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Mobile for Development (M4D) to Create Customer Wealth

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Abstract:

Mobile for development (M4D) is a well documented field of study. At the aggregate level the impact of adoption of mobile phone based services is analyzed comprehensively but at an individual level it is not well documented. If we consider the user as a customer of mobile based services, impact of adoption of mobile phone based services in creation of wealth for this customer has not been researched. In this paper we define the constructs of customer wealth and develop the conceptual model linking intention to use and customer wealth.

1. Introduction

The advent of the internet was conceived as the means to close the global digital divide between the developing and developed nations. The promise was not delivered because of the characteristics of the developing nations such as the high cost of computing infrastructure, cost of maintenance and up gradation of personal computer (PC) based computer system and the failure of equipment on account of the hot and humid climate without support of uninterrupted electricity and air conditioning. Advent of mobile phone technology changed all that. Mobile telephony offered end users a more affordable alternative. Digital mobile telephony had advanced data transmission capability and features such as short messaging service etc. and improved voice quality. In a short span of time mobile telephony became a worldwide consumer market.

In November 2014, out of the total 964.20 million subscribers of telephone services in India, there were 937.06 million numbers of mobile service subscribers and an average rural tele-density of over 45.13 as compared to 141.75 for the urban areas. Promotion of economic benefits has been a major concern in diffusion of mobile adoption, particularly in the BOP segment. There are relatively very few studies in this areas. The International Finance Corporation (IFC) describes the base of the economic pyramid as a huge and rapidly growing low income market across the developing world. It has defined Bottom of Pyramid (BOP) as that segment which has income below US \$ 3 in their local purchasing power. IFC estimates that there are more than 4 billion people in this segment or around 72% of the world population in around 110 countries. For the BOP segment, benefits accruing to the adopters of technological innovation can be measured in terms of increase of their wealth. It has been researched that in developing countries a 10 per cent higher penetration of mobile would increase the GDP by 0.59 per cent (Waverman 2005).

2. Mobile for Development as a Field of Study

Jonathan Donner introduced the concept of mobile for development. This has been carried further by others over years and is relevant even today. The premise is that innovative Information and Communication Technology for Development (ICT4D) projects benefit BOP consumers. de Silva and Ratnadiwakara (2008) and Aker (2008) have shown how adoption of mobile telephone based innovation reduces information search costs leading to lower transaction costs and thereby increasing the personal income of the consumer. A customer's value measures would be increase in personal income, reduction of transaction costs and the recognition that he gets while using the innovated product. Some of the significant studies are presented in Table 1.

Field of Study	Applications	Country	Authors
Health	Telemedicine, Patient Monitoring, neonatal, health call centres	MDNet in Ghana	Chen et.al. 2014
Fishery	Alerts, Market price, vessels' trajectories and catch records	Japan	Saville et.al.2015
Banking	Merchant payment, service request, funds transfer	M Pesa - Kenya	Inagaki. 2013
Agricultural Extension Services	Soil analysis, weather forecast, mandi rates, Market access	mKrishi, Reuters Light, Kisan Sansar	Sinha and Sinha. 2007

Table 1: Mobile for Development: Important Studies

Source: Compiled by Authors

The use of mHealth to deal with primary health care facility and for an emergency situation is well documented. Digital divide is reflected here as well. A similar project has been undertaken in Pakistan. Aga Khan foundation has undertaken the task to increase communication and collaboration between health centers in the northern areas of Pakistan and urban centers.

Use of mobile telephones and its associated benefits to the fishermen community has been covered by (Reuben 2007). Kerala's fishers saw their welfare increase through the use of mobile phones but lack of financial services can inhibit the realization of the new options that wireless telephony allow.

M Pesa in Kenya has been an example of financial inclusion (Inagaki, 2013). In India, (Ranganathan and Kapoor, 2014) have described how Abhishek Sinha and his brother Abhinav Sinha created a software application that enables migrant workers from cities across the country to transfer money to their families. It is a mobile based service. Mobile penetration in India has created a new opportunity for agricultural extension services (AES) to be offered through mobile device to a large BOP population.

