conceptual problems.

PI2: That's why I think developing mentality is very important in this case. The main thing is if you tell that you are giving something for free, you will find many people for receiving them...but here you need people who should have the mentality of giving as well. If you think for opportunity or benefit of this system, you will find that we need this in Bangladesh than here. You see, most of the people of our country do nothing...you will find that on an average, each family that consists of five members has only one earning member...like me....whenever you discussed on TB, I am thinking this could be an alternative for evaluating time...funding could be one problem, that's true...what you can do...not for funding...for involving people in the system...you need to motivate them that they should help others which will ultimately help him...if he shares his skill, it will not reduce...rather he will be honored to others for his altruistic attitude, on the other hand he will also be benefitted...that is there is an option of give and take...he will give something to someone, he will get something from him...

Similar wariness was also expressed by the discussants in Bangladesh regarding mentality of the people for adopting the system:

PBD25: everything is depending on the mentality....there are people from different areas in an association....if they try to introduce such Time Bank in their own areas...so it will not be very difficult to spread the idea...but at

first you should have some success stories....so people will be encouraged to join and work....but everybody must have commitment...everybody must have the tendency to work and to help others...

PBD31: ...To change the mentality could be a big challenge...I think....this is also true that young people will join...for sure...they can catch any new idea easily...there is a chance for sharing knowledge.....I think....but you have to make sure that the system is reliable to all...

In respect to organizational viability, support from the Governmental body might make the initiative feasible as the Government is considering ICT as one of the important sectors for country's development.

PI 21: Actually, we are far from Bangladesh, yet, as much as I understand, Government has a priority in technological development, even in the last election; Government has successfully captured the support of the young voters by captioning Digital Bangladesh...and of course there is outcome of this vision....like the Information center in the rural area....if you can make a link with Ministry of Social Service affairs, I think your way will be smoother...so if you target the young and communication technology, you should try to make this link...like I have developed a system if you want to provide value to this system and to develop you society which is related to your ICT vision you must come to this activity..

Along with Governmental support, support of the local organization or clubs might also be helpful for initiating and sustaining a system like TAS. In this respect, the role of coordinator is also mentioned as vital.

PI22: if any organization or club in an area patronize the activities of Time Bank for collecting skills of the local people or providing training how to use the system...could be very helpful...because, people who are not reachable due to lack of Internet access or mobile phone, I am considering the worst case...you can circulate about your system , benefits, rules and regulations and activities by spending 1 taka for circulating a message through liftlet...ok...for example, I am a TAS member I will do this activity for the promotion of the organization and activities of the organization willingly...in return I will get time in my account...you must have a very good team...to coordinate your work...in this case if you have only one or two persons with Internet access they can help you as the middle men...

Moreover, issue concerned the possibility to make it easy to extend the scope of a TAS instance to let exchanges happen outside the original community: a sort of card was described as a means that let the TAS mechanism travel with the mobile people.

PBD 18: "Community members who work under this system could have membership card. When he is not in his community but in need of instant service, he can use his card and shows his balance."

Of course, online TAS could solve this problem once the necessary infrastructure is implemented, but the issue was about having this possibility across hybrid or offline TAS instances of this mechanism.

5.2.9 Design Space

Participants from both Bangladesh and Italy agreed on the fact that this kind of system might be useful for the community in the long run; however, getting people to be involved with the system could be a big challenge at the initial stage and even for sustainability issue. The study was also interested to know how a system could be developed for a TAS which might be more compatible for the users of the developing country context where technology is not as advanced as it is in developed countries and where mass people are not highly comfortable with technology. Hence, the discussion on this topic came up with some ideas.

PI4: you can think for some incentives, rewards or recognition in any way..... If a member earns 100 credits, he will be given a prize... Yes, kind of recognition...people will induce to make more + balance...and the system should be user-friendly...

In addition to the service exchange which requires physical interactions, participants proposed for the options in the design that can help to provide services online:

PII: Yes...I am just adding...that many things can be done online...like I may post I am looking for a book of Falguni Mukhopadhdhay....How can I get this? Or I need the 'Tana poren' (name of a Bengali novel) of Shomores Mojumder sorry Basu...or I need that page of that book....who can help me....anyone who has this among the member can do this by transferring the file....Or I can post I need this particular information of Dhaka University...these can be done in many ways....or through skype...I can solve a problem of any member by talking on skype...

During the discussion the participants' emphasized on the fact that a mobile based system could bring more success in case of implementing a TAS in Bangladesh. The participants opted for a mobile based system for wide spread acceptability and diffusion of TAS:

PII4: If you develop a design based on mobile, the percentage of possibility to be success is more, in my opinion. You may ask –why? If you consider the age, in Bangladesh who are like 40-50, they are using smart phone. If they need, they are learning an application from someone or if someone shows or helps, they can easily do this; even, if they do not know, they will learn if someone shows them.

Considering the need for a TAS for the less educated and for the people who are not comfortable with technology, participants proposed for a solution which could be more suitable for them:

PI22: I can suggest you one thing...in the superstore, you must have noticed there is a code for each item...if possible, you must give a training or a brief about the available service to the member in this way...like for one service code is 1, another service 2 and like this....all members should be knowledgeable about it, if any one needs health tips press 1, if anyone needs cooking service press 2...I do not know if it works...and after receiving the service they will send an sms to one particular number....that's it and in this case each member should have unique ID, so that this give or take can be identified...and of course for implementing this system you must go for an orientation program or training...and I think this is also very simple for a rickshaw puller...I mean who is not literate or not very handy with technology..

The increasing busy schedule in the daily lives of the Bangladeshi that discussed in the previous section was also reflected while considering the design of a TAS:

PBD26: Transaction like banking makes it interesting to me...it may happen that I may hesitate to ask for a help from any person even he is known to me...buthere I have the option to give as well.....so I will not hesitate to take help from others...again...this may happen that.....in the next week I will face a problem because of the coaching time schedule of my children.....I mean the time may coincide....so if I can express this need in advance ...I may get some solution...again...you see...as I know that I will have need for two hours of help from someone...I can store this...by doing something in advance....

Furthermore, for the issue regarding the design of the system, participants proposed to use of text message service through a mobile phone or even a simple phone call to a specific number for receiving or providing services:

PI22: for sending sms or receiving sms will not be a big problem for the people from any class...recently I notice in every competition I mean the reality show, there is an option to vote Mr X type yes and send sms to this number...this will not be a problem....Who will bear the sms content cost? People who will be involved from the admin side, they must bear this cost....because, if I prefer this system as it is cost free, I will not hesitate to send any sms if I do not need to pay for this sms...otherwise, as you said about the unemployed people they will not come join in the system... I think the people behind the system should have coordination with the mobile operator...this coordination will help to fix the cost for sms, this will have an impact on willingness to send sms, because if this cost is borne by the Time Bank authority I am very happy to join....

It was also raised by another participant:

PI17: I do not understand the technical side, but if I can call someone to get any help or if any one call me to help her, that I usually do... fine for me...it is usually I do...but there is no question of time...in your case, if there is a

phone number where I can call to get the time as my savings, I can join in the system...

From these remarks, we recognized a mobile-based system as the more feasible for the final adoption and appropriation of TAS supporting exchange of services in Bangladeshi community or similar context.

5.3 Discussion of the Attitudinal Survey and EFG Discussions

In Bangladesh, exchanges of services and products are familiar as a local tradition and culture. Though this culture of solidarity is diminishing in course of time due to socio-economic reasons (Jesmin & Ingman, 2011), communities still have a strong neighborhood relations which is clear from the survey results. Our findings from the focus group discussions also provided with similar views of diminishing solidarity and the discussions also helped us to clarify the situation more elaborately. As found in the survey results and focus group discussions, regarding the knowledge about and attitude towards a TAS and respondents' willingness to be a member of such system and systems' compatibility, the necessity for such a system and requirements for a usable system some conclusions can be drawn.

It can be inferred that though the people are unaware about technology mediated service exchange system like a TAS, their attitude to adopt such a system is highly positive. Thus, people might have a latent need for this kind of system which would facilitate to get interacted with neighboring communities and to bring back their gold old time of cooperation and solidarity. Not only that, people might also have a feeling that they are deprived of something like a TAS which might be helpful to make balance in their busy working schedule and family lives. While the survey results showed that people of different ages are willing to assist each other in small errands, the focus groups discussions confirmed that different segments of people are in need of helping hands in order to run their daily activities smoothly. Most notably, while in the developed countries such systems have been identified as a promoting tool for the physical health and sense of belonging, especially among older and lower-income persons, and people who live alone (Lietaer & Dunne, 2013), for Bangladesh it is identified -and this is an unexpected outcome- as a tool for marginal people who are poor in terms of money and also for the rich people who are poor in terms of time. Moreover, a TAS is identified more feasible for the area where people are busier and where there is a lack of regular interaction among the neighborhoods. We will come back to this point later in this section.

Another inference that can be drawn from the survey results is that the respondents could comply with the 'time' exchange mechanism of the system for exchanging services. Moreover, the technological environment is also favorable for the introduction of a TAS. It reflects the fact that the higher the ICT familiarity is, the more the possibility of accepting a technology-based system. Evidences from the focus group discussions strongly confirm the survey findings and reflect the fact in terms of ICT familiarity that support for introducing a TAS in Bangladesh.

While the needs and potentials for a TAS in Bangladesh is clear from the results of both the survey and the findings from the focus group discussions, security came as one of the main concerns along with some other wariness like mentality of the people to get involved in the system. The survey results indicate that the majority of the respondents agreed with the fact that they are not willing to receive help from or to provide help to unknown person. This may reflect the fact that, though people are in need for a system like TAS for serving different purposes, they would feel more comfortable with the known people or friend for these purposes. Hence, a TAS is more feasible in a small community where people could rely on each other. However, the system seems more potential where people are far away from their acquaintances and when they remain very busy with their profession that do not allow them to have time for fulfilling a need even they have enough money in hand for that, particularly in the working day . The focus group discussions on this topic helped clarify and elaborate the fact. In this regard, the suggestions for designing the system came up with a solution for getting the identification and reputation of the service provider and service receiver. Moreover, in this regard, they suggested for a system that facilitate a location based search of service. i.e. the system will give them an option to find their own location first and then to find the service. Hence the system should be developed in a way which could ensure the identity and reputation of the service providers and also a location based search of service.

Moreover, the survey results showed that young people perceived that knowing a large number of people personally and having some kind of interaction with them can help them to find a job. This fact was confirmed during the focus group discussion that a TAS could facilitate such an environment where experts and amateur can interact and this environment would help to express the latent skills of the community members which would in turn help to get a job. In this connection, employment opportunity, recognition of skills or potentials of the human resources can be assumed as the long term impacts of the system.

Last but not least, the other conclusion that can be drawn from both the survey and focus group discussions is that a mobile-enabled system is more compatible for people in Bangladesh for introducing a TAS there. We recall the numbers that are already described in Chapter 4 in relation to mobile phone and smartphone users. In Bangladesh, there are about 102.99 million active mobile phone subscriptions according to the Bangladesh Telecommunication Regulatory Commission. Hence, it is easily understandable why people are more interested to a mobile-based system for a TAS.

Our literature review (Chapter 2) showed that alternative currency paradigms, e.g. a TAS, have the possibilities for social and economic exchange that mitigate the downsides of the established paradigm of pre-negotiated money-based exchange. However, their success deeply depends on local conditions that are social, cultural, economic, and technological. Hence, the results of the Focus Group Discussions presented in the previous sections have to be discussed from these multifaceted perspectives to see if a system like a TAS could be accepted by the urban people of Bangladesh.

From the social and cultural perspectives, TAS enables a collaboration among the community members that helps to strengthen the social ties and capital

(Coleman, 1988; Ozanne, 2010; Putnam, 2000; Seyfang & Smith, 2002; Seyfang, 2003b) which are getting deteriorated in the Bengali society (Jesmin & Ingman, 2011). Hence, a TAS would facilitate an environment that might help the society to get back their decreasing social values. Moreover, the transaction procedure that supports a TAS is very simple and can be easily grasped, at least in its basic mechanisms. In fact, volunteering is culturally and religiously entrenched with the people of the country (Hasan, Mulamoottil, & Kersell, 1992). TAS simply gives a recognized and regular structure to something people are used to do from time to time in their life: to help people if they need support. Indeed, it is clear from the Focus Group Discussion that the Bangladeshi society is familiar with the basic concept of a TAS that requires collaboration among the members to make a service done, although the name 'TAS' was not known by the respondents; however, they were able to understand how it works and to make their considerations on its potentiality: this means that a TAS is at least compatible with the local culture.

Moreover, the basic property of a TAS is to value everyone's contribution on the same value of time (Bellotti et al., 2014; Carroll, 2013; Han et al., 2015; Seyfang, 2004a), in contrast to the traditional exchange economy that is based on different value for different services. Hence, TAS has a potential for acceptance to two groups of people: '*money poor*' and '*time poor*'. On one hand, the direct advantage to the people of Bangladesh who are relatively poor in terms of wealth is that the inequalities that characterize the traditional exchange economy are less influential as the need is the basic fact that moves this service transaction system, to a great extent irrespective of the monetary value of the exchanged services; so a TAS is powerful to enhance personal dignity as everyone can share the feeling to be productive and active in her own social area. On the other hand, since the people are getting busy day by day, time becomes a scarce resource whose value is incommensurable when needs can be satisfied by small errands or cannot be anticipated and then cannot be managed by regular money transaction. Hence, as it was reflected by the discussants, this makes TAS potential towards the busy people, who have time constraints of several nature that are linked to either preserve their job or commute to their job place or to manage the peak of (agriculture) activities. This makes reciprocity (that is the basic mechanism of a TAS) more likely to happen as the target population is potentially larger and more diversified.

Furthermore, the changes in family structure (from extended to nuclear type) (Jesmin & Ingman, 2011) and in demographic profiles (gradual growth in elderly population) (Rahman, Mohsin, & Tareque, 2009) in Bangladesh play a strong role for the acceptance of a TAS. Literature shows that involvement with a TAS is supportive of the elderly because it facilitates the interaction outside of their age group and may alleviate the sense of dependency from their families (Collom, 2008b) as well as give them a chance of improving both their physical and mental health (Lasker et al., 2011); this is reflected in the opinion of the discussants as the family members getting busier day by day and having lesser time for the elderly members of the family. Hence, a TAS may provide an opportunity for this group of people to get involved as they are often in need of services, have free time to give, and can benefit from intergenerational interactions (Boyle, 2014; Cahn, 2000).

Again, Bangladesh is one of the mostly populated countries in the world (Streatfield & Karar, 2008): this high density of population in the urban areas is an

opportunity for a TAS since it makes it easier for people to interact within such areas and to provide the services required through a TAS. On the other hand, in the rural areas people usually have more time and less work and less money. So, a TAS can also represent a platform for the mutual exchange of services in the rural areas where scattered people can come into one network, can contribute with their time to provide and receive services in the whole network, and according to their needs.

From the economic perspective, TAS provides a potential environment for informal engagement of the unemployed people in work which might lead to a formal employment (Boyle, 2014). The literature shows that membership in a TAS promotes the sense of belonging among lower income persons (Lietaer & Dunne, 2013). In western countries, for example, the Wall Street Journal reported that a rapid growth of TAS is correlated with the ever higher unemployment of countries such as Spain (Moffett & Brat, 2012). This means that a TAS makes greater economic sense to people without a job. An analogous situation is happening in Bangladesh, since it is characterized by a diffused unemployment and underemployment, and by a general under participation of women to institutional labor force. Similar to the opinion of the discussants, this is likely to happen in Bangladesh as there is a chance that this unemployed or underemployed people will get involved by a TAS because of available services that will not require cash. They will also have enough time to contribute for providing services to others that will help them to earn more time credit for their needs. Unemployed people may consider a TAS as a platform able to enhance their interaction with many people, hence as an opportunity for them to enlarge their social network and improve their chances to get a job in the future.

From the technological perspective, in many developed countries TAS initiatives are getting an increasing popularity: this diffusion stimulates the academic research toward improving the supportive technology and making it more user friendly (Bellotti et al., 2013; Carroll, 2013; Han et al., 2015). This positive trend can be an opportunity for Bangladesh in combination with its Government's policy called "ICT vision 2020" that aims to make Bangladesh digital by 2020 (Bhuiyan, 2011): this initiative is expected to make people more familiar with ICT in a short time and to enhance connectivity as "equitable access to all". The obvious concern and suggestions came out for technologically disadvantaged people during the discussions; in fact, people of Bangladesh are now switching from basic feature mobile phones to smartphones and the user base is increasing significantly. At present, there are 4.96 million smartphone subscribers in Bangladesh, boasting an impressive 222% growth in Smartphone purchases in the year 2012 to 2013 alone (Ghorai et al., 2013). These promising numbers of mobile phone penetration have propelled the potentiality of adoption of a TAS in Bangladesh and also support the choice of leveraging the mobile phone technology to start the introduction of a TAS in the first phase.

On the downside, obviously, there are some issues raised during the discussions with respect to the adoption of a TAS in relation to its protocol of services exchange, which have shown some problematic implications and limitations. As found in literature also (Ozanne, 2010; Seyfang, 2004a), TAS can suffer from a limited service exchange and interaction capabilities between the TAS and the community members which might make the members reluctant to use the system,

e.g. one member is looking for a transportation service which is not available in the system or the service is not available when it is required by a service seeker. Moreover, as in other studies (Bellotti et al., 2013; Seyfang, 2004a), while in every situation there are people who are likely to donate their own time, and possibly money to sustain the initiative, the expense of running a TAS can put communities with limited resources at a natural disadvantage. A TAS that includes those populations requires sufficient staff support to arrange and supervise exchanges, necessitating a higher level of start-up funding as well. However, the focus group discussants are aware of the management problems and have suggested for some solutions e.g. to put the management as one of the possible action that the TAS staff would offer in exchange of some services available within the TAS network (Section 5.3.8).

Though the discussions show a lack of knowledge and awareness of a ‘TAS system’ among Bangladeshi people, they are culturally familiar with its basic idea. Hence, the identified barriers are not country specific; rather they are general for both developed and developing country context.

Hence, the overall situation in Bangladesh depicts the potential of collaboration and coordination of work among the people from an urban domain in Bangladesh by a co-coproduction mechanism like a time based service exchange system-TAS- as such a system could have potential to address the existing problem of unemployment and underemployment in the younger strata’s of Bangladeshi population, aid busy people in family time balance and support, involve more and provide health care for elder people, and the last but not least, save cash for the less affluent people.

Although the idea behind TAS was totally new to the sample of participants (and likely to the reference population), it apparently hit on a problematic issue that is of a great relevance for them: it was as if people living in a society in the middle of a “development” process towards a (western?) maturity, would feel the need to maintain a strong liaison with the “good old times”, while still living the present and preparing for their “best of all possible worlds” to come. The social, organizational and technological solutions characterizing a TAS were perceived and discussed as a possible means toward this goal (Cabitza et al., 2016).

5.4 Summary

This chapter has discussed the findings from the survey and exploratory focus group discussions. In general, both the survey results and focus group findings showed that people in Bangladesh do not have knowledge about a technology mediated service exchange systems, though they have a general positive attitude towards these kinds of systems; moreover, that they live in a technological and cultural environment that is favorable to accept these patterns of exchange, and that they possess a general attitude to join in such systems. The requirements that have been elicited from the field study will be discussed in the next chapter.

Chapter 6: The Prototypical Solution

This chapter presents the prototype which has been built on the basis of the requirements elicited from the analysis of the data collected in the field work (section 6.1). The objective of this chapter is to describe the main functionalities of the prototype and the rationale behind them (Section 6.2).

