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**A Market Separations Perspective to Analyze the Role of ICT in Development at the
Bottom of the Pyramid**

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Research in Progress Paper

Abstract

The “Bottom of the Pyramid” “BOP” defined to include people sustaining on less than US \$2 a day is believed to consist of over four billion people. A principal problem facing BOP consumers is lack of access to essential goods and services, due to unavailability (Prahalad 2005) and/or non-affordability. Similarly, BOP producers find it difficult to identify, connect with, and market their products to, potential customers. This research in progress paper examines the research question: How can Information and Communication Technologies (ICT) facilitate market development at the “Bottom of the Pyramid” (BOP)? Combining concepts from the theory of Market Separations and the Automate-Informate-Transform classification of Information Systems (IS) roles, from the marketing and IS literatures respectively, we develop propositions describing how ICT can reduce particular types of market separations between consumers and producers at the BOP, and thus facilitate market development at the BOP. Our study uses qualitative primary data (interviews with 32 respondents in India) and secondary data. Ongoing analysis indicates that consumers and producers in markets at the BOP are indeed separated from one another due to four types of market separations-spatial, temporal, financial and informational. Application of ICT can reduce these four separations to facilitate exchange and consumption for BOP individuals. Expected contributions and implications are discussed.

1. INTRODUCTION

The “Bottom of the Pyramid” (BOP), defined to include people sustaining on less than US \$2 a day (Prahalad and Hammond 2002) is believed to consist of over four billion people, living primarily in Asia, Africa and South America (Hammond et al, 2007).). A principal problem facing BOP *consumers* is lack of access to essential goods and services, due to unavailability (Prahalad 2005) and/or non-affordability (Karnani 2007). Similarly, BOP *producers* find it difficult to identify, connect with, and market their products to, potential customers (Karnani 2007). Traditionally, these problems have been tackled through poverty-alleviation and developmental assistance programs from government and private organizations (e.g. Walsh et al, 2005). However, emerging ideas (e.g., Prahalad and Hammond 2002; Viswanathan et. al., 2008;

Vishwanathan et. al., 2010) suggest that market development at the BOP can be an important mechanism for addressing them. Markets at the BOP are those that include consumers and/or producers that belong to BOP communities. Well-functioning markets at the BOP are those for which market exchanges between producers and consumers take place efficiently (Huang and Rozelle, 1998). They are important for at least two reasons. First, to enable BOP consumers and producers to connect with the larger mainstream economy and have access, respectively, to its sellers and buyers. Second, to facilitate market exchanges between BOP consumers and producers, generating local economic activity.

Even though markets at the BOP are important, it is difficult to develop them, for a number of reasons. These include - remote location of BOP communities making physical distribution of goods costly (Vachani and Smith 2008); BOP individuals having low and uncertain incomes; and the presence of “informal” local markets having exploitative intermediaries with asymmetrical information access (Prahalad and Hammond, 2002). Therefore, BOP consumers and producers are separated from marketers and customers respectively, through physical distance, lack of financial ability, and information asymmetry. Given these separations, market development becomes a critical challenge.

Our research question is thus the following: How can Information and Communication Technologies (ICT) facilitate market development at the BOP? We examine this question through a conceptual lens that combines the theory of Market Separations in the marketing literature (Bartels 1968) with the Automate-Informate-Transform classification of ICT roles (e.g. Armstrong and Sambamurthy 1999; Weill 1992) in the Information Systems (IS) literature. The

separations perspective describes barriers in the flow of goods and information that hinder market exchanges through four kinds of “disconnections” or severances - *Spatial* (geographical distance between producers and consumers), *Temporal* (time difference between production and consumption), *Informational* (informational asymmetry between producers and consumers) and *Financial* (lack of consumers’ purchasing power when they want to buy). The primary role of marketing is to reduce or remove these separations. ICT can improve processes through the *Automate* roles, facilitate product and information-related matching and aggregation for buyers and sellers through the *Informate* role, and enable intra- and inter- organizational process innovation through the *Transform* role. We develop propositions describing how the application of these three ICT roles can reduce or bridge the four types of separations between BOP consumers (producers) and marketers (customers), to facilitate market development at the BOP.

We adopt a qualitative methodology to substantiate our propositions. We conduct interviews with 32 respondents in India, including BOP individuals, social entrepreneurs, policy influencers, and managers from an organization that has successfully developed food grain markets at the BOP. We also draw from secondary examples in scholarly and practitioner literature.