2.1. Adoption of AES over Mobile

There has been an increase in number of telephone subscribers in India and other developing countries and most of the people in the bottom of the pyramid use a simple mobile device primarily to stay connected through telecom link. It has been seen that most of the mobile services operators provide different applications to the agricultural sector through SMS. Some of the key application areas include commodity pricing, weather related information, concurrent update on crop, better market access and access to mobile financial platforms (World Bank Staff, 2012). When we make an attempt to map in economic and social change in rural India in relation to the mobile phone penetration, many interesting applications have emerged. Agropedia, Aqua mini (Bahuman and Kirthi, 2007), mKrishi (Mittal and Mehar, 2012), Reuters Market Light (RML) (Fafchamps and Minten, 2012) and IFFCO Kisan Sanchar (Awasthi, 2008) are some of these innovative solutions. Agropedia is an online platform developed by the Indian Institute of Technology Kanpur (IITK), which serves as a one stop hub for information on the agriculture ecosystem. The wiki style platform provides, among other things, a space for stakeholder interaction, best practice sharing, news updates, and an online library certified by the Indian Council of Agricultural Research (ICAR). Agropedia has also collaborated with Krishi Vigyan Kendra, a training and education center for farmer and rural entrepreneurs, to develop Voice Krishi Vigyan Kendra (vKVK), a mobile-based advisory system that sends SMS and voice-based messages to field officers and farmers around the country. Voice Krishi Vigyan Kendra is a unique web and cell phone based multimodal agricultural advisory system. vKVK makes use of the existing vast extension network of Krishi Vigyan Kendras (KVKs) in the country and allows the extension officers to send SMSs and voice based agro advisories in local dialect to the farmer's mobile phone. Reuters Market Light (RML) is a mobile based agricultural information services platform which sends SMSs to farmers who chose to subscribe to its services via a toll free number. Farmers get SMS updates not only regarding market conditions, but also vital information regarding crops and everything related. Right from pre sowing to post harvest. Updates are delivered in 8 local languages and users have reported a 5 – 10% increase in income levels after using this service. Since its inception in 2007 in the state of Maharashtra, RML has either directly or indirectly reached out to more than 50 lakh farmers in 13 states.

These projects become a source of knowledge and information transfer for farmers from agriculture extension functionaries and markets through mobile ICT platforms. The understanding and adoption by farmers is based on their literacy status. Even if they are providing in local language of local content through text mode, the literacy challenged farmer is facing the real hurdle to utilise the opportunity for his/her benefit.

Another useful study falls in the domain of traditional adoption models and theories such as the Technology Acceptance Model (TAM). The purpose of TAM is to provide an explanation toward the acceptance of technology which explains user's behaviour on accepting new information technology, and analyzes the factors that influence their attitude toward using new information technology. TAM further suggests that two beliefs, perceived usefulness and perceived ease of use are instrumental in explaining the variance in the intention of users. Perceived usefulness is defined as the extent to which a person believes that using a particular system will enhance his or her job performance, and perceived ease of use is defined as the extent to which a person believes that using a particular system will be free of effort. Among the beliefs, perceived ease of use is hypothesized to be a predictor of perceived usefulness. Information system researchers have investigated and replicated TAM, and agreed that it is valid in predicting an individual's acceptance of various corporate IT.

It has been found that substantial literature is available on adoption of Agricultural Extension services (AES) over a mobile. The notable study would be the impact of adoption of product innovation. If we consider an individual to be a customer, a query crops does adoption lead to creation of customer wealth.

3. Customer Wealth

Wealth creation is in the form of career advancement or part time sources of income (Eden and Ackerman 1998). Wealth bears a strong relationship with well being and ill being (Heady 2004). Veblen (1922) elaborated on the idea that in modern Western societies, individuals strive for higher relative wealth in order to satisfy their need for social status. Wealth inequality is measured by Gini Coefficient. Corneo and Jeanne (1999) assume that an individual's status utility depends on the beliefs of the public about his wealth rank, which is not publicly observable.

