"For a company to be successful in emerging markets, it takes a lot more than just making minor modifications to existing products"

"Emerging markets are becoming the catalysts for new products and service innovation. But tapping the talent and growth potential of these rising economies will require manufacturers to shed many of their assumptions about customer needs, product design and innovation strategies that they have relied upon in the developed economies. Companies will need to look beyond traditional strategies in order to meet the needs of markets with significantly lower per capita GDP, while still leveraging the efficiency and expertise provided by their global networks"

G. Coleman, Chief Managing Director, Deloitte 2006

Unlocking new markets

Via sustainable innovation and design break-through
A few questions for investigation. *By Simona Rocchi*

Abstract

This paper addresses some thoughts on business innovation and design challenges related to growth and sustainable development in emerging and developing markets. In the framework of the current debate among academies, public entities, multinationals and non-governmental organizations, it does not pretend to provide an exhaustive explanation on theories and practices in this complex field. Rather, it aims to provide some background information to contextualize a few design research questions: questions that have to be addressed in order to understand how design and design instruments can support businesses - as well as governments and various other types of organization - in creating sustainable solutions in promising new markets.

About Philips Design

Philips Design is a global community of professionals, focused on delivering competitive value to its clients through design. It strives for innovation in both its design services and in the solutions it offers.
At its core is a multidisciplinary team of researchers and designers which, over the past ten years, has been addressing how design can best serve people's current and future value and needs. It continuously develops and experiments with the latest methods in design research.

PHILIPS

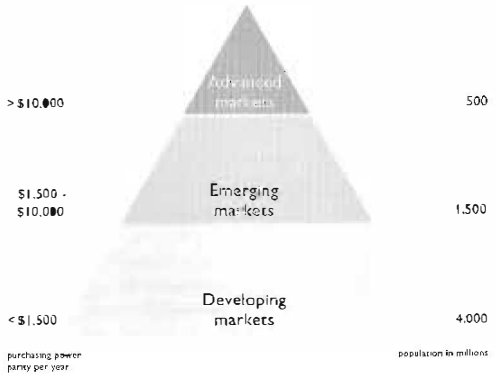

Fig. 1. The global economic pyramid. A representation of the global market based on three main average levels of purchasing power. (Source: Adaptation of a model presented by Stuart Hart, Professor of Management at Cornell University, during the second World Summit for Sustainable Development. Ledgusa - Business Day; Johannesburg, 2002)

Introduction: setting the border of investigation

Most companies target 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 USD 10,000 per year. However; according to Stuart Hart, Professor of Management at Cornell University, these companies underestimate the business potential at the base of the economic pyramid, where many unsatisfied needs make up a market covering the vast majority of the remaining world's population (Hart, 2002). In this context, the following distinction can be made between:

- Developing markets[1], representing the 4 billion people with an average purchasing power of less USD 1,500 per year;
- Emerging markets, which include 1.5 billion people relying on purchasing power of USD 1,500-10,000 per year.

Such a growth opportunity is theoretically present in all regions of the world, from Europe and the United States to Latin America and Asia Pacific. Indeed, gaps between satisfied and unsatisfied needs do not necessarily reflect geographical distinctions; since economic disparity, different level of market maturity and variations in life expectancy are found in varying degrees both in developed and less developed societies. However, in this paper, the focus is mainly on the BRICA countries: Brazil, Russia, India, China and some Asian nations like Indonesia and Vietnam. These are places where opportunities for sustainable growth and innovation seem more appealing in the short-medium term period, based on their Gross Domestic Product (GDP), and assuming that in the next five years their annual increase in dollar spending could be greater than that of the top 6 economies in the world (G6), and more than double its current level (Royal Philips Electronics, 2006).