2. LITERATURE REVIEW

2.1. Theory of Market Separations

Bartels’ theory of market separations (Bartels, 1968) describes four kinds of separations between producers and consumers. *Spatial separation* signifies geographical distances between producers and consumers. *Temporal separation* characterizes time difference between

production and consumption. *Informational separation* describes informational asymmetry between producers and consumers relating to products, demand and other market conditions, whereby one side has more information than the other. *Financial separation* is lack of consumers' financial ability to purchase, when they have a willingness to purchase and fulfill their consumption needs. An important function of marketing is to reduce or remove these separations, thus facilitating exchange and consumption. The nature of marketing activities would therefore, "depend upon the character of the market separations found in the particular social environment" (Bartels 1968). We draw from these perspectives to argue that markets can be developed at the BOP if these four separations are reduced.

2.2. Roles of ICT

Research on how ICT can shape and facilitate information processing and transactions among entities (i.e. individuals, departments and organizations) has conceptualized three roles of ICT—automate, informate, and transform (e.g. Zuboff 1988; Armstrong and Sambamurthy 1999; Weill 1992). The *automate* role looks at computerizing structured and high-volume information processing activities, with a view to increasing their speed and accuracy, and reducing their cost. The *informate* role provides reporting and analysis-based organizational information to facilitate control, co-ordination and decision support. The *transform* role looks at fundamentally changing processes and relationships within an organization or between organizations/entities, by facilitating new forms of information transfer. In this role ICT enable firms to restructure or change their capabilities, processes, and product or service delivery mechanisms. ICT therefore, substitute for human effort (automate), augment human decision-making (informate) and restructure human tasks or processes (transform).

3. RESEARCH PROPOSITIONS

Based on the above discussions, we develop theoretical propositions for examining our research question, as shown in Figure 1. Specifically, we suggest that particular conditions at the BOP aggravate the four market separations, that the roles of ICT can mitigate the separations, and that reduction of these separations can lead to market development at the BOP, marked by increased consumption and exchange. We describe our propositions below.

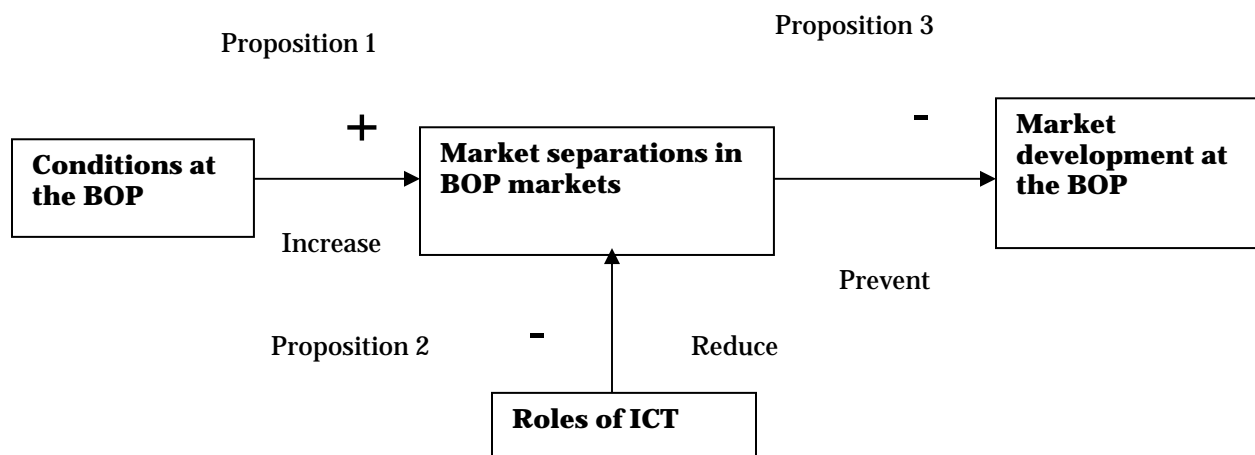


Figure 1: Research Propositions

3.1. Conditions at the BOP and Market Separations

The BOP is characterized by distinctive social and economic conditions, such as inadequate access to education, skills, finances and information (Hammond et al., 2007; Viswanathan and Rosa, 2007), which make BOP constituents economically vulnerable (Karnani, 2007, Narayan et al. 2000). Additionally, the market for their labor and services is unorganized and uncertain, making it further difficult for them to earn fair incomes and develop specialized skills (Banerjee and Duflo, 2007). With prolonged experience of such socio-economic conditions, BOP

individuals develop coping mechanisms, one of them being densely networked social and kinship communities (Viswanathan et. al., 2008, Ruth and Hsiung, 2007) that are not accessible to relatively more mainstream marketers. These socio-economic conditions make BOP markets, “geographically fragmented with weak infrastructure, which makes it hard to exploit scale economies” (Karnani, 2007), implying that as consumers, individuals at the BOP lack access to essential goods and services, because they are unavailable or unaffordable. Based on these arguments, we posit:

Proposition 1-Socio-economic conditions at the BOP lead to market separations at the BOP.