6.1 Requirements of a TAS

In a TAS application a user can declare her availability to offer any service, i.e. doing any work she wishes to do for another user according to her skills: in this case the service is termed as Offer, and a user who wants to offer it is termed as Offerer. The other users can access the list of the Offers and search for them. A user can also express his need for a particular service which in this case is termed as Want and the person who searches for or who needs a service is termed as a Requester. A Requester can have a Want for an Offer and the Offerer can accept the Want of the Requester. A Requester can reserve an Offer, and the Offerer can also commit to provide that Offer. In any case, the commitment to a service is fulfilled when the Offerer delivers the service to the Requester. A transaction can be completed either by the Requester acknowledging the time that the Offerer used for delivering the service; or a transaction can be completed by the Requester refusing a service because it was delivered in a unsatisfactory way: in this second case, effects of the refusal are mediated by the TAS administrator that can remove a specific amount of time from both the Offerer and the Requester accounts, though such kind of conflict is not likely to happen for the kind of services that are usually transacted through a TAS. The macro chart of Figure 6.1 shows how a transaction unfolds through a TAS.

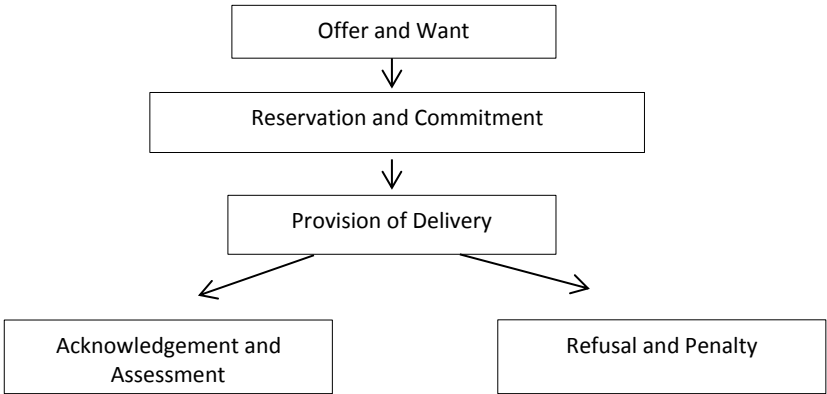


Figure: 6.1 Macro process of a TAS mediated transaction.

In what follows we recall the requirements that have been elicited by analyzing the survey results and the exploratory focus group discussions. We group the re-

quirements under different headings on the basis of the main transaction steps they refer to. In the following, unless differently specified, when we use the term “user” we refer to a person irrespective of her role of Offerer or Requester.

a) Registration:

- The user must fill in a registration form to access the system and create her profile.
- The system must assign the user a default amount of hours (a sort of bonus) at registration time.

b) Offering services:

- The Offerer must describe the services that she is willing to provide in case of request
- The Offerer must upload to a shared calendar the services she is willing to provide.

c) Searching for an Offer :

- The Requester can see the Offerers’ availability.
- The Requester can see the Offerers’ profiles.
- The Requester can request for an Offer.
- The Requester can make a reservation request for an Offer at a particular date.
- The Requester can access the shared calendar to see the available Offers.

d) Managing the Commitments:

- An Offerer can accept the request to provide an Offer.
- The Offerer can accept a reservation request.
- An Offerer who receives a request for a reservation can confirm, cancel or ignore the request.

e) Managing a transaction:

- A Requester must acknowledge or refuse the actual provision of a service.
- A Requester must give an assessment of the quality, punctuality and skill of the Offerer who provided her a service.
- The system must add hours to the Offerer’s account and remove hour from the Receiver’s account after acknowledging the Offer.

f) Resolving a Conflict

- In case of a contested service, the administrator of the system must remove the amount of time that the Offerer spent for the actual provision of that service both from Offerer’s and Requester’s account.

These requirements helped us to construct a model for of the TAS prototype and to conceive its architecture: Figure 6.2, 6.3 and 6.4 show examples of the use case diagrams and the sequence diagrams that supported the development of the prototype.

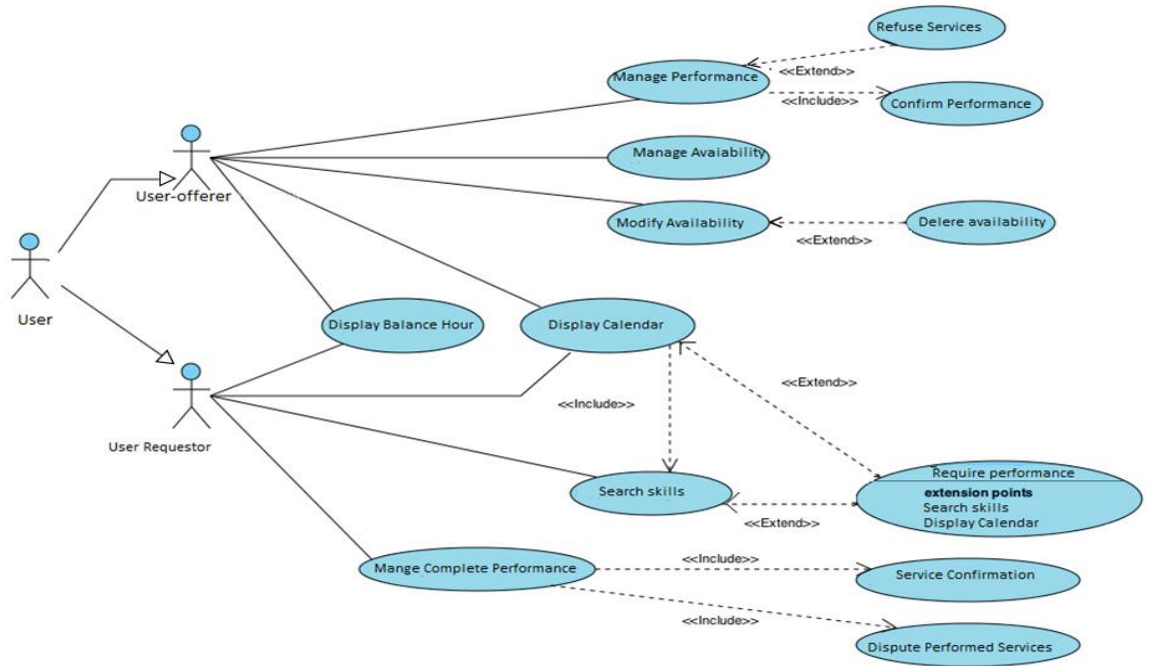


Figure: 6.2 The main use case diagram.

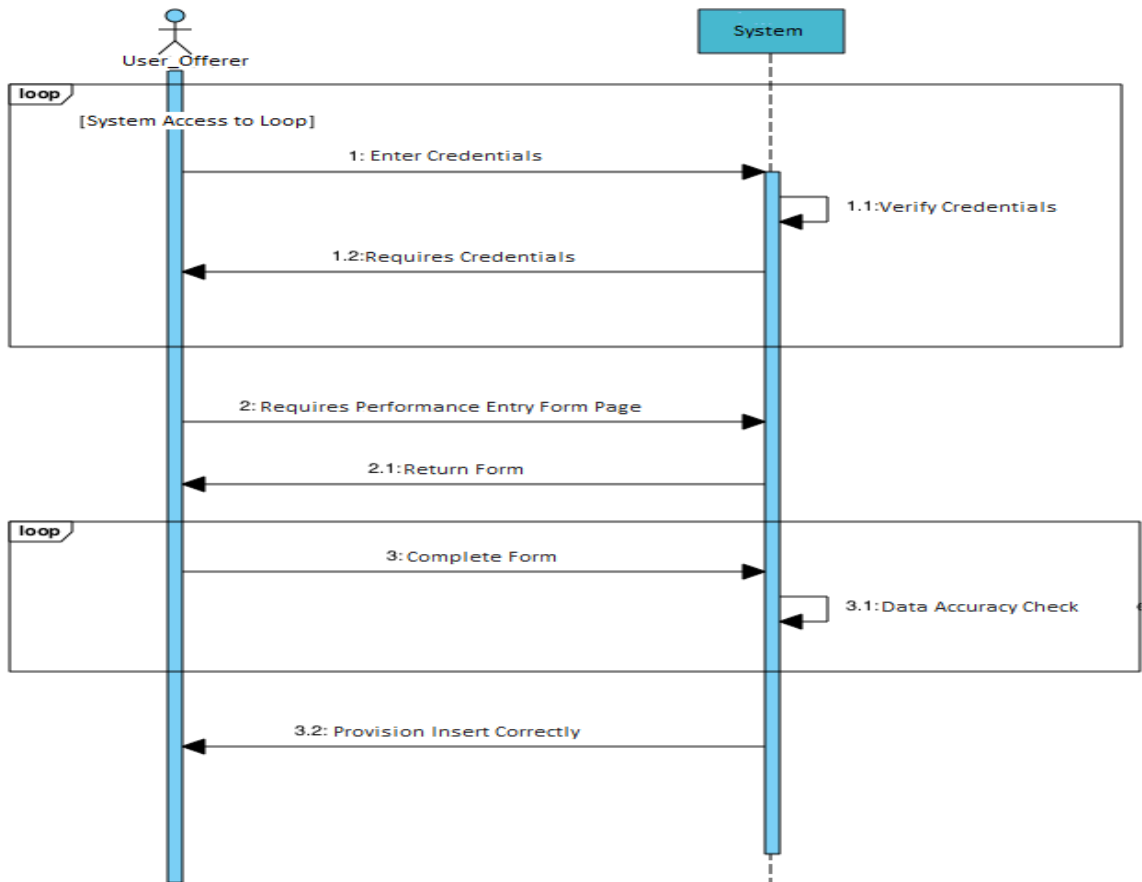


Figure: 6.3 The sequence diagram for an Offer.

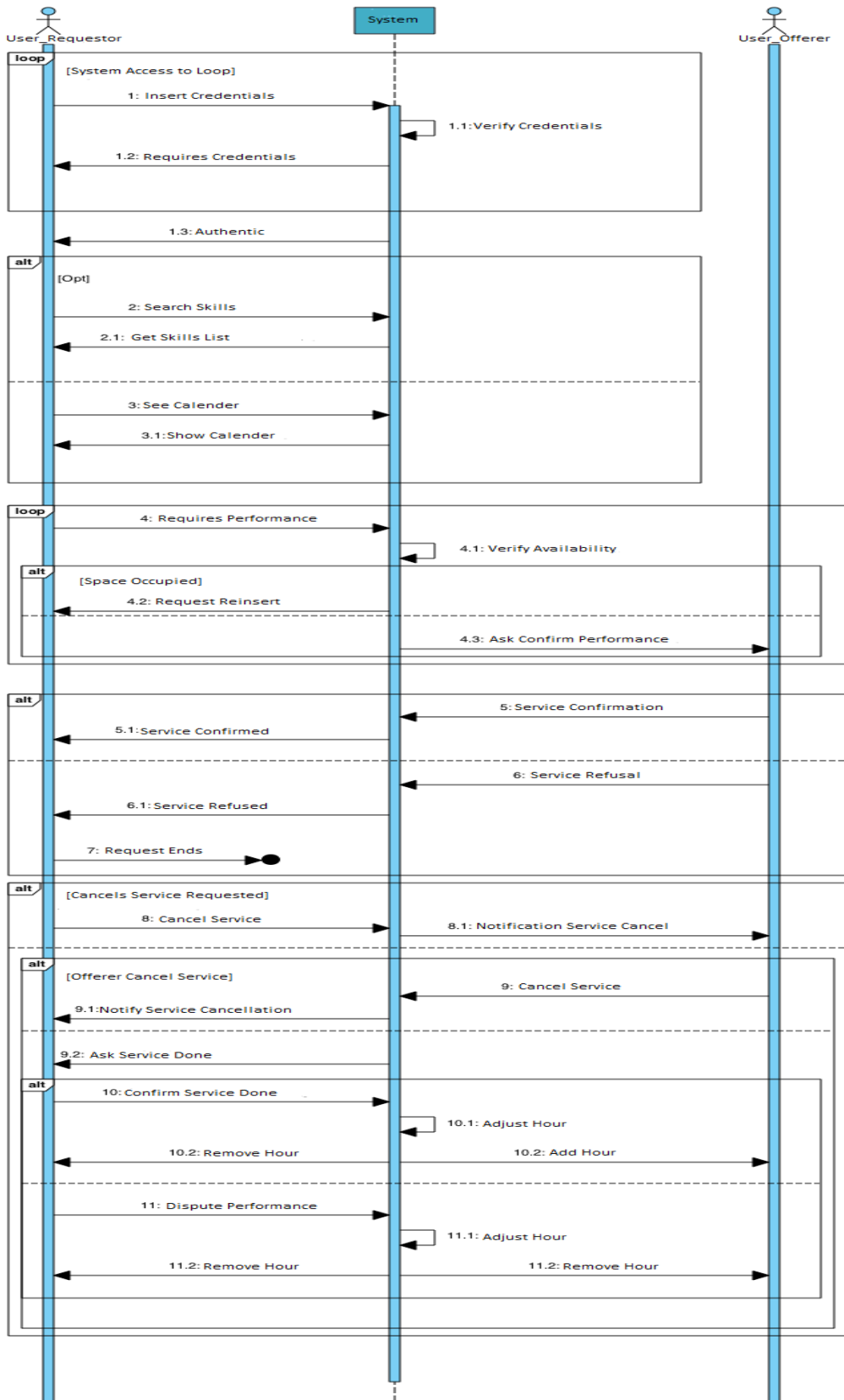


Figure: 6.4 The sequence diagram for a request for a 'Want'.

In the following section we provide a description of the main interfaces that support the operations that the user can perform.

6.2 Interface Controls and Operations

Before describing the various interfaces, it is worth saying that the construction of the prototype followed a basic principle: to focus on the more important functionalities related to the identified requirements and to avoid a too complex interaction style. The main motivation for this choice was the role of the prototype in our research trajectory, that is to confirm the relevance of the features that the involved participants requested and to let them concentrate more on the unfolding of the interaction more than on all possible cross-references among and presentation modalities of the pieces of information collected through the system.

6.2.1 Registration

A user can log into the portal of a TAS if he is already a registered user. A user can create a new account by entering a new username and password and in order to complete the registration, she must fill in a 'user profile' form where she must insert her name, email address, gender, date of birth, home address, and mobile number: the name, the email address, and the home address are the mandatory fields. In case, if a user forgets to fill in any mandatory field, she will receive an error message that indicates the missing mandatory fields. From the main page, a user can request a new password if he forgets it: in this case the system sends an email with a new safe password to the user email account. After the user is logged in to the portal, he can change its username and password.

6.2.2 Navigation

Through the specific navigation buttons a registered user can see the Zones, Offers, Wants, Transactions, Calendar and members list respectively. After accessing the zones list, a user must select one particular zone through the respective button (Figure: 6.5) to see the available Offers and Wants as well as the shared Calendar and Members list of that particular area.

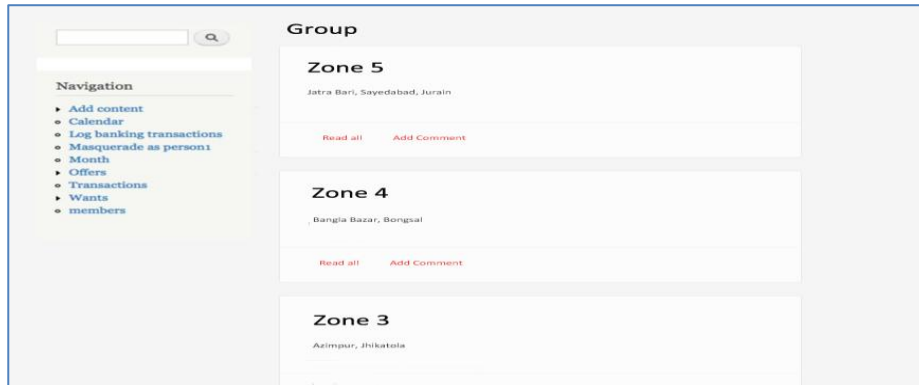


Figure:6.5 TAS shows different zones

6.2.3 Managing 'Offers' and 'Wants'

The user can add new Offers or Wants via the submenu Add Offer or Add Want respectively. The interface that the Offerer sees when he wants to add a new Offer is presented in Figure 6.6:

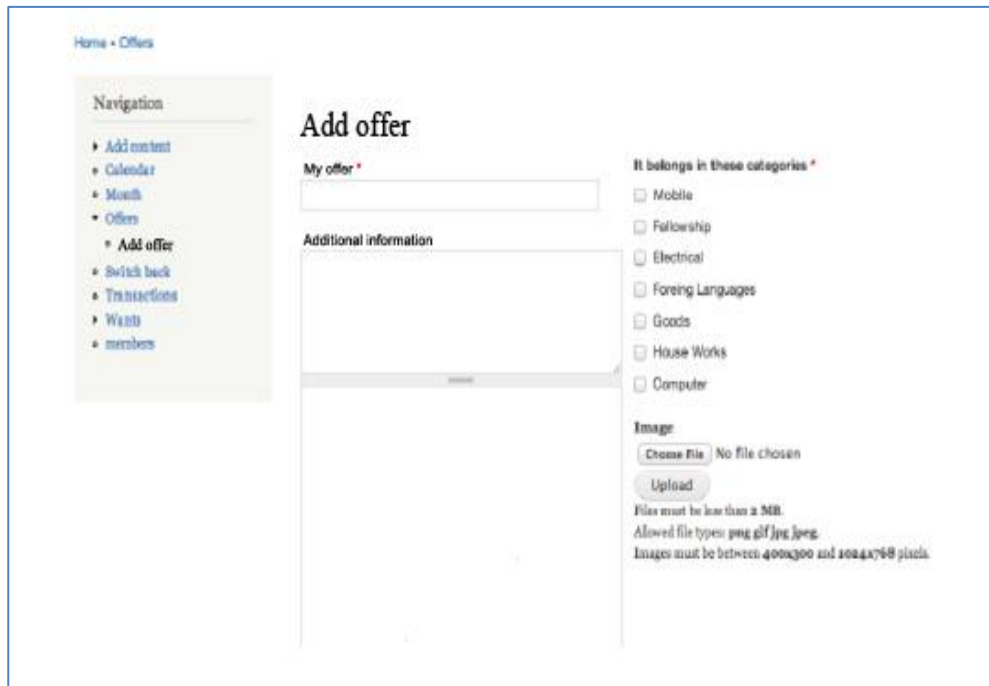


Figure: 6.6 Upload of a new 'Offer'.

In case of uploading an Offer, an Offerer must to provide some basic information. The Offerer has to complete the fields specifying the time, date, place, and the kind of service as mandatory information to describe her availability. If she wants to repeat the Offer regularly in the future, she has select the pertinent option.

Figure: 6.6 shows a partial view of the interface for adding an Offer. The management of mandatory fields remains the same in all cases, as described above.

For example, if an Offerer wants to post an Offer about “fixing television problems” he has to write this in the “My Offer” field, and specify the corresponding category i.e. Electrical, out of a predefined list of categories whose update is under the TAS administrator control. In doing so, the Offerer can also add information to better describe her competences in the text area called “Additional information”. This description could be helpful for the Requester to better interpret the kind of Offer and to take a decision whether he will request this Offer or not. For example, if an Offerer who is willing to do Babysitting and describes the fact that she has acquired the skill through her profession or she has training on Babysitting, obviously it will motivate the Requester to take a positive decision regarding receiving her Offer.

There are different categories of Offer, for example: Foreign language, Electrical, Household etc. and to each category can be associated different Offers e.g. English Lessons and Translation in Italian are two Offers under the “Foreign Language” category.

