ICT for DEVELOPMENT

Working Paper Series

Information
Communication
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Contents

ICT at the Bottom of the Pyramid

Welcome to the Working Paper Series on ICT for Development.

In this maiden issue, the editors have selected six articles illustrating the potential of Information and Communication Technology (ICT) to benefit the bottom of the pyramid in terms of participatory governance, access to banking services and increased agricultural productivity. The first two studies focus on mobile phone services. The first article "Bottom of the Pyramid Expenditure Patterns on Mobile Phone Services in Selected Emerging Asian Countries" evaluates the importance of mobile telephone expenditure in the budgets of consumers in the bottom of the pyramid. Aileen Aguero and Harsha de Silva found that in Bangladesh, Pakistan, India, Sri Lanka, the Philippines and Thailand, consumers regard the services as a necessity rather than a luxury. Mobile phones have become part of everyday life for consumers in these countries. Given mobile phone usage patterns, Rasheda Sultana in her paper, "Mobile Banking: Overview of Regulatory Framework in Emerging Markets" notes the opportunities to provide basic financial services through mobile banking to BOP. She provides an overview of existing mobile banking models and an examination of mobile banking regulations in the Philippines, South Africa and Kenya, where mobile banking has been implemented successfully.

The following two articles examine factors affecting e-government projects that facilitate citizen engagement. In "Factors Affecting e-Government Assimilation in Developing Countries," Boni Pudjianto and Zo Hangjung examine the factors affecting the assimilation of e-government projects in developing countries by using the Diffusion of Innovations Theory. They discover that the environmental context plays the most crucial role in assimilation, which is followed by organizational and technological factors. Rajendra Kumar, meanwhile, analyzes e-government projects in three South Indian states. In his paper, "Inclusive Development through e-Governance: Political Economy of e-Government Projects in Andhra Pradesh, Tamil Nadu and Kerala," he argues that Kerala performed better than the others in making projects more inclusive. In this sense, Kumar supports Pudjianto and Hangjung's findings, as Kerala's regulatory and competition environments prove to be crucial factors in the implementation of e-government projects. Specifically, Kerala is relatively autonomous of dominant class coalitions and traditionally marginalized groups have been empowered.

The final two papers describe how ICT can benefit rural areas in Bangladesh. Genilo and Akther in their paper, "New Media, Knowledge Acquisition and Participatory Governance in Rural Bangladesh," document how a rural village in the Chittagong District has begun to integrate ICT as part of its community-based communication system. In so doing, the authors find that it Kerala enhanced its capacity for knowledge acquisition and improved the quality of participation in public affairs. Residents used ICT to download government forms, search for employment and to access information about agriculture and health. In

their article "e-Krishok: A Campaign to Promote Agricultural Information and Services through ICT," Shahid Uddin Akbar, Parvez Mohd. Asheque and Shariful Islam review the e-Krishok campaign, which envisions that farmers' incomes will improve with the use of agricultural knowledge and innovation. The paper demonstrates that the e-Krishok network links farmers to resources and services needed to increase agricultural productivity. The authors conclude by affirming the role of local mobile network operators in enabling development.

These articles provide a glimpse of ICT from the bottom of the pyramid. It is with great joy we note that many marginalized groups can now use ICT to improve their welfare. Indeed, the information age is now upon us – and it must include every member of society.

On behalf of the entire editorial board,

Dr. Jude William Genilo
Editorial Advisor

Article

Bottom of the Pyramid Expenditure Patterns of Mobile Phone Services in Emerging Asian Nations

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Abstract
This paper evaluates the importance of mobile phone expenditure in consumer budgets of the Bottom of the Pyramid (BOP) in Bangladesh, Pakistan, India, Sri Lanka, the Philippines and Thailand. We examine whether mobile phone services in the selected countries display the characteristics of a luxury or necessity. Upon evaluating the expenditure patterns as a share of total personal income, we conclude the service to be a necessity. Welfare and poverty are then addressed using the estimation of the Engel curve, thus demonstrating how the consumption of various goods and services change according to consumer income. We estimate Engel curves for expenditure on mobile phone services for the BOP in the selected countries to show that mobile phones are part of everyday life for the selected consumer group.

Keywords
Consumer, mobile phone, expenditure, access, poverty, BOP, teleuse.

1. Introduction[1]

A particular group of emerging Asian nations have made good progress in reducing poverty. In Thailand, for example, the number of people living below the national poverty line was 10 percent in 2006. In Bangladesh, the percentage fell from 49 percent in 2000 to 40 percent in 2005; Pakistan saw a reduction from 65 percent in 1991 to 23 percent in 2005; the Philippines had 33 percent in 2006; India reported 28 percent in 2004 and Sri Lanka showed a considerable reduction - from 25 percent in 1996 to 15.2 percent in 2007.[2] Poverty and a lack of infrastructure are major concerns in terms of limiting access to utilities such as electricity, water and transportation. However these factors appear to have far less an impact on telecommunications, and in particular, mobile telephony. It is well-known that mobile telephony has great potential for improving living conditions in an aggregate level[3] and at a disaggregated level.[4]

Thus it is relevant to examine the pattern of expenditure in mobile telephony. Our focus is on a group of emerging Asian countries, Bangladesh, Pakistan, India, Sri Lanka, the Philippines and Thailand, analyzing the BOP. The analysis will determine whether mobile phone services are a luxury service or necessity in economic terms.

The classification is important because it highlights changes in the demand for a good or service when incomes vary. Determining whether a particular product or service is a necessity or a luxury is important regarding taxation.

The paper begins by briefly describing Engel's Law and the Engel Curve, along with additional concepts and applications for services in general and telecommunications in particular. The empirical analysis graphically examines the pattern of mobile telephone service expenditure in the six countries, Bangladesh, Pakistan, India, Sri Lanka, the Philippines and Thailand. This dataset studies the differences between several sociodemographic variables. To complement the findings of the expenditure patterns, the paper estimates Engel Curves and calculates income elasticities as part of the empirical analysis. Concluding remarks close the paper.

2. Engel's law and curve: Concepts and applications

2.1 Origin of Engel's Analysis

Differences in consumption between wealthy families and poor families have been discussed for centuries, but according to Stigler (1954), it wasn't until the 1790s that the world's first quantitative analysis took place in England. Two researchers, David Davies and Frederick Morton Eden, investigated working-class poverty by compiling workers' budgets, but did not include a summary of their findings, because they considered it non-quantitative data.

In 1857, after almost seventy years, Engel classified 153 Belgian families into three socio-economic groups: (1) families dependent on public assistance; (2) families capable of surviving without assistance; and (3) well-to-do families. Based on his study, he developed a law of consumption, known as Engel's law: "The poorer the family, the greater the share of income devoted to food." He also proposed that the wealthier the country, the

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[2] Source: Asian Development Bank.
[3] For example, Waverman et al. (2005) note that in a typical developing country, an increase of 10 mobile telephones per 100 people could increase GDP growth by 0.6 percentage points.
[4] See Jensen (2007), Aker (2008), de Silva et al (2008), Esselaarc et al (2007), Bhavani (2008).

lower the share of food expenditure relative to total expenditure. It was the first empirical generalization concerning budget data.

In 1875, Carrol Wright reassessed the following contentions of Engel: (1) the higher the income, the lower the relative percentage of expenditure for subsistence; (2) the percentage of clothing expenditure is approximately the same for all income levels; (3) the percentage of housing, fuel or electricity expenditure is the same, regardless of income level; and (4) as income increases, the percentage of expenditure on various items increases. Wright accepted the first and fourth proposition only. He noted that negative savings could be evidence of poverty, and thereby recommended implementing a minimum wage.

2.2 The Engel curve and income elasticity

In addition to Engel's law, the Engel curve compares the amount of expenditure on an item with the total household income or expenditure. It is a useful tool for analyzing welfare.

As Haque (2005) reviews, Prais et al (1955) was a pioneer in the study of the Engel curve. Five different forms of curves were fitted: linear, semi-log, hyperbolic, double-log and loginverse, and the total expenditure elasticities for many food and non-food items were estimated.

As the Engel curve and the income elasticity concepts evolve from the theory of demand analysis, some background is necessary.

Demand analysis finds changes in the demand for a particular good with reference to specific explanatory variables. In general, the per capita expenditure on any good can be expressed as a function of a series of variables, including per capita income, prices, time, tastes, preferences and so forth.

According to Haque (2005), selecting a demand model requires the consideration of previously used functional forms. It is also advised to estimate only a few parameters for each consumption item, and to focus on the relationship between expenditure and income, considering prices as fixed. This relationship is defines the Engel curve [5] and is expressed as $Y_i = f(X)$, where Y_i represents the expenditure on good i and X is the consumer's total income (expenditure). Estimating the curve includes the assumption that on average, the differences in consumption patterns between high and low income households can be attributed to differences in current income (total expenditure).

The benefit of accurate estimates of income elasticities is clear when we consider their usefulness for classifying goods in economic terms. If the income elasticity of a good lies between 0 and 1, it will be considered as income inelastic, i.e., a necessary good. This implies that the demand rises as income increases, but that a smaller percentage of income is spent on this item. On the other hand, an item is regarded a luxury if the income elasticity is greater than 1 (income elastic). This would mean that demand rises as income increases, and a larger percentage of income is spent on this item. As Lewbel (2006) notes, goods with income elasticities below zero, between zero and one, and above one are respectively known as inferior goods, necessities, and luxuries.[6]

2.3 Engel curve Applications

The Engel curve evaluates the share of expenditure dedicated to a good or service, usually food, and its relationship to total household income or expenditure. Using quadratic Engel

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[5] Lewbel (2006)'s definition is: An Engel curve is the function describing how a consumer's expenditures on some good or service relates to the consumer's total resources holding prices fixed.
[6] Both necessities and luxury goods are normal goods because their elasticities are above zero.

curves, Girma et al (2002) identified the proportion of Ethiopian urban households in which food has the characteristics of a luxury item. The main objective of this study is to estimate total consumer expenditure levels, beyond which food is no longer a luxury, while taking measurement error into account. In rural China; Gong et al (2000) found economies of scale in families' consumer expenditure patterns, as well as different consumer patterns that relate to the genders of children.

It also has several applications for health care. For instance, between 1966-1998, Freedman (2003) measured the state-level in the USA, finding income elasticities that ranged from 0.817 to 0.844. This is well below unity, which confirms health care is a necessity. African nations are also studied by Okunade (2005), who describes how health care expenditure in Africa responds to changes in the Gross Domestic Product and other variables. A comparison between 1984 and 1995 estimations is also provided, as well as the GDP elasticity of health expenditure.

In OECD countries, the status of health care is found in Sen's (2005) empirical evaluation of the impact of per capita income on health expenditure in 15 OECD countries between 1990 and 1998. Income elasticities were found to range from 0.21 to 0.51, again positing health care as a necessary service.

Social protection has been studied in a similar manner in certain OECD countries. It is defined as public spending on old age cash benefits, unemployment benefits and health expenditure. Auteri et al (2004) finds that social protection does not possess the characteristics of a luxury good, given its elasticity of 0.837.

Hansen et al (2006) estimated income elasticities for housing services using an alternative methodology known as the American Housing Survey. Their results indicate that the demand for housing services is income inelastic at all income deciles, both for owners and renters. For the former, demand was more income elastic than renter demand.

2.4 Engel curves for telecommunications expenditure

Literature on telecommunications expenditure relative to total household expenditure is sparse, and this is particularly so when it comes to using the Engel curve.[7] However Ureta (2005) evaluates household telecommunications expenditure in four countries, Albania, Mexico, Nepal and South Africa. Ureta considers the proportion of family income dedicated to these services and monthly expenditure deciles. In the countries examined, Engel's law applies to food: higher expenditure indicates it has less importance in the family budget: food is a necessity. In the case of telecommunications, however, the opposite is found: higher expenditure results in an increased importance for communications. Thus it falls within the category of a luxury service.

Income elasticities for the demand of internet services have been calculated by Goel et al (2006), using a simple model and cross-country OECD data from 2000. The main conclusion is that internet services may not constitute a necessity, as the income elasticity appears to be unity or larger. Another important finding is that income elasticity appears to be smaller for users than subscribers, which indicates that policies encouraging internet use through subscriptions may not improve equity.

Evidence of income elasticities is also available for two South American countries. In Colombia, Ramírez (2005) compares household expenditures on goods and services over a six-year period. The statistical analysis uses Engel curves, and its focus is on changes in expenditure in terms of magnitude, composition and distribution.

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[7] In a general level, Foster et al (2004) and Foster (2004) relate expenditure in public services to total household expenditure.

Because transportation and communications had an income elasticity above one for the entire period (1.14 to 1.26), both are considered luxury items. In addition, Gamboa (2007) classifies mobile telephony as a luxury service due to an income elasticity of 1.30.

Combining the tools employed by Ureta (2005) and Gamboa (2007) in Peru, Agüero (2008) found that telecommunications services (mobile and fixed telephony and internet) also have the characteristics of a luxury good, with an income elasticity of 1.97 in 2004.

Mobile telephony expenditure has also been evaluated in 17 African countries[8] by Chabossou et al (2008). Mobile expenditure was inelastic with respect to income. That is, the proportion of mobile expenditure to individual income increases less than one percent for each one percent increase in income. As the paper highlights, people with higher incomes spend less on mobile telephony as compared with those on lower incomes.

Milne (2006) summarizes the empirical regularities in telecommunications expenditure patterns. In industrialized countries, communications have the characteristics of a necessity (the income elasticity is less than 1), whereas communications in developing countries are considered luxury goods. Furthermore, with rapid industry development in developing countries, they are expected to follow the trends of industrialized ones. There is anecdotal evidence of middle-income people in industrialized countries struggling to pay mobile phone bills, which have become "an essential luxury" or "an expensive necessity".

The objective of this study is to examine mobile phone service expenditure patterns, and to classify this service in economic terms. The specific focus is on the BOP of six emerging Asian countries: Bangladesh, Pakistan, India, Sri Lanka, the Philippines and Thailand. Expenditure patterns are graphically analyzed at aggregated and disaggregated levels. To support our findings, we estimate Engel curves and calculate income elasticities of each country.

3. Empirical analysis

3.1 Teleuse at the bottom of the pyramid dataset

This data is based on an international study of ICT use at the "bottom of the pyramid" (BOP) in emerging Asian countries, which was conducted by LIRNEasia. Interviewees consisted of those who had used a telephone – though not necessarily owned one - in the previous three months. Interviews took place between 2008 and 2009 in Bangladesh, India, Pakistan, the Philippines, Sri Lanka and Thailand.

For the purpose of the study, BOP was defined as the two lowest SEC groups, D and E. The exception was the Philippines, where only SEC group E was considered. Telecom users between the ages of 15 and 60 were interviewed in rural and urban areas. Quantitative and qualitative methods were used.

The quantitative component involved 9,540 face-to-face interviews using a structured questionnaire. Both households and respondents were randomly selected. The sample was designed to represent the BOP in each country so that the findings could be projected back to this segment.

With the exception of India, where only the majority of states were covered, all regions in each country were covered. Multi-stage stratified random sampling was undertaken, whereby primary sampling units (regions) were randomly selected. Within each selected region, urban and rural centers were randomly selected. Within selected urban and rural

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[8] Benin, Botswana, Burkina Faso, Cameroon, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Mozambique, Namibia, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Uganda, Zambia.

centers, starting points were randomly selected with a fixed number of interviews. The number of starting points selected from each centre was proportional to the population of the selected centre.

One respondent was selected per household; in households with more than one eligible respondent, the Kish grid (random number chart) was used to randomly select a respondent. Within each country, data was re-weighted to reflect the correct SEC D and E population mix in urban and rural areas.

An overview of the sample size and composition is given in Table 1.

Table 1: Sample size and composition

Countries	All BOP	Urban BOP	Rural BOP	Margin of error @ 95% CL (%)
Bangladesh	2,050	1,719	331	2.8%
Pakistan[9]	1,814	899	915	2.3%
India	3,152	773	2,379	1.7%
Sri Lanka[10]	924	320	604	3.3%
Philippines	800	468	332	3.1%
Thailand[11]	800	400	400	3.5%
Total	**9,540**	**4,579**	**4,961**	

3.2 Importance of telecommunications expenditure as a share of total personal income

Firstly, mobile telephone service expenditure (USD) relative to total personal income (USD) is analyzed in each country. The variables of interest are monthly personal expenditure on mobile telephone services available to prepaid users[12] and monthly personal income.

Due to the fact that interviewees were randomly selected, some did not have an income source. This was overcome by factoring in the per capita income of the household.

Before beginning the analysis, it is necessary to provide details about the variables' main descriptive statistics in each country. These are shown in table 2, considering income quintiles.

Table 2: Descriptive statistics of monthly personal income and mobile telephony expenditure by country (USD)

Quintiles	Personal income				Mobile expenditure			
	Mean	SD	Min	Max	Mean	SD	Min	Max
				Bangladesh				
1	16.5	5.8	1.4	25.2	4.1	2.7	0.0	12.9
2	36.1	6.4	25.9	43.2	4.0	2.6	0.1	17.3
3	56.2	5.0	46.0	64.7	4.4	2.7	0.0	12.9
4	83.3	11.0	71.9	100.7	5.3	3.0	0.1	17.3
5	170.5	130.4	107.9	1007.2	5.7	3.2	0.2	18.5

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[9] Excludes tribal regions.
[10] Excludes the North and East regions.
[11] Sample excludes Bangkok because the SEC D and E population in Bangkok is small.
[12] Monthly expenditure on mobile telephone service was constructed considering the value of the last topup and the number of days the individual considers it will last.

| Quintiles	Personal income				Mobile expenditure			
	Mean	SD	Min	Max	Mean	SD	Min	Max
				Pakistan				
1	13.2	4.7	1.6	21.0	4.9	4.2	0.1	19.7
2	32.5	6.2	21.9	39.4	5.2	4.7	0.1	19.7
3	57.7	7.5	41.0	65.6	5.6	5.2	0.1	19.7
4	89.5	10.9	72.2	105.0	6.1	5.1	0.2	19.7
5	196.9	177.3	105.0	1181.1	7.9	6.4	0.1	19.7
				India				
1	17.6	5.1	3.8	25.9	3.9	2.5	0.1	16.7
2	38.8	6.5	26.7	44.4	4.3	3.5	0.1	20.0
3	63.5	5.3	46.7	66.7	5.3	3.8	0.1	19.0
4	85.5	5.2	71.1	88.9	4.9	3.7	0.1	18.8
5	135.1	42.7	93.3	333.3	5.6	4.0	0.2	18.5
				Sri Lanka				
1	21.3	7.8	5.5	34.4	5.1	3.4	0.7	13.8
2	48.3	8.3	36.7	61.2	5.4	3.4	0.3	15.3
3	82.3	10.1	63.3	91.7	5.3	3.6	0.1	13.8
4	127.7	13.6	95.0	137.6	5.8	4.1	0.3	13.8
5	199.1	44.1	145.0	367.0	5.8	4.3	0.3	13.8
				Philippines				
1	18.9	5.7	6.5	27.2	9.5	4.4	2.2	19.6
2	37.4	5.5	28.3	43.5	10.5	5.2	2.4	19.6
3	58.9	6.1	47.8	65.2	10.8	5.0	2.1	19.6
4	93.5	12.9	67.0	109.6	10.8	5.0	1.3	19.6
5	165.0	52.8	115.2	434.8	9.6	4.8	1.9	19.6
				Thailand				
1	34.7	9.8	8.7	48.3	7.7	5.0	0.4	17.4
2	73.5	13.3	49.3	87.0	8.0	4.8	0.4	17.4
3	128.0	17.2	95.0	144.9	9.2	4.8	0.9	18.6
4	173.5	8.1	145.0	188.4	9.1	4.5	0.2	17.4
5	264.9	53.8	195.0	347.8	9.5	4.3	1.4	17.4

The highest personal income levels were found in Thailand, while the lowest were among Pakistan and India. Mobile telephone service expenditure figures show that the BOP in the Philippines spends the most on mobile phone services, while India, by contrast, spends the least.

Differences among the poorest and richest groups should also be documented. For instance, in terms of personal income, the widest inequality was found in Pakistan, where the fifth quintile had an average income of more than 15 times the average income of the first quintile. On the other hand, in Thailand, this difference is the smallest: the average income of the fifth quintile is 8 times the average income of the first.

The horizontal axis of the graphical analysis below shows quintiles of monthly personal income, while the vertical axis shows the percentage of expenditure on mobile telephone service, relative to monthly personal income. As the graphs demonstrate, there is evidence to support Engel's law in the six countries studied. The importance of mobile phone service expenditure decreases as personal income increases, which indicates that mobile telephone services are a necessity for prepaid users in the BOP of each selected Asian country.

Graph 1: Share of mobile telephony expenditure relative to total personal income – by country
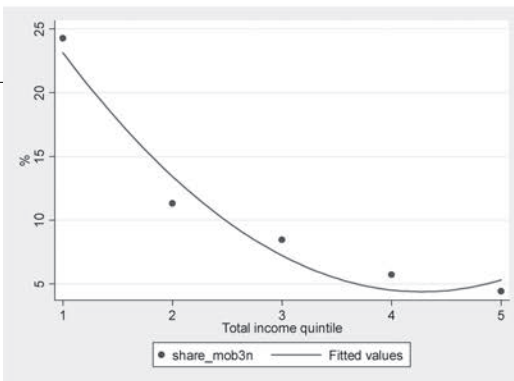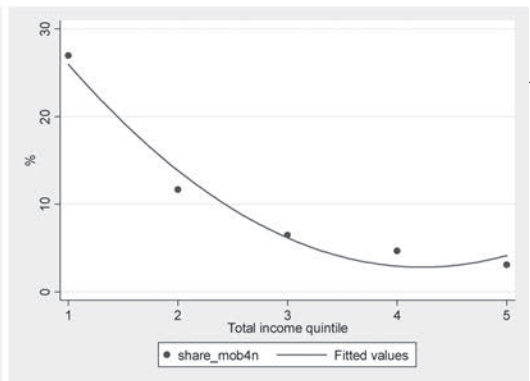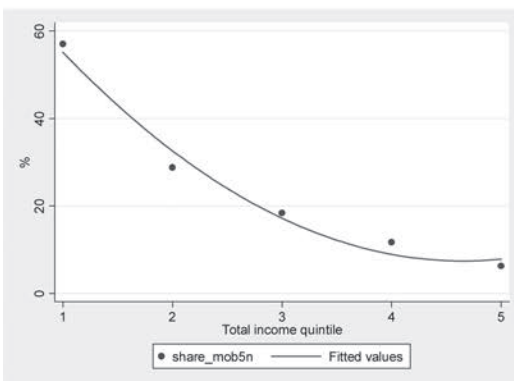
Bangladesh
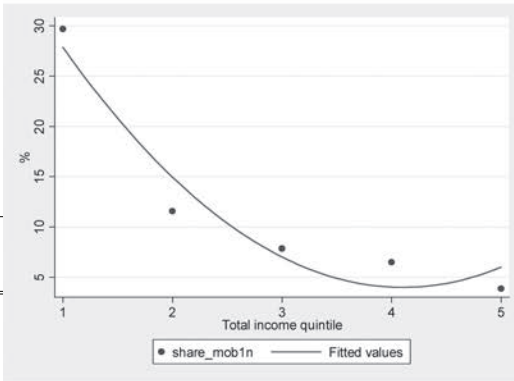
Pakistan
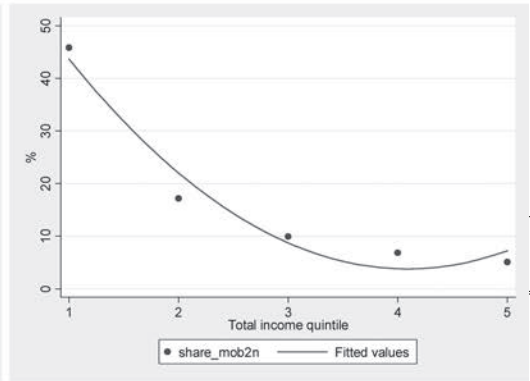
India
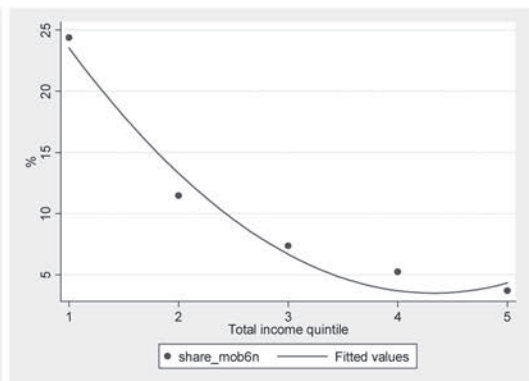
Sri Lanka

Philippines

Thailand

We will now examine poverty levels within the BOP, which are reflected in the income quintiles. Interestingly, the poorest quintile of each country's BOP spends more than 20 per cent of total income on mobile telephone services. In India and Thailand, the first quintiles both spend 24 per cent, whereas in the Philippines it is 57 per cent; the highest for this

income category among the countries. On the other hand, the groups with higher incomes (fifth quintile), show an expenditure on mobile telephony in a range of 3 per cent in Sri Lanka to 6 per cent in the Philippines. These figures are presented in table 3.

Table 3: Percentage of expenditure in mobile telephone services in selected Asian countries – income quintiles (%)

Quintile	Bangladesh	Pakistan	India	Sri Lanka	Philippines	Thailand
1	29.7	45.8	24.3	27.0	57.0	24.4
2	11.5	17.2	11.3	11.7	28.8	11.4
3	7.8	9.9	8.4	6.5	18.4	7.3
4	6.5	6.8	5.7	4.7	11.7	5.2
5	3.8	5.1	4.4	3.1	6.3	3.7

However we must acknowledge that some respondents did not have an income source, and as a result, income levels were imputed considering the per capita income level of the relevant household. This occurred most frequently in the Philippines. To rectify this issue, the same analysis was undertaken with respondents whose income levels were not imputed. The expenditure patterns remained the same for all countries: in other words, mobile telephone services for this sub-set of respondents was once again a necessary service.[13]

A disaggregated analysis has also been performed using the valuable information available from the T@BOP dataset (graphs on the Annex 2). The analysis focuses mainly on the lowest income groups (first quintile) and the highest income groups (fifth quintile).