[1] Developing markets are also known as 'Bottom of the Pyramid' or 'Base of the Pyramid' (BOP) markets

Importance of the theme and encouraging drivers

Today, companies with long-term economic ambitions have to continue being competitive in the saturated markets of developed societies, but also have to learn how to flourish in emerging and developing markets that represent the major growth opportunity for the coming years[2]. In order to build upon this opportunity, the learning process has to start now: understanding unlocking mechanisms and appropriate business and design practices in these unknown territories will require considerable effort before a clear and effective growth strategy can be defined. The challenge is the creation of accessible and affordable solutions able to fit local economic conditions and socio-cultural preferences, without expanding the current use of environmental resources. This challenge offers companies the chance to improve their current product portfolio, and even to create completely new value propositions by combining technological, social and business innovation.

A few drivers underpinning companies' interests in emerging and developing markets have been identified by the World Business Council for Sustainable Development (WBCSD), in one if its first publication on sustainable livelihoods business project (WBCSD, 2004). The main drivers reported in the publication can be summarized as follows:

Opportunity for growth and brand reputation

Potential for new revenue stream generation is certainly the most appealing reason to deal with emerging and developing markets. However, this opportunity offers also the chance to increase a company's brand reputation in the current markets, while establishing and further developing brand equity in other countries.

Framework conditions in many less developed countries are improving

The BRICA countries in particular are strengthening their governance, legal structures, and investment infrastructure. Even if progress is not yet uniform[3], there are signs of improvements in many countries: over the 10 years from 1993 to 2003, the average risk score in low- and middle-income countries improved by 8%. This progress expands the context in which business can profitably operate.

Communications are becoming faster and cheaper

Lower costs of Information Communication Technology (ICT) and transportation enable more geographically-distributed production. This allows companies to benefit from lower labor and material costs, and encourages them to relocate or intensify part of their activities in the BRICA countries.

[2] According to C.K. Prahalad, Professor of Business Administration at the University of Michigan Business School, opportunities of engaging India and China through innovative solutions already exist. He points out that the needs of people on very low incomes are currently relegated to relatively efficient informal economic systems where costs are vastly higher than in the developed markets of the world. Poverty persists, for instance, the cost of credit are also 50 times higher, the price of water 37 times higher, and telecom services 10 times higher than equivalent services in the USA (Prahalad, 2005).

[3] There are significant differences between the BRICA countries GDP per head gives an indication of the differences: Brazil $8,7k; Russia $10,7k; India $3,4k; China $6,2k; Indonesia $3,8k; Vietnam $1,8k (Royal Philips Electronics, 2006).

New and more competent partners are locally available

Today, many local suppliers and various stakeholders offer richer knowledge and know-how, driven by their need to become more self-sustaining, efficient and effective. Furthermore, many of them start to acknowledge that multinationals can help local players fulfill missions and scale-up promising opportunities for socio-economic development.

Aid and investments are beginning to create fertile market territories

A foreign direct investment (FDI) flow to less developed countries increased from $37 billion in 1990 to almost $240 billion in 2000. This increase, together with the profusion of micro-credit services, has contributed to debt relief, and is recognized as an engine for wealth creation and local economic development.

Public expectations and stakeholder pressure towards corporate responsibility:

Civil society increasingly expects companies to operate in an ethical way, both in developed and less developed markets. Business faces a growing pressure from society and various stakeholders to support equitable socio-economic development worldwide, in line with the Millennium Development Goals (MDGs)[4]. Business solutions targeting 'underserved' people are increasingly considered part of corporate social duties and their licenses to operate.

In this business landscape, Philips has started to consistently address the challenge of generating sustainability-driven business initiatives in new promising markets around the world since 2003. At that time, with the 'New Sustainable Business Initiative', the Board of Management launched an invitation to all the five Philips Product Divisions (Consumer Electronics, Domestic Appliances, Medical Systems, Lighting and Semiconductors) to encourage innovative business practices that foster new business models and the creation of appropriate solutions for 'unmet' people's needs (Royal Philips Electronics, 2003). Such practices were not intended as philanthropic actions. They were considered as true entrepreneurial activities aimed at creating both economic and social/environmental returns on investment, possibly with a different payback time on each dimension. Today, this invitation has become stronger in the light of the company's ambition to grow drastically: an ambition not reachable without also considering emerging and developing markets. In this respect, the Board of Management has increased its commitment on growth in the BRICA countries during the Philips Summit meeting held in New Delhi, in March 2006.