A similar interface appears when the Requester wants to insert a new Want. In this case the free text can help the Offerer that is available to fulfill this Want to better understand the conditions under which the service has to be provided, if the Requester added this information.

The interface that a Requester sees when she wants to access the list of available Offers is as in Figure 6.7. Each entry specifies who is offering what and the rating acquired by the Offerer in the course of her interactions with the systems. The rating is a weighted sum of the ratings acquired in the three basic dimensions (effectiveness, punctuality and politeness) that gives more relevance to effectiveness.

Description	Member	Category(s)	rating
fix noida	Mazumder	Mobile	☆☆☆☆☆ Average: 2.5 (2 votes)
fix tv	Hossain	Electrical	☆☆☆☆☆ Average: 4 (2 votes)
fix pc	Karim	Computer	☆☆☆☆☆ Average: 3.5 (2 votes)
fix iphone	Monsur	Mobile	☆☆☆☆☆ Average: 3 (1 vote)

Figure: 6.7 List of ‘Offer’s.

The Requester can find the available Offers also in the calendar, as each Offer is recorded in that information structure as well, and is reported in the related interface (Figure 6.8). The symmetrical situation is generated for the declared Wants that appear in the shared calendar interface as well.

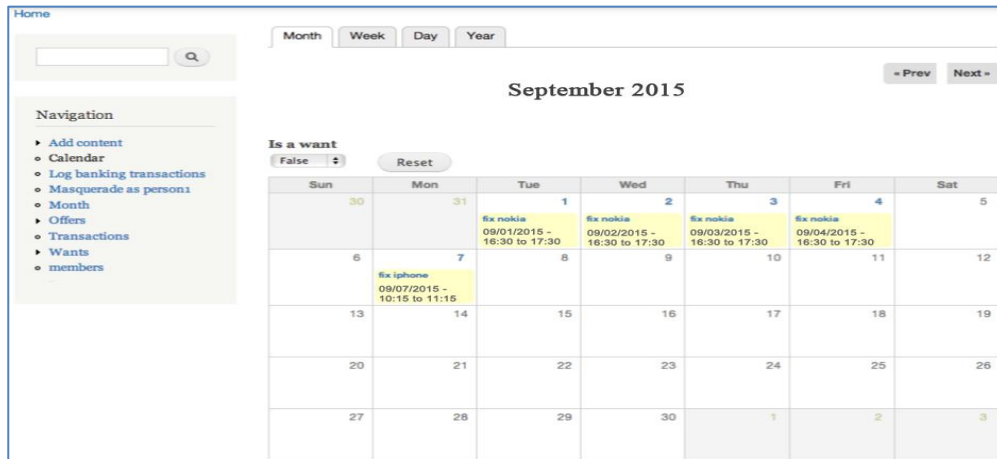


Figure: 6.8 ‘Offers’ in the calendar.

When a Requester declares her interest in one Offer, the corresponding Offerer gets a notification of this fact. Then the Offerer can accept or reject the request either by confirming or by ignoring it. The Offerer can send an email to the Requester, in the case he is unable to provide a service she committed to. If the Offerer is late in providing a service she is committed too, the system considers this situation as a refusal by the Requester.

The TAS application allows a Requester to reserve an Offer for a particular date via the “Register button, with the possibility to send an email to the Offerer. When an Offer at a particular time is requested by more than one Requester, the system creates a “Waiting List” for those requests (Figure 6.9). The Offerer can choose the Requester she is willing to serve. If one of the Requesters cancels her reservation, the Offerer can use the waiting list to choose the Requester she wants to serve, e.g. who reserved the service first or whoever she likes from the previous interactions with her.

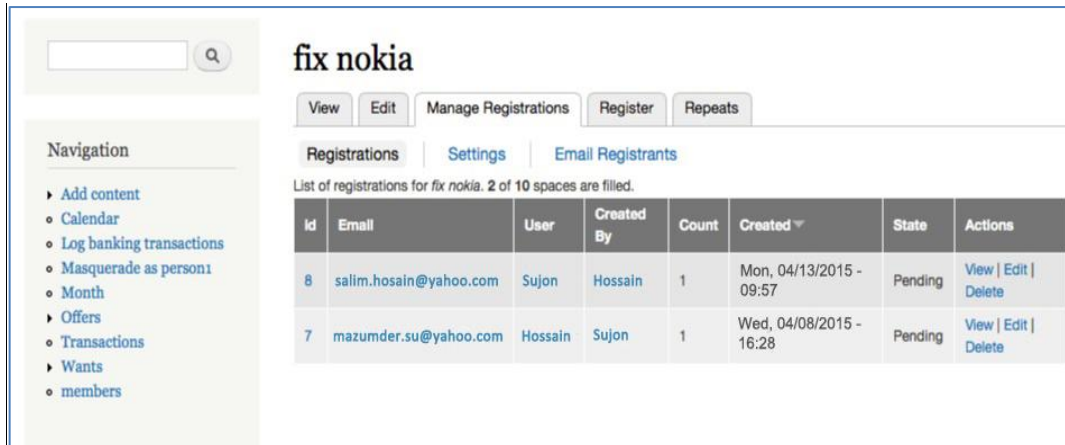


Figure: 6.9 Management of service reservation.

When an Offerer gets the notification of a request, she can decide to manage or ignore it. In the first case she can decide to accept it, cancel it, keep it in the waiting list or leave it pending for the time being. Figure: 6.10 shows how an Offerer decides to leave 'Pending' the Want of the Requester named 'Mohammed'.

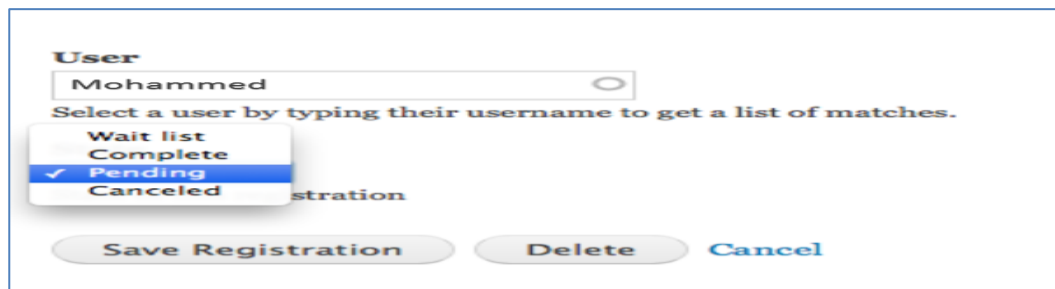


Figure: 6.10 Managing the status of reservation.

When an Offer reaches the maximum number of reservations, i.e. all the available slots for the Offers are reserved by different Requesters, a new Requester of that Offer gets a notification about the unavailability of that Offer. Figure 6.11) shows how a Requester gets this notification for the Offer 'fix tv'.



Figure: 6.11 Reservation provision expired.

6.2.4 Acknowledging an 'Offer'

After receiving a service by an Offerer, the Requester must acknowledge that Offer by declaring the amount of time that the Offerer spent for delivering the service. As mentioned above, when a requester acknowledges an Offer; she must evaluate the effectiveness, punctuality and politeness of the Offerer in fulfilling this commitment (Figure 6.12).

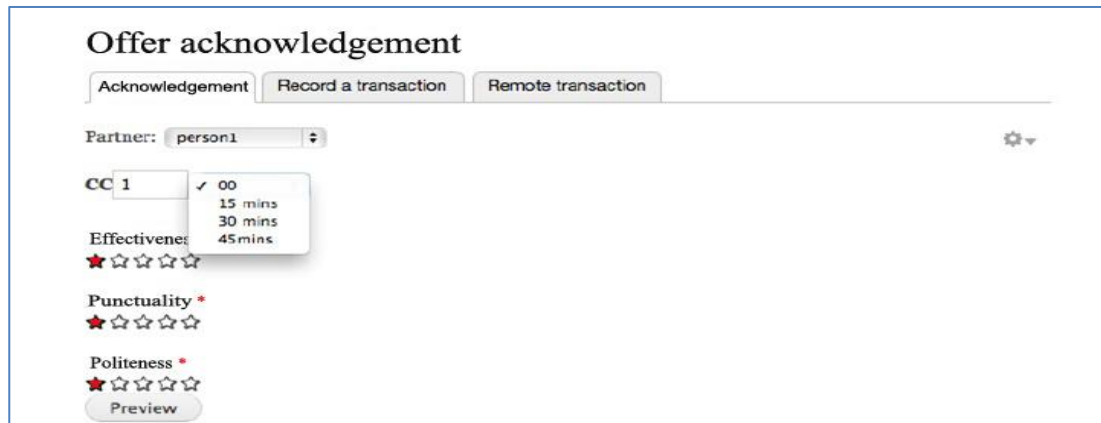


Figure: 6.12 Acknowledging the 'Offer' by endorsing 'time'.

At this point, the system will update the accounts of both parties (Offerer and Requester) by adding and subtracting the amount of time corresponding to the service at hand. If the Requester is late in acknowledging a service, the involved Offerer can solicit the acknowledgement to the Requester. The Requester can decide whether to acknowledge the service or contest it.

When an Offerer makes a request for acknowledgement, there are three states for this request: *Pending*: This is the case when the request has been made but it is in a waiting state for the confirmation by the Requester. *Completed*: This state means that the acknowledgment has been done and the time balance has been updated in both parties' accounts. *Refused*: This state means that the Requester does not want to acknowledge the service of the Offerer.

The refusal of a service by the Requester involves the administrator of the TAS, for resolving this conflict; in this case according to his decision the system will remove the appropriate amount of time from both parties account.

Each user can access her Account of Time (as in Figure 6.13) which shows the current balance of her given and received time and the related transactions; or the list of all services given and received through the button Offers&wants.

Unique serial number	Created	With	Expenditure	Income	Balance
3	01/21/2015 - 10:45	Sumon	CC1:00		CC0:00
2	03/16/2015 - 16:30	Rakib		CC1:00	CC1:00

2015

« Prev

Figure: 6.13 Balance of ‘time’.

6.3 Summary

This chapter has described the main functionalities of the prototype for a TAS which was developed based on the requirements that were derived from the survey results and exploratory focus group discussions (Chapter- 5). This prototype has been validated through other two focus group discussions and a usability testing which are reported in the following chapter.

Chapter 7: Field Study (Phase-II)

Validation of the Prototype

This chapter reports the validation phase of the prototype of a TAS. It describes two Confirmatory Focus Groups (CFGs) that were done to evaluate the functionalities of the prototype. During the EFGs, we discovered that a TAS should have certain features in terms of functionalities in order to be introduced as an idea in Bangladesh. For this purpose, through these CFGs, we evaluated whether the requirements which were derived from the EFGs are met or not. Besides, this chapter summarizes the findings of the usability testing of the interface of the prototype. We followed two separate methods for validating the prototype for two reasons. The main objective of these CFGs is to confirm that the idea of a TAS could be accepted (not necessarily with this prototype) which has been designed based on the requirements of the real users considering the local social context. In this case, we did not use the real prototype as this could hamper our objective in case the participants get more interested in the look and feel of the interface rather than the main idea of a TAS. In what follows, we first describe the procedure and results of the CFGs and then we report the usability testing results.

7.1 The Confirmatory Focus Groups (CFGs)

We organized and moderated two confirmatory focus group discussions in Milan in September 2015. The group discussions were conducted adopting the methodology proposed by (Chiarini et al., 2010) to evaluate the prototype of the TAS. The focus groups involved twelve participants, lasting four hours altogether. These participants were selected from the pool of participants who participated in the previous EFG discussions that we conducted in Summer 2014 for introducing TAS concept among the Bangladeshi people and for eliciting the user requirement considering the local social context (Chapter: 5). The 12 participants were selected and divided in 2 focus groups of 6 participants each, so that the groups were all homogeneous with respect to gender, age, use of smart phone and employment condition as summarized in Table 7.1.

Gender	1 Male & 1 Female	1 Male & 1 Female	1 Male & 1 Female
Age	<25	25-44	45-64
Smart Phone User	User	User	User
Employment Status	Unemployed	Employed	Employed Unemployed

Table: 7.1 The composition of each confirmatory focus group (CFG).

We invited the participants to evaluate and discuss whether their previous requirements were met and if the sequences of steps were sensible and reasonable to complete a task. Discussions were done in a quiet room in which only the participants, the observer and the moderator were present, and the discussions were audio recorded for successive analysis. We started our discussion by briefing about our objectives to the participants; then we showed them a PowerPoint presentation.

In that presentation, the slides contained different screenshots of the prototype. 12 such slides were displayed, representing the procedure of completing different tasks for making a transaction through a TAS. In this case, we used the screenshots of tasks related to the issues which have been found very crucial during EFGs since the idea of a TAS would have been accepted if such issues could have been addressed through the system. Recall that the respondents were very aware about becoming in contact with strangers' through the system: they were very concerned about the identity of the TAS users since they are likely to receive or provide a service through a TAS if they can rely on the service receiver or the provider. Moreover, they were also interested in the system that will help them to select their own zone for a service. There were two main reasons for that requirement: in this case, the members of a TAS will be someone who is familiar to them as they will be from their own community (which will also address the identity issue) and the help that they might need through a TAS can be given mostly by the neighbors. Moreover, they were also very willing to have the possibility to reserve services as they are very busy in their daily lives. Therefore, we took the snapshots that were related to these particular issues and showed how those issues have been addressed in the prototype by answering any question about the information given in the slides.

The discussions were organized according to specific questions for evaluating the prototype against the objectives mentioned above leaving however room to the spontaneous questions. All questions were phrased in an open-ended manner so that they could express their opinions freely.

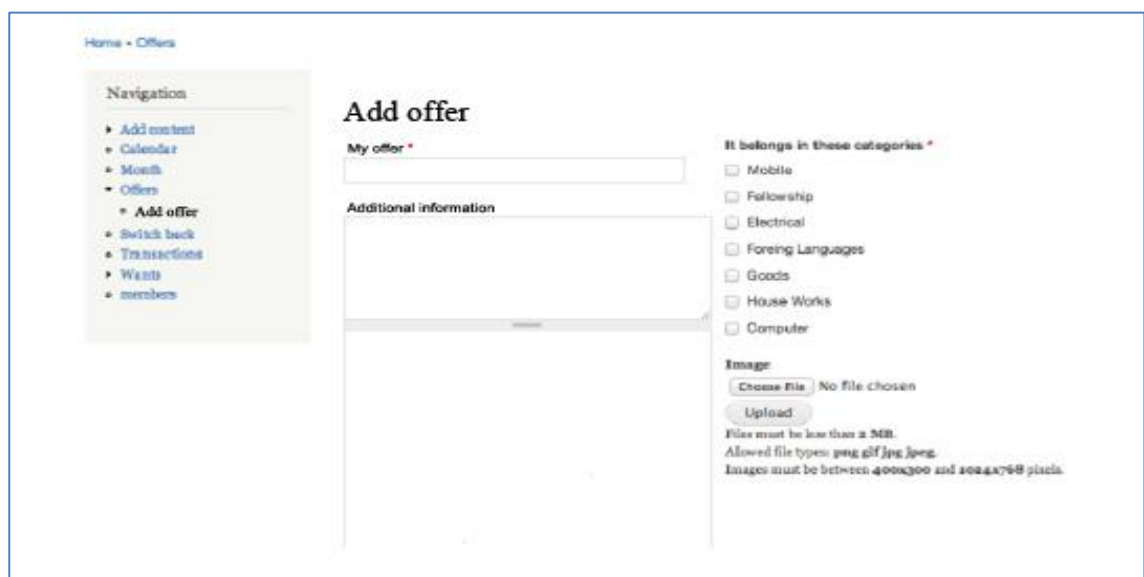


Figure: 7.1 Example of screenshot of the prototype used for CFGs.

7.2. Data Analysis and Findings

The tape recordings were transcribed at the conclusions of the each discussion. During the transcription we assign each participant with unique identification number e.g. P1, P2 etc. We then performed content analysis to identify themes and elements of interest (Fereday & Muir-Cochrane, 2008). The detailed analysis of the discussions is reported in the next sections where we group the relevant passages under three themes with supporting quotations and discuss them accordingly.

Technical Issues		Nontechnical Issues
Crucial previous requirements	The new requirements	Reinforcing previous concerns
-User's Identity -Zone Selection -Service reservation	- Intra-zone time transfer or intra-member time transfer -Support understanding -Ways to increase security	-Promotion and motivation

Table 7.2: The main theme with sub-topics emerging from the CFGs.

7.2.1. Crucial Previous Requirements

All of the participants acknowledged that the prototype has complied with the requirements; the sequences are easy to follow and clear to understand. The recent changes in the technological environment in Bangladesh would accelerate the possibility of grasping the idea of TAS in its present form.

P5: "Nowadays people are used to with using online services for bus or train ticket or they pay their bill online.....the procedure seems more similar to hotel booking...so I think it is easy to understand...and Facebooking makes it much easier..."

P1: "If they came to know that they can get the information from the search button, to me....it is as simple as anything...."

Since people are getting more familiar with technology day by day, the concept will not be very complex to the people who are familiar with similar activities. However, the discussants raised the issue about the people who are not very familiar with technology with a positive attitude that they could be supported by other people. Indeed, we already explored in the EFGs the fact that people who are not

comfortable with using online system for receiving any service, particularly who are our main target - the elderly people, might have been supported by the family members as the procedure seems very simple. This issue was repeated in this discussion as well.

P9: "They can ask to any family members....in the urban area it will not be a problem at all... but in the rural area, it may happen that the only mobile holder is out of home...in this case if there is any nominated person by the coordinator can solve this problem...."

However, we got some new ideas to be considered as new requirements that we described under the theme 'New requirements' in the following section.

In our previous discussion we found that people were very concerned about the security issue and preferred to receive help from the members of their own zone. These CFG discussions acknowledged that the present prototype seems reasonable to reduce the wariness about this issue.

P5: "In fact, if I can check the user profile, it is ok for meand if they are from my same area, I am more relaxed...and now we can check the area first, this makes my task easy....."

Though the discussants agreed on the fact that the present prototype is good enough to meet the requirements about security issue, interestingly they came up with new ideas that can be considered as new requirements for the security issues and to take decision in case of selecting the service providers.

7.2.2. The New Requirements

After confirming the fact that the present prototype of TAS has complied with their previous requirements, a second theme emerged regarding 'security issue' and 'easy to understand' as optional or new requirement for its adoption. As part of local culture, people usually consider a female and an old person less risky in case of allowing them to enter into their house. This was linked to the security issue as one participant said:

P8: "....If the age and the gender can be seen from the user profile, it would be better; I can decide whether I will prefer to select a male or female for receiving help in cooking..."

This was explained by another participant as follows:

P12: "....Certainly I will prefer a male when the service will not be provided in my house, and in case, if I need to allow someone to enter into my house, I would prefer someone of my father's age..."

While age is identified as a crucial factor for the security issue (the older, the safer), it is also recognized that the younger are more suitable as service provider of some specific services as it was put by one participant:

P8: "...Not only for security issue, it would be better if I can see the age when I need to ask for such help that require physical labor, for example bring water or sack of rice from the shop...."

Apart from the security issue, some of the participants were concerned with understanding the language if it is only in Bengali or in English. In order to get more acceptability and popularity, they opined that the interface should be in both languages.

P12: "...I always prefer to read Bengali for better understanding but I prefer to write in English on computer, because it takes me much time when I write in Bengali on computer, I get used to with writing English....."

This opinion was supported by another participant:

P10: "...yes...when I read online newspaper.....I usually read the Bengali one....it is comfortable and easy to understand...so it is better, if there is both...."