Wealth is measured by household income, assets and debts. Wealth directly generates income (Wooden 2005). Income adds to the wealth. There is a correlation between income uncertainty and wealth (Chyi 2007). The propensity to take risks also results in creation of wealth. Low income farmers who take the risk of innovating with seeds, fertilisers tend to have better land yield. These farmers work on survival algorithm and not profit maximization (Weeks 1970). Size of wealth component is estimated from income flows (Wooden 2005). Higher education leads to accumulation of higher wealth. Wealth is also dependent on the region. Schwartz Value

Inventory categorizes 56 human values into 10 value types (Schwartz 1994). One such value is power which is dependent on wealth. So it may be inferred that wealth leads to power. In their survey in Australia, (Headey & Wooden 2004) measured wealth at the household level and attributed it to individual and not a household.

Men do not desire to be rich but richer than others said John Stuart Mill. It is true any for society even today and at all levels of society. Prahalad, Quinn, Markides, Matheson and Liefer all agree that innovation is the primary source of wealth creation. Wealth can be defined as an explicitly stated concern with or interest in pursuing money, material possessions, profit and finances (Cheng and Fleischmann et al 2012). Wealth helps individual cope when income falls (Wooden 2005). It has been observed that over a period of time, mobile adoption leads to lower transaction costs while increasing the number of customers, both leading to higher personal income and finally increasing his wealth.

Based on the various researchers studied, it can be said that customer wealth comprises of well being, perceived economic well being, risk propensity and conspicuous consumption.

3.1. Well Being

Well being is a multidimensional utility, a function of own income and average income in a locality (Luttmer 2005). Own income has a positive coefficient while average income has a negative coefficient. Well being can be either perceived well being or perceived economic well being. Perceived well being scale has been based on perceived well being index developed by Deakin University. Perceived economic well being scale has been developed by Hayhoe (1990). The Personal Wellbeing Index was created from the Comprehensive Quality of Life Scale (ComQol).

3.2. Perceived Economic Well Being

Perceived economic well-being refers to judgments of one's economic situation in light of what is required and desired. Past research identified a variety of predictors of an individual's perceived economic well-being. Those predictors include objective information, such as income and marital status, as well as perceptual information such as personal values and social comparisons. (Hayhoe,1990) found the comparison of one's financial situation to that of friends and other people in the same geographic location to be a significant predictor of perceived economic well-being. The latent Construct for measuring PEWB are level of income, money for necessities and handling financial emergencies, amount that one owes, his level of saving, having money for future needs and economic & financial security.

The concept of well being should be distinguished from perceived economic well being. Economic position forms part of well being by providing monetary resources at the command of the BOP unit. The personal desire to decrease risk leads to adoption of innovation as a hedge against income; it also provides the BOP customer with a potentially more viable economic base. Such interconnections between the adoption of innovation and BOP customer should be kept in mind in attempts to better approximate criteria for perceived economic decision making by BOP customers. The physical wealth is part of well being.

3.3. Risk Propensity

People differ considerably in their attitude towards risks, ranging from cautiousness to risk-seeking and even pleasure in risk-taking. Risk attitudes are multi-dimensional. Individual risk orientations are not necessarily consistent across domains, and the motivations for accepting risks vary considerably, depending on the type of hazard (Rohrmann 2005).

3.4. Conspicuous Consumption

According to Bourdieu (1984), people draw on three different types of resources (economic, social and cultural capital) to compete for status, referred to as symbolic capital (Holt, 1998). Conspicuous consumption is a deliberate engagement in symbolic and visible purchase, possession and usage of products and services imbued with scarce economic and cultural capital with the motivation to communicate a distinctive self-image to others (Himadri et al 2011). In conspicuous consumption tendencies of consumers attach more importance to use the product publicly.