"Emerging markets are the place where virtually everything that you need for a company to grow is happening"

G. Kleisterlee, Philips CEO, 2006

"We believe continuous innovation is key to unlocking this potential... To support our vision we are reinventing our business from top to bottom and in the process transforming our industry too"

G. Kleisterlee, Philips CEO, 2006

[4] In September 2000, all 191 United Nations Members States pledged to meet eight socio-economic and environmental goals by the years 2015. The goals, stated in the Millennium Declaration, include: 1. Eradicate extreme poverty and hunger; 2. Achieve universal primary education; 3. Promote gender equality and empower women; 4. Reduce child mortality; 5. Improve maternal health; 6. Combat HIV/AIDS, malaria and other diseases; 7. Ensure environmental sustainability; 8. Develop a global partnership for development. (http://www.un.org/millenniumgoals/)

New ways of doing business for new markets

At Philips, the implementation of this commitment is still under experimentation. Like other multinationals, Philips has recognized that 'walking the talk' requires business innovation. However, the kind of business innovation necessary in emerging and developing markets is different to that normally adopted in developed markets (Hart, 2005). Purpose and practices tend to be different. In developed economies, many new product/service development processes are geared towards immediately maximizing the sale of these new offerings to increasingly sophisticated customers with a certain degree of purchasing power.

In emerging and developing economies, companies often aim to become operational in territories that represent the markets of the coming decades. Their goal is to develop business propositions that can gradually create market penetration and solid medium-/long-term revenue generation. This often requires supporting local socio-economic improvements in two ways: by enabling self-development and local communities' empowerment; and creating business propositions that can generate return on investment not only gradually but also on social/environmental level. With this in mind, companies face the need to develop new business practices capable of establishing a mutual value creation process between themselves and local stakeholders that have a deep understanding of the contexts, the issues and the opportunities related to the targeted areas (Simanis, Hart, Enk, et al., 2005).

More specifically, according to some findings of the World Business Council for Sustainable Development (WBCSD) in its first publication on 'Sustainable Livelihoods' business project, three basic blocks characterize the innovation process of successful business models in new promising markets: focus; partner and localize (WBCSD, 2004).

FOCUS on core competencies

Companies that concentrate on their key strengths are more likely to tackle an issue effectively and create a viable business. Keeping the focus helps guarantee consistency between the company core business and sustainable livelihood; it will be easier to scale-up pilot projects and move successful initiatives into the mainstream. It is advisable to involve R&D, and rethink existing products lines and services to suit the specific requirements of lower market segments.

PARTNER across sectors

By involving global and local businesses, governments and development organizations that share similar goals, companies can benefit from additional resources, on-the-ground expertise and links with potential customers. Thinking across sectors might lead to innovative partnerships involving companies from different industries and therefore different / complementary skills. addressing many different needs simultaneously, it is advisable to involve partners with a considerable understanding of the local market (and who might enjoy local political or community support) and involve them early in the process in order to use their input when shaping and contextualizing the offer. It is also important to define expectations and align objectives in order to increase co-operation and share eventual risks.

LOCALIZE the value creation

Companies operating in emerging and developing markets often lack the usual infrastructure / support systems available in more developed societies. In many cases there is also a lack of knowledge on people's needs, preferences and aspiration values; companies can miss for instance manufacturing capabilities or distribution channels; market intelligence and consumer insight information (understanding of the socio-cultural context). They therefore need to connect into local networks, which include the targeted communities, to tap into capabilities and human resources. It is advisable to maximize the involvement of local groups by considering how local entrepreneurs and SMEs can best contribute to value creation. Time and energy should also be devoted to development the capacity of local partners, in order to create a solid socio-economic basis for future market growth.