These opinions could be explained in terms of socio-cultural and technological factor related to discomfort in typing Bengali alphabet. This is obvious that people are comfortable in their mother tongue in any case of speaking, reading or writing. However, if anyone wants to write Bengali alphabet on mobile phone or computer, he needs specialized software that supports the Bengali alphabet. Moreover, the peculiar pronunciation of the Bengali alphabet makes it more difficult (Sarcar, Ghosh, Saha, & Samanta, 2010) to write. As a consequence, users prefer to use English alphabet for writing Bengali, e.g. AAMI, which means 'I' instead of writing the same in the Bengali alphabet. Moreover, it is found that this pattern of writing helps them to express what they want to say in a better way than writing in English (Aminuzzaman, 2005).

At present the interface of the prototype is in English and it was done based on the information collected during EFGs as the participants expressed the fact that they are not comfortable in using Bengali alphabet when they type or text any message. The same opinion was also found in this discussion. However, considering the issue of acceptability of the concept of a TAS, they opined for both languages for the interface.

Participants reported that, although most of the activities were simple and easy to understand, it would be better to have detailed information about a TAS and a VDO tutorial regarding how to use the system: this would be more useful for making the usage simpler for a visitor or for the first time user of the system.

P2: "... It seems very easy to me, activities look like what we usually do for hotel booking....few days back, I used AirBnB for searching accommodation for personal reason...the procedure was the same.....if you want to make the things easier, you can make a link for VDO tutorial for different task.....it will be easier...[]....I personally do this...if I find any difficulty in doing something...I search in YouTube...when I watch the VDO clip on that issue...it seems simpler....."

This idea was appreciated by the other participants and who also added:

P5: “...or you can have a page for information...like, information related to offer a service, information related to complete a transaction...like these...you can put one star sign and give a button how to do this...how to do that...one can easily do it independently”

The discussion then moved to the problem of the digital divide: what would happen to the people who do not have internet facilities or who have limited facilities. The people who live in the urban area are in an advantaged position comparing with the people who live in rural areas. The solution was also proposed by the discussants. They agreed on the fact that possessing a mobile phone in every household is no longer a new phenomenon. TAS can be accepted and used by all if there is a provision for mobile notification for the required service.

P10: “...One can easily post his skill with the help of others.....in this case if he gets a mobile notification that someone is looking for his service, he knows his information regarding his skill and availability....he can provide that service accordingly....”

Since many people do not afford internet and smartphone, it is easily understandable why participants opted for mobile notification for the involvement of the users. Then the main point here was the high diffusion of mobile phone could be an influencing factor in terms of acceptability of TAS.

Participants came up with the idea of providing online services (e.g. through skype) as they discussed before in the EFGs. However, we did not take it into consideration during the design phase as we did not find together with the discussants any solution for evaluating this kind of service, i.e. how the service will be measured in terms of time in this case. In this phase, we discussed again on this issue and did not get any result for solving the issue.

Last but not least, the most surprising and interesting idea raised by the discussants was about transfer of ‘Time credit’ to another area or another member. The groups were so enthusiastic about the concept that they discussed about the possibilities and necessities of using ‘Time balance’ for their near and dear one: on one hand, they consider this option could have helped them to get rid of guilty feelings that they conceived for not being beside their old parents, on the other hand, they perceived that this could facilitate them to receive help from others in their need.

P5: “...I think there should be an option for using the points for our family members who are living in Bangladesh...you know, sometimes I feel very sad that am not in a position to help my parents in their work or to be with them in their need....I am earning money here...sending for them....but I am not there..... And they have some difficulties in their everyday needs.....which cannot be solved by money....they look for someone who can help them to go to town and to visit doctor....seek help from my relatives for this task..., or they do shopping by themselves, it seems that I am doing nothing for them...there is no value of my money.....I

mean...if I can use my credit to receive help from someone in Bangladesh who can help my parents in their shopping...would be great.....”

We consider this idea as one of the best outcomes of this phase since this could help the people keeping in touch even if they are situated at a distance from each other due to livelihood or other reasons. In fact, there are around 0.1 million Bangladeshi people living in Italy and they form one of the largest immigrant populations in this country. Livelihood is considered as one of the main reasons for this migration. Most of these people are involved in formal and informal employment and they send money to their family back in Bangladesh. A TAS with the ‘Time transfer’ capability is perceived as a bridge between this migrant people and their relatives in their home country in keeping and fostering their relationship: they think that ‘Time transfer’ is as important as their money transfer activities. Moreover, this idea shows the potential of a TAS as a tool for social capital development beyond the scope of small neighborhood.

7.3.3. Reinforcing Previous Concerns

Despite the fact that we tried to keep our discussion within the track of acceptability of a TAS considering the sequence and workflow of the prototype, some of the participants were concerned with the mentality of the Bangladeshi people and their awareness about the TAS mechanism.

The discussants stressed on the possibility of misunderstanding about the valuation of service in the ‘same unit of time’ scale since, people are used to evaluate physical labor and mental labor differently: this might raise some problems at the inception stage of the idea.

P5: “.....If someone brings a bag of 20kg to my house in 15 minutes and another person can fix a problem of my mobile phone in 15 minutes, how can you evaluate it in the same scale....people may not accept this easily....”

This wariness was also flanked by the fear of any abuse of the system by the users:

P6: “...I think it is necessary to submit at least one paper document to the coordinator or to any specified person so that the person could be traced in case of any possible abuse...”

However, these kinds of possibilities were refuted by the other participants, as it was put by another participant:

P2: “I think in voluntary activities people will not do such immoral activities....because they will come voluntarily...no one will punish him if he does not help others.....anyway, in the worst case you can think for the photocopy National ID....which is very unique”

Furthermore, the participants made a link between the voluntary attitude behind the participation in a TAS and religious viewpoint for negating the idea of abuse:

P2: "...Usually, when we come forward to help others voluntarily, religious view works within our brain, i.e. if we do something good for others, I will get a good return from Allah...so I think if someone involves in this system, will not have that bad intention..."

Irrespective of its link with religion, the usefulness and the necessity of TAS was discussed in regard to its acceptability in Bangladesh.

P7: ".....In fact, religion came after society, in the primitive time, there was no religion, but there was society.....people helped each other, this cooperation helped to build the society.....so.....different people will join with different inspiration.....it will give different types of utilities to different types of people...."

However, strategies for motivating people to get involved in a TAS and retaining them came in the discussions. The participants discussed about the possibilities of integrating low-priced product in the exchanges through the system in order to involve more people in its activities.

P10: "...In my opinion, low income people will be involved in this system if they find something visible...for example....if the system gives the provision to get a pen in exchange of 10 Time points....for example.....there are many people in our country to whom a pen means a lot....."

Yet, the decision of how to evaluate the value of a pen against Time credits is another point to take into consideration. Again, the answer of the prompt question of who will pay for the product came from the discussant:

P7: "...the coordinator of a TAS can negotiate with the large companies...they are spending a lot of money in the name of corporate social responsibility....these companies can sponsor product for a TAS...this is a noble initiative...companies can come forward to help in this initiative..."

Along the same line, the discussants raised the issue about who will pay for the materials and tools that are needed to deliver a service and that cannot be paid in terms of time credits.

Definitely, the coordinator or the initiator of a TAS has to work hard for the most of the non-technical issues like promoting the ideas to make it familiar to the mass people and motivating the participants to join in the system. Besides, the idea of merging tangible products within a TAS for involving more people as well as the use of the normal currency for some specific reasons is an innovative one in relation to the TAS applications reported in the literature; however, these extensions could make the concept of a TAS more complex at the time of its inception in Bangladesh.

7.3 Discussion of the CFGs

We evaluate the prototype of a TAS as a proof of concept to be introduced in Bangladesh. The findings can be discussed considering two major dimensions: effectiveness, i.e. to what extent the prototype seems sensible to complete a particular task on a TAS; and satisfaction, i.e. to what extent the prototype seems compatible with the requirements of the participants. In general, both groups confirmed that the prototype seemed reasonable and sensible to complete a particular task for accomplishing a transaction through TA and the requirements expressed in the Exploratory Focus Groups were met. It showed a general satisfaction with the prototype.

Participants raised many issues in respect to ‘security’, ‘comfort with technology’ and ‘easy to understand’ and related issues. Despite the fact that the present prototype satisfies the participants in terms of achieving the goal of a TAS which was built with special attention to local socio-cultural and technological condition, they came up with new ideas and therefore show the direction for further work.

Finally we can say that, the overall discussion indicates that the prototype has complied with the requirements elicited in the EFGs. Moreover, there is a positive and constructive attitude among the participants towards the idea of a TAS. The participants were found very interested in a TAS and to get involved in a TAS if there is any one available; they came up with the very visionary idea of transferring Time credits between the areas and between the members of the system living in Bangladesh. They felt that this option would add extra value to the acceptability and use of TAS in that country.

In the following section, we describe the usability testing method and report the results for the prototype of a TAS.

7.4 Usability Testing of the Prototype

Our main objective of the usability testing was to know how the users feel when they use the prototype of a TAS: this would help us to identify the usability problem with the interface of the prototype. We adopted Heuristic Evaluation method for the usability testing that we described in Chapter 3. We involved five users for this usability test who have some experience of usability testing. Three of them were software engineers and two were students in Information Systems. They evaluated the interface independently and generated separate list of heuristic violations according to the ten standard heuristic principles: visibility, match between the system and the real world, user control and freedom, consistency and standards, flexibility and efficiency of use, aesthetic and minimalist design, error prevention, recognition rather than recall, help user recognize, diagnose and recover from the error, and help and documentation (Nielsen, 1992, 1994c) (as mentioned in Chapter 3).

At the beginning of the evaluation, we recall them how to consider each principle during the evaluation of the interface. This training session took around 1 hour. Then we gave each user a template with the list of heuristics and asked them to identify at which point of the interface a heuristic is violated and to note it down. They were also asked to describe the reason why they considered that point as a problem and violation of heuristic. We also asked them to identify the phases where they encountered the problems and also to assess the severity of each usability problem. There was an observer who assisted the evaluators in operating the interface when they faced any problem. At the end of the interface evaluation, the evaluators' reports were collected and the descriptions of usability problems were synthesized. Each evaluator provided individual severity ratings independently of the other four evaluators. When the independent analysis was completed, the results of the analyses were combined to the most complete set of interface problems. We completed the whole procedure in two days which took around 14 hours.

7.4.1. The Results of Usability Testing

Through this usability testing, we found that heuristics were violated a total of 28 times. *Recognition rather than recall* (9) and *Help and documentation* (6) were the most frequently violated heuristics. The next table (Table 7.3) shows some examples of usability problems for the prototype along with their corresponding violation and the phases where the problems were found. It was found that a single usability problem resulted in violation of multiple heuristics. For example, Option for Euro in case of acknowledgement violates 'consistency and standards' as a TAS is all about time and no monetary transaction is there: so at first sight the evaluator got confused about it; and it also violates the heuristic of aesthetic and minimalist design because this additional information hampers the importance and visibility of the needed information.

Places of Occurrences	Usability Problems	Heuristic Violation
Home Page	<p>-There is no information about TAS, a visitor will not understand what is TAS about</p> <p>-It is not clear what does a group mean because there are zones under the group, the general perception of group is it is about people</p>	<p>Match between the system and the real world, Recognition rather than recall</p> <p>-Match between the system and the real world, Recognition rather than recall</p>
Navigation	-After registration a novice user will not understand anything from Add content menu	- Match between the system and the real world; Flexibility and efficiency of use; Recognition and recall; Help and Documentation
Managing Offer and Want	<p>-Past dates of the calendar is not blocked, no error message has been shown in case of selecting past date for posting an Offer</p> <p>-A map appears when an Offer or Want is selected as additional information</p> <p>-There is no back option for any task</p>	<p>-Error prevention</p> <p>-Aesthetic and minimalist design</p> <p>-User control and freedom</p>
Acknowledging the Offer	-There is option for Euro	-Consistency and standard; Aesthetic and minimalist design;

Table: 7.3: Seven usability problems out of twenty one and heuristic violation for a TAS.

Figure7.2 summarizes the severity of the usability problems found in the prototype of the TAS. We adopted a 5 point scale for severity ratings as suggested in (Nielsen, 1994b) : a severity rating equals to 4 refers the severity of the problem as Usability Catastrophe (imperative to fix the problem before the product can be released); a severity rating equals to 3 is Major Usability Problem (important to fix, so high priority should be given); a severity rating equals to 2 is Minor Usability Problem (fixing this problem should be given low priority), a severity rating equals to 1 refers to cosmetic problem only (need not be fixed unless extra time is available on the project)and a severity rating equals to 0 means it is not a usability problem. Since the mean value of the set of ratings of the usability problems of the five evaluators ranges from 0.2 to 3.8, we divided the severity ratings into four scales: Catastrophe ≥ 3.5 , Major ≥ 2.5 , Minor ≥ 1.5 and Cosmetic < 1.5

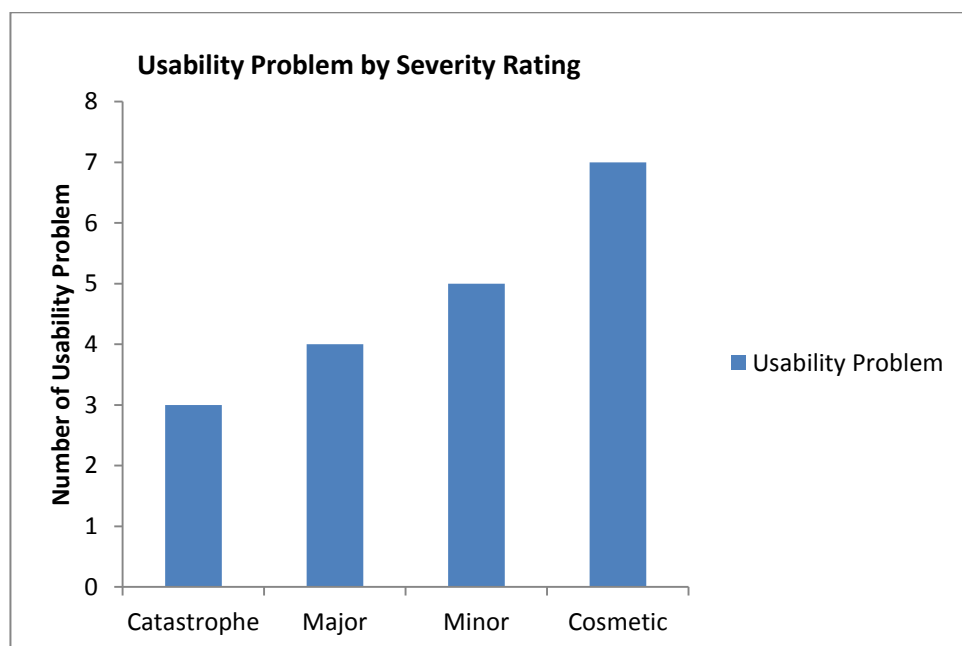


Figure7.2 Usability problems by severity rating of TAS

For the prototype, there were 3 catastrophes, 4 major, 5 minor and 7 cosmetic problems. There were 2 problems that violated heuristic, but in the aggregated result they were not considered as usability problems. For example, the option for logging out is placed at the bottom of the webpage which is usually placed at the top of the webpage; in this case, in terms of heuristic violation there is a mismatch between the system and real world as it did not follow the convention.

Following figure (Figure: 7.3) shows the usability problems and the average severity rating in terms of place of occurrence.

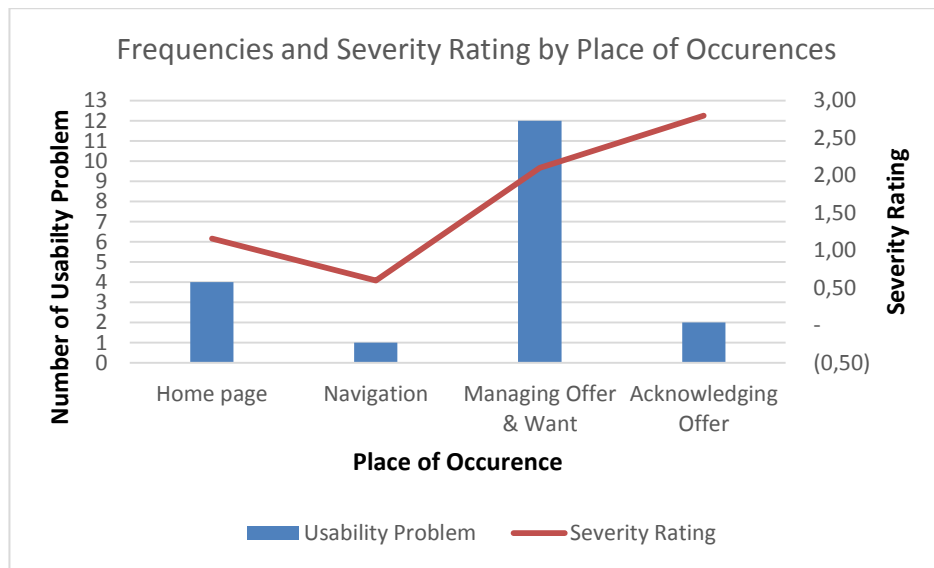


Figure: 7.3 Number of usability problems and severity ratings by place of occurrences.

The most numbers of usability problems occur in managing Offer and Want; though the number of usability problems in acknowledging Offer is very few (2) the severity rating is the highest in this case which is 2.8. The average severity ratings by place of occurrence for four places were in between 0.6 to 2.8.

Hence, we need to address the usability problems found in the process particularly the catastrophes and the major one. Since, there are very few catastrophes in the interface and severity rating is high for the usability problems for one particular case (acknowledging the Offer) with only usability problems, these problems could be fixed within a reasonable time.

7.5 Summary

This chapter has described the validation procedure of the prototype for a Time Accounting System (TAS) through two CFGs and a usability testing. This phase of research has ensured the fact that the prototype has been designed and developed by addressing the techno-organizational structures within the context of Bangladesh and the idea of a TAS could be introduced in Bangladesh where people are in the middle of a socio-demographic transition.

Chapter 8: Main Contributions and Future Research Directions

This chapter presents the conclusions of the research presented in the previous chapters. A critical summary of the whole research process is provided in section 8.1 in the aim to clarify the main problems and the difficulties the research had to face and the related impacts. Then, Section 8.2 discusses the overall contributions of the research at the conceptual and application levels. The limitations of this study are discussed in Section 8.3 that is followed by the directions of our future research that are sketched in Section 8.4 and Section 8.5.

8.1 Research Summary

The systematic survey of the literature reported in Chapter 2 showed that the adoption of technologies in support of local communities in developing countries is quite limited, especially when new forms of collaboration are involved. This fact together with the increasing diffusion and adoption of ICT tools and devices (especially social network applications) create the conditions to investigate whether these ICT supports can be used in these countries beyond the simple aim of increasing socialization among the community members toward the improvement of their life conditions in presence of a rapid and irreversible change of the family structure in these countries.

A specific kind of applications, that are called Time Accounting Systems (TAS), offered the opportunity to investigate the above mentioned possibility. In fact these applications, that are currently almost absent in the developing countries, play an increasingly relevant role in the western countries in alleviating the problems that these two different settings are likely to share in the future in consequence of the economical crisis that generates unemployment and the aging of their populations. Since this research theme is new and there are no experiences to be leveraged in this research effort, and more fundamentally because every local conditions can determine different outcomes, our choice was to focus our research on a specific country, Bangladesh, that is interesting for its positive attitude towards innovation and could allow an easier research design since the author of this thesis lives in Bangladesh and therefore has strong personal motivations in this research. The research design was guided by the research questions and objectives that have been defined in the introductory chapter: to this aim it had to address a number of methodological and practical problems.