Construct	Items
Customer Wealth	Well Being
	Conspicuous Consumption
	Risk Propensity
	Perceived Economic Well Being

Table 2: Proposed Customer Wealth Constructs

Innovation is dependent on the relative advantage, compatibility, complexity, trialability and observability by the BOP segment. It is felt that product innovation which generates customer wealth is dependent on adoption of new product innovation. Adaptability of products depends on the perceived ease of use, perceived usefulness, behaviour intention, social influence and attitude of the individual and environment. A study is required to model innovation in the context of adaptability that creates some customer wealth.

4. Research Methodology

Based on the hypothesized model developed through a detailed review of the related literature on well being, perceived economic well being and conspicuous consumption, a 25 item questionnaire was devised as a measurement scale for the research. It began with the 25 item CW instrument structured on 5 point likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Content validation of the questionnaire was done through two experts each from academia and agricultural scientist. A total of 250 questionnaires were distributed. Stratified sampling method was used to collect the data. Upon obtaining permission from participants they were asked to volunteer their participation in collecting data using a survey instrument. Surveys were handed out to only those participants who consented to participate voluntarily. 213 of these responses were valid. The valid response rate was 85.2%.

4.1. Data Collection Methods

This study emphasized only on a homogeneous group of Bottom of the Pyramid (BOP) segment who would be the users of mobile agricultural extension services. The type of research design was descriptive in nature wherein a survey method was followed with the purpose of collecting and analyzing data. At the first stage, the identification of variables was done based on literature review. At the second stage, the study was carried out following the descriptive research design to test relative significance of each of the factors affecting customer wealth of users of low cost innovative products in India.

5. Data Analysis

We performed an exploratory factor analysis with Varimax rotation for data we obtained. The responses resulted in 4 factors with eigenvalues greater than 1, accounting for 79.29% of the total variance, respectively. 21 items loaded cleanly on the expected factors, without significant cross-loadings, while 4 items who had a loading of less than 0.7 were removed in a step wise manner.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.663
Bartlett's Test of Sphericity	Approx. Chi-Square	2.497E3
	df	190
	Sig.	.000

Table 3: KMO and Bartlett's test

The KMO value is 0.663 which means that the sample size is acceptable.

Rotated Component Matrix ^a							
	Component						
	1	2	3	4	5	6	7
V24	.867	.025	.018	-.113	-.091	.144	-.119
V22	.850	-.181	-.024	.078	-.055	.131	-.183
V23	.826	-.136	.069	.065	-.058	-.291	-.056
V20	.773	-.017	-.012	.155	-.131	.348	.013
V21	.701	.079	.188	-.098	-.257	-.136	.375
V12	-.060	.823	-.028	.115	-.001	-.092	.006
V8	-.058	.730	.244	.196	.102	.186	.306
V7	.063	.719	-.008	-.087	-.007	-.566	.067
V11	.012	.691	.157	.223	.516	-.018	-.074
V13	-.440	.643	.019	.231	-.212	.117	-.069
V16	.120	.029	.823	.001	.085	.204	.220
V17	-.014	.069	.781	.119	.345	.007	-.065
V14	.031	.213	.766	-.066	-.415	.107	.028
V5	.169	.372	-.503	-.170	-.469	.234	-.044
V10	.126	.237	.006	.829	.033	-.257	-.120
V9	.028	.243	.045	.805	.230	.055	.273
V19	.537	.059	-.118	-.539	.292	-.013	-.013
V2	-.294	.118	.109	.032	.820	.048	.195
V18	.216	-.021	.379	-.310	.001	.767	.021
V3	-.130	.070	.101	.081	.136	.003	.902