Fig. 2 The three building blocks of successful 'Sustainable Livelihoods' business
(Source: Doing business with the poor - a field guide, WBCSD, 2004)

These three major building blocks have been further articulated thanks some lessons gained during the maturing of practical business experiences under development (WBCSD, 2005; WBCSD, 2006; WRI, 2004). A few characteristics of new business practices start to emerge and to take shape.

Co-creation of value

In particular, developing/BOP markets practices - due to the complexity of the socio-economic systems of intervention - imply a collaborative effort between global and local players. These include public or private ventures, agreements with either for-profit or non-for-profit organizations (for instance local consultancy groups, Non-Governmental Organizations, universities) and local community involvement. Indeed, it is possible to provide new economically affordable, effective and sustainable solutions on a broad scale simply by combining global financial resources and know-how with local competencies on specific issues and opportunities.

'System thinking' versus 'product thinking'

If the needs of people in emerging and developing economies are to be met, it is not always sufficient to think in terms of single (stand-alone) products and their functionality. Total solutions - a flexible mix of tangible and intangible aspects - need to be envisioned to overcome the lack / weakness of infrastructure, appropriate distribution channels and maintenance services.

This implies the creation of a consortium of partners, all dedicated to solving problems by designing and developing flexible solutions, which can potentially grow over time through the addition of technologies, content and services.

Incubation and piloting phase

In exploring ways to realize solutions for emerging and developing markets, companies have discovered the importance of allocating initial 'seed' money to start pilot projects (using internal capital and often external funding) as well as of creating a motivated and multidisciplinary team (comprised of internal resources complemented by external capabilities) to take care of all necessary activities before the initiative is ramped up.

People, planet, profit approach

Practices for emerging and developing markets need to consider not only economic objectives but also socio-cultural and environmental aspects. Due to the dimension of the potential market demand in less developed regions of the world, and the consequent strain this places on natural resources, there is no alternative. New practices need to adopt a triple value approach by promoting economic prosperity while respecting the natural environment and the local socio-culture values. Social and environmental criteria therefore have to be introduced early in the new business creation process and related design strategies.

"Emerging and developing markets offer business opportunities for growth, value creation and for the development horizon of the world's poor by providing culturally-appropriate and ecologically-effective goods and services"

Benefits plan versus business plan

As an implication of long-term financial expectations and social and/or environmental return on investments, initiatives for emerging and developing markets require the elaboration of 'benefits plans' that contain information on business development, as well as potential social benefits and environmental advantages. This involves introducing social and environmental matrices that include the appropriate indicators for monitoring and measuring the sustainability of the initiatives over time.

Beyond traditional market segmentations

As developing/BOP markets especially relate to particular kinds of users - such as families, communities or even entire villages - conventional consumer investigation techniques, normally targeting single individuals, require additional investigation methods. Observations, ethnographic research and focus groups have proven to be key practices in this area, not only to obtain valuable information for new idea creation (understanding of people's needs, socio-cultural habits and infrastructural conditions), but also to establish trust with the identified potential customers and ensure their further involvement in the co-creation of the solution.

Use of non-conventional entrepreneurial forces

Business practices for emerging and developing markets often rely on 'non-conventional' players to establish the value network that has to be put in place to promote a new offer. Indeed, especially in rural areas, the lack of infrastructure, distribution and marketing channels has stimulated the creation of fresh entrepreneurial local forces, including community leaders and Self Help Groups (SHGs)[5], who are fundamentally important in implementing the business models.

Alternative payment mechanisms

In many cases, solutions for emerging and developing markets have to leverage on micro-credits schemes, 'sharing access models' and 'pay-per-use' mechanisms to be economically viable. In particular, pre-paid systems are crucial in facilitating access to services for users in developing/BOP markets. Indeed, by the adoption of pre-paid cards, customers do not need to present a formal address, which is normally required in any service contract.