Rural/urban disaggregation in Bangladesh, Pakistan and Philippines revealed that the poorest groups spend a higher percentage of their income on mobile telephony in rural areas than in urban ones. In Thailand, India and Sri Lanka, the figure is almost the same in both areas. For the fifth quintiles, the richest ones, the difference is negligible, at below 5 percent.

Gender was also considered. Among the poorest groups in Thailand, Bangladesh and Pakistan, males spent a greater percentage on mobile phone services than females. The reverse was found in Sri Lanka, India and the Philippines. As in the previous disaggregation, no major differences were found between males and females in the highest income groups.

The definition of BOP considers SEC groups D and E. Surprisingly, an independent evaluation found that in Pakistan, India, Sri Lanka and Thailand, the first quintiles spend a higher percentage on mobile telephony in SEC group E. The largest differences were found in Sri Lanka and Thailand; in the former, 23 per cent is spent in SEC group D while 32 per cent is spent in SEC group E. Among the latter, SEC group D spends 21 per cent and 29 per cent is spent in SEC group E.

The analysis also divided respondents into those above or below the age of 35. As expected, those under 35 in the first quintiles spend a greater share of their income on mobile telephony in Bangladesh, Pakistan, India and Thailand. In Philippines and Sri Lanka, people above 35 years of age spend more, though the difference is not considerable.

[13] The resulting figure for Philippines, instead of 57%, is of 32% if we consider respondents whose incomes were not imputed (respondents with an income source). For a comparison of the figures, see Annex 1.

The final comparison was between public phone users and non-users. Among the poorest groups, non-users of public phones spend more on mobile telephony in Bangladesh, Pakistan and Sri Lanka. In India and Thailand, there is almost no difference, while in the Philippines, public phone users spend more than non-users.

3.3 Estimation of Engel curves and income elasticities

As mentioned above, the Engel curve is a useful tool for welfare-related analysis, as it shows how consumption of different goods and services changes with variations in consumers' income. This provides an idea of income elasticities, that is, consumer response, to changes in income. An in-depth analysis of mobile telephony expenditure in Bangladesh, Pakistan, India, Sri Lanka, Philippines and Thailand requires an estimate of Engel curves to calculate income elasticities and complement the previous findings.
Engel curves have different specifications, thus selection depends on the criteria prioritized[14] by researchers. For example, the best function can be chosen after considering statistical criteria; economic criterion may also be considered for selection purposes.
Haque (2005) points out the properties that should be satisfied by Engel curves, which include:

i. The possibility of threshold and saturation levels.
ii. The adding up criterion, i.e. the sum of all expenditure is equal to total expenditure at all levels.
iii. The best representation of the data on statistical grounds.

At the same time, Haque (2005) posits that none of the Engel functions satisfy all such properties simultaneously, and that a researcher must therefore determine the functional form for an Engel curve analysis based on his or her best judgment.
As for mobile telephony and for telecommunications in general, a functional form has already been estimated by Ramirez (2005), Gamboa (2007) and Agüero (2008). We consider the same specification for mobile phone owners in each country:

$$s = \alpha + \beta \ln Y + \gamma \ (\ln Y)^2 \qquad\qquad\qquad\qquad (1)$$

where $s = M / Y$. M represents mobile phone service expenditure and Y is monthly personal income. Estimations are made on an individual level.
It must be noted that the logarithm expression intends to correct heteroskedasticity, a common issue in income variables. Furthermore, the squared logarithm expression attempts to show a non-linear effect in this case. Therefore, we consider that this functional form gives a solid representation of the data on statistical grounds. Estimations for each country are shown in table 4.

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[14] Prais (1954) prioritizes the possibility for threshold and saturation levels.

Table 4: Estimation results for the countries under analysis

Country	Variable	Coefficient	Std. Error	Nº of obs.
Bangladesh	Ln Y	-21.4998	3.9493	
	(Ln Y)^2	1.5426	0.4912	797
Pakistan	Ln Y	-34.6939	5.0408	
	(Ln Y)^2	2.7833	0.6162	510
India	Ln Y	-18.7184	2.2464	
	(Ln Y)^2	1.3177	0.2853	1207
Sri Lanka	Ln Y	-21.7034	3.4680	
	(Ln Y)^2	1.5473	0.4128	480
Philippines	Ln Y	-48.9240	6.1688	
	(Ln Y)^2	3.5566	0.7419	457
Thailand	Ln Y	-23.1197	3.6403	
	(Ln Y)^2	1.5582	0.3924	603

Note: Parameters are significant at 0.01 level.

In Colombia, Gamboa (2007) estimated this functional form for mobile telephony and found that it has the characteristics of a luxury good as income elasticity is above one. For telecommunications in general, Ramirez (2005) also employs this specification and obtains similar findings. Agüero (2008) calculates income elasticities for Peru for fixed and mobile telephony and internet, using the same function. Once again, these services show the characteristics of a luxury good.

With the values resulting from the estimation of the curve described above, income elasticities at country level are calculated as follows:

$$\varepsilon = 1 + \beta / s + 2\gamma \ln Y / s \tag{2}$$

The elasticities for each country are summarized in table 5:

Table 5: Income elasticities for the countries under analysis

Countries	Elasticities
Bangladesh	0.2262
Pakistan	0.2298
India	0.2640
Sri Lanka	0.2075
Philippines	0.1782
Thailand	0.1965

It is clear that mobile phone services for the BOP sectors of our selected countries exhibit the characteristics of a necessary service in economic terms. Income elasticities range from 0.1782 in the Philippines to 0.2640 in India. Thus, the higher the income, the lower relative importance mobile telephony has in an individual's budget. In other words, mobile telephony expenditure is not sensitive to change in disposable income, as mobile expenditure is inelastic with respect to income. Such findings for India in particular are in contrast with Moonesinghe's et al (2006) evidence from 2005, which suggested mobile

phones are a luxury item. Despite the fact that Moonesinghe's methodology and the one applied in this paper differ and comparisons cannot be directly made, we can conclude that the status of mobile telephony has changed in India. This may be the result of an improvement in market conditions, such as price reductions and new tariff plans.

It has been noted that the graphical analysis and the income elasticities estimation produces the same finding; that mobile phone services are a necessity. This finding should encourage further development of mobile phone services for low-income groups in the selected emerging Asian countries. In addition, this pattern of expenditure shows there is potential for the introduction of more services on mobile devices.

These findings contribute to existing literature by providing additional evidence concerning the use of mobile phone services of the BOP in the selected countries. Among the poor in particular, it is a proven information enabler that increases productivity, overcomes geographic limitations and supports social relationships and networks.

4. Conclusion

Expenditure patterns and income elasticities reveal that mobile phone services have the characteristics of a necessity in the BOP of Bangladesh, Pakistan, India, Sri Lanka, Philippines and Thailand. According to the economic classification of goods, this means that for wealthier consumers, less importance is placed on mobile phone services in terms of their budget.

As at October 2009, tax rates in these countries ranged from 7% in Thailand to 29% in Pakistan. From an economic point of view, luxury goods are to be taxed;

16 Elasticities were also estimated for respondents whose incomes were not imputed (respondents with an income source). The same pattern is found. See Annex 1.

but having identified mobile phone services as a necessity, authorities ought not to charge high rates of tax. Policies that foster rather than hamper investment in the mobile phone serctor should be implemented.

In previous studies of Latin America, telecommunications and mobile phone services were found to have the characteristics of a luxury good. However, the conclusion was not to tax these services. On the contrary, it has been stressed that these results reflect specific market conditions; specially competition and technology, along with consumers' income levels. However among the emerging Asian countries under analysis, conditions are quite different, and they do have an impact on the findings contained in this paper.

Competition has been the main driver behind the growth of the mobile sector growth in the selected countries. As de Silva (2007) states, in India, competition has been driven by market entry and falling tariffs. In Pakistan, the competition offered by new entrants brought tariffs down, thereby making mobile services more affordable. Pakistani policies consistently play an important role in sustaining competition among operators. In Sri Lanka, mobile sector growth is driven by competition enabled by wireless technology. In Thailand, once again, the main factor boosting the sector's growth was fierce competition that led to price wars. In the Philippines, competition mostly revolves around value added services, which led to a considerable expansion of the sector.

The different market conditions among Latin American and Asian countries is also acknowledged by Nokia (2009), considering the Total Cost of Ownership (TCO), defined as how much a consumer's income is required to own and use a mobile phone. An important finding is that a TCO of 5 USD or less per month is enough for the majority of the world's lower-income consumers to join the mobile community. With the exclusion of the Philippines (TCO of 8 USD), each selected Asian country had a monthly TCO below the

threshold of 5 USD. By contrast, countries such as Peru and Colombia have TCOs of 21 USD and 11 USD respectively. According to Nokia (2009), these results reflect differences in regulatory environments, operator strategies and taxation policies.

The study was limited by a lack of accurate income and expenditure data, which made imputation procedures necessary. Further efforts should be made to accurately measure income levels and telecommunications expenditure, as it will contribute to a better understanding of the importance of these services to consumers.

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Annex 1: Comparison of figures - imputed incomes (all the individuals) and non-imputed incomes (only individuals with an income source)

1.1 Expenditure share

	Bangladesh		Pakistan		India		Sri Lanka		Philippines		Thailand	
Q	All the individuals	Only individuals with income source	All the individuals	Only individuals with income source	All the individuals	Only individuals with income source	All the individuals	Only individuals with income source	All the individuals	Only individuals with income source	All the individuals	Only individuals with income source
1	29.7	21.9	45.8	19.9	24.3	14.2	27.0	15.0	57.0	32.1	24.4	13.7
2	11.5	7.8	17.2	10.1	11.3	8.4	11.7	6.4	28.8	15.2	11.4	7.1
3	7.8	6.7	9.9	7.2	8.4	5.7	6.5	4.4	18.4	11.0	7.3	5.7
4	6.5	4.8	6.8	7.2	5.7	-	4.7	3.2	11.7	7.2	5.2	5.0
5	3.8	3.7	5.1	4.7	4.4	4.3	3.1	2.9	6.3	5.2	3.7	3.4

1.2 Income elasticities

| Countries	All the individuals	Only individuals with income source
Bangladesh	0.2262	0.2416
Pakistan	0.2298	0.3879
India	0.2640	0.3076
Sri Lanka	0.2075	0.0833*
Philippines	0.1782	0.0539*
Thailand	0.1965	0.1989

* These results are included only as a reference, but should not be considered, as the number of observations for income elasticities estimations was too small and the coefficients were not significant.
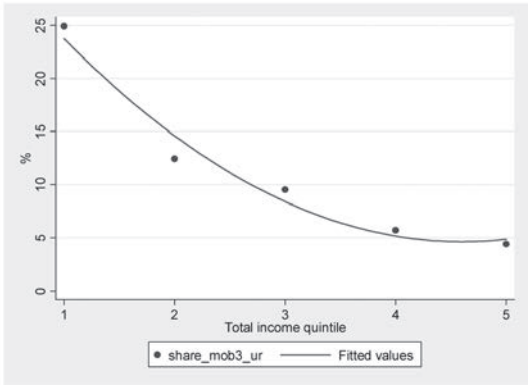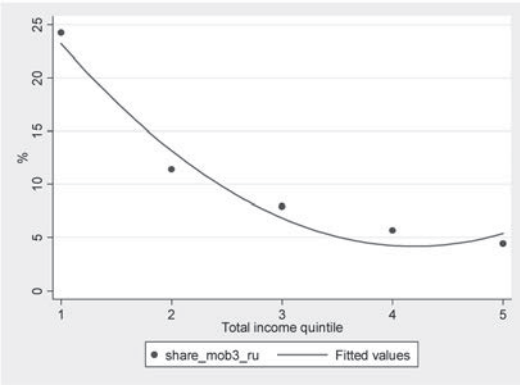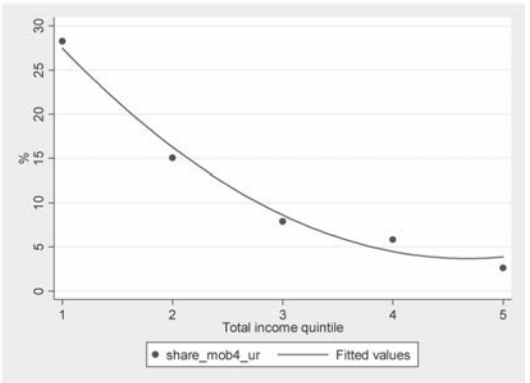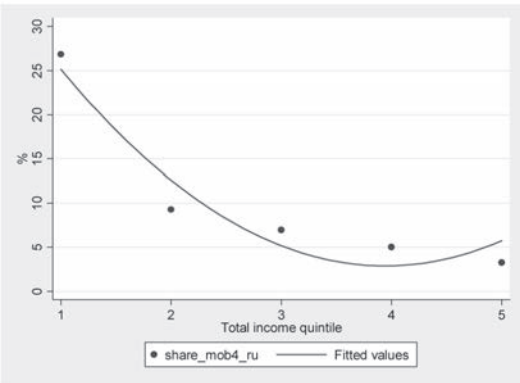
Annex 2: Disaggregated analysis

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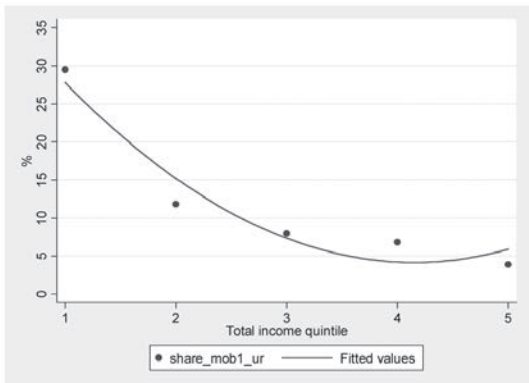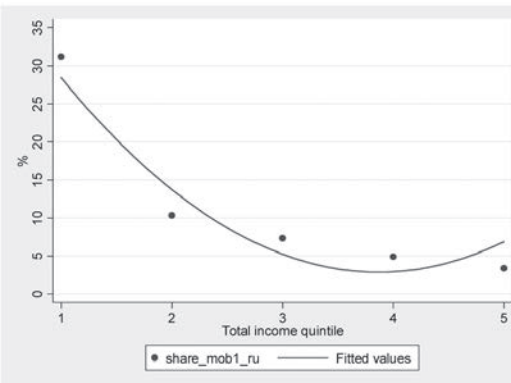
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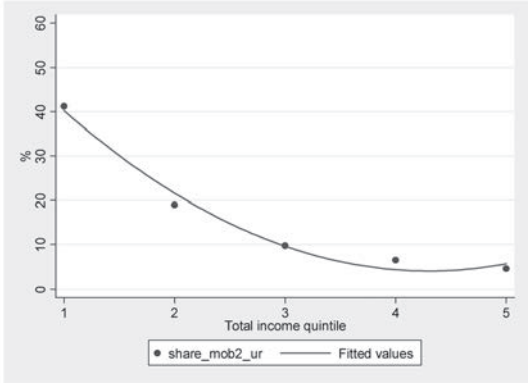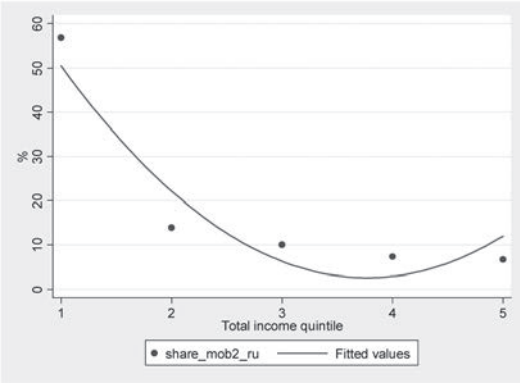
India

Sri Lanka
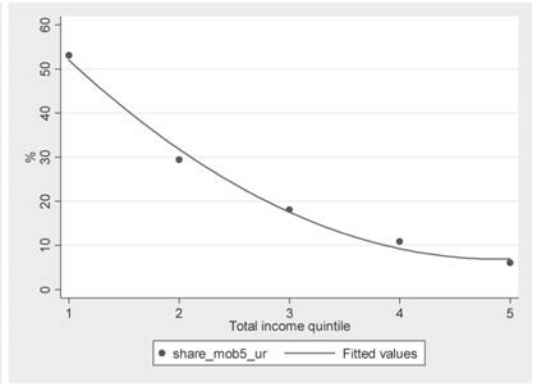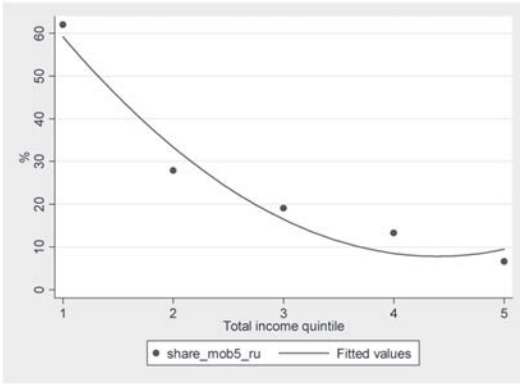
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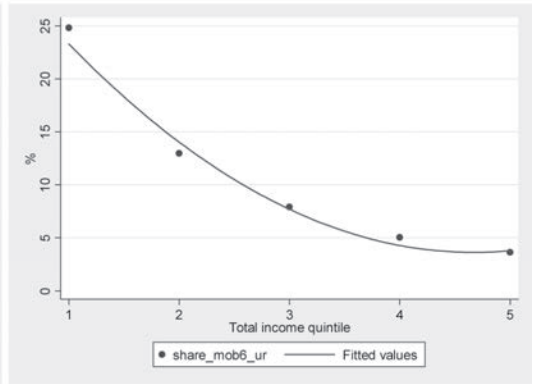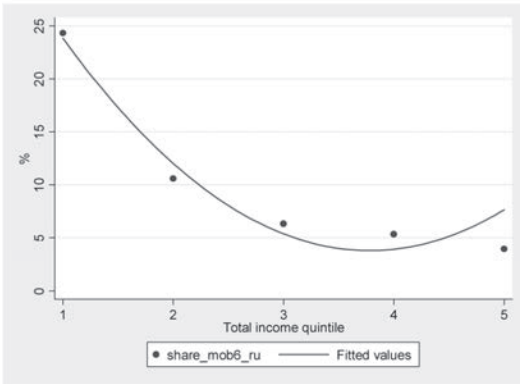
Thailand

2. Female – Male

Bangladesh
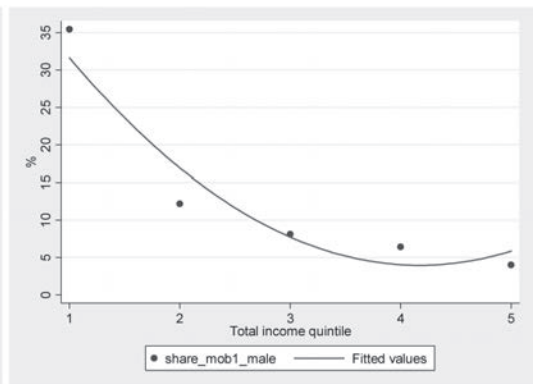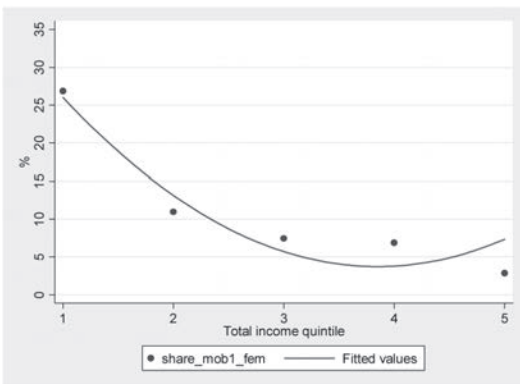
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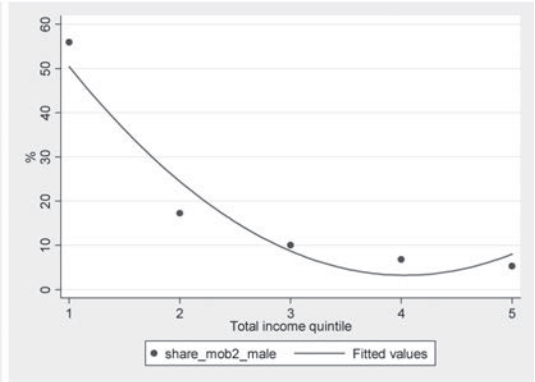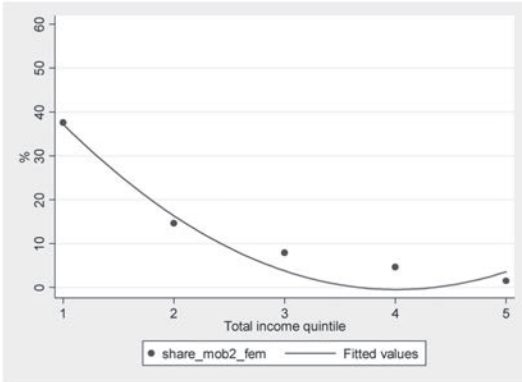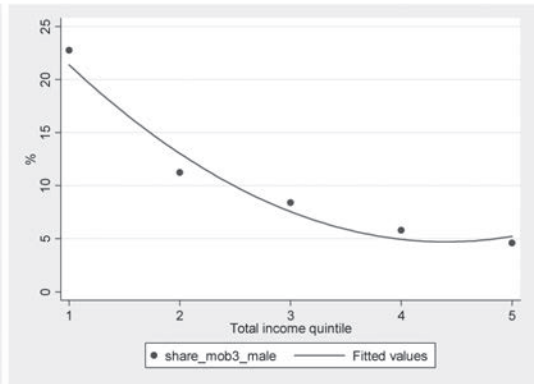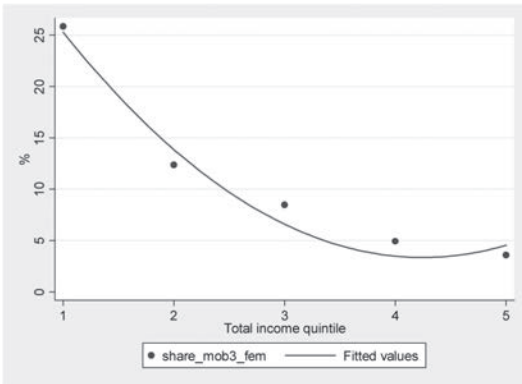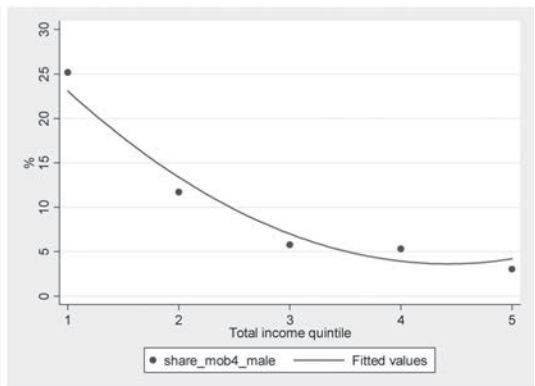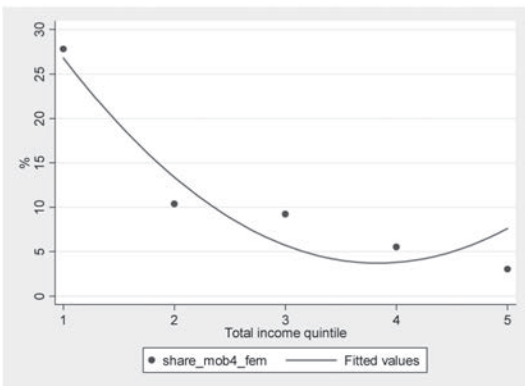
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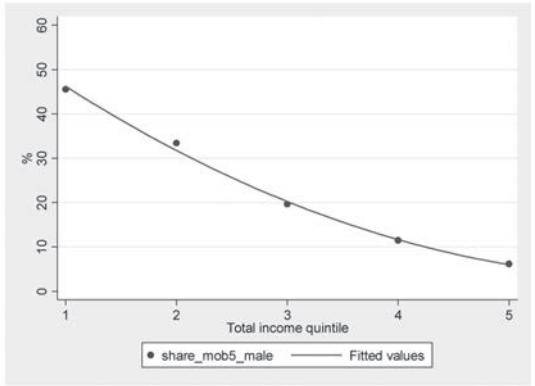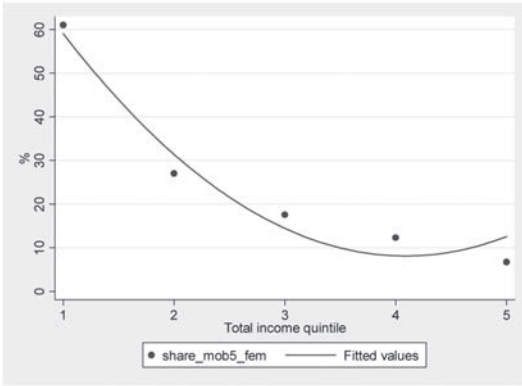
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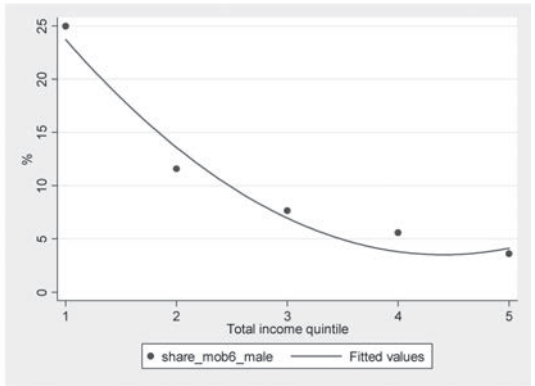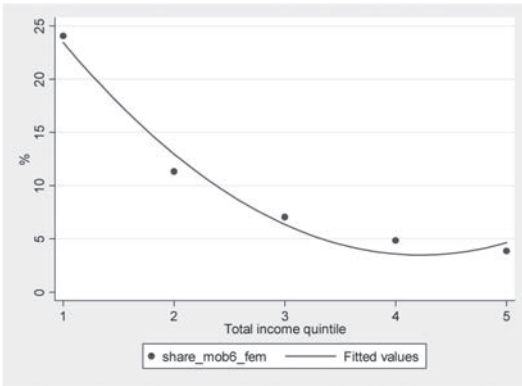
Thailand

