THE FIRST LEARNING EXPERIENCE OF DESIGNING FOR THE BOP

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ABSTRACT:

The business world today is re-conceptualizing global poverty as an attractive opportunity for growth to firms who can simultaneously alleviate the problem of poverty. The so-called 'Base of the economic Pyramid (BoP)', consists of 4 billion people who live on an income of less than US$3 a day. To tap into these overlooked markets, companies and designers will need to reconfigure their business and product innovation models. The challenge is to create accessible and affordable products and service solutions while fitting the local economic and socio-cultural preferences without expanding current environmental resources. This paper describes the business experience of the Delft University of Technology (DUT) and other international companies in this new field of product and service design. A preliminary framework for Designing for the BoP will be proposed in this paper followed by a discussion of the short-term challenges faced in promoting design for BoP.

Keywords: Design for Sustainability, Base of the Pyramid, Emerging Markets

1. INTRODUCTION TO THE CONCEPT OF THE BASE OF THE PYRAMID (BOP)

1.1 BOP

Most companies, professional designers and design schools used to (or still) target only end-users in developed markets. This is a group of approximately 500 million people living at the top of the Economic Pyramid with an average purchasing power of more than US$ 10,000 per year (Rocchi 2006). Such practice, according to Prahalad and Hart (2002; 2005), have led companies and design professionals to underestimate the business potential and product innovation opportunities presented at the base of the economic pyramid, where many unsatisfied needs have made up a new market covering a vast majority of the world's remaining population.

According to the World Bank, 4 billion people live on an income of US$ 3 or less per day and more than 1 billion people live on less than US$1 a day around the globe. This part of the world population is nowadays often referred to as the "Base of the Pyramid" or 'BoP' in short (Prahalad and Hammon 2002; Prahalad and Hart 2002). 'Emerging markets', situated between the top and the base of the Economic Pyramid are also being recognized. The three layers of the Economic Pyramid is illustrated in Figure 1.
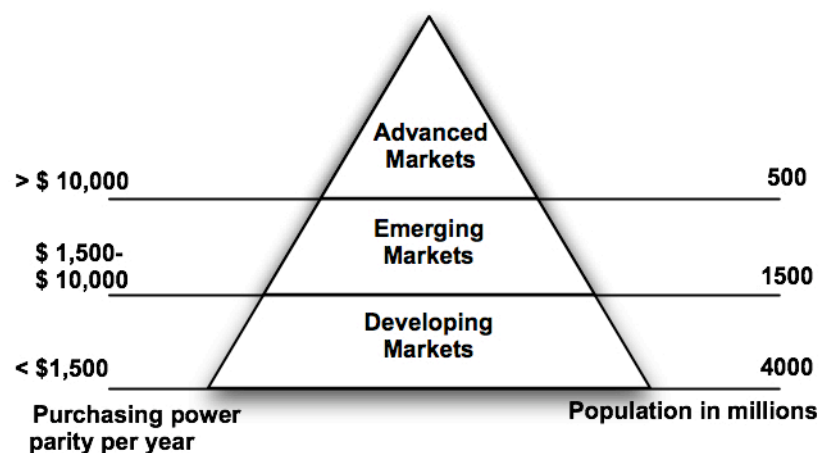

Figure 1: The three layers of the Economic Pyramid (London and Hart 2004; Rocchi 2006).

The business world today is re-conceptualizing global poverty as an attractive opportunity for growth to firms who can simultaneously alleviate the problem of poverty. Because the BoP represents a vast, unexploited marketplace, for companies who have been struggling with mature markets, floundering business models, and seriously questioning about who their future customers will be, these are important markets to explore. Their aim is to develop sustainable business that helps to provide, for example, better healthcare, living and education solutions for the world's poorest people while providing access to this potential market of 4 billion customers worldwide and thus, creating profitable business for the company (Kirchgeorg and Winn 2006).

But tapping into these overlooked markets will require companies to reconfigure their business assumptions, models, as well as their product innovation and design approaches. Multi National Corporations (MNCs) such as HP, Intel, Philips, Microsoft, Shell and Cemex are already investing human and financial resources to explore this novel field of new business and product development. The Delft University of Technology (DUT) and several other international universities like the Illinois Institute of Technology (IIT), Berkeley and Stanford are currently partnering with these MNCs (but also SMEs and NGO's) in order to build up a new knowledge base for 'Designing for the BOP'.