[5] The Self Help Groups (SHGs) operating in emerging and developing markets are forms of microfinance activated by their members (mainly women). These groups collect savings from their members and provide loans to them. However, unlike most accumulating savings and credit associations (ASCAs) found in several countries, these groups also obtain loans from banks and re-lend them to their members. In India, for instance, by 2003, over 700,000 groups had obtained over US$125 million in loans from banks, benefiting more than 10 million people. The level of savings in these groups is estimated to be at least US$170 million (http://ideas.repec.org/p/wbk/wbrwps/3518.html).

A few business experiences: co-creation of sustainable value

Business experiences targeting emerging and developing markets are increasingly taking place around the world. These experiences, some of which are successful and some which aren't, propose context-specific solutions that either make use of current available technologies in new ways, or introduce new technologies by leapfrogging the most appropriate innovation.

Such solutions come from different sectors. A few pioneering ones include access to energy (Eskom-Shell 'Rural Electrification' program in South Africa, in 1991); clothes (Arvind Mills 'Ruf & Tuf' jeans in India, in 1993); telecommunication (Vodacom 'Community Phone Service Program' in South Africa, since 1994, and Grameen Telcom with 'Grameen village phones' in India, since 2001); clean water (WaterHealth International and 'Ultra-violet Waterworks' solutions in India, since 1996) and food (Unilever 'Iodized salt' in Ghana, since 2000). Other more recent solutions include also access to electronics solutions (Cable Net and 'TV cable interactive' in Colombia, in 2002); financial services for food and agribusiness (Rabobank 'Promoting farmers' co-operatives' in Indonesia, since 2003) and low-cost houses (Holcim 'House-for-Life' initiative in Sri Lanka, since 2005).

The business cases described below are running in the BRICA countries, particularly in India, in energy, electronics and medical systems sectors. They touch upon the main features of the business model used and of the promoted solutions, in terms of their product and service components.

Selco Solar Services

The Solar Electric Light Company (SELCO)[6] brings electric power to families, farmers, institutions, and local small businesses in India, Sri Lanka and Vietnam. Specializing in wireless solar electric power systems and related services (e.g. installation, maintenance training), SELCO has installed over 24,000 solar home systems (SHS) on a purely commercial basis, reaching rural and semi-urban customers with an average income of approximately $4 a day. Driving its business philosophy is the idea that poor families in less developed economies are willing to purchase SHSs (as long as they are reliable and affordable) via installment credits.

Providing credit finance to such customers is the company's biggest achievement. Usually, a family pays at least $75 as a down payment plus $10 to $15 a month for 2 or 3 years before owning the system (the bank retains ownership until the loan expires). To provide credit finance, SELCO works with numerous rural banking networks, agricultural societies and micro-credit institutions[7]. In India, for example, 435 rural banks provide consumer credit to SELCO customers. In Sri Lanka, the largest finance company offers loans for SHSs exclusively to SELCO customers. In addition, the World Bank and other financial institutions have instituted consumer finance mechanisms for the purchase of SHSs by off-grid rural households, mechanisms that SELCO also utilizes on behalf of its customers.

The company offer includes various packages of small SHSs:

- SHS with 2 lights and 20Wp module (very few);
- SHS with 4 lights and 35Wp module (very popular and affordable);
- SHS with 6 lights and 50Wp module and with 5 lights and 65Wp, sufficient power to operate a DC color TV (popular in Vietnam).

"Our Solar Home Systems carry the SELCO brand, which has come to mean quality, reliability and service. Without service, you don't have a business. When we launched SELCO, we decided that customer service would be our main product, not technology. The technology was there but not the service in rural areas"

[illegible]

SELCO builds most of its electronic components - which range from charge controllers to lamp fixtures and compact fluorescent lights - locally. Major PV manufacturers provide the modules and several carefully selected manufacturers supply deep-cycle batteries. Its core business is in the value of the service offered. Via the use of micro credits, and the provision of installation and maintenance services carried out by appropriately trained local people, SELCO has been able to enter the emerging market of off-grid rural and semi-urban households.