3. SECs D and E

Bangladesh
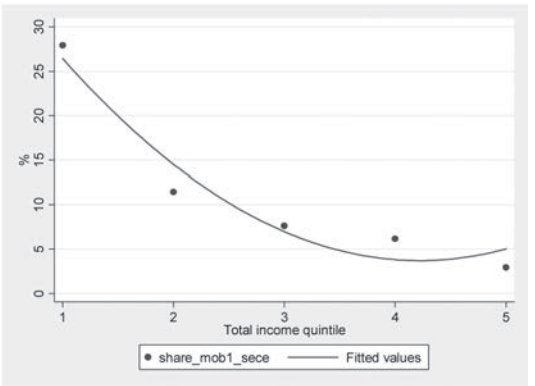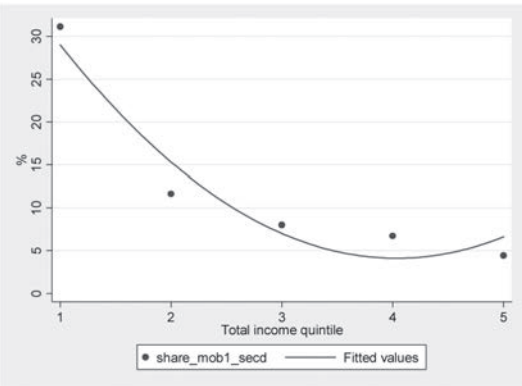
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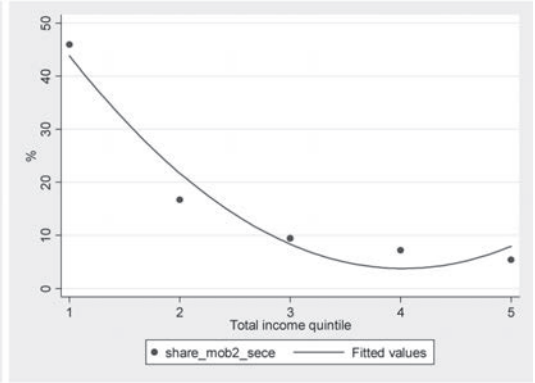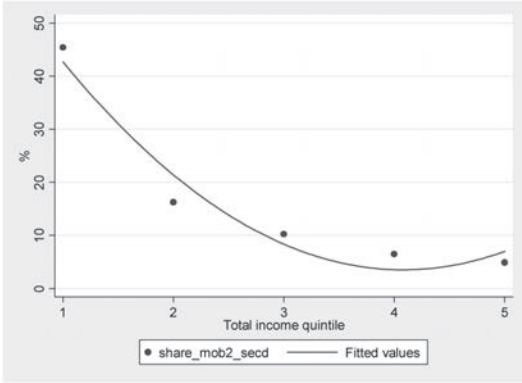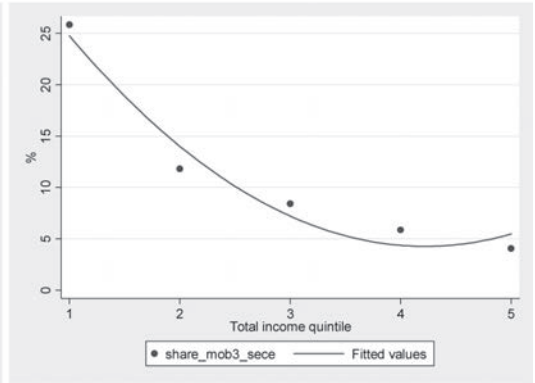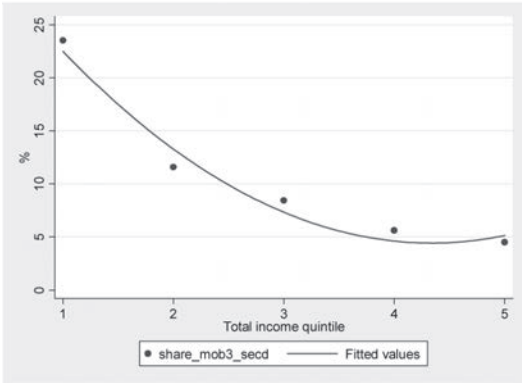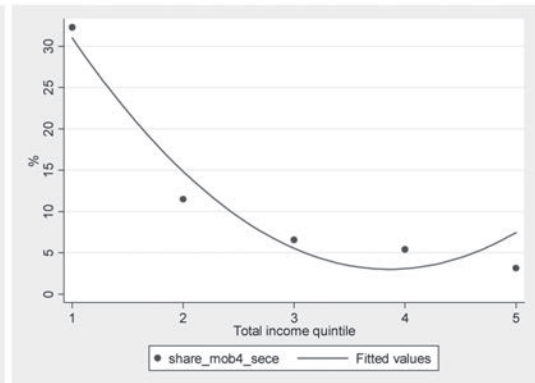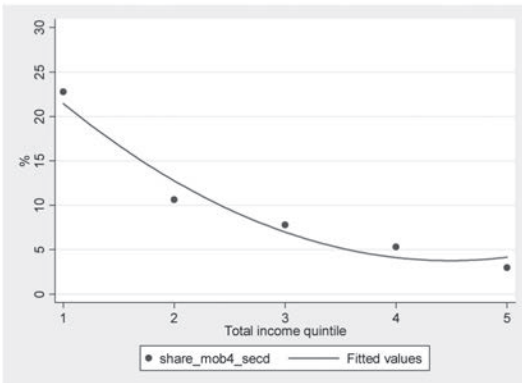
India

Sri Lanka

Thailand
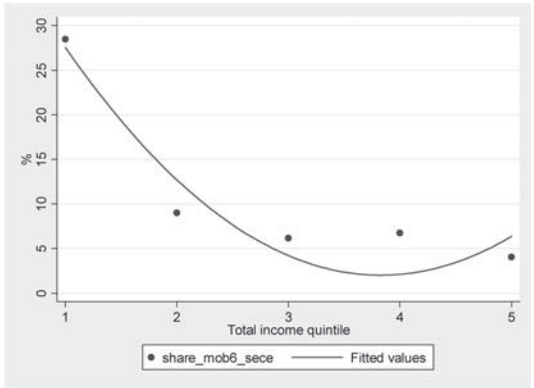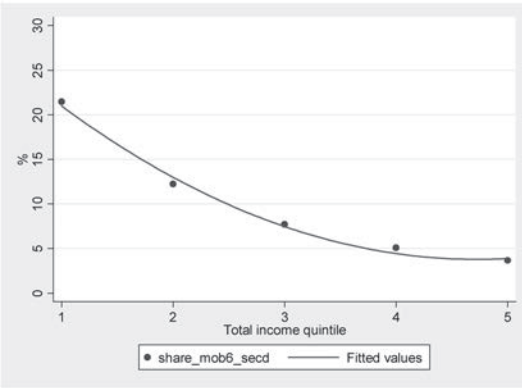
4. Age Categories

Bangladesh
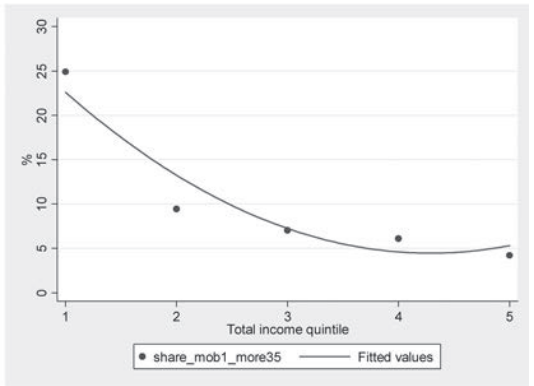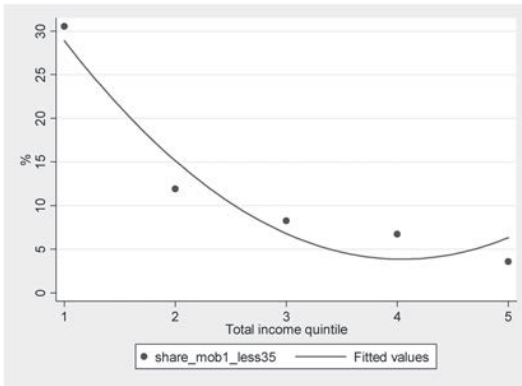
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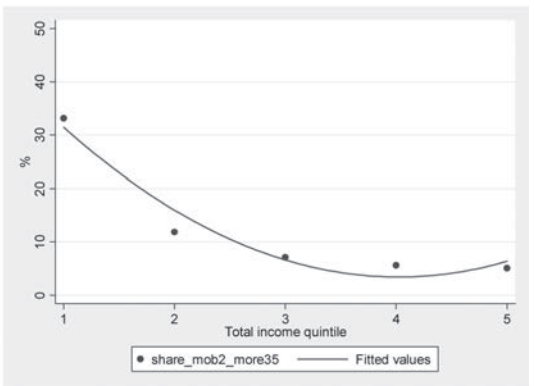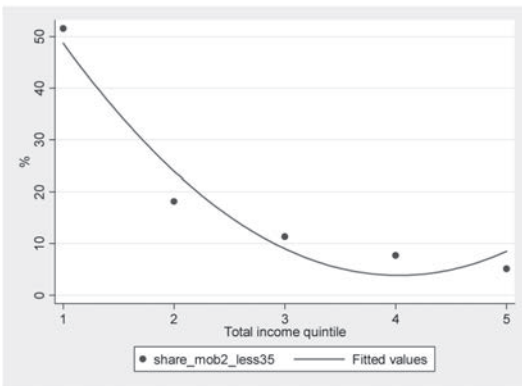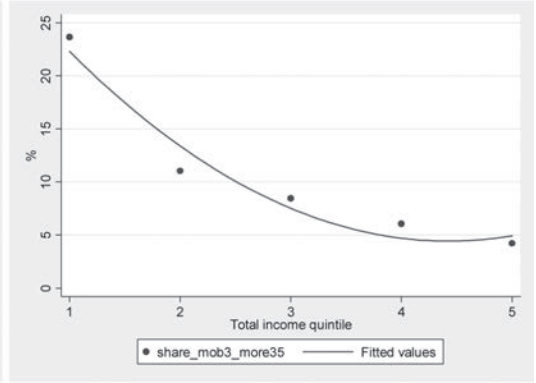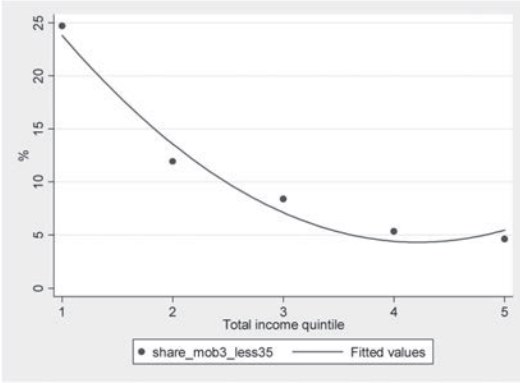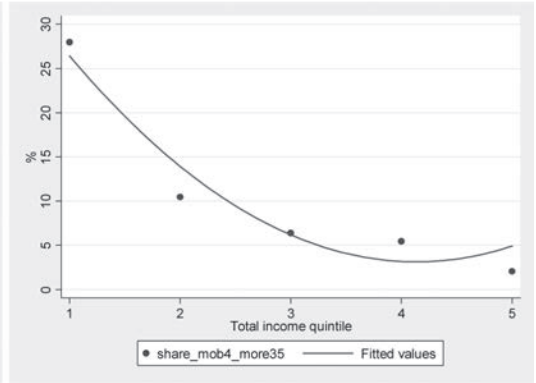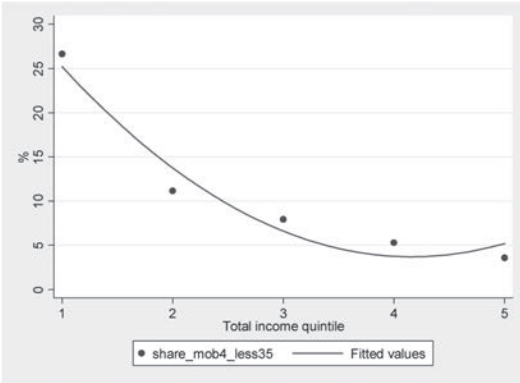
India

Sri Lanka
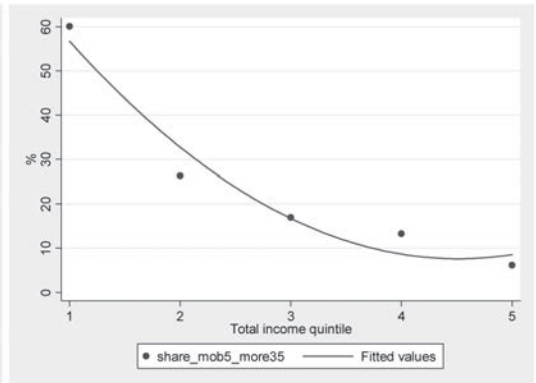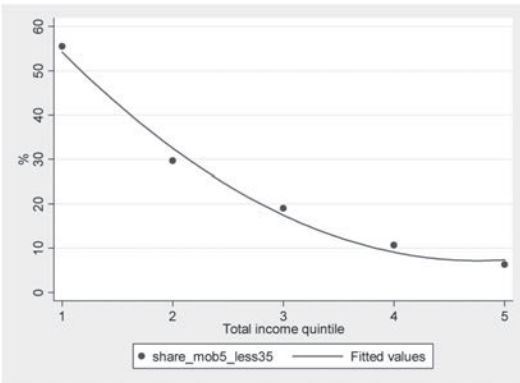
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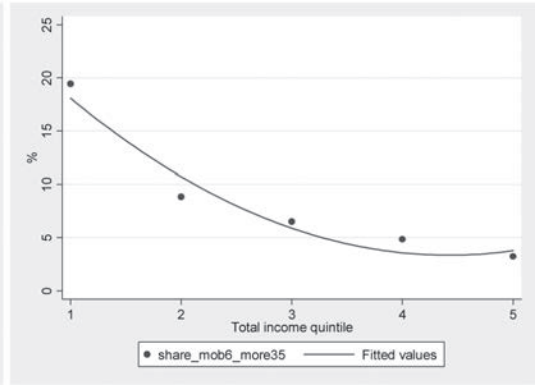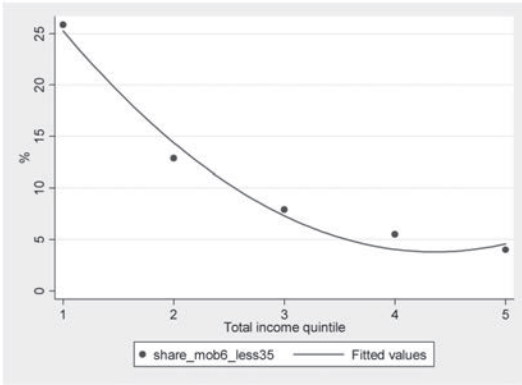
Thailand

5. Users – Non-users of public phones

Bangladesh
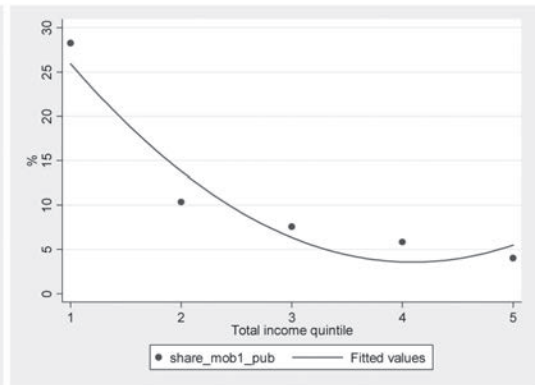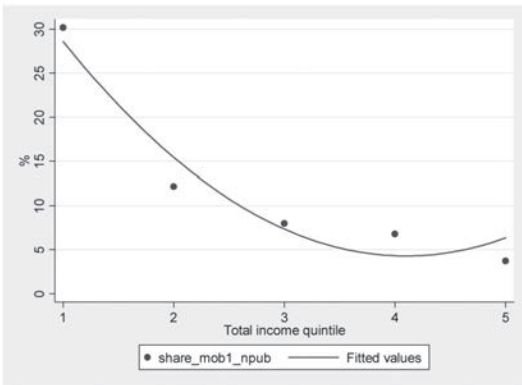
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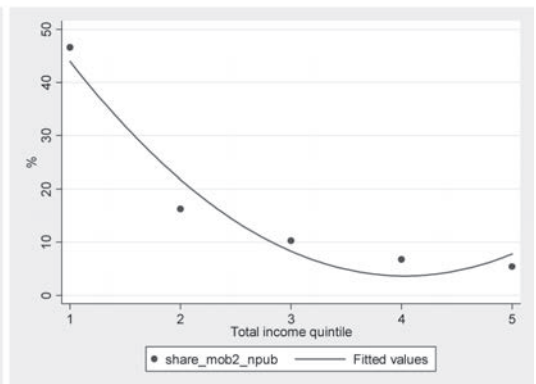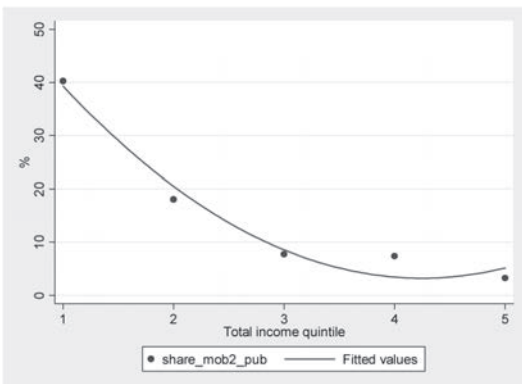
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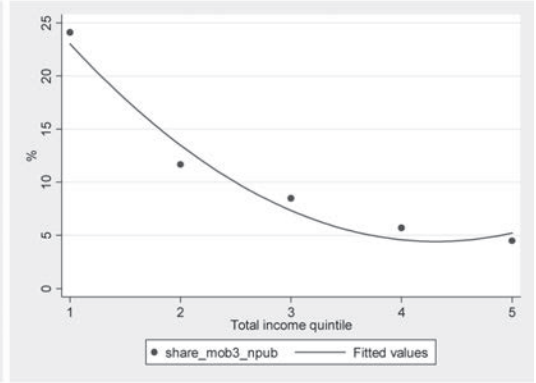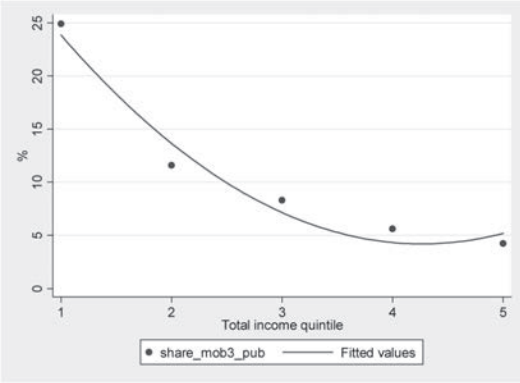
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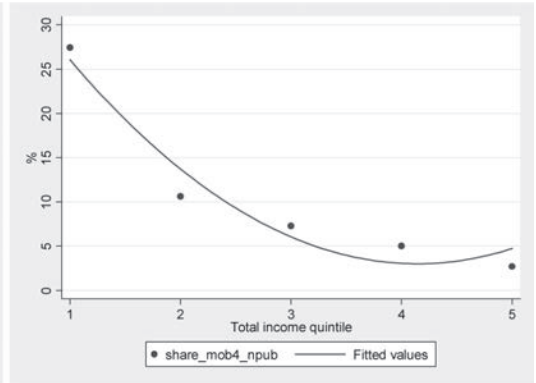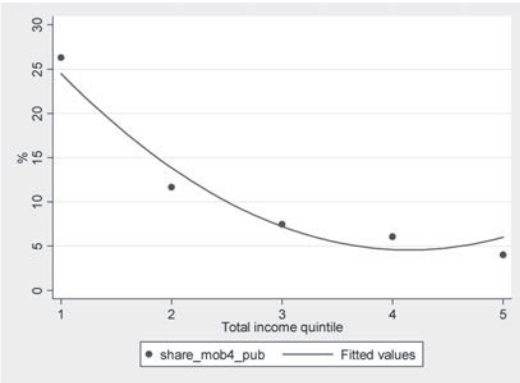
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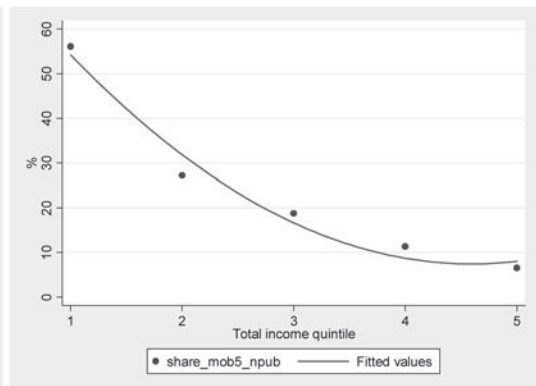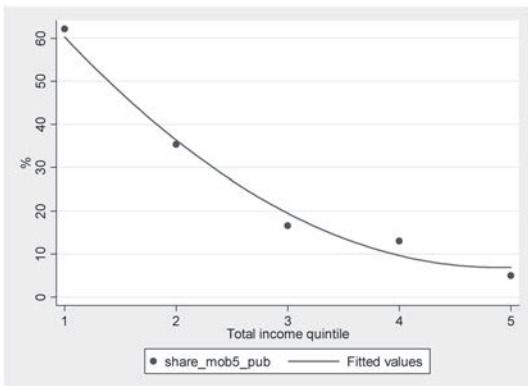
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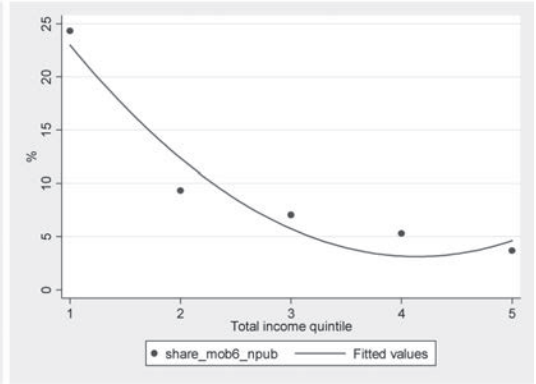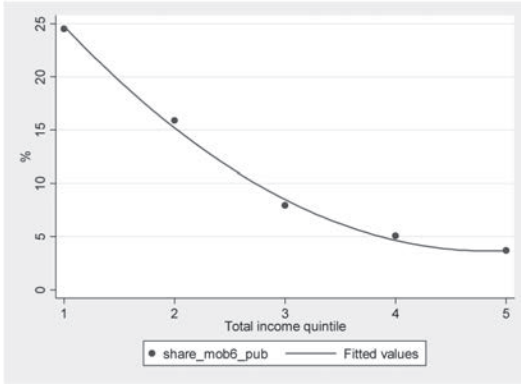
Mobile banking: Overview of Regulatory framework in emerging markets

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Abstract

Across the developing countries, millions of people rely on informal economic activities and local level networks to earn their living. Most of them are from the bottom of pyramid and they don't have access to basic financial services/banks as access to them is costly and very limited. However, the outstanding growth of mobile sector worldwide has created a unique opportunity to provide social and financial services over the mobile network. With over 4 billion mobile cellular subscriptions worldwide, mobile network has the ability to immediately offer mobile banking to 61% of the world population[1]. A study states that the biggest share of mobile payment users will be in the Asia/Pacific region by 2012(Gartner,2008). In the context of being the most promising ICT market and the largest inbound remittance receiver[2], this region is expected to be the hub of m-banking transactions.

The paper starts with an overview of existing models of m-banking and then examines the m-banking regulations in some South Asian countries and of the countries where (e.g. the Philippines, Kenya, South Africa) m-baking/payment system is already in practice or a success. The concerns of financial regulators and policy measures taken so far are discussed in light of the discussions in international forums.

The key questions this paper aims to answer are-

⇒ What are the practiced models of m-banking/payment systems?
⇒ What concerns are generally raised by financial regulators?
⇒ Which m-banking/payment models have drafted or enacted in South Asia?
　　o Bangladesh
　　o India
　　o Pakistan
　　o Sri Lanka
⇒ What m-banking/payment models have been successfully enacted in the countries?
　　o Kenya
　　o The Philippines and
　　o South Africa
⇒ What constitutes a proportionate regulatory approach?

The answers to the above questions help to identify a way forward which can expedite adoption of m-banking/ payments service in South Asia successfully and quickly.