3.2. ICT and Market Separations at the BOP

The four market separations represent difficulties in connecting consumers and producers. The three roles of ICT describe ways in which information-processing can increase the speed and accuracy of tasks (automate), facilitate more effective decision-making (informate), and substitute information flow for physical flow of materials (transform) (e.g. Armstrong and Sambamurthy 1999). By speeding up workflows and decision-making, there is scope for shrinking the time between different activities relating to production and consumption at the BOP. By making available information about products and customers, it is possible to address the lack of information that BOP producers and consumers may have, about the other side. By substituting information flow for physical flow it is possible to reduce physical product movement across inaccessible and remote areas where BOP communities are often found to reside. We thus posit:

Proposition 2: The roles of ICT can reduce the four market separations at the BOP.

3.3. Market Separations and Market Development at the BOP

BOP markets are characterized by poor infrastructure, information asymmetries and weak institutions (Viswanathan et al., 2009), hence are poorly developed. BOP individuals are geographically dispersed and often live in physically inaccessible places having poor transportation facilities (Vachani and Smith, 2008). Such spatial separation can be bridged by localizing product/service development and sourcing indigenous technologies and resources to create goods and services. Temporal separation implies that production and consumption of goods and services are separated in time. It is relevant for BOP producers who live in rural areas, particularly farmers living on subsistence farming (Yunus, 2007) and producing perishable and seasonal commodities such as food grains and other agricultural produce. Informational separation happens because BOP consumers and producers have asymmetrical knowledge of products/services and market conditions, given their low levels of literacy and lack of access to broad-based information sources. Financial separation implies that buyers of goods and services do not possess adequate purchasing power at the time that they have the willingness or need to buy. Reducing each of these separations facilitates greater spatial, temporal and informational proximity between consumers/ producers at the BOP and marketers/buyers within or outside BOP and thus leads to increased exchange in BOP markets. Thus, reducing the four market separations is an effective way of developing these markets.

Therefore we posit:

Proposition 3: Reduction in market separations at the BOP leads to market development at the BOP.

4. METHODOLOGY

We adopted a positivist, qualitative research design (e.g. Yin 2003). Our initial research propositions were framed a-priori, using theoretical bases from (1) roles of IT and (2) market separations. We then examined each proposition in detail in a grounded (Strauss and Corbin 1998) and emergent fashion, for which we gathered data from primary and secondary sources as explained below.

We collected interview data from 32 individuals from India to understand whether and how each of our propositions was valid. These included 16 BOP consumers (having professions such as those of a carpenter, housemaid, contract laborer, rickshaw puller) and 11 BOP producers (e.g. vegetable and fish seller, cycle repairer, roadside eatery stall owner) The BOP interviewees had a daily income of US \$2 and with education levels less than 10th grade. These classification criteria are consistent with literature (e.g. Prahalad and Hammond 2002), and with those included in the United Nations Human Development Index that suggests income and education to be important factors indicating poverty. We also interviewed 4 social entrepreneurs and policy influencers in the context of BOP activities in India, and a senior corporate manager associated with E-Choupal, an ICT-based initiative of the Indian Tobacco Company (ITC), for grain procurement from Indian farmers.

The questions, based on the theoretical background presented earlier in this paper, were framed to understand *how* and *why* - (1) BOP producers and consumers experienced the four separations, (2) use of ICT (primarily the Internet and mobile phones) reduced them, and (2) such reductions

facilitated exchange and consumption for them. Interviews, lasting between 15 and 60 minutes, were audio-recorded, transcribed and coded. Axial coding (Strauss and Corbin 1998) was done to identify data that reflected our three initial propositions. Open coding was used within the axial codes to identify the emergent themes that characterized our detailed examination of each proposition.