The first kind of problem was particularly crucial as in any step of the investigation because there was always the risk to introduce, although unaware, the western perspective in our research practices. In fact all the available methodologies as well as the experience of their applications have been conceived and lived in the western countries. The presence of a native Bengali person in the research team was helpful but could not fully let us avoid this risk. The reflections offered by the Post-

colonial Computing discourse illustrated in Chapter 3 were illuminating and constituted a point of reference in our research trajectory.

On the other hand the practical problems were related to the constraints to perform the necessary research activities within the time span of a PhD program and more importantly to organize them in two different countries, Italy and Bangladesh, in order to have a direct contact with the prospective users of a TAS application.

These difficulties had some mixed effects. On the one hand the research trajectory had to be stopped before the developed prototype could be deployed and experimented in the wild; on the other hand, the above logistic problems allowed us to come in contact with two distinct groups of Bengali people: those living in their country and those who in the recent years moved to Italy. These two groups share the same basic culture and the concerns that are motivated by their common experience to live in an urban area. This fact made it possible to consider them as homogeneous enough to guarantee the soundness of our research outcomes. On the other hand, the difference caused by their living in two different regions belonging to two continents generated complementary considerations about how a TAS application could better support the time-based exchange of services among communities' members.

8.2 Contribution of the Research

The more general contribution of this research is to have investigated a problem that, to our knowledge, was not yet taken into account. In this respect, it opens a new line of research within the stream that investigates the potentialities, the limitations and the constraints of the adoption of collaborative technologies in developing countries. More specifically, this research offers new insights both at the theoretically and application levels.

8.2.1 Theoretical Contribution

From the theoretical perspective, the research design guiding the undertaken investigation is an application of the Postcolonial Computing approach (to our knowledge the first one reported in its entirety). Moreover, it is an empirical proof of its validity in terms of “productivity”, although the design trajectory could not reach its full accomplishment.

The Postcolonial Computing approach is characterized by the notion of hybridization (as documented in Chapter 3). In our experience the hybridization of the different backgrounds, both within the research team and between it and the target population produced an innovative result, besides confirming the outcomes that have been reported in the literature about TAS adoption. Indeed, this class of systems can be useful beyond the two standard target problems: unemployment and the aging society. It can be useful also for wealthy people who are “poor in time” as reported in Chapter 5. This outcome can give a more comprehensive view of TAS

applicability also in western countries, if this phenomenon will be confirmed there. In any case, it raises an unprecedented research question about the TAS concept as articulated in these countries.

The Postcolonial Computing approach claims also that the well-known “western” methods have to be adapted and new methods could be invented. Our experience shows that in new situations like the one dealt with in our research the classic methodological approaches and their tools cannot be taken for granted and directly applied. Only the general foundation principles, like the central role of the users in design and the iterative nature of the latter to refine the features of the solution as in our case, can be preserved. The methods and tools have to be combined and adapted to cope with the complexity and the constraints of the target setting, in our case a wide number of people in Bangladesh for the survey and the focus groups in different countries as mentioned above.

8.2.2 Contribution at the Application Level

The hybridization proposed by the Postcolonial Computing approach was productive also in terms of some functionalities that are innovative with respect to those incorporated in the TAS applications that are in use in the western countries.

The habits of the population living in the considered urban areas in Bangladesh let emerge an innovative requirement for a TAS application: the application should allow one to transfer credits across communities living in an urban area in order to extend the usefulness of the system to people who commute, typically for work sake. On the other hand, the people living in Italy extended this requirement to allow the interaction among TAS systems across the continents. The leading idea was the same, i.e. is some form of TAS systems integration, however at a different scale.

This integration could make sense also for the populations living in western countries (again if this need is confirmed) as mobility is increasing and TAS applications deployed there could offer a better both to native people and to the migrants as these latter could help their relatives and friends in their native countries: a very interesting possibility due to the migration phenomenon and the related problem of integration that is crucial in these days, especially in Europe.

Last, the study uncovered the need to relate the TAS mechanism to the standard economy in an original way. In western countries solutions this means to integration of forms of payment in the institutional currency to make the system more attractive for a larger target of users; in Bangladesh this integration concerns the need to make available to the service offerer the basic amount of money that is needed for the acquisition of the tools necessary to deliver the service: the work effort should still be rewarded according to the TAS principles. Again this is a complementary view that basically shows how poverty can take different connotations in both situations, depending on the people’s need, possibly with different local perception and emphasis.

8.3 Limitations of the Study

Despite the contributions illustrated in the previous section, this research has two main limitations. The first limitation concerns the focus of the study on urban areas only. This choice has been motivated in Chapter 5. However, part of the Bengali population lives in rural areas. In order to fully account for the usefulness of the TAS concept in Bangladesh also these setting should be investigated. We have however to acknowledge that the people involved by our research mentioned at several points of the focus group discussions examples of the potential positive value of this concept also for the people living in these areas: a recurrent example concerned their need of help during some seasonal activities that are particularly labor intensive.

The second limitation concerns the fact that, due to the time and resource constraints, we validated the prototype in focus groups involving the Bangladeshi people living in Milan only. If the prototype could have been validated in Bangladesh too, in the real context of that culture, a more comprehensive feedback would have been received. The focus group discussions highlighted the fact that in Bangladesh there are several communities that practice similar sort of service and commodity exchanges among the community members in their everyday chores, though these exchanges are neither institutionalized nor supported by any technology. The validation of the prototype in these communities would have brought a more precise perception on how the TAS concept and its technological counterpart could be accepted.

8.4 Future Research Directions

The limitations of this study provide direction for new research for investigating the usefulness and acceptability of a TAS in a developing country context. The future research directs to validate the prototype among the Bangladeshi people in Bangladesh; it would help in unfolding the functionality of a TAS and help in improving the design in a much better way. More specifically, we have discussed with local stakeholders the possibility to validate the system in a particular communities living in urban areas, e.g. students who usually exchange different types of services based on their needs; and the possibility to extend the study to other communities such as fishers and farmers communities. The validation of the system in such particular communities would help in uncovering if the functionality of a TAS should be adapted to such different environments.

Moreover, the current version of the prototype has to incorporate the functionalities related to the integration of different TAS instances serving specific communities: in fact this was one of the main innovative ideas that emerged from the study. These functionalities were not implemented during our current investigation as they mainly concern technical interoperability problems: the higher level interaction with the system would remain almost the same. For this reason we preferred to have a simpler interaction scheme to check the functionalities that more

deeply involve the interaction with the user. On the other hand, this technical feature requires a deep understanding of the local infrastructure in Bangladesh that was of the scope of the present investigation.

Finally, the very long run objective is to promote and leverage the experience of use of TAS applications in Bangladesh, to check their role in improving the elderly care and in offering new possibilities to the local people to reduce their employment and the quality of their current socio-economic conditions.

8.5 A Broader View for the Future

The study examined how a TAS could be received in Bangladesh where strong urbanization, high level of unemployment, increasing elderly population, low-income household is a common phenomenon. The motivation to investigate the TAS concept in the context of developing countries was based on the idea that such kind of system can bring a social and economic change in these countries in terms of addressing the care of the elderly people through ICT exploitation. In fact, the demographic transition in developing countries poses a threat to its socio-economic development and Bangladesh is not an exception. Moreover, the existing unemployment problem in these countries would make the situation worse. Hence, this research aimed to shed light on a new way of utilizing Information Technology that combines western knowledge and local need to address a twofold problem by addressing the research questions “Is a time-based service exchange initiative (TAS) useful and appropriate for Bangladesh?” and “In the positive case, how can a time-based service exchange initiative (TAS), be introduced in Bangladesh?”

The precise answer to these questions is that a TAS is perceived as a useful and suitable way that could address different problems at a time. However, the system should be designed and developed considering the local requirements; and a TAS can be introduced in the country if it is well publicized and well understood by the receiving people. The study also revealed that technologically and culturally the country is ready to accept the system.

This study has implication for the IT designers, mobile operators and the Government of Bangladesh and NGOs who are interested in enhancing the pace of computerization and implementation of ICT in various sectors for social and economic development of the country.

Our findings clearly indicate that people are highly interested in a mobile based system for a TAS. In this regard, IT designers, mobile operators and the administrator of a TAS could collaborate to have a more feasible and suitable system for a TAS. This would ultimately help the TAS members in their service exchange in a much better way. Moreover, Government and NGOs could come forward to ensure the support and infrastructure for a TAS which will ultimately support in the country’s socio-economic development.

References

- Abras, C., Maloney-Krichmar, D., & Preece, J. (2004). User-centered design. *Bainbridge, W. Encyclopedia of Human-Computer Interaction*. Thousand Oaks: Sage Publications, 37(4), 445–456.
- Adeel, M., Nett, B., Gurbanova, T., Wulf, V., & Randall, D. (2013). The Challenges of Microfinance Innovation: Understanding “Private Services.” In *ECSCW 2013: Proceedings of the 13th European Conference on Computer Supported Cooperative Work, 21-25 September 2013, Paphos, Cyprus* (pp. 269–286). Springer.
- Adeel, M., Nett, B., & Wulf, V. (2010). Innovating the field level of microfinance: a Pakistan case study. In *Proceedings of the 4th ACM/IEEE International Conference on Information and Communication Technologies and Development* (p. 1). ACM.
- Ahmad, F., Kee, C. P., Mustaffa, N., Ibrahim, F., Mahmud, W. A. W., & Dafrizal, D. (2012). Information propagation and the forces of social media in Malaysia. *Asian Social Science*, 8(5), p71.
- Ahmed, A., Islam, D., Hasan, A. R., & Rahman, N. J. (2006). Measuring the impact of ICT on women in Bangladesh. In *CSREA EEE* (pp. 180–185).
- Ahmed, S., Shuja, A., & Chaudhry, R. M. (2014). The worldwide web and social media as communication channels for propagating brand messages of higher education institutions in the developing world. *European Scientific Journal*, 10(10).
- Al-Ani, B., Mark, G., Chung, J., & Jones, J. (2012). The Egyptian blogosphere: a counter-narrative of the revolution. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work* (pp. 17–26). ACM.
- Alaa, G., & Hussein, D. (2009). A Roadmap for integrating Web 2.0 tools into teaching & research in a developing country context: The Egyptian Perspective. In *MCIS* (p. 7).
- Ali, A. H. (2011). Power of social media in developing nations: New tools for closing the global digital divide and beyond. *Harv. Hum. Rts. J.*, 24, 185.
- Amgad, M., & AlFaar, A. S. (2014). Integrating Web 2.0 in clinical research education in a developing country. *Journal of Cancer Education*, 29(3), 536–540.
- Aminuzzaman, S. (2005). Is mobile phone a sociocultural change agent? A study of the pattern of usage of mobile phones among university students in Bangladesh. In *International Conference on Mobile Communications and Asian Modernities II, Beijing*.
- Amrita, D. B. (2013). Health care social media: Expectations of users in a developing country. *Medicine 2.0*, 2(2).
- Apenteng, S. A., & Doe, N. P. (2014). Social media & business growth: Why small/medium-scale enterprises in the developing world should take an advantage of it (A Case of the country Ghana). *IOSR Journal of Business and Management (IOSR-JBM)*, 16(5), 76–80.
- Ashraf, M. M., Hanisch, J., Swatman, P. A., Kommers, P., & others. (2008). ICT intervention and its impact in village areas of a developing country.

- Avento, N., & Sultana, T. (2013). Potentialities of E-health in Bangladesh: Cooperation from Japan. In *The Challenge of Ageing Society: Technological Roles and Opportunities for Artificial Intelligence*. Turin (Italy). Retrieved from <http://ceur-ws.org/Vol-1122>
- Avgerou, C. (1996). *How can IT enable developing countries to integrate into the global economy?* Ivy League Publishing.
- Avgerou, C. (2008). Information systems in developing countries: a critical research review. *Journal of Information Technology*, 23(3), 133–146.
- Baijnath, N. (2013). Educational technology and social media in a developing world context. *International Journal of Social Media and Interactive Learning Environments*, 1(1), 32–42.
- Barker, M., Barker, D. I., Bormann, N., & Neher, K. (2012). *Social media marketing: A strategic approach*. Cengage Learning.
- BBS. (2012). *Socio-economic and demographic report* (No. 4). Bangladesh: Statistics and Informatics Division (SID), Ministry of Planning, Bangladesh.
- Bellotti, V., Cambridge, S., Hoy, K., Shih, P. C., Handalian, L., ... Carroll, J. M. (2014). Towards community-centered support for peer-to-peer service exchange: rethinking the timebanking metaphor. In *CHI 2014, One of a CHIInd, Toronto, ON, Canada* (pp. 2975–2984). Toronto, ON, Canada.
- Bellotti, V., Carroll, J. M., & Han, K. (2013a). Random acts of kindness: The intelligent and context-aware future of reciprocal altruism and community collaboration. In *Collaboration Technologies and Systems (CTS), 2013 International Conference on* (pp. 1–12).
- Bellotti, V., Carroll, J. M., & Han, K. (2013b). Random acts of kindness: The intelligent and context-aware future of reciprocal altruism and community collaboration. In *Collaboration Technologies and Systems (CTS), 2013 International Conference on* (pp. 1–12). IEEE.
- Bellotti, V. M., Cambridge, S., Hoy, K., Shih, P. C., Handalian, L. R., Han, K., & Carroll, J. M. (2014). Towards community-centered support for peer-to-peer service exchange: rethinking the timebanking metaphor. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems* (pp. 2975–2984). ACM.
- Berg, B. (2007). *Qualitative Research Method for Social Sciences* (4th ed.). USA: Pearson/Allyn & Bacon.
- Bhuiyan, S. H. (2011). Modernizing Bangladesh public administration through e-governance: Benefits and challenges. *Government Information Quarterly*, 28(1), 54–65.
- Bidwell, N. J., Lamas, M., Marsden, G., Dlutu, B., Jones, M., Tucker, W., ... Robinson, S. (2011). Please call ME. NU 4EVER: Callback & social media sharing in rural Africa. *Proc. IWIPS*, 11, 117–138.
- Bostrom, R. P., & Heinen, J. S. (1977). MIS problems and failures: a socio-technical perspective, part II: The application of socio-technical theory. *MIS Quarterly*, 11–28.
- Bowen, J., Southgate, R., Ali, A., Little, S., Liakos, A., Greaves, F., ... others. (2012). Can UK healthcare workers remotely support medical education in the developing world?: Focus group evaluation. *JRSM Short Reports*, 3(7), 47.
- Boyle, D. (2014). The potential of Time Banks to support social inclusion and employability. *EC JRC Scientific and Policy Reports, Report ER 26346 EN*.

- BTRC. (2013). Mobile and Internet Subscribers in Bangladesh. Retrieved from <http://www.btrc.gov.bd/>
- Cabitza, F., Locoro, A., Simone, C., & Sultana, T. (2016). Moving western neighbourliness to East? A study on local exchange in Bangladesh. Presented at the The 19th ACM conference on Computer-Supported Cooperative Work and Social Computing, San Francisco, USA.
- Cahn, E. S. (2000). *No more throw-away people: the co-production imperative*. Washington, D.C.; Charlbury: Essential ; Jon Carpenter (distributor,).
- Carroll, J. M. (2013a). Co-production scenarios for mobile time banking. In *End-User Development* (pp. 137–152). Springer.
- Carroll, J. M. (2013b). Co-production Scenarios for Mobile Time Banking. In *End-User Development* (pp. 137–152). Springer.
- Carroll, J. M., & Bellotti, V. (2015). Creating value together: The emerging design space of peer-to-peer currency and exchange. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing* (pp. 1500–1510). ACM.
- Celik, I., & Schoreels, C. (2014). Use of social media across different generations in higher education in a developing country. In *Open Learning and Teaching in Educational Communities* (pp. 42–55). Springer.
- Chiarini Trembley, M., Hevner, A. R., & Berndt, D. J. (2010). Focus Groups for Artifact Refinement and Evaluation in Design Research. *Communications of the Association for Information Systems*, 26(27), 599–618.
- Clement, A. (1996). Computing at work: empowering action by low-level users. *Computerization and Controversy-Value Conflicts and Social Choices*.
- CMR, C. R. |. (2013, July 10). Bangladesh ships 4.3 million mobiles in Q1 CY 2013: Symphony Mobile Continues to Lead. Retrieved January 21, 2014, from <http://cmrindia.com/bangladesh-ships-4-3-million-mobiles-in-q1-cy-2013-symphony-mobile-continues-to-lead/>
- Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability. *Technology in Society*, 28(1), 63–80.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, S95–S120.
- Collom, E. (2007). The motivations, engagement, satisfaction, outcomes, and demographics of time bank participants: survey findings from a US system. *International Journal of Community Currency Research*, 11, 36–83.
- Collom, E. (2008a). Banking time in an alternative market: A quantitative case study of a local currency system. In *103rd Annual Meeting of the American Sociological Association, Boston*.
- Collom, E. (2008b). Engagement of the elderly in time banking: The potential for social capital generation in an aging society. *Journal of Aging & Social Policy*, 20(4), 414–436.
- Comunello, F., & Anzera, G. (2012). Will the revolution be tweeted? A conceptual framework for understanding the social media and the Arab Spring. *Islam and Christian-Muslim Relations*, 23(4), 453–470.
- Dada, D. (2006). E-readiness for developing countries: moving the focus from the environment to the users. *The Electronic Journal of Information Systems in Developing Countries*, 27.

- Dey, B. L. (2013). A qualitative enquiry into technology acceptance and appropriation: A case study of Bangladeshi farmers' use of mobile telephony. *Journal of Customer Behaviour*, 12(2-3), 261–280.
- Donaldson, O., Duggan, E. W., & Maitland, N. A. (2013). Using a design science approach to create and evaluate a social media crime reporting tool in a developing country: Case Jamaica.
- Edosomwan, S., Prakasan, S. K., Kouame, D., Watson, J., & Seymour, T. (2011). The history of social media and its impact on business. *Journal of Applied Management and Entrepreneurship*, 16(3), 79–91.
- Ellison, N. B., & others. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13(1), 210–230.
- Fereday, J., & Muir-Cochrane, E. (2008). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80–92.
- Fink, A. G. (2002). *The Survey Handbook*. Sage Publications.
- Fink, C., Kopecky, J., Bos, N., & Thomas, M. (2012). Mapping the Twitterverse in the developing world: An analysis of social media use in Nigeria. In *Social Computing, Behavioral-Cultural Modeling and Prediction* (pp. 164–171). Springer.
- Gandhi, L. (1998). *Postcolonial theory: A critical introduction*. Columbia University Press.
- Ghorai, K., Jahan, S., Ray, P., & Chylinski, M. (2013). Mobile phone including smart phone based persuasive system design for controlling hypertension and diabetes in Bangladesh. In *24th Australasian Conference on Information Systems (ACIS)* (pp. 1–11). RMIT University.
- Gregory, L. (2012). *Improving health through participation: time banks as a site for co-production*. Cardiff University.
- Gunatunge, R., & Karunanayake, M. (2004). Information and communication technologies for enhancing socio-economic development at the local level in Sri Lanka: Issues, challenges and strategies. *SAREC Research Cooperation Project on Overcoming Regional Imbalances and Poverty*.
- Gupta, N., Medhi-Thies, I., Ferreira, P., O'Neill, J., & Cutrell, E. (2015). KrishiPustak: A Social Networking System for Low-Literate Farmers. In *Proceedings of the 18th ACM Conference Companion on Computer Supported Cooperative Work & Social Computing* (pp. 45–48). ACM.
- Hamat, A., Embi, M. A., & Hassan, H. A. (2012). The use of social networking sites among Malaysian university students. *International Education Studies*, 5(3), p56.
- Han, K., Shih, P. C., Bellotti, V., & Carroll, J. M. (2015). It's Time There Was an App for That Too: A Usability Study of Mobile Timebanking. *International Journal of Mobile Human Computer Interaction (IJMHCI)*, 7(2), 1–22.
- Han, K., Shih, P. C., Rosson, M. B., & Carroll, J. M. (2014). Understanding Local Community Attachment, Engagement and Social Support Networks Mediated by Mobile Technology. *Interacting with Computers*, iwu040.
- Han, K., Shih, Patrick C., Bellotti, V., & Carroll, John M. (2015). It's Time There Was an App for That Too: A Usability Study of Mobile TimeBanking. *International Journal of Mobile Human-Computer Interaction* 01/2015.
- Hasan, S., Mulamoottil, G., & Kersell, J. E. (1992). Voluntary organizations in Bangladesh: a profile. *Environment and Urbanization*, 4(2), 196–206.

