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Designing for the Base of the Pyramid

by Patrick Whitney and Anjali Kelkar

For companies in the developed world, design, if not the norm, is at least an option for enhancing business strategies. Going beyond these traditional venues, Patrick Whitney and Anjali Kelkar boldly explore the contributions design can make to businesses in developing countries, specifically businesses in the slums of India. Their findings convey design's universal value and offer a beacon of hope in an otherwise grim reality.



Dharavi is Asia's largest slum, with more than 70,000 slum dwellings occupying about 0.671 square miles of land. Image courtesy *Times of India*, Times News Network, Jan. 22, 2004.

In the January 2002 issue of *Strategy+Business*, C. K. Prahalad and Stuart Hart made a powerful case for companies to recognize the existence of a huge untapped customer base in the world's poor areas, where people make less than \$2 a day. In September of the same year, in the *Harvard Business Review*, Prahalad and Allen Hammond reiterated the concept.¹ Poor people are not averse to buying products that can change their lives dramatically. The low-cost, high-value, well-distributed and indigenously produced Indian detergent Nirma, introduced in the 1990s to poor consumers, is a case in point; today, Nirma accounts for 34 percent of the volume share in the detergent market.²

At the Institute of Design, we are extending this idea by focusing specifi-



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cally on wealth creation in urban slums in the developing world. The goal is to make the local economies more sustainable, encourage the growth of small businesses, and in the long term to help transition residents toward improved living conditions. At all phases, our approach is to develop solutions that harness the entrepreneurial spirit of local citizens and the financial development alone.

The design for the base of the pyramid project was initiated by Sam Pitroda, who is currently a telecom entrepreneur and advisor to the government of India. In 1987, he became chief technology advisor

1. C.K. Prahalad and Stuart Hart, "Fortune at the Bottom of the Pyramid," *Strategy & Business*, no. 26, 2002; C.K. Prahalad and Allen Hammond, "Serving the World's Poor, Profitably," *Harvard Business Review*, Sept. 2002.

2. *The Economic Times*, Times News Network, India, December 29, 2003.



Slum Dwelling: Exterior—Lack of space within the house leads residents to use all available space outside for storage, leaving little room for pathways.

to the Prime Minister of India. A few years later, as the chairman of India's Telecom Commission, he was responsible for all aspects of telecommunications development in the country. Beginning in the late 1980s, Pitroda's vision and technology helped to provide phone access to a billion Indians, and in revolutionizing the state of telecom in India, he also created a model for other developing nations. Pitroda, familiar with Institute of Design methods that are normally applied to corporate problems at the top of the pyramid, invited us to apply them to urban slums.

Our initial focus was to develop ways to improve housing. This made sense because slum dwellings are terrible and the most obvious way of improving daily life is to make their homes better.



Slum dwelling: Interior—This is a laundry entrepreneur's house; it operates as a residence for his family, as well as his workspace. During the day, kitchen items are cleared and moved to the ground near the ironing table and the rest of the space becomes a receptacle for piles of ironed and unironed clothes.

Research Framework

A slum household is defined by UN-Habitat as a group of individuals living under the same roof who lack one or more of the following: security of tenure, structural quality and durability of dwellings, access to safe water, access to sanitation facilities, or sufficient living area. To get a broad framework for understanding slums, as well as to understand the overall scope of opportunity, we initiated both secondary and primary research. Our secondary research focused on existing worldwide initiatives sponsored by international organizations and corporate philanthropy, and on local NGOs working in India and other developing countries.

We then conducted primary ethnographic research in slums in three cities of India—Mumbai, Ahmedabad, and Baroda. To ensure a consistent content format, we used a modified version of the POEMS framework, which we discuss further.

We also used a user-experience framework that helps analyze physical, cognitive, social, and cultural aspects of daily life in these households. This research was "remote," in that it was planned and managed from Chicago and conducted by local teams we hired on the ground in India. We prepared research packages that were couriered to the teams in the three Indian cities. These included disposable cameras and notebooks to be used with the research framework we call POEMS.

POEMS (people, objects, environments, messages, and services) was developed at the Institute of Design to help document how people interact with the designed world.³ This framework helped provide our researchers with parameters within which information was to be



Pappadum maker. This woman works from 7 am to 4 pm daily, rolling out about 30 pounds of flour to make pappadums. These are placed in the basket by her side to dry as she rolls them out. At the end of the day she will sell them to a pappadum wholesaler. This is as much as she can physically produce each day, and she is without the financial means to diversify or grow her business.