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[1] Wireless intelligence, 2009
[2] (Ratha., Sanket & Vijayalakshmi, 2009)

List of acronyms

AML   *Anti money laundering*
ATM   *Auto mated teller machine*
CFT   *Combating the financing of terrorism*
CGAP   *Consultative group to assist the poor*
BB   *Bangladesh Bank*
BOP   *Bottom of Pyramid*
BSP   *Bangko Sentral Philippino*
CDD   *Customer Due Diligence*
CBK   *Central Bank of Kenya*
CBSL   *Central Bank of Sri Lanka*
DFID   *Department of international development*
EFT   *Electronic Fund Transfer*
FSD   *Financial Sector Deepening*
KYC   *Know your customer*
MNO   *Mobile network operator*
PSO   *Payment service operator*
PSP   *Payment service provider*
RBI   *Reserve Bank of India*
SBP   *State Bank of Pakistan*
SARB   *South Africa Reserve Bank*
SIM   *Subscriber Identity Module (in mobile phone)*

1. Introduction

Across the developing countries, millions of people rely on formal and informal economic activities and local level networks to earn their living. Most of them are from the BOP (according to World Bank people who earns less than $2 a day: annual income less than PPP US$ 3000) and they don't have access to basic financial service e.g. banks as access to those is costly, not inconvenient and very limited. Access to financial services or banks are vital for those people as- "This lack of access to finance in some parts of the developing world stifles entrepreneurship, stunts development and leaves people trapped in a poor, cash-only society". (Alexander, 2009). Developing countries are still struggling to ensure access of most of its unbanked BOP citizens and the informal sector to the formal financial services.
Mobile banking can be seen as one solution to these problems. Advancements in mobile technology have changed our lives over the past ten years. It has the potential to even more powerfully transform the lives of the world's poorest people. The technology is no doubt the cheapest and most convenient way to connect people and provide array of innovative services. At the start of this century, just 12% of the world's population had a mobile phone. Now that figure is well over 61% per cent (ITU, 2008).

2. South Asia: Access gap

South Asia is one of the fastest growing regions in terms of mobile phone subscribers. The mobile phones are already transforming lives of people here for the better by enabling people to 'leapfrog' (Alexander,2009). Mobile phones play a prominent role in creating and exchanging information, allowing SMEs to communicate with clients and suppliers and

allow individuals to remain in contact to family members. But there are scopes of doing more, above 40% have mobile phones while less than 10%[3] people have bank accounts in this region (Wireless Intelligence, 2009). There is a clear market demand that needs to be served. These 40% mobile owners can be targeted immediately, by providing financial services especially to those who may never have had a bank account.

Domestic and international remittances have become indicative of the potential of mobile banking as the case of the Philippines' G-Cash (from Globe Telecom) and Kenya's M-PESAfrom Safaricom[4] demonstrate. International remittance has significant contribution to South Asian countries' national economies. The remittance flows to developing countries reached $305 billion out of which South Asia got US$66 billion (22%) in 2008 (Ratha., Sanket & Vijayalakshmi, 2009) . The top 10 countries are India, China, Mexico, Philippines, Poland, Nigeria, Romania, Egypt, Bangladesh and Pakistan. Three of these are located in South Asia. However, 'the actual size of remittances would be much higher if informal remittances were taken into account '(Gupta, Pattillo & Wagh, 2009).

The large amounts of money that are remitted home by economic migrants each year are sent home with cost and concerns. According to a study, the largest concern for those sending money is whether it will arrive home safely, followed by concerns over excessive charges and delays in receiving the money (Porteus, 2006). Charges for sending money internationally are dependent on whether sender and recipient have bank accounts, the speed of transfer, destination country, sent amount, exchange rates, and so on. The smaller the amount of money sent, the higher the charges (expressed as a proportion of money sent). The cost of sending £100 can vary from 4% to 40% (UK Remittance Working Group, 2007). Above situation justifies expedited adoption of low/no cost, convenient and secured transaction mean in South Asia as large number of emigrant sends remittances(both domestic & international) with small denomination (even of USD50 in amount).

"The un-banked are un-banked for a reason. They will only transact electronically if there are limited or no transaction costs involved and if doing so is convenient and secure. Serving the currently un-banked profitably and sustainability requires a radically different approach. A paradigm shift needs to occur in order to determine how the poor can be profitably brought into the banking sector." (Comninos, Esselaar, Ndiwalana & Stork, 2008). M-banking can shift the paradigm in a convenient and affordable manner. DFID study reveals "mobile remittances offer the prospect of cutting the transaction cost to the customer by half – a saving that could go directly into the pockets of many of the poorest people in the world. Indeed, if all of global remittances were sent by mobile, it would save around $13 billion a year - more than the UK's annual aid budget. (Alexander, 2009)

3. Overview of Mobile banking model

Introduction and success of m-banking depends on three key determinants- policy & regulation, profitable/sustainable business case for all actors and client uptake. Primarily, policy and regulation sets the foundation stone of the m-banking model. According to CGAP[5] there are two models of mobile banking. Both the model use retail agents (e.g. merchants, supermarkets or post offices) to deliver financial services outside traditional

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[3] Average of unbanked population : National average of banked population in Bangladesh is 3% (Telenor R&I, 2007) , India 5% (CGAP, 2009), Pakistan approx.2% (Alexander,2009).

[4] Mobile operator in Kenya

[5] CGAP is an independent policy and research centre dedicated to advancing financial access for the world's poor. It is supported by over 30 development agencies and private foundations who share a common mission to alleviate poverty. Housed at the World Bank, CGAP provides market intelligence, promotes standards, develops innovative solutions and offers advisory services to governments, microfinance providers, donors, and investors.

bank branches but these models of m-banking systems differ primarily on the following questions –

⇒ Who will establish the relationship (account opening, deposit taking, lending etc.) with the end-customer? The answer can be a Bank or a Non-Bank/Telecommunication Company (Telco).

⇒ What is the nature of agency agreement between bank and the Non-Bank.[6]

i. Bank-based model - Every customer has a direct contractual relationship with a licensed and supervised financial institution (whether account-based or involving a one-off transaction) even though the customer may deal exclusively with a retail agent who is equipped to communicate directly with the bank (typically using either a mobile phone or a point-of-sale (POS) terminal)

ii. Nonbank-based model - Customers have no direct contractual relationship with a licensed and supervised financial institution. Instead, the customer exchanges cash at a retail agent (or otherwise transfers, or arranges for the transfer of funds) in return for an electronic record of value.

Following table shows the comparison of key issues under those m-banking models-

Table 1. Models of m-banking

	Model	
Key issues	**Bank based**	**Non-bank (NB) Based**
Who regulates	Financial regulator	Telco & Financial regulator
Scope	Additive	Transformational
Who holds the deposit	Bank	Bank
Cash in-out points	Bank	Telco/NB
Dominant brand	Bank	Telco/NB
Who has access to the service	Limited to account holders	Limited to subscriber
Carrier/gateway	Any	Telco
Who owns the customer	Bank	Telco/NB
Examples	MTN (S-Africa), other	G-Cash, Smart, Celpay
	SMS banking services	(Zambia), M-PESA

4. Concerns of financial regulator

Regulators need to consider many issues while attempting to increase financial services outreach. A report reveals following 6 issues as the key concern of financial regulators (DFID, 2006)-

1. Are consumers adequately protected? - Appropriate consumer protection against risks of fraud, loss of privacy and even loss of service is needed for establishing trust among consumers which is the single most necessary ingredient for growth of m-banking. These risks increase when agents are involved and reach to a maximum in non-bank-led model.

2. How do m-payments affect the stability of the banking system and national payment system? - Soundness and stability of the banking system and national payment

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[6] Draft policy paper on regulatory framework for mobile banking in Pakistan

system are central to financial regulator of any country. However, the question whether or not mobile banking, particularly at its initial stage, becomes a systemically important payment system, needs deliberations. Answer to this question helps in determining the timing and extent of applicability of Core Principals for Systemically Important Payment Systems to mobile banking.

3. Does the law distinguish adequately between payments and deposits? - It is the purpose (for investment or borrowing) and not the mode of payment (cash or electronic) that defines deposit.
4. Does the law provide for e-money[7] issuance? By which entities? –Legal framework which gives authority to provide or accept payment in electronic form.
5. Is there provision for agencies for cash withdrawal and deposits? – Agents authority to deposit or withdraw cash
6. How do anti money laundering (AML) / combating the financing of terrorism (CFT) regulations affect account opening and cash transactions?

4.1 Existing Regulatory Framework for mobile payment in South Asian countries

The growth of mobile phone and dynamic use of mobile based[8] services among south Asian population indicates that this region can be a potential region for m-banking adoption (Deloitte,2008). Regulators in this region have been working on the framework for quite a while and have been cautious while outlining the guidelines.

4.1.1 Bangladesh

Bangladesh Bank (the Central Bank) has published the draft Bangladesh Payment and Settlement System Regulation 2009 (the Regulations) with the aim of modernizing the payment and settlement systems functioning in Bangladesh. BB will have the authority to grant licenses for payment systems[9], payment system operators[10] (PSO) and payment service providers[11] (PSP) for operation of the payment systems and payment services in bank based model of Bangladesh.
Under this Regulation the interested parties are required to acquire licenses from the BB subject to making of application and payment of appropriate fees although the Regulations exempt existing banks and financial institutions from acquiring the license

Table 2. Legal & regulatory issues: Bangladesh

Model	Bank based
KYC	Customers will have to fill out an application form at banks or agents. The bank will verify the customer under its 'know your customer' (KYC) process to issue a prepaid card. The customer's information must match the information with the bank and the information he or she provided to telecom companies, through host-to-host connectivity.
Maximum limit of transactions	BDT 10,000

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[7] According to the Basel Committee's definition e-money is "a stored value or prepaid product in which a record of the funds or value available to the consumer for multipurpose use is stored on an electronic device in the consumer's possession."
[8] Recent study out of Harvard tracked fishermen off the coast of Kerala in southern India, and found that when they started using mobile phones to call around prospective buyers while they were still out at sea, their profits went up by an average of eight per cent - while prices in the local marketplace actually went down by four per cent. Mobile phones didn't just result in a better deal for producers – they led to a better deal for consumers as well. (Alexander, 2009)
[9] Payment System": means a system that enables payment to be effected between a payer and a beneficiary, involving clearing, payment or settlement service or all of them
[10] Payment System Operator" refers to an entity licensed by the Bangladesh Bank for operating a settlement system for payment activities between participants of which the principal participant must be a scheduled bank or financial institution maintaining accounts with Bangladesh Bank for meeting Cash Reserve Requirement
[11] "Payment Service Provider" refers to an entity licensed and approved by the Bangladesh Bank that provides payment service(s) to its participants or to a payment system for the purpose of facilitating payment(s) or the payment processes settling their transactions through a scheduled bank or financial institution maintaining accounts with Bangladesh Bank for meeting Cash Reserve Requirements.

Model	Bank based
AML/CFT	Regulated under 'Money laundering prevention act 2002'
E-money issuance	Any entity authorized by BB
Payment system	Regulated under 'Payment and settlement system regulation 2008'
Cross border money transfer	Not allowed
Other applicable law	Foreign Exchange Regulation Act 1947 Payment and Settlement System Regulation 2008 Bangladesh EFT Consumer Protection Regulations 2008

The Regulations also lay provisions for the Bank to undertake corrective and remedial measures to protect against violation of the licensing terms and conditions including power to suspend or revoke the license, impose financial penalty and order compensation.The Regulations however leaves room open for the Bank to issue rules, procedures, guidelines and directives under the Regulations in order to govern paper-based payment items and other instruments that are eligible for transaction and electronic check image presentment. Besides the Regulations sets provisions for the Bank to recognize the new payment instrument as a Designated Payment Instrument for protecting the interest of the public by ensuring integrity, security and reliability of the payment system.

In September 2009, BB has given approval to three commercial banks to introduce e-money service named 'Digital money electronic prepaid system'.

4.1.2 India

In year 2008, the Reserve Bank of India (RBI) issued mobile banking guidelines that permit only licensed banks with a physical bank presence in India to launch mobile banking. This disqualifies mobile network operators from offering their own service

The 'Operative Guidelines for Banks' issued by Reserve Bank of India specifies that 'Only banks, licensed and supervised and have a physical presence in India, will be permitted to offer m-banking services'. Services shall be restricted only to customers of banks and holders of debit/credit cards issued as per Reserve Bank of India guidelines.

Table 3: Legal & regulatory issues: India[12]

Model	Bank based
KYC	Banks shall put in place a system of document based registration with mandatory physical presence of customers, before commencing m-banking service.
Maximum limit of transactions	Per transaction limit INR 2500, Overall cap of INR. 5000 per day, per customer
AML/CFT	Regulated under the 'Prevention of Money Laundering Act 2002'
E-money issuance	Policy on e-money clearly does not permit issuance by non-banks
Payment system	The Payment and Settlement Systems Bill 2008
Cross border money transfer	Strictly prohibited
Other applicable law	Competition Act (2002). Consumer Protection Act (1986)

[12] CGAP-Notes on Regulation of Branchless banking in India, January 2008

4.1.3 Pakistan

State Bank of Pakistan (SBP) is the regulatory authority of Banks, Development Finance Institutions, Microfinance Banks and rest of the financial institutions in Pakistan. SBP issued a policy paper on Mobile Banking which elaborately discusses models of mobile banking and associated risks. SBP recommends bank-based model with the scope of introducing non-bank-based model at later stage.

In that context the bank based model 'EasyPaisa' the m-banking service by Telenor Pakistan[13] and Tameer bank, went live on Oct 14 2009 in Pakistan. Telenor during this short span has seen modest success. Within the first few days, they handled 20,000 bill payments ranging from very large to small, with the average amount transacted being USD 13.

Table 4: Legal & regulatory issues: Pakistan[14]

Model	Bank based
KYC	National Identity card (Easy paisa is using it for customer authentication)
Maximum limit of transactions	A customer can do a maximum of 3 transactions per month. The monthly limit for sending or receiving is PKR10,000
E-money issuance	Electronic Transaction Ordinance, 2001 permits an appropriate authority to provide or accept payment in electronic form
Other applicable law	The Electronic Crime Bill (2006)

4.1.4 Sri Lanka

CBSL Central Bank of Sri Lanka) has all the necessary legal powers to regulate the mobile payments under the 'Payment and Settlement System Act of 2005'. The framework for mobile payments is expected to be finalized in 2009. Sri Lankan regime allows non-bank-based model of m-banking under the broad framework of the 'money, payment, clearing and settlement service provider's regulations no. 1 of 2007.[15]

4.2 Successful models of m-banking

The question for South Asian regulators is to what extent the m-payment or banking should be regulated. We can take the practical examples of the regulatory regimes of Kenya, the Philippines & South Africa and learn from their successful examples.

4.2.1 Tested model: Kenya

Vodafone and Safaricom's[16] mobile money transfer service in Kenya M-PESA was launched in September 2007. When this non-bank based model was launched, Vodafone were aiming to add 200,000 subscribers in the first year. Two years later with 6.3 million[17] subscribers, there are more M-PESA customers in Kenya than there are bank accounts.

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[13] Second largest mobile operator in Pakistan

[14] CGAP-Notes on Regulation of Branchless banking in June 2007 & the draft policy paper on regulatory framework for mobile banking in Pakistan

[15] Mobile payments- will Colombo keep its leadership in South Asia by Muhammad Aslam Hayat (Sunday Times-July 2009)

[16] Mobile phone operator in Kenya

[17] (Rasmussen, 2009)

Following results from a survey done by (FSD, 2009) shows the impact of M-PESA to the life of Kenyans(figure 1,2,3,&4).
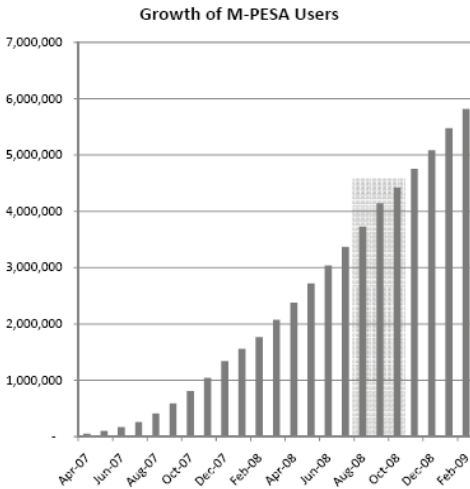
Figure-1: Growth of M-PESA
(Safaricom, 2009)
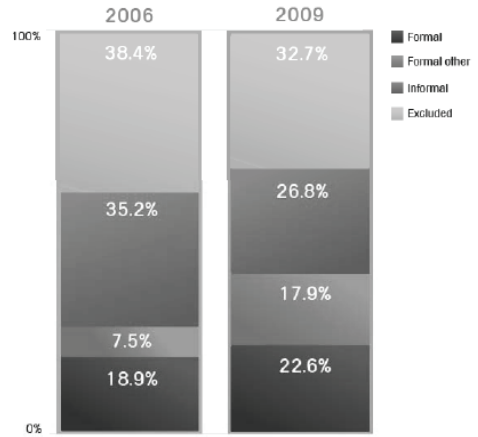
Figure 2: Financial access scenario
(Fin Access, 2009)
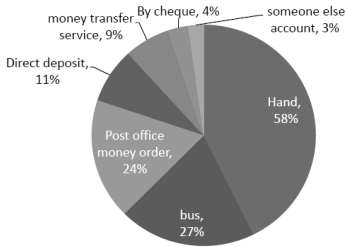
Figure 3. Money transfer scenario 2006
(FSD Kenya,2009)
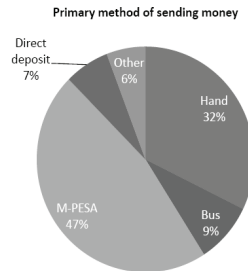
Figure 4: Money transfer scenario 2009
(FSD Kenya,2009)

4.2.2 Regulation

Prior to the launch of M-PESA services in Kenya, Safaricom sought authorization from the Central Bank of Kenya (CBK) to undertake the money transfer service. In evaluating the proposal, the CBK considered the request on the basis of safety, reliability and efficiency of the service (Sirken,2009). Two CBK departments had been involved in this effort. The Financial Institutions Supervision Department (FISD) is responsible for the prudential regulation of banks and deposit-taking MFIs. Its primary concern regarding M-PESA was whether the operator (Safaricom) is stretching or even breaking the rules for the business of banking. By contrast, the National Payment System (NPS) Division of the Banking (which focuses on the integrity, effectiveness, efficiency, and security of the payment system) viewed M-PESA as a payment service provider. The NPSD were more willing

than the FISD to permit experimentation with the nonank-based model of m-banking[18]. (CGAP, 2007). Interestingly, in Kenya telecommunications regulations require that a mobile network operator offer only the telecommunication services listed in its license andm m-banking falls under the definition of telecommunication service in the law. hence, Safaricom stand was should therefore the service should be listed in the license agreement.27 However, the primary regulator with respect to a mobile network operator's m-banking activities will be the banking regulator (i.e., CBK) (CGAP,2007).

Precautionary measures were put in place to ensure that the services did not infringe upon the banking services regulatory framework as provided for under section 2(1) of the Banking Act. Specifically, the proceeds from issuing e-money are held by M-PESA Trust Company Limited in trust for the clients in a pooled account with the Commercial Bank of Africa. Any interest earned on this pooled account cannot benefit Safaricom (without triggering the definition of "banking business"); use of interest proceeds is currently under consideration. Customer claims against M-PESA Trust Company arising from negligence or intentional wrongdoing by the trust company or by Safaricom shall be covered by Safaricom. In addition, caps on the maximum account balance (about US$ 750) and maximum transaction size (about US$ 530) provides CBK with additional comfort because they limit the risks of money laundering and the amount any individual customer could lose in case of insolvency." (CGAP, 2007)

Table 5: Legal & regulatory issues: Kenya[19]

Model	Non-bank based
KYC	Account opening (both on site and remotely) while maintaining adequate "know your customer" (KYC) standards. Domestic and international transfers of funds are not subject to specific KYC rules.
Maximum limit of transactions	KES 50,000 per M-PESA account per day and a transaction limit of KES 35,000 per day in order to mitigate against settlement risk
AML/CFT	AML bill 2007
E-money issuance	Kenya has no laws, regulations or policies dealing directly with e-money
Payment system	There is no law in Kenya expressly governing the payment system.

4.2.2 Audit Order

Then acting Finance minister, John Michuki, in 2008 ordered an audit of M-PESA operations citing money laundering concerns. The purpose of the audit note was to provide insights as to how this innovative money transfer service has developed, how it has enabled the transfer of funds to the un-banked and how the Central Bank of Kenya (CBK) continues to oversee its operations in order to ensure their safety and efficiency.

The issues and risks that had been raised over M-PESA, Mr Kinyua said, have been mitigated through a number of measures which CBK and the Communication Commission of Kenya (CCK) monitor regularly. The central bank has proposed and formulated the enactment of the National Payment System Bill that will strengthen its mandate as an oversight body over all payment systems including money transfer.

The 16 points audit finding states that M-PESA service[20]

1. Does not accept from members of the public money or deposits that are repayable on demand or at the expiry of a fixed period or after notice.

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[18] CGAP-Notes on Regulation of Branchless banking in Kenya, November 2007
[19] CGAP-Notes on Regulation of Branchless banking in Kenya, November 2007
[20] http://kenyapolitical.blogspot.com/2009/01/ministry-of-finance-audit-findings-on-m.html

2.   Does not employ money held or any part of the money for purposes of lending and investment or in any other manner for the account and at the risk of the person so employing the money.

▪   In M-PESA, money collected by agents is deposited in a trust account in one of the leading commercial banks in Kenya. This trust account provides the legal protection for the beneficiaries. The money in this trust account is not under the control of Safaricom and cannot be employed for purposes such as lending, investing or in any other manner for the account. Legal protection of the money in the trust account is provided for in the trustee deed. Various legal instruments pertaining to this service, including the trustee deed have been presented to the Central Bank and reviewed accordingly. Further to this, funds in the trust account deposited in the designated commercial bank are regulated by the Central Bank of Kenya under the Banking Act. The Trustee holds funds on behalf of all M-PESA System participants under a Declaration of Trust (the Trust Deed).

A number of critical issues and risks have been reviewed during the audit that could compromise the safety, efficiency, integrity and effectiveness of the M-PESA system.
These risks have been mitigated through a number of measures which the Central Bank and the Communications Commission of Kenya (CCK) monitors regularly.
The Central Bank of Kenya has continued to oversee the service in line with its 'Oversight Policy Framework' document on payment systems in Kenya[21].

4.3 The Philippines

The Philippines has been proclaimed one of the leaders in mobile banking with its Smart Money and G-Cash initiatives. Their non-bank-based/Telco model allows person to person transfers, purchase of goods from merchants and bills payment.
Smart Money: a re-loadable payment card issued by Banco de Oro that may either be accessed through a Smart SIM card or a MasterCard powered card, similar to a debit/cash card.
G-Cash (offered by Gxchange, a wholly-owned subsidiary of Globe Telecom[22]): a cash-less and card-less method of transforming a mobile phone into a virtual wallet.

The BSP (central bank of the Philippines), has practiced a flexible but hands-on role in the emergence of mobile banking in the Philippines. In 2000, BSP issued two circulars requiring banks wishing to offer services via electronic channels to seek prior approval from BSP before offering them to the public. Pursuant to the circulars, five commercial banks (each having applied individually) have entered into partnerships with Smart, the largest MNO, to use the Smart Money mobile payments platform for account opening, marketing, data processing and other functions. Meanwhile, rural banks seeking a similar partnership with GCash[23] follow a different path.

The general banking law of 2000 allows micro-finance as a legitimate banking activity. The law gives "full authority to regulate the use of electronic devices, such as computers, and processes for recording, storing and transmitting information and data in connection with the operations of a bank… including the delivery of services and products to customers by such entity." (CGAP,2008). The Philippines also adopted an Electronic Commerce Act in 2000 (the "E-Commerce Act'), which recognizes the validity of electronic transactions and electronic signatures and provides the basis for the prosecution of electronic crime, giving a degree of security to private sector actors concerned about repudiation of transactions,

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[21] www.centralbank.go.ke
[22] A telecom company in the Philippines
[23] The mobile banking service offered by Globe, the second largest MNO in the Philippines

legal standing of electronic records, and standards for prosecution of e-commerce crimes. Both of the above laws cover mobile and electronic banking risk management, security procedures, internal controls, anti-money laundering regulations, know your client requirements and consumer protection. The BSP also created a core IT supervisory team to effectively supervise and remain abreast with the latest development in mobile and electronic banking.

Table 6: Legal & regulatory issues: Philippines[24]

Model	Non-bank based	
	SMART money	**G Cash**
KYC	Formal ID card	
Maximum limit of transactions	Daily limit: PHP 50,000 (approx. USD 1,100)	Single transaction limit: PHP 10,000 (approx. USD 220) Daily limit: PHP 40,000 (approx. USD 880) Monthly limit: PHP 100,000 (approx. USD 2,200)
AML/CFT	Comply with the Anti-Money Laundering Act(AMLA)	
E-money issuance	Electronic Commerce Act in 2000	
Payment system	No law/regulation for the national payment system	

4.4 South Africa

The South African government has taken an active role in creating regulations to facilitate the development of bank-based m-banking. Currently it has two m-banking models WIZZIT and MTN Mobile Money – both of which involve non-banks and banks working in partnership. For both, the bank account application is fully integrated with the mobile phone, enabling the customer to use the mobile phone itself as a payment instrument.

SARB (Central bank of South Africa) issued two documents impacting m-banking-

I. Position Paper on Electronic Money which stated that only banks will be permitted to issue electronic money. Stored value payments products in South Africa can therefore only be operated by banks.

II. Bank Circular 619 allowing banks to open mobile phone-operated bank accounts (within certain transaction and balance limits) without having to undertake face-to-face KYC (know your customer) procedures.