Additionally, we reviewed examples from the IS, management and marketing literatures, for social and economic initiatives targeted at rural populations in general, and BOP communities in particular. The following journals were included: *IT for Development*, *Journal of IT*, *Electronic Journal of IS in Developing Countries*, *IT and People*, *MIS Quarterly*, *Information Systems Research*, *Sloan Management Review*, *Harvard Business Review*, *California Management Review*, *Journal of Marketing*, *Journal of Public Policy & Marketing*. Keywords for articles selected included *ICT for social/economic development*, *e-government*, *ICT at bottom of pyramid*. In particular, we examined the case of E-Choupal from the perspective of separations reduction, drawing material from our interviews and a number of papers and reports (e.g., Annamalai and Rao 2003). E-Choupal has two major components: (1) about 124 computerized centers through which ITC procures and stores food grains from farmers, and (2) about 6500 Internet kiosks in 35000 villages through which ITC communicates information on its procurement prices, prices from international commodity exchanges, weather, fertilizers, and farming technologies and techniques to farmers.

5. PRELIMINARY FINDINGS

Our preliminary analysis of primary and secondary data has yielded insights substantiating our research propositions. Findings so far show *how* (1) specific conditions at the BOP can aggravate each of the four separations (Proposition 1), (2) each of the three roles of ICT can reduce or bridge these separations (Proposition 2), and (3) reduction of separations leads to market development (Proposition 3). We describe some of these findings below.

5.1. Proposition 1: Socio-Economic Factors and Market Separations at the BOP

We find that socio-economic factors lead to market separations for BOP individuals. We provide representative illustrations below.

We find, for instance that *low literacy* at the BOP lead to **informational separation**. Low levels of literacy prevent BOP consumers and producers from being able to use print and electronic media to get information about products, and potential customers respectively. A household maid, mentioned, “*I have heard that the Internet gives a lot of information. However, I have never used computers, since I have studied only till Class 4 (4th grade). I don’t read newspapers or magazines either*”. Even when individuals at the BOP can access communication media, it is through one-way communication by non-BOP marketers to communicate their messages, as mentioned by a social entrepreneur. “*Communication is top-down or one-way [communication flow] from the corporate marketers to the BOP consumer. It should be two way [where the BOP producer should be able to communicate to non-BOP buyers despite low literacy levels].*”

We find that *low skill levels* lead to **financial separation**. Most of our BOP respondents had low skills as a result of which they were engaged in poorly paid, jobs such as those of daily wage earners or household help, which resulted in financial separation. As one household maid mentioned, “*When I don’t have enough money to buy what we need, I wait till I can save enough. Sometimes that means going without medicine, if I am sick.*”

We find that *poor information access* can lead to **temporal separation**. For example, a housemaid, i.e. a BOP producer of housekeeping services, mentioned, “*the only way I come to know which household is in need of a housemaid is through my network of other housemaids. There is no organized way of knowing what positions are available, many times I don’t have full time work and my services go asking.*” That is, services by BOP service providers may be available, but there is not enough information to identify those who are ready to consume them at that time.

We find that *poor information access* also results in **spatial separation** because it leads to physically localized and restricted forms of exchange. When asked how far they traveled to make their purchases, many of our BOP interviewees responded with, “*I visit local shops, usually less than a mile or two away*”. When asked why they did not go further, they said that they knew only about the local shops. Additionally, we discovered that local shopkeepers gave them low interest or interest free credit, since they often did not have the cash to pay for their purchases, further preventing them from going beyond local markets.

5.2. Proposition 2: ICT and Market Separations at the BOP

We find that the three roles of ICT reduce the four market separations. For each separation, we provide examples we have analyzed so far, from primary and secondary data.

We find that the transform role reduces or bridges **spatial separation**, through the transform role, by means of whole or partial digitization of products that enables easily scalable distribution models that reach remote areas. Smart Communications, a telecommunication company in Philippines, developed a system for rural cell phone users to electronically operate their prepaid mobile phone accounts through a SIM card and text messages, instead of buying physical phone cards from retailers, often many miles away. Retailers used the SIM card to open, close or recharge accounts electronically, overcoming spatial separation from the BOP customer (Anderson 2006).

We find that ICT reduces **temporal separation** through the automate role, by helping reduce time lag between production and consumption. The automate role creates process efficiencies to reduce time lag between production of perishable dairy products by BOP producers, and their use by buyers. For E-Choupal, as mentioned by a regional head *“With manual scales and record keeping for grains, there was delay in weighing and transportation of the grains. With handheld devices for recording inventory and an ERP application for tracking it, our collection processes are faster and we can get the grain to the mills sooner.”*

We find that **financial separation** can be reduced or bridged by making products and services more affordable for BOP consumers. The transform role, through product digitization, enables

micro-packaging and consequent greater affordability of products. Electronic delivery of pre-paid mobile phone talk time (Andersen 2006) has enabled distribution of phone cards having small and affordable denominations, since the incremental cost of distributing electronic cards is zero. The informate role creates affordable public or community information-based services such as the “Tele-center”, that can be shared by an entire BOP community and are hence affordable. (Kiri and Menon, 2006). Instead of paying separately for different types of information, BOP members are charged an overall service fee.