- Hayashi, M. (2012). Japan's Fureai Kippu Time-banking in elderly care: Origins, development, challenges and impact. *International Journal of Community Currency Research*, 16, 30–44.
- Hossain, M. R. (2005). Aging in Bangladesh and its population projections. *Pakistan Journal of Social Sciences*, 3(1), 62–67.
- Howard, P. N., & Parks, M. R. (2012). Social media and political change: Capacity, constraint, and consequence. *Journal of Communication*, 62(2), 359–362.
- Hultberg, L. (2008). Women empowerment in Bangladesh: A study of the village pay phone program.
- Hussain, F., & Mostafa, M. (2014). "Digital Bangladesh"-A Boon or threat to digital freedom? Available at SSRN 2526095.
- Icek Ajzen & Martin Fishbein. (2000). Attitudes and the Attitude-Behavior Relation: Reasoned and Automatic Processes. *European Review of Social Psychology*, 11(1), 1–33.
- Iivari, N. (2004). Enculturation of user involvement in software development organizations-an interpretive case study in the product development context. In *Proceedings of the third Nordic conference on Human-computer interaction* (pp. 287–296). ACM.
- Islam, M. N., & Nath, D. C. (2012). A future journey to the elderly support in Bangladesh. *Journal of Anthropology*, 2012.
- Jackson, W. A., & others. (1998). The political economy of population ageing. *Books*.
- Jayanthi, V. (2014). Impact of E-banking on banking sector with special reference to social media. *International Journal of Logistics & Supply Chain Management Perspectives*, 2(4), 660–663.
- Jesmin, S. S., & Ingman, S. R. (2011). Social Supports For Older Adults In Bangladesh. *The Journal of Aging in Emerging Economies*.
- Joseph, S. (2012). Social media, political change, and human rights. *BC Int'l & Comp. L. Rev.*, 35, 145.
- Kaisara, G., & Bwalya, K. (2013). Actualization of social capital in social media: prospects of Web 3.0, semantic and sensor web. In *2013 Conference*.
- Kamel, S. H. (2014). Egypt's ongoing uprising and the role of social media: Is there development? *Information Technology for Development*, 20(1), 78–91.
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons*, 53(1), 59–68.
- Kashem, M., Faroque, M., Ahmed, G., & Bilkas, S. (2013). The complementary roles of information and communication technology in Bangladesh agriculture. *Journal of Science Foundation*, 8(1-2), 161–169.
- Kavanaugh, A., Sheetz, S. D., Hassan, R., Yang, S., Elmongui, H. G., Fox, E. A., ... Shoemaker, D. J. (2012). Between a rock and a cell phone: Communication and information technology use during the 2011 Egyptian uprising. In *Proc. of the 2012 Information Systems for Crisis Response and Management Conference*.
- Khan, M., Mondal, M., Hoque, N., Islam, M., & Shahiduzzman, M. (2014). A study on quality of life of elderly population in Bangladesh. *American Journal of Health Research*, 2(4), 152–157.
- Khanam, M. A., Streatfield, P. K., Kabir, Z. N., Qiu, C., Cornelius, C., & Wahlin, A. A. (2011). Prevalence and patterns of multimorbidity among elderly people in rural Bangladesh: a cross-sectional study. *Journal of Health, Population, and Nutrition*, 29(4), 406.

- Kilby, P. (1971). Hunting the heffalump. *Entrepreneurship and Economic Development*, 1–40.
- Kitzinger, J. (1995). Qualitative Research: Introducing focus groups. *BMJ* 1995;311:299.
- Kothari, C. (2004). *Research methodology: Methods and techniques*. New Age International.
- Krueger, R. A., & Casey, M. A. (2009). *Focus groups: A practical guide for applied research*. Sage.
- Kumar, N. (2014). Facebook for self-empowerment? A study of Facebook adoption in urban India. *New Media & Society*, 1461444814543999.
- Kunzmann, K. R., & Wegener, M. (1991). The pattern of urbanization in Western Europe. *Ekistics*, 350(351), 282–291.
- Kuzma, J. (2010). Asian government usage of Web 2.0 social media. *European Journal of ePractice*, (9), 1–13.
- Laizu, Z., Armarego, J., & Sudweeks, F. (2010). The role of ICT in women's empowerment in rural Bangladesh.
- Lampinen, A., Lehtinen, V., Cheshire, C., & Suhonen, E. (2013). Indebtedness and reciprocity in local online exchange. In *Proceedings of the 2013 conference on Computer supported cooperative work* (pp. 661–672). ACM.
- Lansdale, D. (2002). Touching lives: Opening doors for elders in retirement communities through e-mail and the Internet. *Older Adults, Health Information, and the World Wide Web*, 133–151.
- Lasker, J., Collom, E., Bealer, T., Niclaus, E., Keefe, J. Y., Kratzer, Z., ... others. (2011). Time banking and health: the role of a community currency organization in enhancing well-being. *Health Promotion Practice*, 12(1), 102–115.
- Lietaer, B. A. (2001). *The future of money: Creating new wealth, work and a wiser world*. Random House Business.
- Lietaer, B. A., & Dunne, J. (2013). *Rethinking Money: How New Currencies Turn Scarcity Into Prosperity*. Berrett-Koehler Store.
- Liu, J., Boden, A., Randall, D. W., & Wulf, V. (2014). Enriching the distressing reality: Social media use by chinese migrant workers. In *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing* (pp. 710–721). ACM.
- Lotan, G., Graeff, E., Ananny, M., Gaffney, D., Pearce, I., & others. (2011). The Arab Spring| the revolutions were tweeted: Information flows during the 2011 Tunisian and Egyptian revolutions. *International Journal of Communication*, 5, 31.
- Lyytinen, K., & Robey, D. (1999). Learning failure in information systems development. *Information Systems Journal*, 9(2), 85–101. <http://doi.org/10.1046/j.1365-2575.1999.00051.x>
- Madu, R., & Moguluwa, S. C. (2013). Will the social media lenses be the framework for sustainable development in rural Nigeria? *Journal of African Media Studies*, 5(2), 237–254.
- Maguire, M. (2001). Methods to support human-centred design. *International Journal of Human-computer Studies*, 55(4), 587–634.
- Mahakud, G. C., & Bhola, R. M. (2014). Impact of social networking on physical and psychological wellbeing: A cross gender study. *International Journal of Psychology and Psychiatry*, 2(2), 259–274.
- Mäkinen, M., & Kuira, M. W. (2008). Social media and postelection crisis in Kenya. *The International Journal of Press/Politics*, 13(3), 328–335.

- Mantei, M. M., & Teorey, T. J. (1989). Incorporating behavioral techniques into the systems development life cycle. *Mis Quarterly*, 257–274.
- Marks, M. B. (2012). Time banking service exchange systems: A review of the research and policy and practice implications in support of youth in transition. *Children and Youth Services Review*, 34(7), 1230–1236.
- McMellon, C. A., & Schiffman, L. G. (2000). Cybersenior mobility: why some older consumers may be adopting the Internet. *Advances in Consumer Research*, 27, 139–144.
- Melissa, E., Hamidati, A., Saraswati, M. S., & Flor, A. G. (2013). Investigating the potentials of social media to support women entrepreneurship in Indonesian urban areas. In *Proceedings of the Sixth International Conference on Information and Communications Technologies and Development: Notes-Volume 2* (pp. 92–95). ACM.
- Meso, P. N., & Duncan, N. B. (2001). Can national information infrastructures enhance social development in the Least Developed Countries? *Advanced Topics in Global Information Management*, 207–226.
- Miller, E. J., & others. (2009). Both borrowers and lenders: Time banks and the aged in Japan. *Made Available in DSpace on 2011-01-04T02: 37: 05Z (GMT). No. of Bitstreams: 7 02whole. Pdf. Jpg: 945 Bytes, Checksum: 4fc618db3c44d893dad02686a3298ff8 (MD5) 01front. Pdf. Jpg: 945 Bytes, Checksum: 4fc618db3c44d893dad02686a3298ff8 (MD5) 02whole. Pdf. Txt: 612927 Bytes, Checksum: A329fb072f99e2c6115e2c403d08d299 (MD5) 01front. Pdf. Txt: 15783 Bytes, Checksum: C2a73c27dd287a8bdbc94603f47f53d5 (MD5) 01front. Pdf: 32257 Bytes, Checksum: Cc569ee4c464b422f3b3b54520dbfc7d (MD5) 02whole. Pdf: 1315305 Bytes, Checksum: Eb0f99e345238a0e24b0d3689de3d61e (MD5) License. Txt: 1972 Bytes, Checksum: 374661889572e4979aee49031538a2f2 (MD5) Previous Issue Date: 2009-02-23T03: 13: 10Z.*
- Moffett & Brat. (2012, August). For Spain’s jobless, time equals money. *Wall Street Journal*.
- Morgan, D. L. (1988). Focus groups as qualitative research. Newbury Park. Cal.: Sage.
- Morgan, D. L. (1996). Focus groups. *Annual Review of Sociology*, 129–152.
- Mumford, E. (2006). The story of socio-technical design: reflections on its successes, failures and potential. *Information Systems Journal*, 16(4), 317–342.
- Muniandy, L., & Muniandy, B. (2013). The Impact of Social Media in Social and Political Aspects in Malaysia: An Overview. *International Journal of Humanities and Social Science*, 3(11), 71–76.
- Murti, D. C. (2012). Manifestation of “Click” action to political action: Civic practice in social media and the dynamic of democracy in Indonesia.
- Mutula, S. (2012). Ethical and moral aspects of social media: Implications for sub Saharan Africa. In *20th SCECSAL Conference, June*.
- Nag, B. (2011). Mass media and ICT in development communication: Comparison & convergence. *Global Media Journal: Indian Edition*, 2(2), 1–29.
- Newman, J., Rawlings, L., & Gertler, P. (1994). Using randomized control designs in evaluating social sector programs in developing countries. *The World Bank Research Observer*, 9(2), 181–201.
- Newsted, P. R., Huff, S. L., & Munro, M. C. (1998). Survey instruments in information systems. *MIS Quarterly*, 22(4), 553.

- Nielsen, J. (1992). Finding usability problems through heuristic evaluation. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 373–380). ACM.
- Nielsen, J. (1994a). Heuristic evaluation. *Usability Inspection Methods*, 17(1), 25–62.
- Nielsen, J. (1994b). *Usability Engineering*. San Francisco: Morgan Kaufmann.
- Nielsen, J. (1994c). Usability inspection methods. In *Conference companion on Human factors in computing systems* (pp. 413–414). ACM.
- Norman, D. A., & Draper, S. W. (1986). *User Centered System Design; New Perspectives on Human-Computer Interaction*. Hillsdale, NJ, USA: L. Erlbaum Associates Inc.
- Obi, T., Ishmatova, D., & Iwasaki, N. (2013). Promoting ICT innovations for the ageing population in Japan. *International Journal of Medical Informatics*, 82(4), e47–e62.
- Osterwalder, A. (2002). ICT in developing countries. *Lausanne, Switzerland, University of Lausanne*, 1–13.
- Ozanne, L. (2010). Learning to exchange time: benefits and obstacles to time banking.
- Pajo, K., & Wallace, C. (2007). Barriers to the uptake of web-based technology by university teachers. *International Journal of E-Learning & Distance Education*, 16(1), 70–84.
- Park, H., & Lee, E. (2015). Self-reported eHealth literacy among undergraduate nursing students in South Korea: A pilot study. *Nurse Education Today*, 35(2), 408–413.
- Pasmore, W., Francis, C., Haldeman, J., & Shani, A. (1982). Sociotechnical systems: A North American reflection on empirical studies of the seventies. *Human Relations*, 35(12), 1179–1204.
- Philip, K., Irani, L., & Dourish, P. (2012). Postcolonial computing A tactical survey. *Science, Technology & Human Values*, 37(1), 3–29.
- Pimmer, C., Linxen, S., & Gröhbiel, U. (2012). Facebook as a learning tool? A case study on the appropriation of social network sites from mobile phones in developing countries. *British Journal of Educational Technology*, 43(5), 726–738.
- Putnam, R. (2000). Bowling alone: The collapse and revival of community in America. *New York*.
- Putnam, R. D. (2001). *Bowling alone: The collapse and revival of American community*. Simon and Schuster.
- Qu, Y., Huang, C., Zhang, P., & Zhang, J. (2011). Microblogging after a major disaster in China: a case study of the 2010 Yushu earthquake. In *Proceedings of the ACM 2011 conference on Computer supported cooperative work* (pp. 25–34). ACM.
- Rahman, A., Abdullah, M. N., Haroon, A., & Tooheen, R. B. (2013). ICT impact on socio-economic conditions of rural Bangladesh. *J World Econ Res*, 2, 1–8.
- Rahman, K. M., Mohsin, M. I., & Tareque, I. (2009). Trends of Population Ageing from 1950-2050: A Comparative Study Between Bangladesh and World. *Pakistan Journal of Social Sciences*, 6(1), 6–10.
- Rahman, M. I., & Ali, A. M. (2007). Population aging and its implications in Bangladesh. *Jahangirnagar Review Part II Social Science*, 31.

- Rainie, L., & Poushter, J. (2014). Emerging nations catching up to US on technology adoption, especially mobile and social media use. *Fact Tank: News in the Numbers*.
- Ramachandran, R., & Radhika, R. (2013). Health status of elderly: Evidence from India and Japan. *Indian Journal Of*, 27(2), 233–253.
- Reda, A., Shah, S., Tiwari, M., Lillie, A., & Noble, B. (2012). Social networking in developing regions. In *Proceedings of the Fifth International Conference on Information and Communication Technologies and Development* (pp. 94–103). ACM.
- Rice, R. E., & Katz, J. E. (2003). Comparing internet and mobile phone usage: digital divides of usage, adoption, and dropouts. *Telecommunications Policy*, 27(8), 597–623.
- Ritchie, J., Lewis, J., Nicholls, C. M., Ormston, R., & others. (2013). *Qualitative research practice: A guide for social science students and researchers*. Sage.
- Sanders, E. B.-N. (2002). From user-centered to participatory design approaches. *Design and the Social Sciences: Making Connections*, 1–8.
- Sarcar, S., Ghosh, S., Saha, P. K., & Samanta, D. (2010). Virtual keyboard design: State of the arts and research issues. In *Students' Technology Symposium (TechSym), 2010 IEEE* (pp. 289–299). IEEE.
- Sautet, F. (2013). Local and systemic entrepreneurship: Solving the puzzle of entrepreneurship and economic development. *Entrepreneurship Theory and Practice*, 37(2), 387–402.
- Seyfang, G. (2002). Tackling social exclusion with community currencies: learning from LETS to Time Banks. *International Journal of Community Currency Research*, 6(1), 1–11.
- Seyfang, G. (2003a). Growing cohesive communities one favour at a time: social exclusion, active citizenship and time banks. *International Journal of Urban and Regional Research*, 27(3), 699–706.
- Seyfang, G. (2003b). “With a little help from my friends.”Evaluating time banks as a tool for community self-help. *Local Economy*, 18(3), 257–264.
- Seyfang, G. (2004a). Time banks: rewarding community self-help in the inner city? *Community Development Journal*, 39(1), 62–71.
- Seyfang, G. (2004b). Working outside the box: Community currencies, time banks and social inclusion. *Journal of Social Policy*, 33(01), 49–71.
- Seyfang, G. (2005). *Community currencies and social inclusion: A critical evaluation*. CSERGE Working Paper EDM.
- Seyfang, G. (2006). Time Banks in the UK: Building sustainable communities. In *Monetary Regionalisation conference, September* (pp. 28–29).
- Seyfang, G. (2009). *The new economics of sustainable consumption: Seeds of change*. Palgrave Macmillan Basingstoke.
- Seyfang, G., & Longhurst, N. (2013a). Desperately seeking niches: Grassroots innovations and niche development in the community currency field. *Global Environmental Change*, 23(5), 881–891.
- Seyfang, G., & Longhurst, N. (2013b). Growing green money? Mapping community currencies for sustainable development. *Ecological Economics*, 86, 65–77.
- Seyfang, G., & Longhurst, N. (n.d.). What influences community currency growth and spread? Understanding grassroots innovations for sustainability.

- Seyfang, G., & Smith, K. (2002). The time of our lives: Using time banking for neighbourhood renewal and community capacity building.
- Shih, Patrick C., Bellotti, V., Han, K., & Carroll, John M. (2015). Unequal Time for Unequal Value: Implications of Differing Motivations for Participation in Timebanking. Presented at the CH12015, Seoul Republic of Korea.
- Sorour, M. K., & Dey, B. L. (2014). Energising the political movements in developing countries: The role of social media. *Capital & Class*, 38(3), 508–515.
- Spera, C., Ghertner, R., Nerino, A., & DiTommaso, A. (2013). Volunteering as a pathway to employment: Does volunteering increase odds of finding a job for the out of work. *Washington, DC: Corporation for National & Community Service*. [Http://www.Nationalservice.gov/sites/default/files/upload/employment_research_report.Pdf](http://www.Nationalservice.gov/sites/default/files/upload/employment_research_report.Pdf).
- Spier, S. (2011). CollectiveAction2. 0: The impact of ICT-based social media on collective action—difference in degree or difference in kind? *Available at SSRN 1979312*.
- Spinuzzi, C. (2005). The methodology of participatory design. *Technical Communication*, 52(2), 163–174.
- Starbird, K., & Palen, L. (2012). (How) will the revolution be retweeted?: Information diffusion and the 2011 Egyptian uprising. In *Proceedings of the acm 2012 conference on computer supported cooperative work* (pp. 7–16). ACM.
- Stewart, D. W., Shamdasani, P. N., & Rook, D. W. (2007). *Focus Groups: Theory and Practice*. Newbury Park, CA, USA: Sage Publications.
- Streatfield, P. K., & Karar, Z. A. (2008). Population challenges for Bangladesh in the coming decades. *Journal of Health, Population, and Nutrition*, 26(3), 261.
- Sultana, T. (2005). Diffusion of mobile telephone in Japan : Strategic recommendations for Bangladesh. *The Chittagong University Journal of Business Administration , University of Chittagong, Bangladesh*, 20, 97–110.
- Sultana, T. (2013). Technology for the Health Services of Ageing Societies in Developed Countries: Lessons for Developing Countries.
- Sultana, T. (2015). Social media in developing countries: A literature review and research direction. Presented at the ItAIS2015: XII Conference Of The Italian Chapter Of AIS (ItAIS 2015), Rome, Italy.
- Sultana, T., Locoro, A., & Cabitza, F. (2015). Investigating opportunities and obstacles for a community-oriented social media in Bangladesh. In *International Reports on Soico-informatics* (Vol. 12(1), pp. 15–24). Limerick: IISI - International Institute for Socio-Informatics.
- Swindell, R. (2000). Using the Internet to build bridges to isolated older people. *Australasian Journal on Ageing*, 19(1), 38–40.
- Talero, E., & Gaudette, P. (1995). Harnessing information for development: A proposal for a world bank group vision and strategy*. *Information Technology for Development*, 6(3-4), 145–188.
- The World Factbook. (2015). Unemployment and Underemployment in Bangladesh. Retrieved January 21, 2014, from <https://www.cia.gov/library/publications/the-world-factbook/geos/bg.html>
- Thomas, K., Adeniyi, O., & others. (2013). Health Personnel’s Perception On The Use Of Social Media In Healthcare Delivery System In Rural and Urban Communities of Oyo State, Nigeria. *Developing Country Studies*, 3(3), 134–142.