Today, the company has 35 branches (Solar Services Centers) operated by its three subsidiaries: SELCO-India, SELCO-Sri Lanka and SELCO-Vietnam. Considering there is an untapped worldwide household power market of over 400 million families, it is actively looking at new plans to franchise its delivery system and business model, in association with local partners in various countries.

Fig. 3. Delivery of a solar home system to a rural family in India. SELCO branch office (Sources: Solar Today magazine, March/April 2003, Selco Brochure 2004)

6 SELCO is the world's first solar service company with 285 employees, two international offices located in Bangalore, India, and San Francisco, California, and a solid rural power delivery infrastructure spread over three different regions.

7 Recovery rates in such situations are over 9[illegible]% and defaults are rare.

The HP 'Mobile Photo Studio'

The 'Mobile Photo Studio' is part of a broad spectrum of solutions and services developed at the Kuppam Hewlett Packard i-community centre[8], a community portal located in a rural province north of Bangalore, India. It makes a need for ID photos, necessary for a variety of government forms and applications (e.g. to gain access to healthcare services), by providing village entrepreneurs with a portable photography tool kit. This is appropriate because very few of the region's 300,000 inhabitants can afford a camera. Films and quality batteries are hard to find, and printing necessitates a time-consuming and expensive trip to the nearest city.

With the 'Mobile Photo Studio', HP has created a digital camera and printer, capable of producing quality digital photographs. It has a solar-powered rechargeable battery, and comes zipped up in a tough yet lightweight (7 kg) backpack. This solution has enabled local entrepreneurs to create a new business; delivering photos to people rather than people to a photographer. With a pricing scheme that allows dozens of local women to rent the equipment for $9 a month, the 'Mobile Photo Studio' provides immediate income for rural families. Since it is simple to operate and portable, the women can take their business to some of the region's least accessible communities, and villagers can buy high-quality ID photos for a fraction of the cost of traveling to a photographer in the city.

In the rural district of Kuppam, the 'Mobile Photo Studio' is often used for much more than ID photos. Residents are lining up for family portraits, and 'village photographer' services are in demand for wedding ceremonies, religious celebrations, news stories, and even insurance claims. Meanwhile, the skill and prestige of the women in the village photographer program is growing daily. HP is currently working with local entrepreneurs to explore business and revenue models that would maximize return on investments while adhering to community economic constraints. Able to purchase consumables at the market rate from HP, many of the entrepreneurs have reported doubling their monthly family income. The 'Mobile Photo Studio', is considered to be a 'win-win' situation, where both a multinational company and local entrepreneurial forces benefit.

Fig. 4 The HP 'Mobile Photo Studio'. A tool kit for the creation of high-resolution digital photography and printing services by local entrepreneurs in the Kuppam region of India. (Source: 'Eradicating Poverty through Profit' WRI conference, San Francisco 2004.)

Village Photographer program economics:

- Price of the complete kit: $500
- Kit rental: $9/month
- Price of a 4" x 6" photograph $0.70
- Price of an ID photo: $0.20
- Gross margin earned by the photographer: $0.22 per 4" x 6"
- Family monthly incomes of village photographers doubled on average from US$15 to US$30
- Currently 18 village photographers in Kuppam (initially only 2)

[8] In the Kuppam community HP has established a platform of web services and web-based applications to provide very low-income citizens with access to critical government, healthcare, education and agriculture information services.

"Technology can help drive sustainable solutions that bridge the divide between the privileged and less privileged sections of society and improve the quality of life at all levels. However, new value delivery models needs to be created to make this happen and this strategic partnership is a step in that direction."