3. Vijay Kumar and Patrick Whitney, "Faster, Cheaper, Deeper User Research," *Design Management Review*, Spring 2003.



This man has been a shoe repairman for more than 25 years. But because he forms part of the “invisible” business force, he works wherever he can find space—in this case, under a tree by a sidewalk. This is not a fixed place of work, since he is periodically evicted by the municipal authorities and so must often move from location to location. His profits are based on the quality of the location he can find on a daily basis and not on customer loyalty, because his customers often can’t find him more than once.

gathered. Depending upon the situation, we used different types of observers, including an architecture student, social workers, and MBA students. The use of common frameworks enabled us to compare the findings from this diverse group of people.

As observations helped us to identify patterns around the daily life of slum dwellers, it became apparent that while our initial goal of fixing



Slum dwellers line buckets, utensils, and other assorted water containers at a community tap and wait their turn to fill water. This process often starts as early as 4 am and can go on for up to three hours. Often children miss school because they have to stand in line for hours, while their parents leave for jobs in the city.

housing was still a prime issue, it could not be targeted independently because it was inextricably connected to issues of water quality and access, sanitation, finance, healthcare, and related problems of employment, communication, education, and so on. It was clear that if any solution were to be effective, viable, and sustainable, it must

have a systemic approach. Furthermore, while our research indicated enormous amounts of entrepreneurial business activity, interviews with residents taught us that these businesses were incapable of growing further or diversifying. The reasons for this are complex, but worth discussing.

4. National Sample Survey (NSS), India, 1999-2000.

Slums grow due to a constant influx of poor migrants, generally arriving from rural areas, who come to the city seeking employment and better living standards. Slums are most often located near areas of primary activity, as this is where migrants are most likely to find work.

Slums are almost always illegal dwellings that grow over the years to form cities within themselves. They are hubs of activity where, on an average day, one can see a range of entrepreneurial activities taking place, including seasonal, transient, and mobile businesses, large and small-scale industries, and services such as domestic, manual, or construction labor. The pictures in this article describe some of the people we interviewed through our user research who form part of India’s large informal economy.

Despite this seemingly thriving economy, slum dwellers continue to live in abject poverty. The main reason is that 92 percent of workers in India represent the “informal economy,” in which financial transactions are cash-based and undocumented.⁴ Since there are no records of these transactions, the informal economy remains largely invisible and unregulated. As unrecognized members of society, slum dwellers have no security of earnings or means to build collateral. Lack of access to credit creates a huge obstacle to their chances of planning for the future. Therefore even earlier migrants, despite having moved to the city years before and



This man is a sculptor whose work involves carving intricate floral patterns on marble slabs. The fine marble dust that forms a cloud around him settles in the lungs over time causing microscopic perforations, which bleed and make the worker susceptible to a host of infectious diseases. Since he is paid daily and not on contract, and the cost of labor in India is so low, his services are expendable. He is not compensated by the company he works for, and he has no health insurance; typically workers with debilitating diseases continue to work their jobs, because they have no other way to survive.

increased their income, continue to live in deplorable conditions. They don't own their homes, and this exacerbates transient living and lowers living standards. While slum redevelopment initiatives are constantly being introduced, very little addresses the issue of new migrants that flood the city daily and squat illegally wherever they find space. Not addressing this problem drains government budgets, increases



Dhobhis are laundry men who collect soiled clothes from residents around the city. Clothes are stacked in bundles on a cart and wheeled long distances before arriving at the laundry facility. They are then washed through a step-by-step process in a variety of tubs—soak, rinse, wash, wring—and then starched and laid out to dry. Sunshine is ample but space is lacking; clothes are often left to dry on pavements, railings, and other roadside spaces. The clothes are then ironed and delivered back to the customer. Not only is the process time-consuming—customers usually get their clothes back within a week—it is not particularly profitable either. The price per clean article is so low that it barely covers the cost of detergent, and labor costs for pickup and delivery are not considered at all.

municipal expenditures, and puts pressure on a city's resources, while creating pockets of unvalued real estate.⁵

A problem this complex requires a systems-oriented approach, with interconnected solutions that address a multitude of problems at once. This kind of work has a long history at the Institute of Design. For more than three decades, through the work of Professor Charles Owen and others, teams of students and faculty have taken on large-scale problems. Topics have included the home of the future, space station design for NASA, harvesting energy and food from the ocean, improving healthcare, and improving public schools—all examples of

5. Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (New York: Basic Books, 2000).

problems that cannot be addressed using standard design methods alone.