Table 4: Rotated Component Matrix

Factors obtained after factor analysis

Factor 1 Well Being	20	I have money for necessities as I save due to use of mobile apps
	21	Using wise mobile applications, I can handle financial emergencies
	22	I owe less amount of money to my creditors after mobile apps adoption
	23	I have savings due to use of mobile apps
	24	With use of mobile applications, I have money for future needs
Factor 2 Consumption	19	Due to possession of a mobile, compared to other people of (my/ our) generation and background (I/we) have been lucky in (my/our) financial affairs.
	7	My Mobile says something to people around me when I buy a high priced brand.
	8	I buy mobile because I want to show others that I am wealthy.
	11	I would buy a mobile just because it has status.
	12	I am interested in new mobile which gives me status
Factor 3 Risk Propensity	13	I would pay more for a mobile if it had status.
	14	I take recreational risks because I possess mobile applications (speed driving, mountaineering, gliding)
	16	I take financial risks because of mobile applications (credit worthiness)
	17	I take safety risks because of mobile applications (late night, emergency)

Table 5: Factors

6. Discussion on Results

Little research has connected intention to use to customer wealth. This research seeks to refine our knowledge of intention to use influences by creation of customer wealth with low cost innovative products like mobile agricultural extension services. A reliable and valid measurement of customer wealth or change facilitator style needs to be utilized in order to understand intention to use low cost innovation.

Results of this study validate the notion that customer wealth is an interplay of several factors. In the study conducted it has been found that perceived economic well-being, consumption and risk propensity create customer wealth. For providing customer wealth one should take an incorporated view of the situation and work on multi cleft strategies. These strategies for creation of customer wealth may be intended in light of following interpretation made in this research:

6.1. Limitations of this Study

Besides, we have only studied one mobile agricultural extension services, while there are currently other technologies such as the internet based or WhatsApp based extension services. Studying all of them would allow us to establish a generalization of intention to use low cost adoption towards the customer wealth.

The results in this study should be interpreted with caution. The sample in this study may not be representative of the population targeted for adoption of low cost innovative products.

6.2. Conclusion

The wealth of the vulnerable sections of society like the farmers in the BOP segments is measured by their perceived economic well being, consumption and risk propensity. This wealth also called as customer wealth increases when they adopt a new mobile for development application. This is not similar to household wealth which is a measure of property or income alone. Perceived economic well being and conspicuous consumption are the constructs of customer wealth. The proposed model in figure 1 fits for further study.

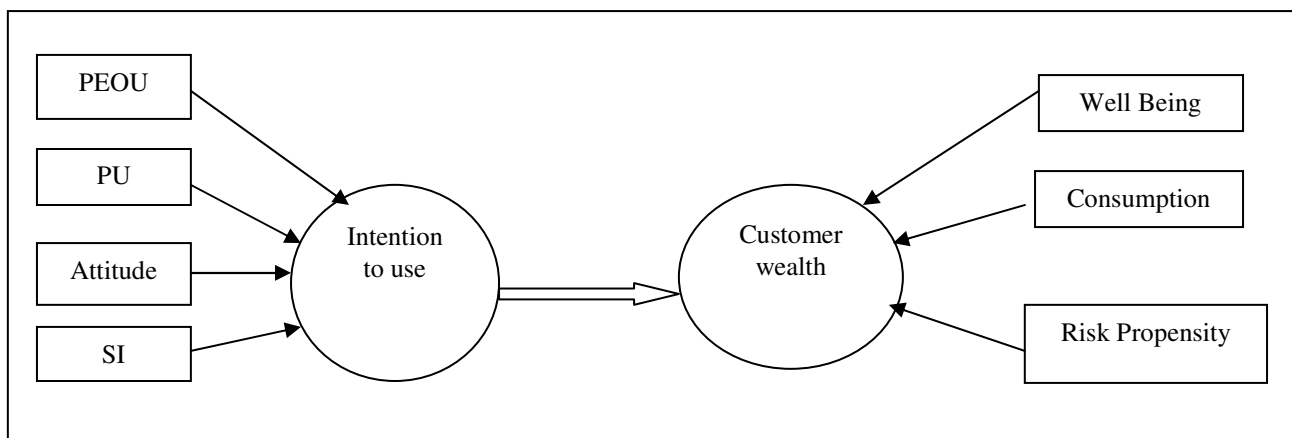


Figure 1: Product Adoption

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