- Torp, S., Hanson, E., Hauge, S., Ulstein, I., & Magnusson, L. (2008). A pilot study of how information and communication technology may contribute to health promotion among elderly spousal carers in Norway. *Health & Social Care in the Community*, 16(1), 75–85.
- Trist, E. L. (1963). *Organizational choice: capabilities of groups at the coal face under changing technologies: the loss, re-discovery & transformation of a work tradition*. Tavistock Publications.
- Tufekci, Z., & Wilson, C. (2012). Social media and the decision to participate in political protest: Observations from Tahrir Square. *Journal of Communication*, 62(2), 363–379.
- Uddin, M. T., Islam, M. N., & Kabir, A. (2012). Demographic dependency of aging process in Bangladesh.
- Ullah, S., Ahmad, A., & Khan, T. F. (n.d.). Fundraising for sustainable community development and role of social media: case of Pakistan. *Marketing*, 1009, 4Cs.
- United Nations. (2007a). *The Social, Health and Economic Consequences of Population Ageing in the Context of Changing Families* (Seminar Findings). Thailand.
- United Nations. (2007b). *World Population Ageing*. New York, USA: UN Department of Economic and Social Affairs.
- Walker, A. (1990). The economic “burden” of ageing and the prospect of intergenerational conflict. *Ageing and Society*, 10(04), 377–396.
- Walsh, C., & Power, T. (2011). Going digital on low-cost mobile phones in Bangladesh. In *Proceedings of the Annual International Conference on Education & e-Learning (EeL), 7-8 November 2011, Singapore* (pp. 151–156).
- Wolfsfeld, G., Segev, E., & Sheaffer, T. (2013). Social media and the Arab Spring politics comes first. *The International Journal of Press/Politics*, 18(2), 115–137.
- Wong, F., Lean, M., & Fernandez, P. R. (2010). Social life connects the world: Malaysian youth’s usage behaviour of social network sites.
- Wulf, V., Aal, K., Abu Kteish, I., Atam, M., Schubert, K., Rohde, M., ... Randall, D. (2013). Fighting against the wall: Social media use by political activists in a Palestinian village. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1979–1988). ACM.
- Wulf, V., Misaki, K., Atam, M., Randall, D., & Rohde, M. (2013). “On the ground” in Sidi Bouzid: investigating social media use during the tunisian revolution. In *Proceedings of the 2013 conference on Computer supported cooperative work* (pp. 1409–1418). ACM.
- Wyche, S. P., Schoenebeck, S. Y., & Forte, A. (2013). Facebook is a luxury: An exploratory study of social media use in rural kenya. In *Proceedings of the 2013 conference on Computer supported cooperative work* (pp. 33–44). ACM.
- Xie, B. (2008). Multimodal computer-mediated communication and social support among older Chinese internet users. *Journal of Computer-Mediated Communication*, 13(3), 728–750.
- Zimet, G., Dahlem, N., Zimet, S., & Farley, Gordon. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52(1), 30–41.

Appendices

Appendix 1: Survey Questionnaire

Time Accounting System Survey (Time Banking Survey)

Context Information

Interviewer's Name

1. First of all what's your age?

- Less than 25 years
- Between 25 and 44 years
- Between 45 and 64 years
- More than 64 years

2. You are

- Female
- Male

3. How would you define your familiarity with the use of computers and the access to services available on the Internet (for instance: emails, Web sites)?

Please choose **only one** of the following:

- No familiarity or very low
-
-
-
-
- High familiarity

4. Speaking of electronic devices that are connected to the Internet that you can use for your personal purposes (possibly shared with other people), which claim is true?

Please choose **only one** of the following:

- You have a computer
- You have a smartphone
- You have both
- You have neither
- I don't know

5. You said you have a smartphone as your mobile phone. Do you use it also for applications like home banking, weather forecasts, and reading news?

Only answer this question if the following conditions are met:

Answer was 'You have a smartphone' *or* 'You have both' at question 4 (Speaking of electronic devices that are connected to the Internet that you can use for your personal purposes (possibly shared with other people), which claim is true?)

Please choose **only one** of the following:

- Yes
- No

6. Moreover, do you use a free messaging application, like whatsapp, wechat or facebook?

Only answer this question if the following conditions are met:

Answer was 'You have a smartphone' *or* 'You have both' at question 4 (Speaking of electronic devices that are connected to the Internet that you can use for your personal purposes (possibly shared with other people), which claim is true?)

Please choose **only one** of the following:

- Yes
- No, I don't need it.
- No, but I'd like it.

7. In regard to your Internet connection, which claims are true?

Please choose **only one** of the following:

- I don't have an Internet connection
- My connection is flat (the charge is fixed irrespective of use)
- My connection is not flat (you pay according to how long you are connected)
- I don't know

8. How fast and reliable is your Internet connection?

Only answer this question if the following conditions are met:

Answer was 'My connection is flat (the charge is fixed irrespective of use)' *or* 'My connection is not flat (you pay according to how long you are connected)' at question 7' (In regard to your Internet connection, which claims are true?)

Please choose **only one** of the following:

- Very slow and unreliable
-
-
-
-
- Very fast and reliable

9. How frequently you text message to anybody from your mobile?

Please choose **only one** of the following:

- never or very seldom
- 1-3 times per month
- 1-5 times per week
- 1-5 times per day
- more than 5 messages every day

10. Do you find texting messages (SMS) from your mobile phone convenient/easy?

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Very much

11. Why do you find it difficult/inconvenient?

Only answer this question if the following conditions are met:

Answer was 'Not at all' *or* "....." at question 10 (Do you find texting messages (SMS) from your mobile phone convenient/easy?)

Please write your answer here:

12. Approximately, what's your budget for using your mobile phone per month?

Please choose **only one** of the following:

- Less than BDT 300.
- Between BDT 300 and 500 BDT.
- Between BDT 500 and BDT 700
- More than BDT 700.

Socialization

13. How many hours do you do paid-work per week?

Please choose **only one** of the following:

- I am not employed in any job
- I am employed for less than 20 hours per week
- I am employed for more than 20 but less than 35 hours per week
- I am employed for more than 35 hours per week

14. Do you agree on that knowing more people personally would help you get a (better) job, either now or in the future?

Please choose **only one** of the following:

- No, I totally disagree
-
-
-
-
- Yes, I totally agree

15. Do you agree that someone could teach you a job also by showing what to do directly, since many practices cannot be learnt only on written books?

Please choose **only one** of the following:

- No, I totally disagree
-
-
-
-
- Yes, I totally agree

16. Have you ever been a member of a voluntary association or involved in some social service within your community on a periodic basis?

Please choose **only one** of the following:

- Yes, also currently
- Yes, in the past, but not now
- No, never

17. Why did you quit from the organization?

Answer was 'Yes, in the past, but not now' at question 16 (Have you ever been a member of a voluntary association or involved in some social service within your community on a periodic basis)

Please write here:

18. How much do you feel as an integrated member of and to really belong to the following communities?

Please choose the appropriate response for each item:

	Not at all		Very much
the building or neighborhood where you live	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>
club or voluntary association	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>
the parish mosque or any religion temple/ community	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>
the city or region or country you are a citizen of	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>

19. Would you mind asking for help/support from someone whom you do not know for small routine errands, like for instance: doing some shopping (for medicines or food or other basic necessities), cleaning house, queue up at some office for you?

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

20. Would you mind asking for help/support from someone whom you do not know if this took you out of serious troubles, for instance to either change a tire, or to buy some important medicine while you are sick or cannot move from your home, or to stop a massive water loss at home?

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

21. If you asked for help, how much likely is it that you could receive immediate assistance/help for small errands (like for instance, to repair something at home, get through some tough paper work or get important pieces of advice on how to apply for a service or save money for a good you need) from:

Please choose the appropriate response for each item:

	Very unlikely			Very likely
a family member:	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a friend of yours:	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
one of your neighbors:	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a colleague of yours:	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
a member of a club or voluntary association you attend too (if any):	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>
anyone met in places you habitually frequent, even if you don't know her personally:	<input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>

22. How much willing would you be to provide help or assistance to a neighbor or acquaintance if she or a close relative of her asked you for it, like running an errand for her or visiting her at the hospital? Please choose **only one** of the following:

- Not willing at all
-
-
-
-
- Totally willing

Time Accounting System (Time Banking)

For this questionnaire, we call Time Accounting System (Time bank) a system that fosters the exchange of little services between people like home repair. For such a system all hours are equally valued: 1 hour of time = 1 time credit, whether this time is spent for activities that would be paid very much otherwise (e.g., private lessons or expert advices) or simple errands (e.g., little repairs, laundry). Every Time Bank member has an account whose statement varies according to how many hours of support/help she has provided (positive) or received (negative). Time Banks allows members to look for specialized help as every member is to fill a personal profile where she states what she is proficient in and what she is willing to do to help other members.

23. Have you ever heard of Time Banking?

Please choose **only one** of the following:

- Yes
- No

24. Thus, would you trust a person whom you do not know if a Time Bank certified that she is knowledgeable with respect to what she can help you about?

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

25. On the other hand, would you trust this stranger if you could ask a friend of yours if she is knowledgeable with respect to what she can help you about?

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

26. Would you find it weird or inopportune to claim (time) credit for having helped a relative or a friend of yours that is registered to the same Time Bank?

Please choose **only one** of the following:

- Not at all
-
-
-
- Definitely yes

27. Would you find it weird or inopportune to claim (time) credit for having helped a stranger?

Please choose **only one** of the following:

- Not at all
-
-
-
- Definitely yes

28. . Would you ask a person whom you helped in some task and who is not a Time Bank member already, to acknowledge that officially, for instance by replying a SMS received from a specific phone number, or replying an email, or filling in a Web form?

Please choose **only one** of the following:

- Not at all
-
-
-
- Definitely yes

29. Would you like to help one who is looking for support (within TB system) even if you do not know that person?

Please choose **only one** of the following:

- Not at all
-
-
-
-

- Definitely yes

30. Would you like to certify to a third party that someone has helped you in some circumstance if this person asked you to do so (assuming you are not a Time Bank member)? Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

31. Would you describe your competencies, skills and interests, in a word, things you are proficient about and/or are willing to do free of charge for someone else registered to a Time Bank? Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

32. Are you willing to receive help from any member whose age is below 25 years?

Answer was *'More than 64 years'* or *'between 45-64 years'* at question 1 (First of all, what is your age)

- Not at all
-
-
-
-
- Definitely yes

33. Are you willing to provide any services to a member of any age group/whose age is less than 25 years?

Answer was *'More than 64 years'* or *'between 45-64 years'* at question 1 (First of all, what is your age)

- Not at all
-
-
-
-
- Definitely yes

34. Are you willing to receive help from a member whose age is more than 65 years?

Answer was 'below 25 years' and '*Between 25-44 years*' at question 1 (First of all, what is your age)

- Not at all
-
-
-
- Definitely yes

35. Are you willing to provide any services to a member of any age group/whose age is more than 65 years?

Answer was 'below 25 years' and '*Between 25-44 years*' at question 1 (First of all, what is your age)

- Not at all
-
-
-
- Definitely yes

36. Have you already been a member of any Time Bank?

Please choose **only one** of the following:

- Yes, now
- Yes, time ago
- No, never

37. Why did you quit from Time Bank?

Answer was '*Yes Time ago*' at question 36 (Have you already been a member of any Time Bank?)

38. Would you like being a member of such a system?

Only answer this question if the following conditions are met:

Answer was 'No, never' *or* 'Yes, time ago' at question 36 (Have you already been a member of any Time Bank?)

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

39. If you enjoy or enjoyed such a membership, would you recommend other people, like neighbors and friends, to join such an initiative?

Only answer this question if the following conditions are met:

Answer was 'Yes, now' *or* 'Yes, time ago' at question 36 (Have you already been a member of any Time Bank?)

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

40. Some say that by helping others you are helping yourself in the long run. Do you agree?

Please choose **only one** of the following:

- Not at all
-
-
-
-
- Definitely yes

Bengali Version

1. প্রাসঙ্গিক তথ্য

1. **Interviewer:** [1] Interviewer's Name
2. **AGE:** [1] সবার আগে, আপনার বয়স কত?
3. **GENDER:** [1] আপনি
4. **ICTFamiliarity:** [1] আপনি কী ভাবে কম্পিউটার ব্যবহার এবং ইন্টারনেটে বিভিন্ন সেবার সাথে (যেমন: ইমেইল, ওয়েব সাইট) আপনার পরিচিতিতে সংজ্ঞায়িত করবেন?
5. **ElecDevAvailability:** [1] ইন্টারনেটের সাথে সংযুক্ত করা ইলেক্ট্রনিক ডিভাইস যা নিজের ব্যক্তিগত কাজে ব্যবহার করতে পারেন (এমনকি অন্য লোকদের সাথে share করে হলেও) তার ব্যাপারে নীচের কোনটি সঠিক?
6. **SmartApp:** [1] **ElecDevAvailability.NAOK == "A1" or ElecDevAvailability.NAOK == "A3"]** আপনি বলেছেন, মোবাইল ফোন হিসেবে আপনি স্মার্ট ফোন ব্যবহার করেন, আপনি কি হোম ব্যাংকিং, weather forecast, পত্রিকা পড়া বা অন্য কাজের জন্য এই ফোন ব্যবহার করেন?
7. **FreeMsgAppUse:** [1] **ElecDevAvailability.NAOK == "A1" or ElecDevAvailability.NAOK == "A3"]** তাছাড়া, আপনি কি আপনার মোবাইল ফোনে ফ্রি মেসেজ অ্যাপ্লিকেশন যেমন whatsapp, wechat বা facebook ব্যবহার করেন?
8. **Connectivity:** [1] আপনার ইন্টারনেট সংযোগ বিষয়ে কোন দাবিটি সত্য হতে পারে?
9. **ConnectionQuality:** [1] **Connectivity.NAOK == "A2" or Connectivity.NAOK == "A3"]** আপনার ইন্টারনেট সংযোগ কত দ্রুত এবং নির্ভরযোগ্য?
10. **TextFreq:** [1] আপনি আপনার মোবাইল থেকে কি প্রায়ই টেক্সট মেসেজ পাঠান?
11. **TextFriendliness:** [1] আপনি কি আপনার মোবাইল ফোন থেকে টেক্সট মেসেজ পাঠানো সহজ মনে করেন?
12. **TextUnfriendReason:** [1] **TextFriendliness.NAOK == "A1" or TextFriendliness.NAOK == "A2"]** কেন এটা কঠিন / অসুবিধাজনক মনে হয়?
13. **MobileBudget:** [1] প্রতি মাসে মোবাইল ফোন ব্যবহার করার জন্য আপনার আনুমানিক বাজেট কত?

2. সামাজিকতা

1. **Employment:** [1] প্রতি সপ্তাহে আপনি কত ঘন্টা কাজ (paid-work) করেন?
2. **PersonRelationEmploy:** [1] আপনি কি মনে করেন অনেক লোককে ব্যক্তিগতভাবে চেনা বা জানা আপনাকে একটা ভালো চাকরি পেতে বর্তমানে বা ভবিষ্যতে সাহায্য করতে পারে?
3. **LearnByDoingExample:** [1] যেহেতু অনেক কাজ বই পড়ে শিখা যায় না, আপনি কি মনে করেন কোনো একটি কাজ আপনাকে কেউ সরাসরি দেখানোর মাধ্যমে শিখতে পারে?
4. **MemberVoluntaryOrg:** [1] আপনি কি কখনও কোন স্বেচ্ছাসেবী সংগঠনের সদস্য ছিলেন বা নিয়মিত ভাবে আপনার কমিউনিটিতে সমাজ সেবায় জড়িত ছিলেন?
5. **ReasonQuitMembership:** [1] **MemberVoluntaryOrg.NAOK == "A2"]** আপনি কেন আর উক্ত প্রতিষ্ঠানের সাথে জড়িত নেই?
6. **IntegrtToCommunity:** [1] নীচের কোন community র প্রতি আপনি সত্যিকার বা আন্তরিক ভাবে একাত্তা বোধ করেন?
7. **MindAskingHelpErrand:** [1] আপনি চেনেন না, এমন কারো কাছ থেকে সামান্য কিন্তু নিয়মিত সাহায্য যেমন কিছু শপিং করা (ওশুধ, খাবার, বা অন্যান্য নিত্য প্রয়োজনীয় জিনিসের জন্য), বাসা পরিষ্কার করা, আপনার জন্য কোনও অফিসে বা কোথাও লাইনে দাঁড়ানোর জন্য সাহায্য চাইতে কি কিছু মনে করবেন?
8. **MindAskHelpBigProb:** [1] আপনি চেনেন না বা জানেন না এমন কারো সাহায্য যদি আপনাকে কোনো বড় সমস্যা উওরলে সাহায্য করে (যেমন গাড়ীর চাকা পরিবর্তন, আপনি অসুস্থ বা বাড়ি থেকে বের হতে পারছেন না এমন সময় ওশুধ এনে দেওয়া), বাসায় পানির পাইপ বনধ করতে সাহায্য করা(যা প্রচুর পানির অপচয় রোধ করে)- আপনি কি তার সাহায্য চাইতে কিছু মনে করবেন?
9. **likelinessOfRecvHelp:** [1] কোনো সমস্যা উওরলে সাহায্য চাইলে (যেমন, বাসায় কিছু মেরামত করা, কোনো কঠিন পেপার ওয়াক) করা, কোনো সেবার জন্য কিভাবে আবেদন করতে হয় তার জন্য উপদেশ পাওয়া, প্রয়োজনীয় জিনিসের জন্য টাকা জমানোর ব্যাপারে পরামর্শ)- কার কাছ থেকে অবিলম্বে সাহায্য পাওয়ার সম্ভাবনা আছে?
10. **WillingToHelpNeighbr:** [1] আপনার একজন প্রতিবেশী বা পরিচিত তার বা তার আত্মীয়ের জন্য যদি আপনার কোনো সাহায্য চায় (যেমন: কিছু পৌঁছে দেয়া, হাসপাতালে দেখতে যাওয়া), আপনি তা করতে কত টুকু ইচ্ছুক?

3. টাইম ব্যাংকিং

1. **TimeBankKnowledge:** [1] আপনি কী কখনো টাইম ব্যাংকিং ব্যাপারে বা টাইম ব্যাংকিং এর কথা শুনেছেন?
2. **TrustthruTimeBank:** [1] কাজেই, আপনি চেনেন না এমন একজনকে কি আপনি বিশ্বাস করবেন, যদি টাইম ব্যাংক নিশ্চিততা দেয় সে যে কাজে আপনাকে সহযোগিতা করবে সে কাজে সে দক্ষ?
3. **TrustthruFriends:** [1] অন্য দিকে, আপনি কী একই অপরিচিত ব্যক্তিকে বিশ্বাস করবেন, যদি আপনার একজন বন্ধুকে তার ব্যাপারে জিজ্ঞাসা করতে পারেন সে যে কাজে আপনাকে সহযোগিতা করবে সে কাজে সে দক্ষ কি না?