Table 7: Legal & regulatory issues: South Africa[25]

Model	Bank based
KYC	South African Identity number
Maximum limit of transactions	ZAR 1,000 per day
AML/CFT	The Financial Intelligence Center Act (FICA) and its regulations govern anti-money laundering.
E-money issuance	Only banks can issue
Payment system	Regulated by National payment systems act

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[24] CGAP-Notes on Regulation of Branchless banking in the Philippines , May 2008
[25] CGAP-Notes on Regulation of Branchless banking in South Africa, February 2008

4.5 Comparison of Regulatory framework

Among the above three m-banking models of Kenya, Philippines and South Africa (SA), SA has relatively less impact compared to others. A study states "South Africa's position is surprising: experiments began there comparatively early and several well known pioneering models such as Wizzit and MTN Mobile Money emanate from there, but the role that non-banks can play in issuing e-money is circumscribed by the current guidance note on e-money which has frustrated some potential innovators. To further enhance its environment, South Africa would have to amend its position, for example by creating a category of regulation for non-bank e-money issuers, or 'narrow banks,' a step that has in fact been suggested". (Porteus, 2009)[26]

Table 8: Impact of different m-banking models

Deployment	M-PESA[27]	MTN Banking[28]	G cash
Launch date	2007	2005	2005
M-banking model	Non-bank based	Bank based	Non-bank based
Some key figures	- 6.3 million customers - 9000 agents - US$170 million P2P transaction in Feb. 2009	Not reported as yet	*1.2 million registered users of virtual wallets post a transaction volume of about PHP 5 billion a month[29]*
Customer experience	*-Users say it is faster (98%), more* *- Convenient (97%), and safer (98%) than alternatives* *• 4 out of 5 say not having it would have a "large negative impact" on their lives* *• It is the main means of sending money for 50% of Kenyans*	*- MTN Banking charges are among the highest* *- For a client using the full service basket, none of the South Africans — WIZZIT, MTN, or the countries Big 4 gets close to meeting the threshold for affordability.* *- Fees ranged about 4 to 7 times greater than what would be affordable.*	*G Cash one of the most affordable among the m-banking products[30]*
Impact on the life of unbanked	Medium/High	Low	Medium/High

Above overview of regulatory frameworks in different countries highlights that the successful cases of m-banking or payment are in those regimes where non-bank based models has been introduced. That is why, most of the countries are adopting the liberal model i.e. non-bank based model, According to a study 'Number of countries where non-banks have found accommodation has been larger than where it is prohibited'. (Rasmussen, 2009)

5. Way Forward

In south Asia the arguments between bank and non-bank based model has been debated for quite a long time. On that note, the issue of rigorous regulation has already been questioned by regulatory specialist/ industry analyst. "Mobile payments should not be seen as a turf war between the financial and telecommunication sectors but as a complement to existing financial services. The genuine concerns of banking regulators about mobile payments and mobile banking must be addressed in any framework touching the financial system of a country. For a banking regulator it is important to provide adequate protection for consumers, ensure economic stability, provide interoperability of electronic systems and guarantee security of transactions. Central Banks, while allowing

[26] Porteus. D. Mobilizing Money through Enabling Regulation,2009
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[29] http://www.mb.com.ph/articles/232220/globe-showcasing-gcash-mobile-money-summit
[30] Rosenburg, J, (2008). How do you price a mobile banking service. Retrieved from CGAP website on 5 December,2009. http://technology.cgap.org/2008/08/25/how-do-you-price-a-mobile-banking-service/

mobile payments, have to ensure the stability of the banking and payment systems and also ensure that issuance of e-money does not harm the national economy. For the purpose of checking how much credit is in the market, there should be an adequate level of transparency. The Anti-Money Laundering and Know-Your-Customer principles must also be applied to mobile payments"-(Hayat, 2009)[31].

On this area, the regulatory practices of Kenya or the Philippines where m-banking has been successful can clearly help the regional regulators to customize their model accordingly. While drafting existing laws/regulation in the financial sector, the convergence of banking, payments and telecommunications were not taken into account. Hence, those laws may be over or under protective. In this case the regulators can start with existing law or with a modified version of exiting law. Later they can make changes on an as-required basis or rapidly to keep the pace with developments (CGAP,2008). Regular monitoring with a capable monitoring team (capacity of monitoring is very crucial in this case) and periodic audit would help to maintain balance between the benefits and the risks[32].
On the other hand, in certain issues neither governments nor regulators alone will be able to determine which m-banking/payment model will really work in respective markets. Especially for those governments who face difficulties on the questions - how to balance extending the reach of financial services as quickly as possible to as many as possible, while ensuring that they protect the vulnerable. DFID wants, to support those Governments in taking these tough decisions. That is why they announced three year project to help regulators to share experience, learn from where others have gone before and in so doing, help expand the availability of this m-banking across the developing world (Alexander,2009). The developing countries can harmonize with DFID announced program FAST[33](Facilitating Access to Financial Services through Technology program. This program plans to support m-payment/banking area in three ways:

- Firstly, DFID will provide support to introduce branchless banking to mass markets in developing countries across Africa and South Asia where there are high numbers of people without access to finance. This will include helping Governments to look at using technology for their own social protection payments to citizens – helping to bring down public costs at a time when literally every penny counts.

- Secondly, DFID will carry out at least eight research studies world-wide to look into how new technologies such as mobile phone banking, smart cards and biometric banking are already helping the poor to access financial services. And

- Thirdly, DFID will help to develop the industry standards for this new area of regulation – starting with a conference in London next month, which will bring together financial and technology regulators from 20 developing countries to share lessons.

6. Conclusion

Challenge regarding m-banking to policy-makers and regulators is two-fold: Firstly, to encourage banks and mobile operators to develop solutions that are not proprietary, and secondly, to allow access to potential new entrants that can disrupt the lucrative business models of the banks and mobile operators. The key challenge is to do this while at the same time ensuring high levels of security and trust. "Just like convergence forced the

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[31] http://sundaytimes.lk/090712/FinancialTimes/ft323.html
[32] CGAP-Notes on Regulation of Branchless banking in the Philippines , May 2008
[32] CGAP-Notes on Regulation of Branchless banking in South Africa, February 2008
[33] http://www.dfid.gov.uk / Media-Room / Speeches - and - articles / 2009 / Douglas - Alexander - sets - out -how-branchless-banking-can-help-the-poorest-people/

integration of broadcasting and telecommunications, so mobile banking is forcing the convergence of the financial and telecommunications sectors. Unfortunately, the convergence of two such heavily regulated industries means that this potential is unlikely to be met unless policy-makers lay the ground rules for innovation." (Comninos, Esselaar, Ndiwalana & Stork 2008)"

Rather than being very conservative or getting confused with Bank-based or non-bank based model, we should adapt a tested version (of course with some customization according to specific national circumstances) which has been already successful in some parts of the world. Generally the transferred amounts are capped and extensive/ regular monitoring is done on transactions, so there should not be very conservative approach from the financial/ relevant regulators. " Banks need to get back to basics and focus on making money through financial intermediation rather than through transaction fees. Policy-makers and regulators need to ensure that evolving systems serve the broader objectives of economic growth and development as well as protect consumer interests, while creating an environment that encourages and rewards innovation". (Comninos, Esselaar, Ndiwalana & Stork 2008)"

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Article

Factors Affecting e-Government Assimilation in Developing Countries

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Abstract

Information Technology (IT) must assimilate with organizations to exploit its potential value for the target adopter. This paper examines factors affecting the assimilation of e-Government in developing countries. A conceptual framework was developed for the context of IT innovation, which was developed on the basis of the Technological-Organizational-Environmental (TOE) Framework and the Innovation and Diffusion Theory. In this paper, we analyze assimilation as a single stage technology diffusion process. An Innovation diffusion theory is coined with TOE framework to explain how assimilation processes are affected by ICT expertise and infrastructure, TOP management support, organizational compatibility, extend coordination, regulatory environment and competition.

By utilizing data from the questionnaire, the determinants and mechanisms of this process were identified and the process of e-Government assimilation was reconstructed. Questionnaires were distributed among ITTP students at KAIST University and international students. The respondents were selected from government offices in developing countries who responded vis-à-vis the assimilation process.

Our research found that the environmental context plays the most important role in assimilation of e-Government, followed by organization and technological factors. Our research concludes that the TOE framework can be used to analyze assimilation of e-Government and contribute to a better understanding and model enhancement.

Keywords

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1. Introduction

The study of Information and Communication Technology (ICT) in the public sector has a long history. It has made a considerable contribution to the modernization of public administration (Brudney & Selden, 1995; Perry & Kraemer, 1979). There are several literatures that examine the adoption and technological impact on government delivery services. Recent improvements in the utilization of ICT to assist citizens are an interesting topic of research. Nowadays, all levels of government use the internet to communicate with citizens. Governments are using ICT to enable employees to improve efficiency and to create new possibilities for citizens to interact with government. Numerous studies have examined e-Government adoption, implementation and impacts (Brown, 2007; Moon & Norris, 2005; West, 2004). e-Government is expected to be one of the most important IT issues in the following decades. (Marche & McNiven, 2003).
Research on e-government has highlighted its multifarious benefits to citizens, business and government. The impact of new technologies on the government sector has not only helped to improve service delivery (Moynihan, 2004; Von Haldenwang, 2004; West, 2004) and promote democracy (Von Haldenwang, 2004; West, 2004), but also to reduce corruption (Cho and Choi, 2004; Von Haldenwang, 2004) and increase competitiveness (Srivastava and Teo, 2006). Howeverfew empirical studies have explored the factors affecting the assimilation of e-Government in developing countries. These gaps were the prime motivator for this research paper.
Researchers found that approximately 60 percent of e-Government projects fail to meet expected outcomes. Heeks (2003) analyzed more than 40 e-Government development projects in developing countries and found that around 35 percent failed totally, while 50 percent partially failed, and only 15 percent were successful. This figure indicates that the risk of failure in developing countries is high. This alarming trend drives our exploratory research on e-Government.
Previous research has categorized e-Government as an important diffusion. This study utilizes the literature on Technological-Organizational-Environmental (TOE) framework, diffusion of innovation (Rogers 1995) and is combined with institutional theory to determine the antecedents of assimilation.
The definition of e-Government used in this study refers to the transformation of relationships between the government and its stakeholders, such as citizens, businesses and employees. It uses Information and Communications Technology (ICT) to improve efficiency, effectiveness, transparency, accountability, responsibility and service delivery (Kraemer & King, 2003; World Bank, 2000). In this context, the implementation of e-Government initiatives requires substantial reform in public organizations. However the bureaucracy is typically resistant to innovation.

Although there is a rich body of literature on e-Government adoption and implementation, research on e-Government assimilation is limited. Existing research is mostly concerned with the adoption of e-Government while a system was procured and implemented. Within a decade, research on practices and functionalities development become a concern of e-Government researchers (Gil-García, & Cresswell, 2005; Ebbers & Van Dijk, 2007)

By drawing on the literature on Technology-Organization-Environment (TOE) Framework (Tornatzky and Fleischer, 1990), we develop a theoretical model to explain the determinants of e-Government assimilation, and how it is affected by its antecedents. The TOE framework has emerged as a useful theoretical lens to better understand technology adoption. Initial efforts from academics have largely been devoted to assimilation in e-business (e.g., Zhu et al. 2003, 2006). Here we try to expand our knowledge to e-Government research. We shall focus on the single stage of e-Government assimilation to investigate the antecedents of assimilation and their contextual factors. Therefore, several research questions arise:

1) Why does e-Government assimilation differ from one organization to another?
2) What kind of theoretical foundation can be used to study e-Government assimilation?
3) What factors contribute to e-Government assimilation within the organization?
4) How would these effects vary across different countries?

To answer these questions, we use the TOE framework combined with Institutional Theory and Innovation Diffusion Theory.

The rest of this paper is organized as follows: a literature review, the theoretical development and hypothesis, the development of instruments and conclusion.

2. Literature review

2.1. Theory of Innovation Assimilation

The study of Innovation Assimilation has a long history that is grounded in Innovation Diffusion Theory as developed by Rogers (1995). It is a multi-disciplinary field with contributions from prominent sociologists, economists, communication experts and engineers. However, it is important to distinguish between diffusion and assimilation. Diffusion is the process by which a technology spreads across organizations, while assimilation refers to organizations stretching from initial awareness to formal adoption and full-scale deployment (Robert G Fichman, 1999). Purvis et al. (2001) defined assimilation as "the extent to which the use of technology diffuses across the organizational projects or work processes and becomes routine." Along with defining assimilation, Rogers (1995) adds a definition of innovation as "the process through which an idea, practice, or object that is perceived as new by an individual, such as the Internet, are disseminated over a matter of time in the society".

Research on IT innovation adoption and diffusion has analyzed a set of theoretical models. M.M. Kamal has identified various information technology adoption models, which is presented in figure 1.

It has been suggested that there are functional parallels between Information System (IS) implementation in general and the diffusion of technological innovation (Premkumar et al, 1994 ; Fichman, 1992 ; Kwon and Zmud, 1987). The main advantage of borrowing the innovation diffusion theory is that it has a valuable cumulative tradition and provides a strong theoretical base for investigating incorporation within the organization.

2.2. Technology–Organization–Environment (TOE) Framework

Tornatzky and Fleischer (1990) developed a framework that explains the decision to adopt a technological innovation. It posits that a firm is influenced by the organizational and environmental context. Their findings of the TOE framework have been extensively used by researchers to study technology adoption. The TOE framework identifies three factors that influence the assimilation of IT (Figure 2). The framework is based on *the technological context* describes the existing technologies in use and new technologies available to the organization, *the organizational context*, such as organizational readiness and top management championship. *The environmental context* consists of the environmental characteristics in which the organization conducts their services. These three factors influence an organization's decision to assimilate an innovation.

References	DIVERSE INFORMATION TECHNOLOGY ADOPTION — Stages/Phases					
Change Model (Lewin, 1952)	Unfreezing	Change (or Moving)	Refreezing			
Organisational Innovation Model (Pierce and Delbecq, 1977)	Initiation	Adoption	Implementation			
Four Phase Innovation Adoption Process	Initiation	Adoption	Implementation	Evaluation		
Stages of Innovation Adoption (Becker and Whisler, 1967)	Stimulus	Conception	Proposal	Adoption Decision		
The Research Model (Agarwal and Prasad, 1998)	Awareness	Perception	Adoption Decision — Channel Type / Personal Innovativeness			
Organisation Innovation Adoption (Frambach and Schillewaert, 2002)	Awareness	Consideration	Intention	Adoption Decision	Continuous Use	User Acceptance
Innovation Adoption and Implementation (Gallivan, 2001)	Primary Authority Adoption Decision	Secondary Adoption and Organisational Assimilation	Organisational Acceptance And Consequences			
Innovation Adoption (Rogers, 1995)	Knowledge of Innovation	Attitude towards Innovation	Adoption Decision	Implementing Innovation Idea	Confirmation of Decision	
IT Adoption Model (Dixon, 1999)	Analysing Requirements & Assessing Capabilities	Analysing Fit of Technology	Adoption Decision	Accept for Utilisation or Upgrade Capabilities / Rejection		
Technology Acceptance Model (Davis, 1989)	Investigating the External Variables	Perceived Usefullness / Perceived Ease of Use	Attitudes Towards Technology	Behavioral Intention for Technology Acceptance	Actual system Accepted and in Use	
Two Stage Innovation Adoption Model (Zaltman et al. 1973)	Primary Adoption A Firm Level Decision for Technology Acceptance	Secondary Adoption Actual Innovation Implementation and including Individual Adoption by Users				

Figure 1. *IT Adoption Model*[1]
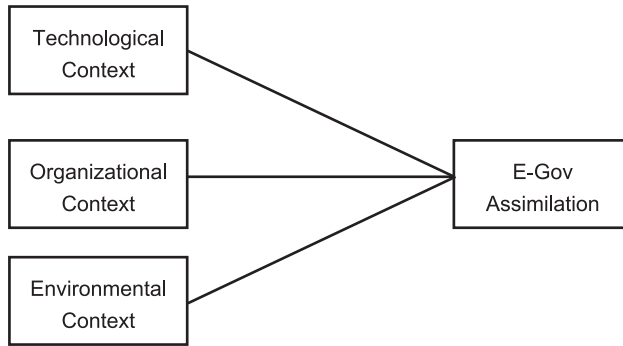
Figure 2. *Conceptual model TOE Framework*

Within the context of Information System (IS) research, previous IS studies utilize the TOE framework; for example, e-procurement adoption (Thompson S.H.Teo et.all.2009), e-business value (Zhu et al., 2004), e-business diffusion (Hsiu-Fen Lina et all.2008) and e-commerce (Jennifer L. Gibbs et.all 2004). The literature review indicates that most studies examine technology adoption and diffusion. Although the TOE framework has been used in various research contexts, it has not been used extensively to analyze e-government, particularly in terms of the assimilation process (Table 1).

Table 1. *Previous Studies that Intersect with TOE Framework*

References	Research subject	Main construct
Thompson S.H.Teo et al. (2009)	Adopters and non-adopters of e-procurement in Singapore	Perceived direct benefits, indirect benefits, perceived costs, firm size, Top management support, Information sharing culture, Business partner influence
Hsiu-Fen Lin et al. (2008)	Determinants of e-business diffusion	IS infrastructure, IS expertise, organizational compatibility, expected benefits of e-business, competitive pressure, trading partner readiness
Ming-Ju Pan et al. (2008)	Determinants of adoption ERP	IT infrastructure, technology readiness, size, perceived barriers, production and operations improvement, enhancement of products and services, competitive pressure, regulatory policy
Cheng Zhang et al. (2007)	IT diffusion	IT infrastructure, government regulation and promotion, IT management
Shirish C. Srivastava et al. (2007)	e-government development	ICT infrastructure, technology development, human capital, public institutions, macro economy
Susan K. Lippert et. al. (2006)	Web Services Adoption	Security concerns, reliability, deployability, firm size, firm scope, technological knowledge, perceived benefits, competitive pressure, regulatory influence, dependent partner readiness, trust in web service provider.
Zhu & Kraemer, (2006)	Innovation Assimilation on e-Business	Technology readiness, technology integration, size, global scope, managerial obstacles, competition Intensity, regulatory environment
Jennifer L. Gibbs & Kenneth L.K. (2004)	The Determinants of E-commerce Use	Technology resources, perceived benefit, lack of organization compatibility, financial resources, firm size, external pressure, government promotion, legislation barriers
Kuan & Chau, (2001)	EDI Adoption	Perceived direct benefits, perceived financial cost, perceived technical competence, perceived industry pressure, perceived government pressure

2.3. Institutional Theory

From an institutional perspective, DiMaggio and Powell (1983) stated that organizations are influenced by pressure from the external or internal environment. Organizations become more similar due to isomorphic pressures reflected by three important legitimization processes (or forces): coercive/regulatory, mimetic/cognitive, and normative.

Thus public services are likely to adopt e-Government due to the pressures of regulation and a competitive environment.

3. Theoretical Development and Hypothesis

Grounded in prior research on the assimilation of e-Government, we extend the research of e-Government as single stage assimilation. We develop an e-Government assimilation based on the TOE Framework, as shown in figure 3. We identify e-Government assimilation factors and also keep the variable, Technological-Organizational-Environmental as drawn from previous work. We shall now analyze the correlation of every independent factor (TOE factors) affecting e-Government assimilation.

In this study we adopt the definition of assimilation by Purvis et al. (2001): "the extent to which the use of technology diffuses across the organizational projects or work processes and becomes routine." To measure e-Government assimilation, we gathered information about IT innovation and evaluated its potential benefits. Thus we examine single stage assimilation of e-Government as the one-shot assimilation factor. Three indicators were used to identify this construct, referred to as Masseti and Zmud (1996), although the formative scale was modified to fit the e-Government context. We used *volume* to measure a specific organization's processes. *Diversity* represents the functional area within an institution that has been automated by e-Government. *Depth* measured the vertical impact of e-Government systems on organization systems.
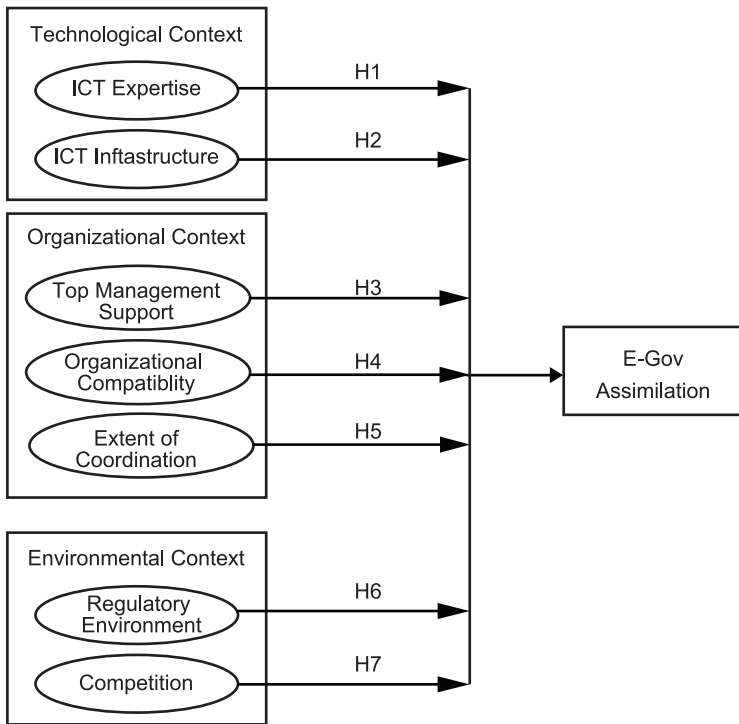
Figure 3. *Single stage model of e-Government Assimilation*

We shall now briefly describe the constructs, theory and hypothesis in this study.

Technological Context

Technological context is defined as existing technology and new technology that is available to the organization. The existence of ICT infrastructure and expertise appears critical to the assimilation of e-government. Without the availability of technological infrastructure, e-government implementation is unrealistic (Srivastava and Teo, 2004; Koh et al., 2005). Thus the level of ICT expertise and the availability of infrastructure are linked to the level of e-government assimilation.

ICT expertise is defined as an organization's level of ICT expertise in e-government. Organizations are more likely to adopt e-Government when ICT expertise is available, because expertise increases the likelihood of innovation (Crook and Kumar, 1998). Chau and Tam (1997) examined the lack of ICT expertise in reducing ICT implementation. Empirical evidence has found that an organization whose employees have the necessary skills and technical knowledge are more likely to implement e-Government applications (Lin and Lee, 2005). Hence, this study hypothesizes:

(H1) Higher levels of ICT expertise are positively related to e-Government assimilation.

ICT Infrastructure: Research on the technological context in IS has shown that sophisticated ICT infrastructure increase the chances of implementing IS (Zhu and Kraemer, 2005). We define ICT infrastructure as a collection of physical technology resources, including shared technology and technology services which provide ICT services. Kowtha and Choon (2001) stated that IT innovation depends on complementary resources and existing ICT infrastructure, as organizations already familiar with IT tend to have a positive attitude toward further assimilation. Hence, it is hypothesized:

(H2) Increased ICT infrastructure increases the likelihood of successful e-Government assimilation.

Organizational Context

The second factor in e-government assimilation is the organizational context. Previous studies utilized the TOE framework to explain the organizational context. It uses various organizational factors, such as the tangible and intangible resources required by an organization (Zhu et al., 2006).

Top management support is defined by Chatterjee et al. (2002) as managerial beliefs and support for the adoption and diffusion of IT innovation. In this context, top management support and commitment has often been considered crucial to the adoption process. With long term strategic vision, top management can encourage the organization to participate in e-Government assimilation. In addition, strong support from top management may cause the necessary resources to be allocated. Therefore, we hypothesize:
(H3) Top management support will positively influence e-Government assimilation.

Organizational compatibility: We utilize a previous study by Grandon and Pearson (2004) on the scope of e-Commerce to fit within the e-Government context. In this study, the examination of organizational compatibility refers to the degree to which technological innovation is perceived as consistent with existing operating practices, beliefs and values, past experiences, and needs (Rogers, 1995). Rogers argued that greater compatibility between organizational policy and technological innovation is positive, because it permits innovation to be interpreted in familiar contexts. Hence we hypothesize:
(H4) Organizational readiness will positively influence e-Government assimilation

Extent of coordination: Top Management will influence e-Government assimilation, though they are likely to have different opinions on ICT's role and value. Coordination theory suggests that Top Management judgments and actions can be linked to a variety of coordination mechanisms, ranging from standard operating procedures, liaison roles, and task forces to manage teams. Therefore we hypothesize:

(H5) The use of coordination mechanisms will positively influence the assimilation of e-Government

Regulatory environment is identified as coercive pressure to assimilate e-Government from the government or legislative influences. Past research has shown that coercive pressure is a significant factor in the adoption of innovation (Hart and Saunders 1998; Hu et al. 2006). In the context of e-Government, it requires formulating a new regulatory framework. In this study, regulatory support refers to governments' role in encouraging e-government by providing incentives. Prior studies show that regulatory support is a critical environmental factor that affects e-government usage. Therefore we hypothesize:

(H6) The regulatory environment is positively related to e-Government assimilation

Competition environment drives e-Government adoption and assimilation (Iacovou, Benbasat and Dexter 1995, Zhu et al. 2003). Competition may first drive organization to adopt innovations to maintain a competitive edge. Based on ICT technology, organizations can improve service responsiveness and transparency, increase operational efficiency (Zhu and Kraemer 2002) and achieve user satisfaction. However in government organizations, the competition pressure tends to influence the mimicking of other successful institutions. Hence we hypothesize:

(H7) The competition environment is positively related to e-Government assimilation

4. Empirical Study

To test the conceptual model and associated hypotheses, we used survey methodology. A survey instrument was developed from a comprehensive literature review to identify measurement factors. Modifications were made to the existing scale to make it more relevant to e-Government assimilation. The research was conducted as a partial program from the multi stage analysis of e-Government assimilation. It is conducted as a pretest analysis before the macro survey was performed. As the target organizations are government institutions that have already implemented e-Government, we also selected ITTP students from KAIST University. The survey used an online system provided by Zoomerang www.zoomerang.com.

Operationalization of Constructs

We test the conceptual model and associated hypotheses by checking the consistency of the data. In the first stage, a confirmatory factor analysis was conducted to assess the measurement model. It was followed by an examination of structural relationships. We used three factors to validate our model: construct reliability, convergent validity and discriminant validity.

Survey instrument

We evaluated the literature prior to developing this scale (Iacovou and Benbasat 1995; Massetti and Zmud 1996). In particular, the TOE Framework analysis and dimensions of e-business assimilation as identified by Zhu at al. (2006) were used to construct a formative scale.