1.2. RURAL AND URBAN BOP'S

As discussed in section 1.1, a vast majority of the world population has been ignored for a long time in relation to product innovation and business opportunities. The few activities that took place were mainly coordinated by NGO's or (local) governments and focused on the rural areas which despite the fact that the main challenges for the coming decennia will be more evident in the Urban BoPs and relatively less in the Rural BoPs.

The global countryside has reached its maximum population and will begin to shrink after 2020. As a result, cities will virtually account for all future world population growth. Cities have absorbed nearly two-thirds of the global population explosion since 1950. The proportion of the world's urban population living in slums is projected to increase from 33% in 2003 to 45% in 2025. According to the United Nations, more than one billion people (i.e. 1/6 of the world population) are currently living in the slums of cities (Davis 2006). In many large cities, unplanned population growth, often informal settlements, has led to a crisis in living conditions as well as in the provision of social and health services. The urban poor face very different issues and livelihood choices in comparison to the rural poor. The rapid growth of cities caused by migration as well as natural population increase

driven by high fertility has outpaced governments' abilities to provide basic service (e.g. water supply, sanitation, drainage and solid waste disposal), (communication) infrastructure and economic opportunities.

Consequently the main part of our current 25 Product Innovation BoP projects at DUT are connected to healthcare, safe water access, ICT infrastructure, education and reliable renewable energy sources (Kandachar, Diehl et al. 2007).

1.3 AN EXAMPLE: WATER CHALLENGES IN THE BOP

As discussed in previous paragraphs, the challenges to improve the life quality of the world's poor people are numerous and diverse and vary depending on the context. Often these problems are interrelated. For example, a lack of access to water results in people spending many hours a day collecting water. This spending of time alternatively could be used for working (income generation) or going to school (education). In many cases, the water collected is polluted or contaminated due to improper handling or poor storage facilities which results in diseases. Diseases again reduce the time that people can work or use for activities. According to the Human Development Report 2006 (UNDP 2006):

- 1.700.000.000 people in the world lack access to clean water;

- 3.300.000.000 are without proper sanitation facilities;

- 2.200.000 people die from preventable water- and sanitation related diseases each year;

- Every day 600 children die.

The challenge for firms, professional designers as well as design schools is to breakthrough in this vicious circle. The question is 'How can companies and designers contribute to reduce these numbers?'. As an example, we would like to highlight one of the BoP water projects, which was executed by the Delft University of Technology (DUT) in collaboration with the firm Vestergaard Frandsen (VF).

1.4 A CASE STUDY: THE LIFESTRAW IN AFRICA FOR CHILDREN

The company Vestergaard Frandsen (VF) has developed a product named 'LifeStraw', which purifies surface water for personal use with filters (See Figure 2). A LifeStraw can clean up to 700 litters of water (the yearly consumption of an adult) and is relatively affordable (€2,5€).

Figure 2: (from left to right) The original LifeStraw, field test in Africa and the new concept LifeStraw Child

DUT in collaboration with VF investigated several aspects of the usability and implementation of the LifeStraw concept in practice in Africa, focused on children under the age of five. During the field research, it was observed that children younger than three years old could not handle the original LifeStraw by themselves. They did not understand how to suck the water and could not understand why there was no water coming to the mouth when sucking. Since small children are most vulnerable for waterborne diseases, it was decided that the design of the LifeStraw should be adjusted to cater the capabilities of children. The final proposal consists of an adjusted LifeStraw, named LifeStraw Child, a flexible bottle with a special mouthpiece (see Figure 2, picture on the right). The bottle has a one-way valve that lets air in but not out. Using a smaller LifeStraw makes the product smaller and easier for children to handle (Bottema 2006). The intensive context research and usability tests with real potential users in the African context are essential for coming to these findings.

2. DESIGNING PRODUCTS AND SERVICES FOR THE BOP

For a company or designer to be successful in emerging and developing markets, it would require far more efforts than making minor modifications to existing products. They will have to face the need of developing new business and product innovation practice that can establish a mutual value creation process between themselves and the local stakeholders. They must possess a clear understanding of

these new contexts, the issues and the opportunities related to the targeted areas (Simanis and Hart 2006). The challenge is to create accessible and affordable solutions while fitting the local economic and socio-cultural preferences without expanding current environmental resources (Rocchi 2006). The target of these companies is not only to alleviate the poverty of the people in BoP but also to improve the environment in which they live, where traditional utilities such as electricity, water, and gas are lacking and communications and transportation structures are poor. Since most BoP communities are ecologically fragile, new products and services will have to be highly eco-efficient (Sethia 2005).