K. Ramachandran, CEO, Philips India, 2005

Distance Healthcare Advancement (DISHA)

Distance Healthcare Advancement (DISHA) is one of the main Philips' pilot projects that foster new business models in promising markets. Carried out by Philips India with the support of a consortium of partners, DISHA aims to deliver high-quality, low-cost diagnostics to low-income rural communities that are not addressed by the existing healthcare system. The aim is to provide greater access to primary healthcare services for the approximately 275 million people in India who live on around $1,000 to $2,000 a year.

To reach its goal, DISHA uses a custom-built 'tele-clinical' van equipped with appropriate diagnostic devices and medicines. It combines Philips' capabilities, technologies and expertise with the knowledge and experience of various for-profit and non-profit governmental and non-governmental organizations active in the field of healthcare. In the partnership, Philips Medical Systems supplies appropriate diagnostic equipment to the tele-clinical van (x-rays, ultrasound, ECG devices etc.). Apollo Hospitals provide a male and female doctor and two paramedics for the van. The Indian Space Research Organization (ISRO) provides satellite connectivity from the tele-clinical van to the remote Apollo Hospital, while Electronics Corporation of India, another governmental organization, supplies the satellite dish. Active in social mobilization, micro finance and micro insurance, the Non-Governmental Organization Development of Human Action (DHAN) brings its knowledge of local communities to the project (to estimate the demand for various diagnostic services and to raise awareness of, and confidence in, this initiative).

Thanks to the optimization of the different tasks in the value network - and to the synchronization of the actions - the consortium can supply healthcare diagnostic services to 15,000 users a year. Diagnostic tests are conducted in the van itself and, if required, the specialist doctor at the referral hospital is consulted. All necessary patient information is transmitted via satellite. Video-conferencing is also available for the specialist to interact with the patient and the on-site doctor. An NGO pre-screening team visits villages to assess those most in need.

The on-site medical consultation is currently for free for users, who pay for dressings, medicines and specialist diagnostic services (average cost $1.80). In the second phase of the project, total care (including diagnostics, medicines, tele-consultation etc.) will cost an average of $6-7 per user, a substantially lower amount than is charged through the current private health system[9].

User benefits include broader access to specialized healthcare, faster reliable diagnosis and improved overall health provision. Lower-income families save money thanks to affordable local provision and reduced travel time - diagnostic facilities are now within easy walking distance, instead of being a considerable distance away. As a result, many say the cost of seeking specialist healthcare has

[9] Poor rural Indian households spend close to 12% of their income on healthcare, making the availability and affordability of quality healthcare a major personal issue. Nearly 28% of the population takes loans at interest rates of 60-120% per year to pay for either prolonged treatment or for hospitalization.

Fig 5. DISHA van providing health care services during a visit to rural communities. (Source: Philips DISHA pictures bank, 2005)

already halved. In addition, local women have traditionally had poorer healthcare, with the family breadwinner's health coming first. Through its low-cost provision, DISHA serves to help combat this inequity. Hospital consultants are now also able to use their time more efficiently, and pressure on existing rural primary health centers has been reduced (WBCSD, 2005).

The first pilot project was officially launched in July 2005, targeting the Theni district (Tamil Nadhu). Within six months a tele-clinical van performed 2500 diagnoses and image transfers in order to test the concept and ensure viability by the end of the year. The intention now is to scale up the (adjusted) pilot in other areas of the Theni district first, and to cover other districts in Southern India in the course of 2006, with six additional smaller tele-clinical vans (without the X-ray equipment) and lower-cost solutions to reach more inaccessible areas.