Dependent Variable consists of 3 formative indicators: *volume* to measure an organization's processes using e-Government. *Diversity* represents the functional area within an institution as automated by the e-Government system. *Depth* was measured by asking respondents to indicate the vertical impact of e-Government systems on organizational activities, which is distinct from operational functions

Independent Variable: *ICT expertise* was measured by the awareness of e-Government and training provided. *IT infrastructure* was operationalized by asking respondents to describe the technology used by the organization (Zhu etal.2006). *Top Management Support* was adapted from Chatterjee et al. (2002) as a three item reflective scale. Participation was operationalized by asking the respondents the extent to which senior management actively participated in the following planning and monitoring activities: (1) articulating a vision for the organizational use of the e-Gov, (2) formulating a strategy for the organizational use of the e-Gov, and (3) establishing goals and standards to monitor the e-government program. *Organizational Compatibility* refers to the perceived alignment between IT innovation and the culture and values of the assimilating organization. *Extent of Coordination* refers to the use of coordination mechanisms to manage e-Government programs. *Regulatory environment* includes e-government laws and regulation, as well as incentives provided by the government. *Competition environment* is measured by three factors representing the degree of rivalry among government organizations. All responses were measured using a five-point Likert scale, with anchors ranging from strongly disagree (1) to strongly agree (5), except in the case of dependent variables.

5. Data Analysis and Result

The sample respondents came from 16 countries. Almost one-fourth of the respondents were ITTP students or alumni.
The analysis was performed using the Partial Least Square (PLS) and SPSS version 17.0. We employed Partial Least Squares (PLS) because it allows constructs to be modeled as formative or reflective indicators (Chin, 1998). PLS also imposes minimal demands in terms of sample size to validate a model as compared with alternative structural equation models. Table 2 shows the means and standard deviations:

Table 2. *Descriptive statistic*

Construct	Code	Number of indicators	Mean	Standard deviation
Assimilation	ASSI1	1	2.571	1.168
	ASSI2	1	2.393	1.100
ICT expertise	ICTE	2	3.125	1.080
ICT Infrastructure	ICTI	2	2.839	0.987
Top management support	TOP	3	3.560	0.910
Organizational compatibility	ORG	2	2.768	1.112
Extent of coordination	EXT	4	3.652	0.927
Regulatory environment	REG	4	3.866	0.963
Competition environment	COM	3	2.518	1.293

5.1. Testing the Measurement Model

The *reliability test* for examining the internal consistency is performed by Cronbach's Alpha and Composite Reliability (CR). As shown in Table 3, the constructs show a value above the threshold 0.7 for Cronbach's Alpha and 0.7 for CR referred to Werts et al 1974. *Convergent validity* was assessed by examining each measurement as to whether it correlates strongly with assumed theoretical constructs. It is has a significant t-value from its latent construct. The p-value of this t-value is significant as it is at least on the 0.05 alpha protection levels (Gefen et.al. 2005). In Table 3, the CR is greater than 0.7 and AVE (Average Variance Extracted) exceeds 0.5, suggesting good convergent validity (Sethi and King 1994). During the evaluation, items with loading above the threshold were retained and items with loading less than threshold were removed. After examining the results, five indicators were removed.

Table 3. *Construct and measurement results*

Title	Construct	Indicators	t-Statistic	Cronbach's alpha	CR	AVE
Assimilation	Volume	ASSI1	57.4602**	0.831	0.922	0.855
	Diversity	ASSI2	25.6198**			
Technology	ICT expertise	ICTE1	17.0152**	.751	0.888	0.799
		ICTE2	7.2227**			
	ICT Infrastructure	Infra2	4.8282**	.926	0.956	0.916
		Infra3	4.5181**			
Organization	Top Management Support	TOP1	6.3422**	.916	0.946	0.855
		TOP2	15.9163**			
		TOP3	10.9337**			
	Organizational compatibility	Orgc1	4.0401**	.820	0.918	0.848
		Orgc2	5.0446**			
	Extent of coordination	Ext1	3.9067**	.907	0.897	0.689
		Ext2	2.7569*			
		Ext3	4.5265**			
		Ext4	3.0403**			
Environment	Regulatory environment	Reg1	3.1417**	.819	0.788	0.698
		Reg2	2.5165*			
		Reg4	2.9163**			
	Competition environment	Com1	19.9547**	.825	0.896	0.742
		Com2	14.4267**			
		Com3	7.3401**			

*Significant at P<0.05; ** Significant at P<0.01

Discriminant validity refers to the extent to which different constructs diverge. To examine the discriminant validity of the reflective construct, we used a cross loading table that revealed the correlation of the latent variable scores with the measurement items. It shows an appropriate pattern of loadings, as the measurement items load highly on theoretically assigned factors but not highly on other factors. In Table 4 (Appendix), a cross loading table with bold-faced formatting of numbers emphasizes that the loading of measurement items on constructs have greater loading than inter-construct correlations (off-diagonal elements).

As a second step we use Fornell and Larcker's (1981) criteria: the square root of the Average Variance Extracted (diagonal elements of the correlation matrix in Table 5) should be greater than the absolute value of inter-construct correlations, suggesting that the items

share more variance with their respective constructs than with others. As shown in Table 5, each construct met this criterion. Thus our measurement model satisfies various reliability and validity criteria. The constructs developed by this measurement model could therefore be used to test the conceptual model and associated hypotheses.

Table 5. *Correlation of the constructs and Square root of AVE*

Latent variables	ASSI	ICTE	ICTI	TOP	ORGC	EXT	REG	COM
ASSI	0.925							
ICTE	.449	0.894						
ICTI	.304	.142	0.957					
TOP	.333	.371	.505	0.925				
ORGC	.174	.339	.254	.015	0.921			
EXT	-.135	-.102	.103	.247	-.215	0.830		
REG	-.115	.009	-.150	-.086	-.018	.249	0.835	
COM	.753	.394*	.316	.311	-.047	-.198	-.228	0.861

• Diagonal element (in bold) are the square root of Average Variance Extracted (AVE).

Testing the *structural model* was performed using PLS-graph. The test of the structural model includes: (a) estimating the path coefficients, which indicate the strength of relationships between dependent and independent variables, and (b) the R square value, which represents the amount of variance explained by independent variables. The path in the PLS model represents standardized regression coefficients. The structural model reflects the assumed linear and causal relationships among the constructs.

Table 6. *Results of hypothesis testing*

Hypothesis	R^2	Path coefficient (γ)	t-value	Supported?
H1 ICT Expertise	0.629	0.166	3.091**	yes
H2 ICT Infrastructure		-0.028	1.564	no
H3 Top mgnt. support		0.188	4.624**	yes
H4 Org. compatibility		0.199	9.007**	yes
H5 Extent coordination		0.028	1.531	no
H6 Regulatory		0.252	2.800**	yes
H7 Competition		0.735	5.796**	yes

*Significant at P<0.05; ** Significant at P<0.01

Table 6 explains that 62.9% of the variance in e-Government assimilation is caused by independent variables. In terms of hypothesized factors associated with e-Government assimilation, we found that five out of seven hypotheses satisfied the 0.01 level of significance. One technological variable (ICT expertise), two organizational variables (Top Management Support and Organization Compatibility) and two environmental variables (Regulatory and Competition) were found to positively influence assimilation e-Government. However, contrary to hypotheses H2 and H5, ICT infrastructure and coordination were not supported.

6. Discussion and implications

The primary purpose of this study is to understand the factors influencing e-Government assimilation. The main factors include: Technology, Organization and Environment. Based on theoretical development from contextual conceptualization, our model identifies factors shaping assimilation and reveals which affect e-Government assimilation in developing countries most significantly.

The findings provide a preliminary insight into the proposed theoretical foundation within developing countries. Specifically, we found that five constructs, ICT expertise, Top Management Support, Organization Compatibility, Regulatory and Competition, had a positive influence on assimilation of e-Government. Furthermore, 62.9% of the variance in e-Government assimilation is explained by independent variables.

The results also demonstrate that environmental factors play a key role in e-Government assimilation. Accordingly, the path coefficients show the value of competition and regulatory environment with values pf 0.735 and 0.252. The findings confirm the importance of regulatory factors in e-government assimilation. The lack of a supportive regulatory environment had a negative impact on assimilation. In term of competition, it may be inevitable that government organizations compete to deliver their services and increase transparency.

In term of organization factors, organizational compatibility significantly impacts e-Government assimilation. This may occur because organizational compatibility influences the degree of acceptance of e-government. Top management support has a significantly positive relationship with assimilation, which is consistent with a study by Liang et. al. In a similar vein, is the findings are also consistent with Teo and Ranganathan's study that found that when B2B commerce received higher levels of support from top management, there was a significant correlation with successful adoption. In terms of technological factors, the findings unexpectedly indicate that infrastructure is not supported in assimilation of e-Government. This finding is not in consonance with past research. Several factors may have produced such a result, such as the growth of alternative channels to access the internet in developing countries over the last decade. Furthermore, the boom in mobile phone services in developing countries increases internet penetration. Hence, this may lead to less dependence on ICT infrastructure to e-Government assimilation. However ICT expertise is significant in explaining e-Government assimilation. It implies that competence in technology helps leverage the implementation of e-Government.

Certain limitations must be mentioned: we conducted the survey from international students studying in Korea; thus the respondents are not the surrogate of their institution and the representing officer. Secondly, the sample number was insufficient due to lower levels of expected response. We could not increase the sample number due to time constraints.

7. Conclusion

Developing an understanding of e-government assimilation in the public sector is important in moving towards effective e-government adoption. The purpose of this study is to help IT practitioners in the public sector learn how to use the TOE framework to identify, analysis, improve decision-making, and gain a competitive advantage from the implementation of e-government.

This paper makes an important contribution to policy development. Firstly, although the literature discusses the potential benefits of e-Government, there is still a limited amount of empirical analysis to examine the assimilation process of e-Government. Therefore, this

study provides insights of the factors associated with the assimilation of e-Government. Another contribution to the methodological front in e-government literature is the use of PLS, as it is one of the few to use it. Future studies on e-government could also use PLS as it has lower restrictions on sample size as compared with SEM techniques.

This study indicates that the regulatory environment, competition, organization compatibility, top management support and ICT expertise are important prerequisites for e-government assimilation. Our research also shows relatively little extended coordination of ICT infrastructure with e-government assimilation. This contrasts with past studies that identify infrastructure as an important factors for e-government assimilation.

This research can be used as a reference to analyze multistage assimilation of e-Government.

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Appendix

Table 4. *Cross loading table*

	ASSI	ICTE	ICTI	TOP	ORGC	EXT	REG	COM
Ass1	.940**	.364	.311	.283	.134	-.091	-.160	.784**
Ass2	.910**	.480**	.245	.338	.194	-.167	-.041	.591**
ICTE1	.442*	.918**	.131	.507**	.311	-.042	-.160	.359
ICTE2	.353	.868**	.124	.114	.294	-.154	.218	.345
Infra2	.355	.141	.991**	.515**	.253	.092	-.164	.358
Infra3	.122	.130	.922**	.423*	.229	.125	-.092	.160
TOP1	.229	.490**	.302	.863**	.026	.317	.082	.260
TOP2	.339	.285	.511**	.961**	-.012	.132	-.092	.294
TOP3	.334	.307	.544**	.946**	.033	.269	-.180	.304
Orgc1	.122	.300	.322	.024	.888**	-.078	.124	-.069
Orgc2	.187	.323	.178	.008	.953**	-.279	-.109	-.028
Ext1	-.081	.015	.069	.393*	-.077	.865**	.308	-.196
Ext2	.043	.054	.185	.317	.087	.690**	.292	-.127
Ext3	-.126	-.150	.167	.193	-.248	.974**	.218	-.166
Ext4	-.031	.028	.020	.116	.032	.762**	.216	-.183
Reg1	-.136	.085	-.173	-.044	.103	.112	.954**	-.248
Reg2	-.053	-.143	-.098	-.156	-.247	.356	.770**	-.170
Reg4	-.032	-.072	-.013	-.082	-.139	.448*	.769**	-.058
Com1	.667**	.302	.135	.095	-.052	-.218	-.271	.885**
Com2	.739**	.410*	.392*	.444*	-.038	-.017	-.003	.891**
Com3	.504**	.291	.284	.244	-.032	-.339	-.387*	.806**
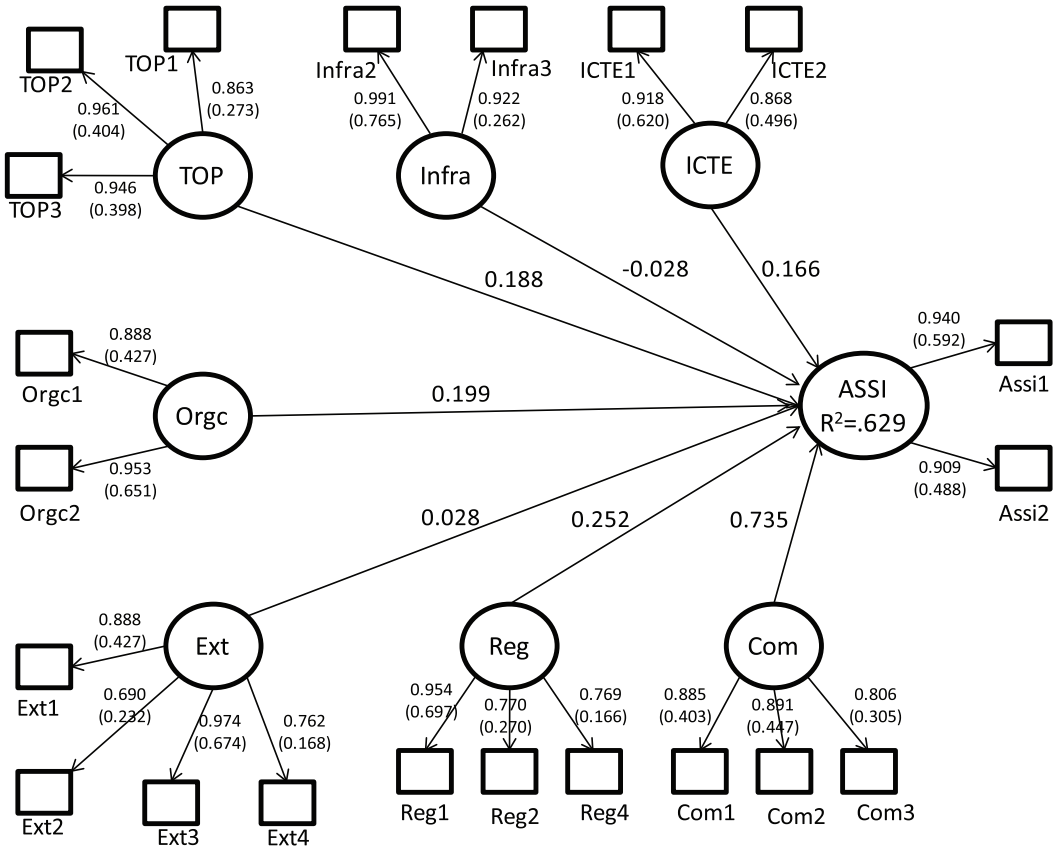
Figure 4. *Structural Model Results.*

Inclusive Development through e-Governance: The Political Economy of e-Government Projects in India

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Abstract
E-government projects have become prominent in developing countries over the last decade. But can projects designed to improve the quality of citizen-government engagement turn their focus to traditionally marginalized communities and groups? What are the institutional, political and economic factors that influence the nature, scope, and success of such projects? This paper examines five specific e-government projects in three states in southern India. The projects include the eSEVA and Computer-aided Administration of Registration Department (CARD) in Andhra Pradesh, Sustainable Access in Rural India (SARI) in Tamil Nadu, and Akshaya and Information Kerala Mission (IKM) in Kerala. Using both primary and secondary sources and a comparative multiple case study approach, I found that each state aimed to implement projects improving the delivery of government services. Kerala's initiatives, however, were more inclusive by decentralizing projects to the lowest tier of government and thus ensure the benefits have a far wider reach. The nature and scope of projects in Kerala are unique.
Why has Kerala focused more on inclusive development than the other states? The answer can be found in the political economy of development policies. I shall argue that whilst the class system exists in almost every Indian state, in Kerala, the state is relatively independent of the dominant class coalitions. Its politics has been broadened by the mobilization of traditionally marginalized castes and social groups. Kerala's e-government projects are more inclusive due to the empowerment of these groups, who exerted pressure on the state to distribute public benefits more equitably. I conclude that inclusive e-government projects greatly contribute to improving living standards among the marginalized. The findings may be used to enhance the impact and sustainability of other e-government projects in developing countries.

Introduction

Over the last two decades, information and communications technology (ICT) have assumed great importance as the primary tools to foster social, economic and political development in developing countries. Almost every developing country has initiated ICT development projects that focus on rural and poor communities . Improving the quality of citizen-government engagement is increasingly recognized as the solution to a plethora of problems faced by the governments and public agencies. This is especially so in developing countries, where public agencies often face resource constraints. In such cases, e-government has been touted as a lower cost approach to improving the quality, response times and access to services (ADB, 2003). Some analysts have noted its role in improving the efficiency and effectiveness of public administration (Pacific-Council, 2002; UN-ECOSOC, 2003a). It is regarded as a tool to increase transparency in administration, reduce corruption, and increase political participation (Seifert & Bonham, 2003). Its potential to make governments more effective in facing the challenges of the information and communication age has also been observed (OECD, 2003; UNDP-APDIP, 2003).

Can projects focus on inclusive development for the traditionally marginalized communities and social groups? What are the institutional, political and economic factors that determine the nature, scope, and success of such projects? Research on e-government projects has predominantly been concerned with success or failure in a project specific or context specific situation, such as critical success and critical failure factors (Heeks & Bhatnagar, 1999), 'design-actuality' (Heeks, 2002) or 'design-reality' gaps (2003a), and long term sustainability (Kumar & Best, 2006). The influence of institutional, political and economic factors on the design and implementation of such projects has not been sufficiently researched.

In this paper, I examine these factors in the context of five flagship e-government projects in three southern states in India. These projects are: eSEVA and Computer-aided Administration of Registration Department (CARD) in Andhra Pradesh, Sustainable Access in Rural India (SARI) project in Tamil Nadu, and Akshaya and Information Kerala Mission (IKM) in Kerala. eSeva offers online payment of taxes and utility bills, registration and issue of birth and death certificates, among others. CARD has aimed to digitalize the land registration process and the delivery of documents electronically. SARI created computer and internet kiosks in rural communities that include voice chat and e-government services. However the majority of kiosks became financially unviable after two to three years of operation and subsequently closed down (Best & Kumar, 2008). Akshaya aims to provide e-literacy to every household in the state. IKM strives to implement e-governance in every local body, both urban and rural. Using both primary and secondary sources and a comparative multiple case study approach, I found that each state aimed to implement projects improving the delivery of government services. Kerala's initiatives, however, were more inclusive by decentralizing projects to the lowest tier of government and thus ensure the benefits have a far wider reach. The nature and scope of projects in Kerala are unique. Fig. 1 shows the location of the three states where this study was conducted.

The paper begins with a brief literature review and a description of the analytical framework used to examine the influence of institutional and political economy factors on the design and implementation of projects. I will then provide an outline of the five e-government projects under examination and the research methods employed. The results will be presented within a comparative framework and an analysis of the political economy and institutional factors affecting the design and implementation of these projects. Recommendations for making projects more inclusive will subsequently be outlined. The paper will further discuss the study's implications for the success and sustainability of projects in developing countries. It will conclude by presenting an alternative analytical framework to better ensure inclusive social and economic development through e-government projects.

Fig. 1: *Location of Tamil Nadu, Andhra Pradesh, and Kerala in India*
Source. http://www.tourindia.com/htm/homepage.htm , modifications by the author

Literature Review

Scholars have underscored the potential of ICT to bridge the information divides and promote social inclusion (Phipps, 2000). It helps in overcoming geographical barriers, improve the delivery of public services and overall responsiveness to citizens and it encourages deliberation (Markoff, 2000; Thompson, 1999). Yet despite the great potential of ICT to transform governance and the fact that ICT development projects have existed for well over a decade in developing countries, most projects completely failed to achieve their objectives or succeeded only partially (Heeks, 2003a). Heeks (2003a) has noted that only 15% of e-government projects in developing countries can be considered a success, while 50% were partial failures and 35% failed completely.

Researchers have attempted to analyze the reasons behind the failure of specific projects in developing countries. Cecchini and Raina (2003) studied an e-governance project in rural India and found that use of the services was low and the poorest people seldom ever used them. In a study of a community-based e-government initiative in South Africa, Benjamin (2001) found that the lack of updated content and interactivity led to the failure of the project. Heeks (2002) has documented several ICT initiatives that were total or partial failures in developing countries. Researchers have also found that a lack of government support, flaws in project design, and low market demand for these services have resulted in the limited success or partial failure of these projects (Dagron, 2001; McNamara, 2003; Proenza, 2001).

Researchers use analytical terms to explain the failures of these projects, known as critical success and critical failure factors (CSF and CFF) (Heeks & Bhatnagar, 1999), 'design-actuality' (Heeks, 2002) or 'design-reality' gaps (Heeks, 2003a), poor economic sustainability of rural ICT projects (Best & Maclay, 2002), or political and institutional factors due to a lack of commitment from the political leadership (Bhatnagar, 2000). A sustainability failure model has also been developed to examine projects that succeeded initially but ultimately failed to meet long-term objectives (Kumar & Best, 2006). The sustainability failure model examines the projects using five factors: financial or economic sustainability, cultural or social sustainability, technical sustainability, political or institutional sustainability, and environmental sustainability. I shall adopt this framework to analyze the sustainability of the projects.

Though the approaches noted above help to develop an understanding of the reasons for success or failure, they fail to adequately take into account the political economy and institutional factors. Scholars have pointed out that government actions are affected by institutional arrangements, cultural norms and prevailing patterns of social and political behavior (Fountain, 2001). These factors affect the way technology is used by policy makers and citizens. Scholars argue that in the long run, technology may serve to reinforce existing social and political norms rather than transforming them (Davis, 1999: Chadwick, 2001). Institutional processes and political norms affect how governments conceptualize, formulate and implement ICT projects. Social and political norms in India continue to be affected by the class system, with dominant classes influencing state policies.

The analytical framework used to understand why the three states took the initiatives they incorporates the political economy of development in India in the post-independence period and the launching of economic reforms in the early 1990s. The dominant line of thinking in this area has focused on the class character of the state in India, and in particular, how the dominant classes influenced the state for their own benefit. The main argument is that state actions in India can be understood as the result of bargaining by a few dominant classes to protect and advance their interests (Bardhan, 1984, 1998; Byres, 1994; Chaudhuri, 1995; Datta-Chaudhuri, 1990). These dominant classes include industrialists, rich farmers, and 'professionals,' consisting of bureaucrats, military and white-collar workers. These classes are heterogeneous and fragmented by regional differences (Datta-Chaudhuri, 1990). They exert collective influence over the state to advance their own interests. Datta-Chaudhuri (1990) explains how these dominant groups influenced policy-making during the pre-reform period. For example, rich farmers in India ensured that land reforms were not pushed beyond a certain point and that agricultural income and wealth were not taxed. The state provided high prices for agricultural outputs and low prices for the major inputs, forcing the government to provide heavy subsidies for agriculture. Similarly, during the pre-reform period, industrialists extracted concessions to protect their domestic market from foreign competition and forced the public sector to subsidize intermediate goods. The business associations sought favors from the government in exchange for their support (Sinha, 2005). It was a classic rent-seeking arrangement (Krueger, 1974). The professional class ensured their employment was protected by making it difficult for firms to reduce surplus and inefficiency. Pressure from backward regions ensured the central government allocated public sector investments into those regions. The provision of heavy subsidies and the protection of an inefficient industrial sector reduced the resources available for public and private investment and slowed down growth rates (Bardhan, 1998).

However fragmentation and realignments took place among the dominant coalition following reforms. While one section of industrialists supported the reforms, others sought state support to protect their inefficient production. Wealthy farmers diversified into trade, small industry, and real estate, while the bureaucracy accepted necessity of the reforms (Bardhan, 1998). Support for the reforms has mainly come about as a result of the realignments.

It is necessary to determine whether the above framework is applicable to regional governments in India during the post-reform period. While the class character exists in almost every state in India, in Kerala, the state was relatively autonomous of dominant class coalitions (Cairo, 2001; Dre`ze & Sen, 1995). In Kerala, politics has been marked by the mobilization of traditionally marginalized castes and social groups following social movements during the pre-independence era (Cairo, 2001; Desai, 2001). The communist party in Kerala played an active role in the mobilization. The empowerment of these groups led to pressure on the state to distribute economic and social benefits more widely. Thus, the state focused on distribution rather than capital accumulation and growth (Cairo 2001). The analytical framework discussed above is helpful in understanding why Kerala has greater focus on making the e-Government projects inclusive than Tamil Nadu and Andhra Pradesh. I argue that it is the result of the empowerment of the traditionally marginalized castes and social groups, who exerted pressure on the state to distribute economic and social benefits more widely. I conclude inclusive development through e-government projects can significantly expand access to online services for marginalized communities, which in turn improves their welfare. The findings of this research may have tangible implications for success and sustainability of such projects in developing countries.

Research Methods

I primarily use qualitative data from primary and secondary sources and employ a comparative multiple case study approach. The research method is focused on explanatory and inductive-iterative theory building and cross-case comparative analysis and synthesis (George & Bennett, 2005; King, Keohane, & Verba, 1994; Ragin, 1987; Yin, 1994, 2003). This approach helped to generalize the results. I selected flagship projects in each state for cross-case comparative analysis. Each project was launched and implemented with the involvement of the state government and were in operation for comparable time periods. The selection of flagship projects facilitated a cross-case comparison of the institutional factors behind the design and implementation of the projects.