2.1 HOW DO MNCS DESIGN PRODUCTS AND SERVICES FOR THE BOP?

In order to gain more insight in how Multinational Corporations (MNCs) develop products for the BoP, we carried out an explorative research with 7 Western and Asian MNCs. They are: Philips, VIA, Haier, Motorola, Intel, Microsoft, and BenQ. The learning purpose has been achieved by case interviews with MNC managers who are influential in the companies' emerging market strategies and product innovation processes.

Most MNCs consider front-end research (Design Brief Formulation) and product delivery (Product Launch) as the two most critical phases in developing products for the BoP market (See Table 1) (Chang 2006). Most challenges are derived from the unfamiliarity with the local context and the distinct infrastructure in emerging markets. Although MNCs have strong global resources and networks, a sustainable local enterprise network is necessary for them to interact with the local community. Non-governmental organizations (NGOs) play a vital role in the innovation process of several MNCs, especially when the latter intend to approach consumers at the Base of Pyramid. Our findings show that Western MNCs rely more heavily on NGO partnerships when compared to their Asian counterparts.

To succeed in the BoP market, the most important factor is the willingness to listen carefully to the local people and local stakeholders and understand what they need, not what product innovators think they need. In addition to sustainability benefits such as improvement to health and environment, there must be added value created in the products from which the benefits can be recognized by consumers at the BoP (Chang 2006).

Although business potential in emerging markets has become more explicit, it is still difficult to make predictions on sales revenue and return on investment (ROI) in these markets and such predictions cannot be as precise as those indicated in developed markets. Due to the new levels of affordability and limitations on infrastructure, it is essential to develop new business models where target consumers are probably not the end users but local governments, schools and entrepreneurs. The differences in product innovation process are summarized in Table 1.

Process	Differences in the Product Innovation Process
Strategy Formulation	Motivation on CSR, new business model creation, local and NGO partnerships, Greenfield opportunities, influence from government policy
Design Brief Formulation	Ethnographic research, NGO partnerships, local university collaboration, studying local life, living with the poor, listening carefully
Product Development	NGO partnerships, local university collaboration (on pilot testing)
Product Launch	NGO Partnerships (training, distribution, collect feedback), new channels, new business models, local ecosystem setup
Product Use	N/A

Table 1: Summary of the identified differences in the Product Innovation Process. The main differences are in the Design Brief Formulation and the Product Launch (Chang 2006).

Local context has relatively less impact on the actual product development process as most MNCs centralize their management on development and manufacturing resources. Therefore product design and development can still take place either locally or in other MNC product development base.

2.2 DUT FRAMEWORK FOR DESIGNING FOR THE BOP

So how can new business opportunities and product innovation in the BoP be combined with a long-term sustainable development for all stakeholders? Based upon the experience from our 25 BoP demonstration projects during the last five 5 years (Kandachar, Diehl et al. 2007), literature research

and our explorative research with MNCs, we would like to propose a new framework for 'Designing for the BoP'. This framework is a merge of the '4 Ps' of Design for Sustainability (D4S) and the '4 As' of developing successful business for the BoP (see Figure 3). The 4 Ps of Design for Sustainability stand for People (social aspects), Planet (environmental aspects), Profit (business aspects) and Product (Crul and Diehl 2006). All 4 Ps should be taken into careful consideration during the product development process in order to develop a sustainable product or service.

In addition, in order to develop successful products and services for the BoP, '4 As', namely Availability, Affordability, Acceptability and Awareness have proven to be essential for business success (Anderson 2006; Prahalad 2006):

- **Availability** – Addressing challenges in distribution. Unlike the developed world, distribution channels in BoP markets can be fragmented or non-existent.

- **Affordability** – Addressing low incomes. BoP consumers have low disposable incomes, and product may also need to match the cash flows of customers who frequently receive their income on a daily rather than weekly or monthly basis. The price of the new product and service should be reduced significantly – at least 80 percent of the cost of a comparable product or service in the West.

- **Awareness** – Addressing limited media access. Many BoP customers do not have access to conventional media. Building awareness and educating with the respect to the product will be another challenge for all the stakeholders.