We find that ICT can reduce or bridge **informational separation** by enabling access to information that is important to BOP consumers and producers, through the informate role. Rural farmers for instance benefit from information on agricultural products (fertilizers, grain commodities’ prices), farming practices, and the weather (Badiane and Shively 1998). Uganda MTN maintains a database of food grains and livestock, called Foodnet, which can be downloaded onto a cell-phone, based on SMS requests from farmers (Anderson 2006). Other information includes data on water, government schemes and weather, through the Tarahaat portal aimed at rural populations in India (Peterson 2001), and health information to pregnant women and new mothers, through an SMS-based mobile phone service (Grameen Bank).

5.3. Proposition 3: Market Separations and Market Development at the BOP

We find that ICT-enabled reduction/bridging of the four market separations results in development of markets through greater exchange and consumption, manifested in a number of

beneficial conditions for BOP individuals. That is, the presence of the separations prevents the presence of these conditions.

For example, BOP buyers have access to more goods and services. Rural tele-health initiatives, in reducing the spatial separation between healthcare providers and BOP individuals have enabled the latter to access healthcare diagnosis from hospitals in the bigger cities, as demonstrated by initiatives in Uganda and India (Govindrajan 2010). Reduction of financial separation makes it possible for BOP consumers to have access to simple financing mechanisms like credit cards, and reduction of information separation facilitates access to insurance (Kanungo 2003) and agricultural products. Further, BOP producers have greater access to buyers, for their goods and services. As part of the E-Choupal initiative for instance, information about the price that farmers would get for their grains is communicated through Internet kiosks in the villages. Such reduction of informational separation through digitized delivery of price information has enabled farmers to find appropriate buyers for their produce.

6. ONGOING DATA ANALYSIS, EXPECTED CONTRIBUTION AND RELEVANCE TO GOALS OF SIGDEV

We expect our ongoing data analysis to yield further detailed insights and illustrations regarding our research hypothesis. In particular we expect to understand how (1) each of the four roles of ICT reduces market separations, (2) what the outcomes of such reduction are, (3) which roles might be particularly important for a specific separation, and (4) interdependence between the separations. We hope to present these findings at the workshop.

The BOP, in spite of being a considerably large segment, has not been explicitly addressed in the literature on ICT-driven development. In particular, the relationship between ICT deployment and economic/social benefits implicates social and individual processes that are not theoretically well understood. Emerging commentary in the BOP context (e.g. Yunus 2007) calls for profit maximization accompanied by social welfare, referred to as “social business”, and potentially achieved by increasing opportunity for consumption as well as income generation. This paper focuses on the market separations perspective and strives to understand how reduction of market separations, can explain the relationship between ICT and positive social/economic outcomes at the BOP, thus theoretically advancing research in this area.

Literature on IS in developing countries provides three discourses, addressing respectively, (1) transfer and diffusion of IS knowledge from developed countries, (2) social embedded-ness of IS innovation in developing countries, and (3) the role of ICT in facilitating transformative socio-economic processes (Avgerou 2008). The first discourse looks at adaptation of IS research frameworks such as technology acceptance and IS implementation models to developing countries (e.g. Korpela et al., 2000; Jarvenpaa and Leidner, 1998). The second analyzes context specific and socially embedded factors influencing the design and use of IS innovations (e.g. rural healthcare systems) in developing countries (Braa et al 2004). The third examines the “developmental” potential of ICT, examining macro-level social and institutional changes that are implicated in the implementation of ICT in developing countries. Even though positive outcomes of decreasing the digital divide such as improved access to information (e.g. Kanungo 2003) and e-governance (Madon 2005) have been identified, there is dearth of theoretical

understanding within the third discourse, for understanding *how* ICT can lead to development (Avgerou 2008). Hence it is important to examine *particular courses of action* that can achieve social and economic changes through ICT. We expect our paper to address this call.

For practice we expect that marketers wishing to sell to consumers at the BOP can use our findings to identify separations that are key to their product, and direct relevant IS applications towards reducing them.

We thus believe that this research provides theoretical elaboration and extension in the under-researched domain of how ICT can lead to developmental outcomes at the BOP, and that our findings offer useful pointers for marketers and policy makers wishing to address the BOP, for focusing their ICT deployment.

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