4. **WerdClaimCrditRelatv:** [1] একই টাইম ব্যাংকে নিবন্ধীকৃত হয়েছে এমন একজন আত্মীয় বা বন্ধুকে সাহায্য করার জন্য (সময়) ক্রেডিট দাবি করাকে কি আপনি অদ্বুত বা অনুপযুক্ত মনে করেন?
5. **WerdClamCrdtStrnger:** [1] একজন অপরিচিত ব্যক্তিকে সাহায্য করার জন্য (সময়) ক্রেডিট দাবি করাকে কি আপনি অদ্বুত বা অনুপযুক্ত মনে করেন?
6. **ClaimStrangerForHelp:** [1] আপনি সাহায্য করেছেন এমন ব্যক্তিকে, যিনি টাইম ব্যাঙ্ক এর মেম্বার নন, আপনার কাজের জন্য একটি এসএমএস অথবা একটি ইমেইল এর জবাব দিয়ে অথবা একটি ওয়েব ফর্ম পূরণ করে আপনার কাজকে স্বীকৃতি দিতে বলবেন ?
7. **WilingHelpStrangerTB:** [1] একজন অপরিচিত ব্যক্তি (টাইম ব্যাংকিং সিস্টেমের মধ্যে) যদি সাহায্য এবং সমর্থন চান আপনি কি তাকে তা করবেন?
8. **ConfirmHelpOfOthers:** [1] যদি কোন ব্যক্তি আপনাকে সাহায্য করেছে তা একটি তৃতীয় পক্ষের কাছে প্রত্যয়ন করতে বলে আপনি কি তা করবেন(যদি আপনি টাইম ব্যাংকের সদস্য না হন)?
9. **WilingDescribeSkill:** [1] আপনি আপনার কাজের দক্ষতা এবং আগ্রহ বর্ণনা করতে এবং / অথবা একটি টাইম ব্যাংকে নিবন্ধিত অন্য কারোর জন্য বিনামূল্যে তা প্রদান করতে কত টুকু ইচ্ছুক ?
10. **WilingHelpfromYoung:** [((AGE.NAOK == "A4"))] যে কোনো বয়সের কারো কাছ থেকে কি আপনি সাহায্য নিতে আগ্রহী?(মনে করুন যিনি আপনাকে সাহায্য করবেন তার বয়স ২৫ বছরের নিচে)
11. **WilingHelpYoung:** [((AGE.NAOK == "A4"))] যে কোনো বয়সের কাউকে কি আপনি সাহায্য করতে আগ্রহী?(মনে করুন যাকে আপনি সাহায্য করবেন তার বয়স ৩০ বছরের নিচে)
12. **WilingHelpFrmSenior:** [((AGE.NAOK == "A1" or AGE.NAOK == "A2"))] যে কোনো বয়সের কারো কাছ থেকে কি আপনি সাহায্য নিতে আগ্রহী?(মনে করুন যিনি আপনাকে সাহায্য করবেন তার বয়স ৬৫ বছরের উপরে)
13. **WilingHelpSenior:** [((AGE.NAOK == "A1" or AGE.NAOK == "A2"))] যে কোনো বয়সের কাউকে কি আপনি সাহায্য করতে আগ্রহী?(মনে করুন যাকে আপনি সাহায্য করবেন তার বয়স ৬৫ বছরের উপরে)
14. **TimeBankMembership:** [1] আপনি কি ইতিমধ্যে কোনো টাইম ব্যাংকের সদস্য হয়েছেন?
15. **ResonsQuitTimeBank:** [((TimeBankMembership.NAOK == "A2"))] আপনি কেন এই প্রতিষ্ঠান থেকে সরে গিয়েছিলেন?
16. **WilingTimeBankMembr:** [((TimeBankMembership.NAOK == "A2" or TimeBankMembership.NAOK == "A3"))] আপনি কি এই ধরনের কোন সিস্টেমের সদস্য হতে চান?
17. **InitiateEnrolMember:** [((TimeBankMembership.NAOK == "A1" or TimeBankMembership.NAOK == "A2"))] আপনি এই ধরনের কোন সিস্টেমের সদস্যপদ উপভোগ করে থাকলে/ বা এখনও করলে করলে এতে যোগদানের জন্য প্রতিবেশী, বন্ধু এবং অন্য লোকদের সুপারিশ করতে উদ্যোগ নেবেন?
18. **HelpReturnsHelp:** [1] অনেকে বলে, অন্যদের সাহায্য করলে পরিশেষে নিজেকেই সাহায্য করা হয়- আপনি কি এর সাথে একমত?

Appendix 2 : Questionnaire Coding

AGE	Age	সবার আগে, আপনার বয়স কত?	1.First of all what's your age?
GENDER	Gender	আপনি	2.You are
ICTFamiliarity	Familiarity with ICT	আপনি কী ভাবে কম্পিউটার ব্যবহার এবং ইন্টারনেটে বিভিন্ন সেবার সাথে (যেমন: ইমেইল, ওয়েব সাইট) আপনার পরিচিতি কে সংজ্ঞায়িত করবেন?	3.How would you define your familiarity with the use of computers and the access to services available on the Internet (for instance: emails, Web sites)?
ElecDevAvailability	Availability of Electronic Devices	ইন্টারনেটের সাথে সংযুক্ত করা ইলেক্ট্রনিক ডিভাইস যা নিজের ব্যক্তিগত কাজে ব্যবহার করতে পারেন (এমনকি অন্য লোকেদের সাথে share করে হলেও) তার ব্যাপারে নীচের কোনটি সঠিক?	4.Speaking of electronic devices that are connected to the Internet that you can use for your personal purposes (possibly shared with other people), which claim is true?
SmartApp	Use of Smart Phone Application	আপনি বলেছেন, মোবাইল ফোন হিসেবে আপনি স্মার্ট ফোন ব্যবহার করেন, আপনি কি হোম ব্যাঙ্কিং, weather forecast, পত্রিকা পড়া বা অন্য কাজের জন্য এই ফোন ব্যবহার করেন?	5.You said you have a smartphone as your mobile phone. Do you use it also for applications like home banking, weather forecasts, and reading news?
FreeMsgAppUse	Use of Free Message Application of Smartphone	তাছাড়া, আপনি কি আপনার মোবাইল ফোনে ফ্রি মেসেজ অ্যাপ্লিকেশন যেমন whatsapp, wechat বা facebook ব্যবহার করেন?	6.Moreover, do you use a free messaging application, like whatsapp, wechat or facebook?
Connectivity	Connection with Internet	আপনার ইন্টারনেট সংযোগ বিষয়ে কোন দাবিটি সত্য হতে পারে?	7.In regard to your Internet connection, which claims are true?
ConnectionQuality	Quality of Internet Connection	আপনার ইন্টারনেট সংযোগ কত দ্রুত এবং নির্ভরযোগ্য?	8.How fast and reliable is your Internet connection?
TextFreq	Text Frequency	আপনি আপনার মোবাইল থেকে কি প্রায়ই টেক্সট মেসেজ পাঠান?	9.How frequently you text message to anybody from your mobile?

TextFriendliness	Text Friendliness	আপনি কি আপনার মোবাইল ফোন থেকে টেক্সট মেসেজ পাঠানো সহজ মনে করেন?	10.Do you find texting messages (SMS) from your mobile phone convenient/easy?
TextUnfriendReason	Reasons of Texting Inconvenience	কেন এটা কঠিন / অসুবিধাজনক মনে হয়?	11.Why do you find it difficult/inconvenient?
MobileBudget	Mobile Budget	প্রতি মাসে মোবাইল ফোন ব্যবহার করার জন্য আপনার আনুমানিক বাজেট কত?	12.Approximately, what's your budget for using your mobile phone per month?
Employment	Employment Time	প্রতি সপ্তাহে আপনি কত ঘন্টা কাজ (paid-work) করেন?	13.How many hours do you do paid-work per week?
PersonRelationEmploy	Personal Relationship and Employment Correlation	আপনি কি মনে করেন অনেক লোককে ব্যক্তিগতভাবে চেনা বা জানা আপনাকে একটা ভালো চাকরি পেতে বর্তমানে বা ভবিষ্যতে সাহায্য করতে পারে?	14.Do you agree on that knowing more people personally would help you get a (better) job, either now or in the future?
LearnByDoingExample	Learning from Practical Help	যেহেতু অনেক কাজ বই পড়ে শিখা যায় না, আপনি কি মনে করেন কোনো একটি কাজ আপনাকে কেউ সরাসরি দেখানোর মাধ্যমে শিখতে পারে?	15.Do you agree that someone could teach you a job also by showing what to do directly, since many practices cannot be learnt only on written books?
MemberVoluntaryOrg	Membership of Voluntary Organization	আপনি কি কখনও কোন স্বেচ্ছাসেবী সংগঠনের সদস্য ছিলেন বা নিয়মিত ভাবে আপনার কমিউনিটিতে সমাজ সেবায় জড়িত ছিলেন ?	16.Have you ever been a member of a voluntary association or involved in some social service within your community on a periodic basis?
ReasonQuitMembership	Reasons for Quitting from Voluntary Organization	আপনি কেন আর উক্ত প্রতিষ্ঠানের সাথে জড়িত নেই?	17.Why did you quit from the organization?
IntegrtToCommunity	Integration towards Community	নীচের কোন community র প্রতি আপনি সত্যিকার বা আন্তরিক ভাবে একাত্তা বোধ করেন?	18.How much do you feel as an integrated member of and to really belong to the following communities?
MindAskingHelpErrand	Mind Asking Help for small errand	আপনি চেনেন না, এমন কারো কাছ থেকে সামান্য কিন্তু নিয়মিত সাহায্য যেমন কিছু শপিং করা (ওষুধ, খাবার, বা অন্যান্য নিত্য	19.Would you mind asking for help/support from someone whom you do not know for small routine errands, like

		প্রয়োজনীয় জিনিসের জন্য), বাসা পরিষ্কার করা, আপনার জন্য কোনও অফিসে বা কোথাও লাইনে দাঁড়ানোর জন্য সাহায্য চাইতে কি কিছু মনে করবেন?	for instance: doing some shopping (for medicines or food or other basic necessi- ties), cleaning house, queue up at some of- fice for you?
MindAskHelpBigProb	Mind Asking Help for small errand to overcome big problem	আপনি চেনেন না বা জানেন না এমন কারো সাহায্য যদি আপনাকে কোনো বড় সমস্যা উওরনে সাহায্য করে (যেমন গাড়ীর চাকা পরিবর্তন, আপনি অসুস্থ বা বাড়ি থেকে বের হতে পারছেন না এমন সময় ওষুধ এনে দেওয়া), বাসায় পানির পাইপ বনধ করতে সাহায্য করা(যা প্রচুর পানির অপচয় রোধ করে)- আপনি কি তার সাহায্য চাইতে কিছু মনে করবেন?	20.Would you mind asking for help/support from someone whom you do not know if this took you out of seri- ous troubles, for in- stance to either change a tire, or to buy some important medicine while you are sick or cannot move from your home, or to stop a massive water loss at home?
likelinessOfRecvHelp	Likelihood of Receiving Help	কোনো সমস্যা উওরনে সাহায্য চাইলে (যেমন, বাসায় কিছু মেরামত করা, কোনো কঠিন পেপার ওয়াক) করা, কোনো সেবার জন্য কিভাবে আবেদন করতে হয় তার জন্য উপদেশ পাওয়া, প্রয়োজনীয় জিনিসের জন্য টাকা জমানোর ব্যাপারে পরামর্শ)- কার কাছ থেকে অবিলম্বে সাহায্য পাওয়ার সম্ভাবনা আছে?	21.If you asked for help, how much likely is it that you could receive immediate assistance/help for small errands (like for instance, to repair something at home, get through some tough paper work or get important pieces of advice on how to apply for a service or save money for a good you need) from:
WillingToHelpNeighbr	Willingness to help neighbours	আপনার একজন প্রতিবেশী বা পরিচিত তার বা তার আত্মীয়ের জন্য যদি আপনার কোনো সাহায্য চায় (যেমন: কিছু পৌছে দেয়া, হাসপাতালে দেখতে যাওয়া), আপনি তা করতে কত টুকু ইচ্ছুক?	22.How much willing would you be to pro- vide help or assistance to a neighbor or ac- quaintance if she or a close relative of her asked you for it, like running an errand for her or visiting her at the hospital?
TimeBankKnowledge	Knowledge about Time Bank	আপনি কী কখনো টাইম ব্যাংকিং ব্যাপারে বা টাইম ব্যাংকিং এর কথা শুনেছেন?	23.Have you ever heard of Time Bank- ing?
TrustthruTimeBank	Trust others	কাজেই, আপনি চেনেন না	24.Thus, would you

	through Time Bank	এমন একজনকে কি আপনি বিশ্বাস করবেন, যদি টাইম ব্যাংক নিশ্চয়তা দেয় সে যে কাজে আপনাকে সহযোগিতা করবে সে কাজে সে দক্ষ?	trust a person whom you do not know if a Time Bank certified that she is knowledgeable with respect to what she can help you about?
TrustthruFriends	Trust others through friend	অন্য দিকে, আপনি কী একই অপরিচিত ব্যক্তিকে বিশ্বাস করবেন, যদি আপনার একজন বন্ধুকে তার ব্যাপারে জিজ্ঞাসা করতে পারেন সে যে কাজে আপনাকে সহযোগিতা করবে সে কাজে সে দক্ষ কি না?	25. On the other hand, would you trust this stranger if you could ask a friend of yours if she is knowledgeable with respect to what she can help you about?
WerdClaimCrditRelatv	Weired Claim Credit from Relative	একই টাইম ব্যাংকে নিবন্ধীকৃত হয়েছে এমন একজন আত্মীয় বা বন্ধুকে সাহায্য করার জন্য (সময়) ক্রেডিট দাবি করাকে কি আপনি অদ্ভুত বা অনুপযুক্ত মনে করেন?	26. Would you find it weird or inopportune to claim (time) credit for having helped a relative or a friend of yours that is registered to the same Time Bank?
WerdClamCrdtStrnger	Weired Claim Credit from Strangers	একজন অপরিচিত ব্যক্তিকে সাহায্য করার জন্য (সময়) ক্রেডিট দাবি করাকে কি আপনি অদ্ভুত বা অনুপযুক্ত মনে করেন?	27. Would you find it weird or inopportune to claim (time) credit for having helped a stranger?
ClaimStrangerForHelp	Claim starngrers for Help	আপনি সাহায্য করেছেন এমন ব্যক্তিকে, যিনি টাইম ব্যাঙ্ক এর মেম্বার নন, আপনার কাজের জন্য একটি এসএমএস অথবা একটি ইমেইল এর জবাব দিয়ে অথবা একটি ওয়েব ফর্ম পূরণ করে আপনার কাজকে স্বীকৃতি দিতে বলবেন ?	28. Would you ask a person whom you helped in some task and who is not a TB member already, to acknowledge that officially, for instance by replying a SMS received from a specific phone number, or replying an email, or filling in a Web form?
WilingHelpStrangerTB	Willingness to help strangers	একজন অপরিচিত ব্যক্তি (টাইম ব্যাংকিং সিস্টেমের মধ্যে) যদি সাহায্য এবং সমর্থন চান আপনি কি তাকে তা করবেন?	29. Would you like to help one who is looking for support even if you do not know that person?
ConfirmHelpOfOthers	Confirm Help of Others	যদি কোন ব্যক্তি আপনাকে সাহায্য করেছে তা একটি তৃতীয় পক্ষের কাছে প্রত্যয়ন	30. Would you mind to certify to a third party that someone has helped you in some

		করতে বলে আপনি কি তা করবেন(যদি আপনি টাইম ব্যাংকের সদস্য না হন)?	circumstance if this person asked you to do so (assuming you are not a Time Bank member)?
WillingDescribeSkill	Willingness to Describe Skill	আপনি আপনার কাজের দক্ষতা এবং আগ্রহ বর্ণনা করতে এবং / অথবা একটি টাইম ব্যাংকে নিবন্ধিত অন্য কারোর জন্য বিনামূল্যে তা প্রদান করতে কত টুকু ইচ্ছুক ?	31. Would you describe your competencies, skills and interests, in a word, things you are proficient about and/or are willing to do free of charge for someone else registered to a Time Bank?
WillingHelpfromYoung	Willingness to receive help from young	যে কোনো বয়সের কারো কাছ থেকে কি আপনি সাহায্য নিতে আগ্রহী?(মনে করুন যিনি আপনাকে সাহায্য করবেন তার বয়স ২৫ বছরের নিচে)	32. Are you willing to receive help from a member whose age is below 25 years?
WillingHelpYoung	Willingness to help young	যে কোনো বয়সের কাউকে কি আপনি সাহায্য করতে আগ্রহী?(মনে করুন যাকে আপনি সাহায্য করবেন তার বয়স ২৫ বছরের নিচে)	33. Are you willing to help a member whose age is below 25 years?
WillingHelpFrmSenior	Willingness to receive help from seniors	যে কোনো বয়সের কারো কাছ থেকে কি আপনি সাহায্য নিতে আগ্রহী?(মনে করুন যিনি আপনাকে সাহায্য করবেন তার বয়স ৬৫ বছরের উপরে)	34. Are you willing to receive help from a member whose age is more than 65 years?
WillingHelpSenior	Willingness to help seniors	যে কোনো বয়সের কাউকে কি আপনি সাহায্য করতে আগ্রহী?(মনে করুন যাকে আপনি সাহায্য করবেন তার বয়স ৬৫ বছরের উপরে)	35. Are you willing to provide any services to a member of any age group/whose age is more than 65 years?
TimeBankMembership	Time Bank Membership	আপনি কি ইতিমধ্যে কোনো টাইম ব্যাংকের সদস্য হয়েছেন?	36. Have you already been a member of any Time Bank?
ResonsQuitTimeBank	Reasons for Quitting from Time Bank	আপনি কেন এই প্রতিষ্ঠান থেকে সরে গিয়েছিলেন?	37. Why did you quit from Time Bank?
WillingTimeBankMembr	Willingness to be Member of Time Bank	আপনি কি এই ধরনের কোন সিস্টেমের সদস্য হতে চান?	38. Would you like being a member of such a system?
InitiateEnrolMember	Initiate enroll	আপনি এই ধরনের কোন	39. If you enjoy or

	others for Membership	সিস্টেমের সদস্যপদ উপভোগ করে থাকলে/ বা এখনও করলে করলে এতে যোগদানের জন্য প্রতিবেশী, বন্ধু এবং অন্য লোকেদের সুপারিশ করতে উদ্যোগ নেবেন?	enjoyed such a membership, would you recommend other people, like neighbors and friends, to join such an initiative?
HelpReturnsHelp	Help Returns Help	অনেকে বলে, অন্যদের সাহায্য করলে পরিশেষে নিজেকেই সাহায্য করা হয়- আপনি কি এর সাথে একমত?	40. Some say that by helping others you are helping yourself in the long run. Do you agree?

Appendix 3: Questions for the Exploratory Focus Group

1. Have you ever heard of Time Accounting System (Time Banking)?
2. Do you think such kind of initiative will be helpful in Bangladesh?
3. What problems are you anticipating in case of taking initiative for such system in Bangladesh?
4. What can be done to overcome these problems?
5. What benefits are you anticipating with this system in Bangladesh?
6. Would you like being a member of such a system?