- **Acceptability** – Responding to Socio-Cultural Dimensions. The innovation must result in a product or service of high quality. BoP customers will be not satisfied with 'simplified' or 'stripped' western products.

This merge of the '4 Ps' and the '4 As' results into the following framework for Designing for the Base of the Pyramid (BoP):
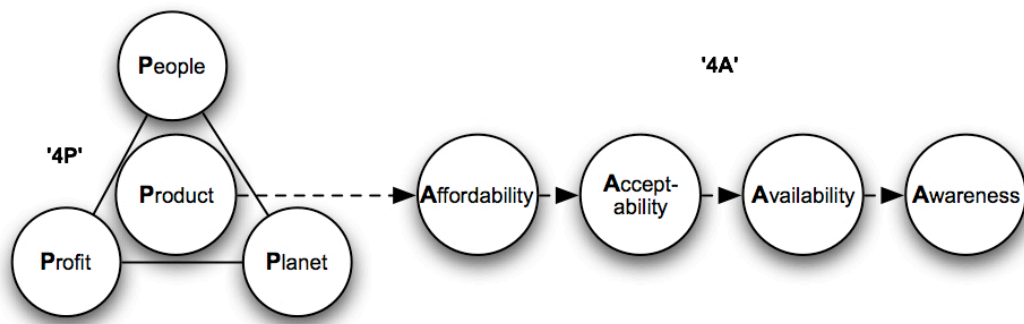
Figure 3: Framework for Designing for the Base of the Pyramid.

Currently this new framework is being applied in a new range of DUT BoP projects in emerging economies including Cambodia, India and West Africa.

3. HOW CAN DESIGNERS GAIN INSIGHT AND UNDERSTANDING OF THE BOP CONTEXT?

As concluded, creating products for emerging and developing markets require a clear understanding of the needs and the context of the people within. Because of this, it is apaprent that researchers and designers should engage with the local culture directly in order to understand the local people better. A unique set of design and business tools and practices adapted from social anthropology, ethnography and Participatory Rural Appraisal (PRA) for building what we call an MNC's "native capability" are being developed, used and evaluated (Hart 2004). New ways of 'contextual design' (Beyer and Holzblat 1998; Iacucci and Kuutti 2002) are also becoming more and more popular among product designers. Understanding people's needs and interactions with the materials, economic and socio-cultural world is a basic starting point for successful product innovation, especially in the BoP.

At present, various design tools (such as personas, cultural probes, scenarios and user profiles in context-of-use) are available to capture insights related to users' needs, aspirations and behaviours in their original contexts. (Leonard and Rayport 1997; Rodríguez, Diehl et al. 2006; Sanders, 2000). These new contexts and participatory techniques can introduce the end-user to the design process by co-design which helps to obtain more detailed information than the common focus groups or observational research methods (Gaver, Boucher et al. 2005)(Sanders, 2000). Many design context tools are already available, however, most of them have been applied in the developed markets only.

Currently we are testing and evaluating these kinds of context tools in the emerging and developing markets in practice (Rodriguez, Diehl et al. 2006; Rodrigues, Thompson et al. 2007). For example, in the Digital Inclusion project IntoContext, we tested a wide range of context research tools including shadowing, role play, probes, brainstorming, generative sessions as well as focus group in the local community to gain insights about the locals' interactions with ICT products in East Africa (Rodrigues, Thompson et al. 2007). For more information on the Microsoft Digital Inclusion project, please visit http://www.intocontext.org

4. CONCLUSION AND RECOMMENDATIONS

The Base of the Pyramid, where currently 4 billion people are living with a daily income of less than US$3 per day, has been overlooked so far. The recent upcoming interest of large and medium sized enterprises to explore these markets to alleviate poverty and other sustainability problems as well as to exploit new consumer markets, has posed a tough challenge for the design world. The challenge is to create accessible and affordable solutions while fitting the local economic and socio-cultural preferences without expanding current environmental resources. In order to achieve this aim, new design tools and methodologies for 'Designing for the BoP' will have to be developed and tested. Most of the challenges are derived from the unfamiliarity with the local context and the distinct infrastructure in emerging markets. Researchers and designers should engage with the local culture directly in order to better understand the people and their context.

Because of globalization and the upcoming importance of the BoP, design professionals as well as design schools should invest more in research and capacity building for 'Designing for the BoP'.

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