Conclusions: changes in the design paradigm, looking for answers

The creation of accessible, economically affordable and contextualized solutions often requires new business models as well as innovative corresponding design strategies. Indeed, design - as an intrinsic part of the business value creation process - has to face the complexity of today's markets directly. It has to question 'what' to shape, in terms of tangible and intangible aspects of a solution, and 'how' to do that, in terms of adequate approaches, tools and kind of competencies involved. Design innovation processes that are looking for competitive added-value propositions in mature and saturated markets have already started to consider:

- going beyond traditional consumer segmentations (such as income, gender, age or education), to generate specific, qualitative **user insights** via the use of appropriate techniques;
- adopting a '**system thinking**' mindset rather than a 'product thinking' approach. Redefining answers to user needs and aspirations from scratch, and creating rich combinations of material components, services and content.

These two milestones of design innovation are becoming even more important when addressing emerging and developing markets. On the one hand, a deep understanding of the context of application - in terms of issues like availability of infrastructure, distribution channels and technologies in place - is required. In addition, sufficient knowledge on belief systems, social structure, cultural values and lifestyles is also necessary in order to create successful solutions for these markets. This is valid both when redesigning a global proposition to meet regional market requirements, and when designing something completely new and different from what already exists.

If the purchasing power of end-users is low, the offer has to be right and must clearly communicate its added value. Especially in developing markets, experience shows that a 'deep listening' of the 'voice' of potential communities, families and individuals to target is crucial when defining the most appropriate offer (Simanis, Hart, Enk, et al., 2005). Even if people's basic needs are more or less the same everywhere in the world, their local manifestations and ways of prioritization can vary depending on the context.

Besides leveraging valuable user insights, design increasingly needs to shift from a 'linear and deterministic thinking' approach, which focuses on the generation of continuous incremental product improvements in the product development process, to a 'holistic view', which aims to generate product-service-systems able to support innovative ways of production, distribution and usage[10]. For a number of years, theories and practices on design and 'functional and systems thinking' have been promoted by well-known design professors such as J.C. Brezet (Brezet et al., 2001) and E. Manzini (Manzini, Collina, Evans, 2004) as a valuable potential path to provide competitive and sustainable solutions.

Today, these theories and practices become essential in promising markets where (stand-alone) products may not be sufficient on their own to guarantee market penetration. The question here is: 'Do we need to provide a product, or the results/benefits brought by such a product, to fulfill people's needs, values and aspirations?' The right offer might require the identification of the most appropriate combination of traditional and/or digital services, plus high-tech and low-tech technologies. Product-service systems, as an open and flexible platform of tangible and intangible components that can grow their functionalities over time, seem to be a very appealing option for creating sustainable solutions in emerging and developing markets.

Taking these issues into consideration, a few design research questions need to be posed for envisioning, designing and realizing fast prototyping solutions in such markets.

[10] Design innovation can be distinguished in 'incremental' and 'radical'. When incremental it provides some improvements that fit in with existing users' expectations, and which do not require behavioral changes. When radical it offers new solutions able to generate new patterns of production and consumption (new ways of fulfilling a need through different activities, ways of interacting with products and services). This distinction also reflects the different meaning of 'eco-design' and 'design-for-sustainability'. Eco-design, in essence is the integration of environmental criteria into the product development process (Brezet, 1998). And, as such, it promotes incremental product improvements by the use of different environmental strategies that modify physical assets to answer conventional consumption patterns. Design-for-sustainability, on the other hand, considers both environmental and social criteria in the entire socio-economic system of reference. It aims to stimulate technological changes and social innovation by solutions that might reconfigure ways of living and doing business.

How can designers generate insights into potential current and future target groups in their specific local context?

How can we co-design and co-produce appropriate solutions with potential customers and local stakeholders, now and in the future?

What kinds of specific typologies of design qualities do solutions for emerging and developing markets require to be successful?

How can we validate and measure personal satisfaction and social/ environmental benefits generated by the introduction of new solutions?

In emerging and developing markets contexts, the leapfrogging of eco-efficient technologies (such as white LED lighting technologies and new solar power technological systems) seem to be promising due to the lack or limitations of existing infrastructures.

Consulted sources and recommended reading in the field

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