The primary data mostly came from a series of structured interviews with government officials and firms engaged in developing e-government solutions and providing services to citizens. A total of 57 interviews were conducted in the three states during November 2006 to March 2007. These included 43 interviews with software firms and 14 interviews with senior officials in the three state governments and their agencies engaged in policy making. The interviews were conducted with government officials included senior civil servants in charge of policy making and senior officials of government agencies, as well as the chief executive officers (CEOs) and senior-level managers in private firms. Every interview with government officials were conducted face-to-face, while most of the interviews with software firms were conducted over the phone. In the case of Tamil Nadu, primary data also came from a structured survey of 27 SARI kiosk owners who had closed their kiosks after six months to three years of operation. This survey was conducted during August and September 2005 in the local Tamil language. I also conducted semi-structured interviews with other stakeholders, such as SARI project officials, officials from n-Logue, the company providing internet services to the kiosks, and government officials. The officials included the then Secretary of the Information Technology Department, Tamil Nadu Government in Chennai; n-Logue officials in Melur; and the District Collector and the head of the National Informatics Center (NIC) in Madurai. I conducted a total of 10 such interviews. The interviews were conducted in English during July and August 2005.

The secondary sources of data included official documents published by the three state governments and their agencies regarding e-governance policies and projects. Other sources included studies and scholarly research on these projects, reports by consulting firms, newspapers and magazines.

Description of the Projects

eSeva in Andhra Pradesh

eSeva aims at providing Government to Citizen (G2C) and Business to Citizen (B2C) services to the public from 46 service centers located in the twin cities of Hyderabad and Secunderabad and the Ranga Reddy district (www.esevaonline.com). Centers have also recently been opened in 20 other state districts. Using a Public-Private-Partnership (PPP) model, this project built on the success of TWINS (Twin Cities Integrated Network Services), a project launched in 1999 in Hyderabad and Secunderabad. It adopted an integrated approach by including central and state government services within its fold.

The eSeva centers currently provide 66 G2C and B2C services, such as online payment of utility bills, issue of licenses and certificates, reservation of bus tickets, receipt of passport applications, etc. (www.esevaonline.com). The centers accept almost all forms of payment, such as cash, cheque and credit card. Using Intranet on a Wide Area Network (WAN), the centers are connected to their respective government departments.

The project was initially driven by the highest political executive in the state, the then Chief Minister Mr. Chandrababu Naidu. The project's financial viability was secure because it was implemented through the PPP mode with cost recovery based on user fees. The project met its objectives and became popular among citizens, especially in terms of paying utility bills online (Second Administrative Reforms Commission, 2008). The success was largely driven by its facility to pay electricity bills online (Bhatnagar 2005). However the project had a limited reach in rural areas, as there was limited clientele (Second Administrative Reforms Commission, 2008).

CARD Project in Andhra Pradesh

Computer-aided Administration of Registration Department (CARD) project aimed to computerize the Registration Department. This state department primarily deals with the registration of transactions and deeds in immovable properties, valuation of properties, and issuance of encumbrance certificates. After being launched in November 1998, the project was implemented in all 387 Sub-Registrar Offices (SRO's) in the state by 2007 (APDIP 2007). The project uses a LAN for each of the 387 SRO offices provided with a server and four computers. The SRO offices act as an access point for citizens wishing to use the services.

The services included online registration of deeds and the issuing of encumbrance certificates and market valuation of properties. The services are provided on a nominal fee per service basis. The current user charges levied are as follows: Rs. 95 for registration of documents up to 10 pages with additional Rs. 5 for every additional page, Rs. 20 for encumbrance certificates, and Rs. 20 for certified copies of the documents (APDIP 2007). The government of Andhra Pradesh enacted new regulations to provide legal sanctity to the scanned documents. It also legislated changes in the Registration and Stamps Act, Urban Land Ceiling Act, Surplus Agricultural Land Act, Endowment Property Act, and the Property Act to facilitate the new procedures (APDIP 2007).

The project was highly successful. It drastically reduced the time taken to register properties and obtain related documents. Previously, citizens could only obtain encumbrance certificates seven days after their application, but could do so within 10 minutes once the project was implemented (APDIP 2007). Citizens can also obtain certified copies of documents within 15 minutes and register a document within one day, which used to take three to seven days. The project registered 1.18 million documents and served 5 million citizens in a year (APDIP 2007).

The project has also proved to be financially viable. Against an initial investment of around Rs. 300 million (approx. US$ 70 million at 2000-01 exchange rates), it had earned revenues of Rs. 475 million by 2007 (APDIP 2007).

A unique feature of this project is that it was implemented and managed by in-house staff (APDIP 2007). Government staff were provided with adequate training to implement the project. Like the eSeva project, it was also driven by the keen interest of the then Chief Minister of the State, Mr. Chandrababu Naidu (De 2005). Researchers have noted the outstanding role Mr. Chandrababu Naidu played in championing the information technology industry and e-government projects (Kshetri & Dholakia, 2005).

SARI Project in Tamil Nadu

The SARI project began as a collaborative venture between several organizations: the Indian Institute of Technology, Madras; Berkman Center for Internet and Society, Harvard Law School; Georgia Institute of Technology; I-Gyan Foundation; and n-Logue Communications Pvt. Ltd. Initially, the Massachusetts Institute of Technology was also a partner. It used Wireless-in-Local Loop (WLL) technology developed at IIT Madras to provide Internet connectivity to rural villages. The project was launched in November 2001 in Melur Taluk (an administrative unit within a district) in Madurai district. It had established 78 kiosks at its peak in June 2004 (Best and Kumar 2008).

The Internet was offered to the local community at kiosks run as self-sustained businesses with cost recovery through service charges. The kiosks were operated by two sets of operators. A local NGO called the Dhan Foundation was operating 42 kiosks in July 2005. The remaining 36 were owned and operated by local self-employed entrepreneurs. These kiosks were called 'Chirag' kiosks, while those operated by the NGO were 'Dhan kiosks'. Technical support for every kiosk was provided by n-Logue Communications. n-Logue Communications also provided maintenance services to the Chirag kiosks.

The kiosks provided a host of online applications and services to rural people, including computer training; email/voice mail/voice chat; e-government services such as requesting birth and death certificates; agricultural, veterinary, and health services. Internet content was provided in the local languages of these areas. The services were based on a self-sustaining commercial model with the charges ranging from Rs. 10 (approx. US $0.22) to use email to Rs. 100 (approx. US $2.2) for one hour of basic computer education everyday for a month.

The kiosks made encouraging progress in the first 18 months of operation, with 10 Chirag kiosks achieving commercial viability (Kumar, 2004). The e-government services at the kiosks had also proved successful in the beginning, as the presence of kiosks in the village was associated positively with two G2C services: obtaining birth certificates for children and applications for old age pensions (Kumar and Best 2006). Users reported considerable savings of time, money, and effort compared with obtaining the services from the government office. Kumar and Best (2006) also found evidence of a reduction in corruption in the delivery of these services through kiosks.

Although the e-government component of the project operated successfully for a year, it failed to maintain local political and administrative support to remain institutionally viable. The initial champions of the project in the government either left or were transferred out of the district and the lower level bureaucracy started opposing the project as it threatened their rent-seeking opportunities (Kumar and Best 2006). The state government also failed to show continued commitment and support to the project, ultimately leading to its failure.

Akshaya Project in Kerala

Akshaya project aimed at providing computer literacy and e-government services to citizens. It was launched in Malappuram district in 2002 on request from the village councils to provide computer training to the people (De 2005). The project established 2,662 e-centers in eight of the state's 14 districts by August 2009, out of which 2,382 are in rural areas (www.akshaya.kerala.gov.in). The government plans to open at least two centers in every village council in the state during the third phase. It will also provide at least one center within 2-3 kilometers of every household.

The Akshaya centers were set up and run by local self-employed entrepreneurs, who obtained equipment with the assistance of bank loans. The initial investment to establish a center is around Rs. 300,000 (approx. US $5,800). The services included computer training and G2C and B2C services, such as online payment of utility bills, filing sales tax returns, mobile phone recharge coupons and so forth.

One of the major areas of focus was e-literacy (De 2005). As of September 2009, over 3 million people became e-literate through these centers (www.akshaya.kerala.gov.in). Women have been the major beneficiaries of this program, as over 65% of participants in the initial phase were women (De 2005). Women also account for over 33% of the entrepreneurs running the centers.

One of the distinguishing features of this project is its emphasis on inclusive development. Unlike the other two states, the government in Kerala made local self-governing institutions, such as the village councils, the key players in implementing the project. Locals played a key role in selecting locations and entrepreneurs. They also monitored the center's delivery of services. Genuine involvement on the part of the local elected representatives and the local administration provided a sense of ownership to the local community and resulted in remarkable success. Involving self-governing institutions also enabled the project to reach remote areas and to provide services to marginalized communities. The objective of making the centers within easy reach of every household also promoted inclusiveness.

Information Kerala Mission (IKM)

Information Kerala Mission is a flagship e-government project that aims to computerize 1,215 local self-governing institutions. It is stated to be the largest and most comprehensive local body computerization project in India. It also aims to develop ICT based solutions for an entire range of issues concerning local body governance, decentralized planning, and local economic development (www.infokerala.org/about.html). Solutions for better planning and monitoring at the local level, administration of council services, employment information, and revenue collection have found. In the pilot phase, the project was implemented in five village councils. Implementation is in progress in 609 of the 1,215 village councils in the state (www.infokerala.org/about.html).

A unique feature of the project is that it has been driven by the state government with the objective to build the capacity of local self-governing institutions. The project was a finalist at the Stockholm Challenge in 2006.

Analysis of the Projects

As the discussion in the preceding section demonstrates, each of the three states pursued different strategies in the design and implementation of the projects. While Andhra Pradesh showed exceptional political commitment led by the Chief Minister, it was lacking in the SARI project in Tamil Nadu. Kerala took the project to rural areas and made local self governing institutions the nerve centers for implementation. In this section, I shall analyze the factors responsible for the differential performance in implementing e-government projects. I will employ the analytical framework of sustainability of projects along the five dimensions, as discussed by Kumar and Best (2006).

Andhra Pradesh

As noted earlier, both eSeva and CARD proved highly successful in delivering services to citizens more efficiently. They have also proved to be financially sustainable through cost recovery through user fees. Both projects were driven by exceptional political commitment that was led by the Chief Minister of the State.

However, despite political commitment and technical and financial support, the two projects have remained confined to urban centers and taluka headquarters within the

district. While eSeva has only recently attempted to expand to districts outside the twin cities of the state capital, CARD has been implemented in the offices of the Sub-Registrars only. Thus, while eSeva has failed to reach the vast rural population in the district, CARD has been beneficial only to those who deal with property transactions. Hence, these two projects have not succeeded in expanding their reach to marginalized sections of society.

Tamil Nadu

As noted earlier, SARI project had strong institutional and financial support from key international educational institutions. It also had the full support of the state government in the beginning. However the state government and district officials lowered their commitment towards the e-government component of the project after 18 months from the time it was launched. As the interviews with the government and the SARI project officials reveal, the project also faltered due to the transfer of key district and Taluka officials and opposition from the bureaucracy's lower levels, as it threatened their rent-seeking opportunities. The project also failed to reach out to the socially and economically marginalized communities (Kumar 2004) and did not involve local self-governing institutions. In terms of the sustainability failure model, the project thus suffered failure along the political/institutional and social sustainability dimensions.

Kerala

Kerala showed exceptional commitment in taking the Akshaya project to rural areas and making elected village councils the main agencies responsible for implementation. It also reached out to the socially and economically marginalized sections of rural communities by establishing kiosks within easy reach of every household and offering e-literacy training. Making elected village councils responsible for implementing the projects was key to ensuring continued political and institutional commitment.

The second project, the Information Kerala Mission, also had strong political commitment from the state government. This project has has shown good progress in its implementation. No other state showed the same level of commitment in empowering local institutions and involving them in implementing the e-government projects.

Cross-case Comparative Analysis of the Three States

As discussed in the preceding paragraphs, the three states achieved varying degrees of success in implementing e-government projects and making them socially inclusive. A comparative cross-case analysis of the states using the sustainability failure model can help to identify the factors responsible for the differential outcomes. Using the sustainability failure model, the analysis is presented in the Table 1 below.

Table 1: *Cross-case Comparative analysis of the e-government projects in the three states*

Project	Financial / Economic Sustainability	Social/Cultural Sustainability and Inclusiveness	Technical Sustainability	Political/Institutional Sustainability	Environmental Sustainability
eSeva in Andhra Pradesh	Yes	Limited	Yes	Yes	Yes
CARD in Andhra Pradesh	Yes	Yes	Yes	Yes	Yes
SARI in Tamil Nadu	No	No	Yes	No	Yes
Akshaya in Kerala	Yes	Yes	Yes	Yes	Yes
IKM in Kerala	Yes	Yes	Yes	Yes	Yes

As the above table shows, only one project in Andhra Pradesh and two projects in Kerala were completely sustainable. It is relevant to note that the CARD project in Andhra Pradesh showed sustainability along the social dimension, due to limiting the scope of

services to transactions in immovable property. Due to this unique feature, the project cannot provide services to socially and economically marginalized communities, who have virtually no transactions in property. However the project achieved its objectives and demonstrated sustainability along every dimension.

Why did Kerala show exceptional commitment to making the projects more inclusive by reaching out to the socially and economically marginalized communities and involving local self-governing institutions? Interviews with senior government officials in Kerala reveal that the state was focused on ICT as an enabler of socioeconomic development. To further examine these factors, the factors behind the decision making process of the state is analyzed below.

Political Economy of Development Projects

As noted in the literature review, scholars argue that the dominant classes in India influence the state to their benefit. State actions in India can be understood as the result of bargaining with a few dominant classes to advance their interests (Bardhan, 1984, 1998; Byres, 1994; Chaudhuri, 1995; Datta-Chaudhuri, 1990). These dominant classes include industrialists, wealthy farmers, and the 'professionals,' consisting of bureaucrats, military and white-collar workers. These classes are heterogeneous and fragmented by regional differences (Datta-Chaudhuri, 1990). They exert collective influence over the state to protect and advance their own interests. While the class character exists in almost every state in India, in Kerala, it is relatively autonomous of dominant class coalitions (Cairo, 2001; Dre`ze & Sen, 1995). Its politics has been widened by the mobilization of traditionally marginalized castes and social groups, which was the result of many social movements during the pre-independence era (Cairo, 2001; Desai, 2001). The communist party in the state played an active role in mobilization. These groups exerted pressures on the state to distribute economic and social benefits equitably. This resulted in the state focusing on distribution rather than capital accumulation and growth (Cairo 2001).

The relatively autonomous character of Kerala was evident during interviews with its senior government officials. One remarked that, "the state cannot afford to be seen as promoting the interests of private capital in the IT industry, as was the case in Andhra Pradesh and Tamil Nadu. However the working class character of the state has caused it to expand the reach of e-government projects". This indicates that Kerala's focus on making e-government projects more inclusive was due to the empowerment of socially and economically marginalized groups.

As noted in the literature review, scholars argue that existing social and cultural norms and established patterns of political behavior affect the institutional processes of the state. This indicates that Kerala's social and cultural norms and political behavior might have contributed to making e-government projects more inclusive by reaching out to the socially and economically marginalized communities and involving the lowest tier of local-self government in their implementation. As discussed in the next section, this may have implications for the success of such projects in developing countries.

This study also shows that inclusive development in e-government projects increases access for marginalized communities and improves their welfare.

Implications for ICT Development Projects in Developing Countries

The findings of this research may have implications for the success and sustainability of such projects in developing countries. As this research shows, reaching out to disadvantaged communities improves their welfare and makes them more inclusive. Involving local self-governing institutions in designing and implementing the projects helps in giving local communities a sense of ownership and makes them socially and politically sustainable. However achieving these goals requires state governments to adopt new technologies to improve the welfare of the common people. This is a shift away from

traditional patterns of political behavior, which are influenced by dominant class coalitions. As the example of Kerala proves, social inclusion through e-government projects must reach out to disadvantaged sections of society.

Suggestions for Further research

As the primary data was mainly collected from high level government policy makers, it would be useful to collect data from other stakeholders. For example, service users and the local self-government functionaries could be interviewed to analyze more deeply how state governments designed and implemented the projects. This will provide further insight into the institutional processes that determine the role of stakeholders in such projects.

Conclusion

This research shows that social, political, and institutional sustainability is crucial to making e-government projects more inclusive and in turn improving the welfare of marginalized communities. This study analyzed five flagship e-government projects in three southern states in India and found that Kerala succeeded in making its projects more inclusive. This was achieved by reaching out to marginalized rural communities and making the local self-governing institutions responsible for the implementation. That this occurred in Kerala and not the other two states may be due to its relatively autonomous character and the empowerment of marginalized communities. This study may have significant implications for the success of the ICT development projects in developing countries.

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Article

New Media, Knowledge Acquisition and Participatory Governance in Rural Bangladesh

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Abstract

This paper documents how a rural village in Bangladesh has started to integrate new media as part of its community-based communication system. In so doing, the village enhanced its capacity for knowledge acquisition and improved the quality of participation in public affairs. We argue against the notion of the new media being a panacea for social inequity. Rather, for new media to contribute to participatory governance, it needs to be incorporated as part of the villagers' everyday lives. The information acquired from the new infrastructure needs to be incorporated into the local knowledge system.
To support the hypothesis, this paper investigates a Rural Knowledge Center in Mirsarai Upazila, Chittagong District, Bangladesh. Using a qualitative and exploratory design, key informants included opinion leaders and residents. Findings indicate that residents have started to integrate the new media as part of the community-based communication system, which is comprised of informal, formal and mediated networks. Residents use new media to download government forms, obtain examination results/certificates, search for jobs, receive weather updates and so forth. Village youths have received training in Microsoft Office applications to increase their employment potential. Opinion leaders access information about agriculture, health and other information relevant to the community. In this sense, the new media has, to some extent, improved the community's knowledge acquisition capacity and in doing so, enhanced the quality of participation in governance.

Keywords

new media, governance, knowledge management, rural village.

Introduction

This paper documents how a rural village in Mirsarai Upazila, Chittagong District, Bangladesh has started to integrate new media as part of its community-based communication system. As of result, it has enhanced its knowledge acquisition capacity and improved the quality of participation in public affairs. Using a case study approach, we argue that new media needs to be incorporated into villagers' community-based communication system before it can contribute to participatory governance. To provide some background to the Rural Knowledge Center in Mirsarai Upazila, Chittagong District, this section discusses the concepts of Digital Bangladesh; namely, participatory governance and e governance. This paper is significant, given that Bangladesh has a great deal of new media infrastructure, a large digital divide and an e-governance readiness level at the emerging stage. Despite these conditions, several non-government organizations have initiated projects promoting free and equitable access to information via Information and Communication Technology (ICT), with a vision of greater participatory governance.

The Promise of Digital Bangladesh

One of the interim Awami League government's campaign promises was a "Digital Bangladesh" by 2021. "Digital Bangladesh" will have a knowledge-driven economy, that is, "one in which the generation and exploitation of knowledge play the predominant part in the creation of wealth" (United Kingdom Department of Trade and Industry, 1998). During the last few decades, the world economy has shifted from industry to knowledge. The path to prosperity is now through knowledge acquisition. In Bangladesh, 65 percent of the population is based in agriculture and 85 percent live in rural areas. This means that rural communities need to become learning organizations, which, according to Easterby-Smith and Lyles (2003) are "entities with the capacity to learn effectively and prosper." Senge (1990) added that a learning organization "is a place where people continually expand their capacity of creating results they really want, where patterns of thinking are broadened and nurtured, where collective aspiration is free and where people are continually learning to learn."

The Acquisition of Knowledge

To become learning organizations, rural villages must practice some form of knowledge management. Vera and Crossan (2003) point to definitions of knowledge management as "the explicit control and management of knowledge within an organization aimed at achieving the company's objectives," "the formal management of knowledge for facilitating the creation, access and reuse of knowledge, typically using advanced technology," "the process of creating, capturing and using knowledge to enhance organizational performance" and the "ability of organizations to manage, store, value and distribute knowledge." In his study of a Thai farming community, Genilo (2007) argues that rural villages can engage in knowledge management using a four-step cycle – gathering, organizing, refining and disseminating.

However this article focuses on gathering and acquiring knowledge. According to Genilo (2004), "the community may acquire the innovation and new technology through securing (internal origin) or capturing (external origin)." Securing knowledge from within the community usually involves informal and formal communication networks. Capturing knowledge outside the community, however, not only requires informal and formal communication networks, but also mediated networks, which include the mass media and new media.

Thus, Information and Communication Technology (ICT) plays an important role in enabling rural villages to acquire outside knowledge. The Organisation for Economic Cooperation and Development (1996) has pointed out that ICT "are the enablers of

change. They do not by themselves create transformations in society and are best regarded as the facilitators of knowledge acquisition in innovative societies." Genilo (2004) added that once new technology is acquired, farmers must reinterpret the innovation and to fit it within the context of the community. This is where outside knowledge is refined and/or localized.

In broad terms, ICT encompasses any medium to record information, such as technology for broadcasting information and communicating through sound or images. It also includes a wide variety of computing hardware; mobile phones and other personal devices; application software; and the internet. Through ICT, rural villages in Bangladesh have gained an ability to access to outside information. This makes it possible to rethink their development goals, expand local knowledge and become learning organizations.

Accessing Outside Information

Arguably, the ability to access information only translates into actual access if citizens (whether urban or rural) are guaranteed the right to information. On 29 March 2009, the Bangladeshi Parliament passed the Right to Information (RTI) Bill 2009, which made it mandatory for most publically funded agencies to obtain permission before refusing a citizen's request for information. Bdnews24 (2009) reported that the government hoped "to ensure transparency and accountability, reduce corruption and facilitate good governance." Incidentally, just a year earlier, the Global Integrity Report gave Bangladesh low scores in terms of public access to information. In reply to the question "Do citizens have a legal right of access to information?" the yes vote was just 33 percent. To the question "Is the right of access to information effective?" the affirmative score was 30 out of 100.

In an article in The Daily Star on 23 February 2009, Shaheen Anam explains that "RTI will provide the key to good governance and will make participatory democracy meaningful. It will also assist in implementing people-centered development which is based on equitable growth. For a democracy to be meaningful it has to be participative and inclusive. This can only happen when the general population can get relevant information effectively from public authority." In accordance with this, Mirdul Chowdhury (2009) suggests one pillars of Digital Bangladesh is governance, that is, "a government that has the capacity to deliver services to citizens through the Internet, radio and TV and also makes its internal operations more efficient and transparent through the use of ICT." In other words, the government should promote universal access to government services; integrate administrative systems, networks and databases; and make such information available online to citizens. Government should become citizen centric and technology driven.

The Meeting Point of Participatory and e Governance

The right of citizens to participate in public affairs was explicitly recognized in the Declaration of the Right to Development adopted by the United Nations in 1986. Paragraph 1 of Article 1 states: "The right to development is an inalienable human right by virtue of every human person and all peoples are entitled to participate in, contribute to and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized." Osmani (2007) explains that "the right to development is to be seen not simply as the right to enjoy the fruits of development, but also as a right to participate in the process of realizing them."

One advantage of citizen participation in bureaucratic decision-making is altering incorrect perceptions of what citizens need and reducing the waste of scarce resources. Osmani states that, "when people are able to exercise their voice in the conduct of public affairs, they will have an opportunity to reveal their true preferences. Only participation can allow this exercise of voice." Osmani further explains that "the very presence of ordinary people at the discussion table will give them some power to influence the decision-making

processes and their outcomes – even if they are not always able to participate on equal terms with the elite decision-makers." Participation based on Osmani's analysis may encompass four types of activities: (1) ascertaining people's preferences; (2) formulating policies, rules and instructions based on those preferences; (3) implementing proposed policies, rules and instructions; and (4) monitoring, evaluation and ensuring accountability of policy formulation and implementation.

For rural communities to participate effectively in public affairs, they must have access to outside information. Locals need information from the government and technical experts on issues that affect them, and this is where e-governance plays a key role. e-Governance is defined as "the public sector's use of information and communication technologies, with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective." Through e-governance, governments aim to: (1) improve internal organizational processes of governments; (2) provide better quality information and service delivery; (3) increase government transparency to reduce corruption; (4) reinforce political credibility and accountability; and (5) promote democratic practices through public participation and consultation. Through e-governance, rural citizens will gain access to information that affects them, expand their local knowledge by integrating outside technical knowledge; and be able to participate effectively in public decision-making processes.

ICT for Development Initiatives in Rural Bangladesh

With a teledensity limited to urban and semi urban areas, a literacy rate of 64 percent and an e-governance readiness at the emerging stage, transforming rural villages in Bangladeshi into learning organizations seems like a distant dream. However non-government organizations have undertaken ICT for Development projects in rural areas with a vision of enabling participatory governance. One example is the Bangladesh NGOs Network for Radio and Communication (BNNRC). Established in 2000, the BNNRC is a national networking body of alternative mass media. It aims to build a democratic society based on the free flow of information and equitable and affordable access to information through ICT. The BNNRC vision is "to see the rural people having easy, quick and low cost access to global communication so that they can be enriched and updated with knowledge."

According to BNNRC Chief Executive Officer Bazlur Rahman, "BNNRC believes that access to information is not a privilege; it is a human right. If access to information cannot be ensured, development projects cannot succeed. Freedom to information provides the benefits of good governance and peace." To actualize this vision, BNNRC established Rural Knowledge Centers (RKC) in ten upazilas. Each RKC is equipped with computers, printers, mobile phones, internet access and photocopy and laminating machines. Before setting up a RKC, BNNRC conducts workshops with local leaders, government, non-government organizations to discuss the RKC concept and objectives.   The organization then commissions a baseline survey to gauge local opinion. If a satisfactory response is received, a RKC is established in the locality. BNNRC regularly monitors the use of services in RKCs, which include computer education, information services, internet access, mobile phone services, laminating services, photocopying services, photography services and ICT for Development Seminars.

The BNNRC Saherkhali RKC in East Saherkhali Village, Saherkhali Union, Mirsarai Upazila, Chittagong District, was established in July 2006 in tandem with the Youth Center for Social Action (YPSA). The village is 65 kilometers north of Chittagong City and measures 21.59 square kilometers. Its population of 25,500 people – 13,000 (51 percent) female and 12,500 (49 percent) - are mostly engaged in agriculture. The East Saherkhali is one of nine villages comprising Saherkhali Union. The BNNRC Saherkhali RKC has eight staff members and four volunteers. RKC volunteers undergo a half day orientation to discuss the basics of ICT and RKC, and how they can contribute to better governance.

Using a qualitative and exploratory design, the paper's research methods included field observation, in-depth interviews and document review. Nine key RKC users were interviewed in May 2009. They were opinion leaders (5) and students (4). Opinion leaders' were between 28 and 45 years old. Three were male while two were female; three were Muslims and one Hindu. They held important posts in the village, such as school teacher, madrasa teacher and village governing councilor. The students were males in between 16 and 21 years old. Three owere Muslim and one Buddhist. Three were studying at the National University and the other attended business studies at Nizampur College. All key informants were asked about their community-based communication system, integration of ICT and participation in governance.

Community-based Communication System at the Saherkhali RKC

The community-based communication system can be divided into informal, formal and mediated networks. According to Genilo (2007), "informal networks are loose groupings of farmers who band together due to personal relationships, commonalities and special interests. Formal networks are organized and registered organizations established to accomplish certain objectives. Mediated networks include mass media and new media." Community residents can obtain information from any of these networks to improve knowledge acquisition capacity and to improve the quality of participation in public affairs. In the Saherkahli RKC, the youth have a formal organization called "Sheikh Ibrahimtola Tarun Shongho," which addresses concerns such as irrigation rationing, crop diseases and fish illnesses. The opinion leaders, on the other hand, belong to the Irrigators' Association. Two opinion leaders are affiliated with Union Parishad, the village governing council.
Part of village's informal network consists of a football team. The team is formed seasonally to compete with other villages. They also belong to the "Nobochetona," a group that holds cultural programs during the winter season. The cultural program includes opera (jatra), song and dance. Opinion leaders have formed informal linkages with non-government organizations such as the YPSA. Key informants felt that the most knowledgeable members of the village include school teachers, madrasa teachers, upazila chairmen and village leaders. These are the people they seek advice from whenever they have a problem.
Key informants read newspapers such as Prothom Alo, The Inqulab and Jugantor for information about politics, economics, job opportunities, agriculture and sports. They read the newspaper in village bazaar shops and the union parishad office. While radio is not popular, all key informants have television sets, and two have cable connections. They mostly watched news, public affairs programs and entertainment programs, such as dance and drama. Key informants do not have video players or personal computers. However every informant has a mobile phone, with one student using it to watch music videos in addition to texting and calling.

Integration of ICT in Community-Based Communication System

The village has only one computer with internet access, which is located in the RKC. The other alternative is to visit the internet kiosk in Mirsarai Upazila proper. However the internet rate is more expensive and it is too far away from their homes to provide the necessary assistance. Hence, all key informants prefer to utilize the Saherkhali RKC. Once a week, the key informants visit the RKC to use the internet for around three hours (albeit not continuous, given power disruptions). Opinion leaders access information on agriculture, education, health and women/children. Since opinion leaders are members of the union parishad, information is needed to improve participation in meetings. Most opinion leaders, however, do not know how to use a computer and require the assistance of RKC staff to access information. Only one opinion leader knows how to use Microsoft Office, email and web browsing. Some opinion leaders also use the internet to download

examination results and government forms.

Students, on the other hand, had received training on Microsoft Office – particularly Microsoft Word, Excel, Powerpoint and Publisher. Although the students do not use Microsoft Office for their classes, they believe that being computer literate will improve employment opportunities. Students basically use the internet to download examination results, songs and music videos. Hindi, Bangla and English songs are downloaded and played with a multimedia player. They also browse the internet for anything that catches their attention. However the students and opinion leaders do not use email or chatting services. Information downloaded from the internet is saved on the RKC computer for everyone to see. Key informants mentioned two problems affecting internet usage – power disruptions and a long journey to the RKC. If they have problems understanding the English content on the web, they seek the assistance of the RKC staff. The students said they are the only ones in their family who access ICT. Their father, mother and siblings have never visited the RKC.

A summary of the Saherkhali RKC ICT Usage report covering September 2006 to April 2008 is presented below:

RKC Service	Number of Males	Number of Females	Total Number of Users	Average Number of Users per month
Computer Training	44 (86.3%)	7 (13.7%)	51 (100%)	2 to 3 persons
Computer Printing	41 (48.2%)	44 (51.8%)	85 (100%)	3 to 4 persons
Government Form Downloading	50 (82.0%)	11 (18.0%)	61 (100%)	2 to 3 persons
Document Lamination	42 (57.5%)	31 (42.5%)	73 (100%)	3 to 4 persons
Mobile Calls	163 (33.5%)	323 (66.5%)	486 (100%)	22 to 23 persons

Of the village's 4,250 families, the RKC has made inroads with 15 to 20 percent of the total population. Village residents have started integrating ICT in their everyday communication system. As shown in the table, the most popular services availed by the villagers are mobile calls, followed by computer printing, document lamination, downloading government forms and computer training. Government forms downloaded and laminated include land records (dalil), land taxes record, certificates, widow card, marriage registration, birth certificates, income documents and so forth. As of May 2009, more than 70 persons had received computer training. The report reveals that it is men who overwhelmingly avail of computer training and downloading government forms. Women, on the other hand, use the RKC mobile phone services more than men do. This may reflect the different roles of men and women at the village level. As men are considered the breadwinners, computer training is seen as necessary for improving employment opportunities. In the same way, men take responsibility for handling with government affairs, thus they download government forms more frequently than women. Women mostly stay in the village and do not possess own mobile phones. Hence, women visit the RKC to call their husbands, brothers and/or sons at work. Since most families are poor and can only afford one mobile phone, it is used by the breadwinner.

Participation in Governance

According to BNNRC Chief Executive Officer Rahman, "RKC can be used to enhance participatory governance, since information about some government sectors are available. RKC also provides information on the benefits of voting and wider participation in the activities of government." For this reason, opinion leaders in Saherkhali RKC access information in the RKC to improve the quality of participation in governance. Opinion leaders explained that an open and independent governance system prevails in their village. They attend union parishad meetings every Sunday to discuss problems faced by the locals and government projects in their locality. Opinion leaders have no familiarity with e-governance and are only clear on local and participatory governance. Students, on the

other hand, did not feel the need to participate in governance because they do not have access to parishad meetings. They believe it is up to their fathers and grandfathers to participate in governance. The students were also unfamiliar with e-governance.

However the RKC offers easy access to government information, such as the aforementioned examination results and 59 government forms. In addition, the RKC had been involved in preparing voters' lists and took part in the National Identity Card program organized by the Bangladesh Election Commission. However these activities are simply availing government services and thus fall short of being described as participation in public affairs.

Conclusion and Recommendations

The following points may be concluded from the case study. Firstly, opinion leaders and students in rural areas have started to integrate ICT at the RKC as part of the community-based communication system. Key informants regularly utilized new media alongside informal, formal and other mediated communication networks. ICT is primarily utilized for gathering information and entertainment. Secondly, opinion leaders have utilized ICT to acquire knowledge on topics such as agriculture, health, economics, politics, women and children. These opinion leaders use the new knowledge to make more informed decisions at the local government level. Clearly, the knowledge acquired through ICT has enhanced the quality of participation in local governance.

Be this as it may, there remains the need for further contributions on new media in knowledge acquisition and participatory governance. Based on its findings, this study recommends that the RKC organize a seminar aimed at improving the understanding of e-governance. Key informants were unaware of ICT's potential to contribute to better district and national governance. They were vague about the steps the Bangladeshi government has taken to promote e-governance. Secondly, it is recommended that the RKC or village leaders formally organize the youth to give them a public voice and remove the feeling of powerlessness when it comes to public affairs. Third, although opinion leaders used ICT for knowledge acquisition, the scope of usage was highly limited. Therefore the RKC should devise plans to improve opinion leaders' access to web resources. The RKC may choose to guide opinion leaders to avoid directionless web browsing and opinion leaders may likewise receive training on computer literacy.

Fourth, further research should be undertaken to investigate how ICT complements other community-based communication channels, such as informal, formal and mediated networks. This will provide a comprehensive picture on knowledge management at the community level. It may also be worthwhile to consider the role of gender at the village level and how it affects ICT usage, which would complement the Saherkhali RKC report. Finally, as this study focused on ICT 's role in knowledge acquisition, there remains a need to analyze how ICT facilitates other aspects of knowledge management at the village level. In the case study presented, most key informants did not have email accounts or engage in chatting – a means by which ICT enables information sharing. However as key informants leave downloads on the RKC computer, the information may be accessed by other users. This is a particularly innovative way of sharing information among villagers.

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e-Krishok: A Campaign to Promote Online Agricultural Information and Services

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Abstract

This paper reviews the outcomes of a campaign that provided farmers with ICT-based information and advisory services. The e-Krishok campaign was led by the Bangladesh Institute of ICT in Development and it facilitated the role of local telecenter networks in improving the incomes and living standards of farmers in Bangladesh. The campaign is now in the final phase - replicating the pilot - so this paper focuses on the scale-up strategies that were based on lessons learnt during the pilot phase, as well as the achievements of the replication phase. It will also examine whether e-Krishok can become a viable and sustainable project that will benefit Bangladesh's farmers. It will provide a comprehensive account of the campaign so that practitioners engaged in similar initiatives can draw on the experiences of BIID.

1. Introduction

A. Background and Rationale of the e-Krishok Campaign

In recent times, private sector initiatives have provided substantial developments in widening access to ICT in rural communities. It is beyond dispute that farmers' limited access to online information and services results in productivity constraints and makes them more vulnerable to crop related diseases. Existing government information and services for agriculture include the Sub-Assistant Agricultural Officers (SAAOs) and field workers from the Department of Agriculture Extension (DAE). However the capacity to spread knowledge among farmers is limited. Farmers are unable to reach the SAAOs in a timely manner for advice on agricultural issues.

Bangladesh Institute of ICT in Development (BIID) supports a local cellular network operator's telecenter network in more than 500 locations across the country. It aims to reach farmers using ICT centres to provide agricultural information and advisory services. BIID identified the need for online (mainly through www.ruralinfobd.com) agricultural information and advisory services to be made available at the rural telecenters it supports. Promotional tools were used to motivate rural communities, including farmers and students, to use the information and services in telecenters. However the endeavour proved inadequate in reaching farmers. A major obstacle to farmers visiting telecenters is a traditional mind-set. Farmers prefer to seek advice from more experienced farmers or GoB's extension workers and SAAOs. Even if farmers are aware of a local ICT centre, they are mostly unable to comprehend its benefits and thus feel hesitant about approaching telecenters for advice on agricultural problems.   A more engaging and interactive campaign that specifically focused on the benefits of telecenters for farmers was needed. The e- Krishok campaign therefore evolved as a strategy to promote agricultural information and services available at telecenters.

2. Strategic Approach

B. Vision, Mission, Strategies and Implementation Process

1) The vision
e-Krishok envisions that farmers' incomes and livelihoods will improve with better agricultural knowledge (information + know-how) and innovation. The e-Krishok network links farmers to one another and provides resources and services designed to boost agricultural productivity and profitability.

2) Its Mission
Its mission is to empower farmers through participatory, self-managed networks that are facilitated by telecenter operators and market intermediaries. By sharing and utilizing information, increased productivity and improved livelihoods will result.

3) The Core Strategy
Key Strategies of the campaign:

• Targeting service delivery to benefit a critical mass of e-Krishok member farmers and mobilizing beneficiaries to promote telecenter services to farming communities.
• A local field investigator, known as a Brand Promoter, will act as an interface between the telecenter and farmers for information exchange, service trial creation and beneficiary identification.

4) e-Krishok Sevice Delivery Model
BIID developed a service delivery model with rural farmers in mind. BIID understands that farmers are largely unfamiliar with ICT technology such as the internet and computers. Therefore, it set up a service delivery mechanism which does not require farmers to come face to face with the technology.   BIID trained the owners and/or operators of rural telecenters to use the content available in Bangla on the e-Krishok website. Local farmers are encouraged to visit telecenters by the Brand Promoters (BP) of e-Krishok. BPs are members of the local community and are well known and trusted by farmers to act as the human interface between the farmers and the telecenter. The BP is entrusted to mobilize farmers to attend local meetings that highlight the benefits of e-Krishok. When farmers face problems with crops, they can visit the telecenter and inform the owner/operator. The owner/operator then browses for a solution on the e-Krishok website; or, if the solution is not available online, details of the problem can be emailed to agricultural specialists, who reply to queries on a daily basis. Thus, a solution may be found within 24 hours, which

convinces farmers to return to e-Krishok with their problems in the future. The process is shown in the diagram below:
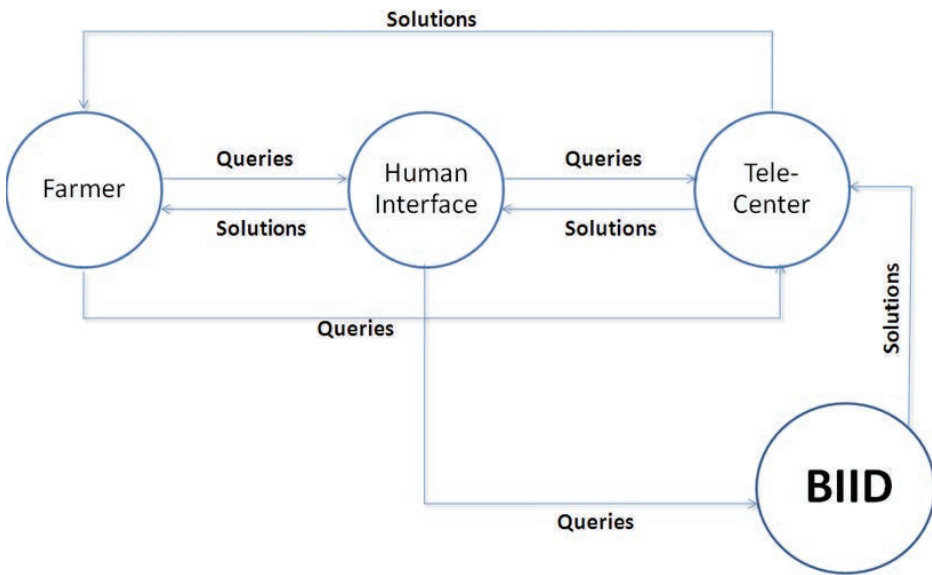

Figure 1: *e-Krishok Process*

5) Implementation Process

After jointly compiling a preliminary list of 20 locations with GP, 10 locations were selected for the pilot. The selection criteria included:

• Predominance of agriculture in the local economy
• Performance of the centre
• Entrepreneurs' dynamism and acceptance within local community
• Level of willingness on the part of lead farmers, local leaders, local government and other market intermediaries, such as input suppliers and NGOs working with farmers.

Provided the pilot is successful, the campaign will be replicated throughout rural Bangladesh. Once the pilot phase is complete, implementing organizations will decide whether or not to replicate the pilot.
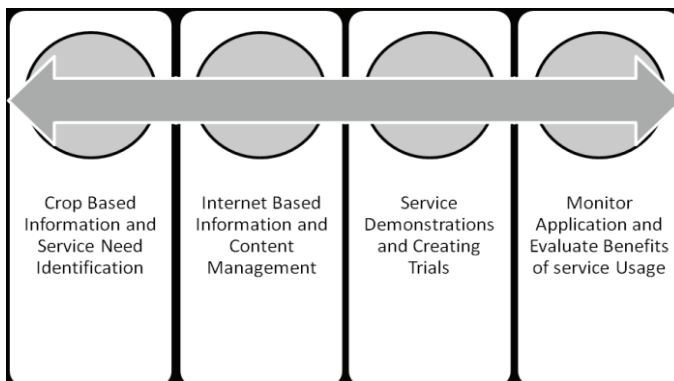The pilot was implemented according to a four-step process in 10 telecenter locations.

Figure 2: *Stages in Implementation*

3. Activities and Key Milestones of the Pilot Phase

The campaign was launched in October 2008 as a pilot in 10 telecenter locations. The major milestones of the campaign are as follows:

- In August – September 2008, 12 telecenter locations were examined to understand local settings and farming related issues. Finally, 10 locations were selected for the pilot phase of the campaign.
- In October 2008, Brand Promoters (BPs) were recruited following a daylong orientation program.
- During November 2008, the e-Krishok campaign was formally launched.
- In December 2008, e-Krishok groups were formed, briefed and given e-Krishok member IDs.
- During December 2008, a crop calendar identifying farming problems was created through a series of courtyard meetings facilitated by BPs, an activation agency and BIID team.
- In January 2009, problem verification through courtyard meetings was facilitated by BIID agriculturists.
- In January 2009, problem specific information and advisory services to members was introduced.
- In January 2009, online video conferences were held between e-Krishok members and agriculture experts stationed in Dhaka.
- During February – March 2009, the trial of services for members using telecenters continued.
- During April 2009, the farmers that benefited from the information and advice from telecenters were identified.

4. Key Achievements of the Pilot Phase

The piloting phase was completed by the beginning of May; after which an assessment was made regarding the benefits realized by network farmers, the number of farmers reached and the queries generated, as well as any secondary benefits. The following table summarizes the major achievements and outcomes of the pilot campaign, according to a list of pre-selected indicators.

Table1: *Summery of Outcome Based on Key Indicators*

Indicators	Value (in numbers)
Farmers reached (direct + indirect) through the campaign	2500
Registered Members (Direct reach)	756
Total # of queries of farmers handled by TELECENTERs in 10 locations (Trial of Services)	~550
No of farmers that reported to have benefited by applying information / advice of telecenters (Beneficiaries)	~150

Source: Project Document of BIID, May 2009

5. Replication and Scaling up of e-Krishok Campaign

e-Krishok was designed to bring the benefits of ICT to farmers in rural Bangladesh. By using ICT, farmers will be able to solve problems affecting their livelihood, decreasing their incomes and hence holding back their development. e-Krishok has attempted to demonstrate the main benefits of ICT based information and advisory services to farmers by promptly providing them with solutions to their problems. However changing the mindset of rural farmers is difficult; because the stakes are so high, farmers are resistant to change. Farmers are used to depending on the few people around them that they know and trust. They are weary of the unfamiliar, because a bad harvest could spell disaster for a farmer.

Given these barriers, the achievements of the pilot phase of e-Krishok are significant. It was possible to demonstrate a clear financial benefit to farmers who were willing to come forward and use the service. This achievement convinced the implementing organizations to replicate the pilot in more than 100 locations throughout Bangladesh.

During the replication phase, the core strategy and implementation process remained the same, however the lessons learned from the piloting process were also incorporated.

6. Lessons Learnt from the Pilot Phase

The most important lesson learnt during the pilot concerned earning the trust of farmers, so that they were motivated to seek the services of a telecenter or any other ICT based service delivery platform. Although the pilot took place in 10 locations, it was more successful in five locations, namely - Baira, Manikganj; Kapasia, Gazipur; Chowgacha, Jessore; Parbotipur, Dinajpur and Kanaighat, Sylhet. The factors that contributed to better outcomes in these locations were: a) Entrepreneurs were motivated and participated whole-heartedly in reaching farmers effectively and b) BPs successfully formed connections with farmers.

The pilot phase enabled BIID to identify four major areas for greater focus. Recommendations were formulated for the replication of the campaign:

1) Service development

Service development will mainly focus on forging links between telecenters and suppliers with the buyers of farmers' produce. An e-commerce web-portal is already under construction to enhance farmers' access to markets. Furthermore, services other than those directly related to farming will be introduced following consultations with farmers.

2) Capacity Building

A structured approach will be used to build the capacity of telecenter entrepreneurs and BPs. For entrepreneurs, the key areas will include content sourcing, interacting with and mobilizing the e-Krishok network and reporting to BIID. BPs will be trained to upgrade their skills for identifying problems, information management and reporting - and most importantly, for motivating farmers to visit telecenters. This will mean that farmers are no longer dependent on BPs to convey information from the centres.

3) Field Coordination and Monitoring

The level of field coordination that BIID required for only 10 locations clearly indicates that the replication phase will require a decentralized provision for field coordination. BIID plans to employ a regional coordinator for a group comprising 20 locations.

4) Collaboration with DAE's extension workers

In light of the campaign's long-term vision to induce behavioural changes in farmers, BIID underscored the need for involving GoB's extension workers (SAAOs) in the process of making telecenters a credible and familiar source of agricultural information.

7. Activities and Key Milestones of the Replication Phase

The replication phase began in November 2009. The major milestones of the replication phase are as follows:

- In October 2009, work began to identify 100 locations where the campaign would be replicated.
- In October 2009, Field Supervisors were recruited and oriented to push the campaign at the field level.
- In November 2009, BPs for 100 locations were recruited and appointed for a period of 3 months. They attended a day-long orientation programme for training and an awareness of their responsibilities.

- In November 2009, e-Krishok formally began the replication phase.
- In December 2009, the first of a series of review meetings were held to assess the campaign's performance in 100 locations. These meetings addressed the concerns of entrepreneurs and BPs and also highlighted the need for improved performance.
- In January 2010, the second round of review meetings were held.
- In February 2010, the campaign came to an end, and the process of identifying beneficiaries began.

8. Key Achievements of the Replication Phase

Although the replication process is ongoing, the process of identifying its benefits for farmers has already begun. The following table provides a summary of the achievements and outcomes of the replication phase to date.

Table2: *Summery of Outcome Based on Key Indicators*

Indicators	Value (in numbers)
Farmers reached (direct + indirect) through the campaign	14228
Registered Members (Direct reach)	12668
Total # of queries of farmers handled by TELECENTERs in 100 locations (Trial of Services)	6793
No of farmers that reported to have benefited by applying information / advice of telecenters (Beneficiaries)	2178

Source: Project Document of BIID, February 2010

Although the major lessons of the campaign were learnt during the pilot phase, two additional lessons emerged during the replication phase. They are as follows:

1) The Need for Clear Branding of e-Krishok

Most of the telecenters are situated in local bazaars, which are usually crowed and also served by other telecenters. In order to make the distinction between telecenters with e-Krishok information and other generic telecenters clear to farmers, e-Krishok telecenters need to incorporate the e-Krishok brand.

2) Reducing over-dependence on human resources

In order for the campaign to succeed, there must be a local interface - the BP. The BP is supervised by field supervisors to ensure maximum performance, but in the long run, this is is unsustainable. The campaign must reduce the dependence on current levels of human resources. Ultimately, only the entrepreneur will interact with the farmer face-to-face.

10. Taking e-Krishok Nationwide

The success of the replication phase indicates that e-Krishok is a viable ICT based intervention that is capable of bringing tangible change to farmers in rural Bangladesh. This would be a breakthrough in the ICT for Development (ICT4D) sector in Bangladesh. BIID will spread the campaign to all 64 districts: it is BIID's intention to reach every single village. To achieve its goal, BIID has developed the following strategies:

- Forge partnerships with private sector agri-businesses with the aim of promoting e-Krishok. These agri-businesses are more deeply penetrated into the rural agricultural market; hence there is scope to work together with mutual aims.
- Private sector extension workers will demonstrate the benefits of e-Krishok from the partner agri-businesses.
- Work with the public sector to provide additional services in telecenters, such as the Fertilizer Recommendation Software.

- Spread awareness of e-Krishok through the mass media. The campaign has been dependent on face-to-face contact with farmers, but this bottleneck can be removed by promoting e-Krishok in rural areas through the mass media.

These strategies will enable BIID to spread the e-Krishok campaign nationwide. These strategies were devised while keeping in mind the need for sustainability. By creating a model involving multi-sector partners, BIID has the correct strategic balance to take e-Krishok nationwide.

10. Taking e-Krishok Nationwide

BIID has opted to pursue the e-Krishok campaign's long-term vision of sustaining the benefits of ICT to farmers. BIID envisions the campaign's telecenter networks becoming a permanent mechanism for farmers to utilise. The process of transformation is depicted in the diagram below.

Figure 3: *Process of e-Krishok Transformation*
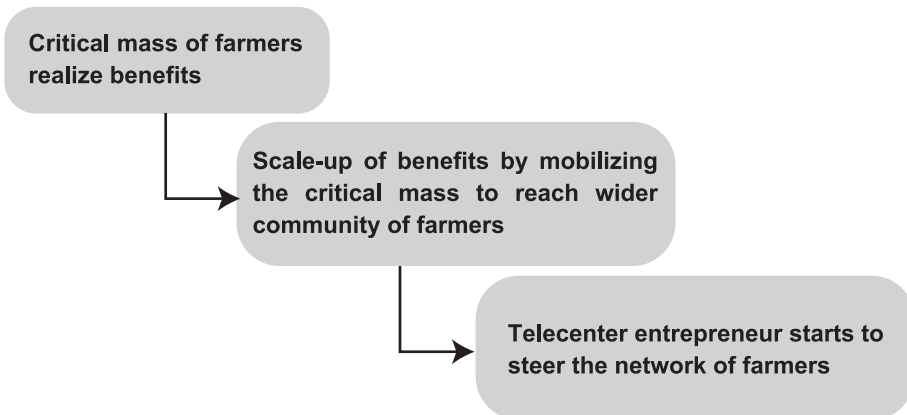
Existing mechanisms require BPs to play a major role in maintaining regular contact with farmers. However once farmers recognize the telecenters as an access point for online information and services, BPs will become obsolete. Telecenter entrepreneurs can create constructive relationships with farmers' networks by fostering leadership and creating a self-managing, interactive network that promotes various services.

e-Krishok is first and foremost a campaign seeking to provide information and advisory services to farmers through ICT. However in order to increase widespread familiarity with ICT, an adjustment in the mindset of farmers is necessary. This will not happen overnight - it may be a generational change. However the e-Krishok campaign has made it clear that online services can significantly benefit farmers in rural Bangladesh. ICT can improve livelihoods, increase income and widen opportunities in rural Bangladesh, thereby bringing about a positive development in overall socio-economic conditions.

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