To address the problem of slums in India, we developed frameworks that helped link both design and business innovations to a social context.

To begin generating a system of concepts, we first identified high-level design criteria, such as access to credit, economic opportunities, and secure earnings. These were mapped to a list of needs for basic living standards, such as employment, safety, shelter, water, and so on to ensure that each of the design criteria addressed as many needs for basic living as possible.

As we've already pointed out, a problem this complex requires a systems-oriented approach, with interconnected solutions that address a multitude of problems at once. The concepts were then mapped to design criteria to ensure no concept existed independently but rather that each was intrinsic to the system as a whole. As a result, each concept addresses at least two or more of the listed criteria.

We will discuss two concepts to provide an example of how they work as a system.

Mobile H2O

One of the overwhelming problems in slums is access to fresh, clean water. Currently, water is paid for by slum dwellers and delivered to them at a central location in the slum area by water tankers. The other alternative is to walk the long distance to a public water source; these are usually outside the neighborhood. In either case, the water is untreated and from unreliable sources, such as ponds and lakes at the outskirts of the city. Hence it is often the chief cause for the spread of disease, epidemics, and chronic illnesses.

Mobile H2O would be a new business that could provide a reliable supply of fresh and clean water to slum homes. Water purification plants would seal their product into bags made from recycled plastic. Water trucks would deliver these daily to individual water delivery vendors on the outskirts of slum areas. (Slums usually have unnavigable dirt paths, and as a result the mode of transport varies from slum to slum, from handcarts to small motorized vehicles.)

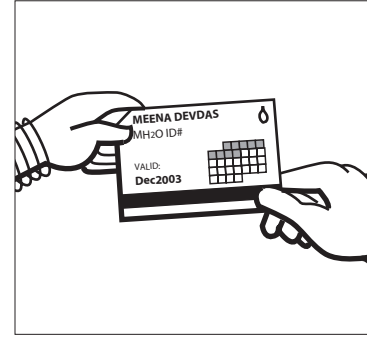
Mobile H2O: Scenario of Use



1. Meena pours water into a utensil to prepare breakfast, she is pleased because she doesn't have to boil water anymore.



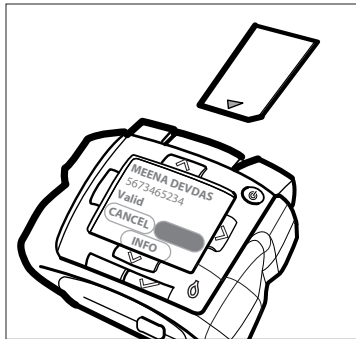
2. Half an hour later, the Mobile H2O water vendor is at her door with a fresh delivery of water.



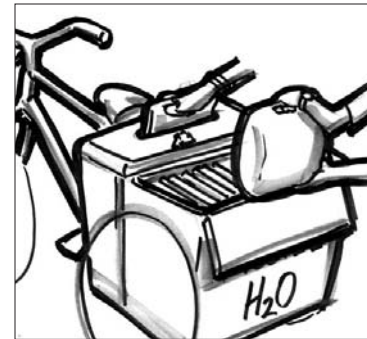
3. He takes the Mobile H2O subscription card from her and inserts into his PDA.



4. Her subscription allots her five bags per day for six months.



5. This helps document the transaction, as well as confirm she has paid for the delivery.



6. He then hands her a fresh bag of water and takes the used bag from her. At the end of his deliveries, he will sell the used bags to a Mobile H2O used-bag collection agent.

Water vendors will each service a specific area and number of customers. Customers will be given a smart card and will receive water bags based on the type of subscription they bought. The water vendor will use a PDA to swipe the smart card and to document water delivery transactions. This will provide details about payment and delivery by removing the risk of cash transactions for both parties while reliably documenting each transaction and creating a record for the vendor, as well as the customer.

The goal would be to create an incentive for both parties to build a credit history, so that eventually a transaction record is built that addresses credibility issues regarding the users, as well as provide access to financial services.

Mobile H2O is actually based on a model of

mobile food vending. It would mean better distribution of safe and affordable drinking water, as well as an incentive for companies to invest in the concept and create new jobs, while simultaneously addressing issues of health, education, and economic sustainability. The subscription-based model would be facilitated by technology companies and service providers and would help address issues of transaction transparency, as well as reduce interference from middlemen.

As pointed out earlier, each of these concepts needed to address at least two design issues. Mobile H2O would directly target issues of health, transparency of transactions, and improved living, and it would indirectly address issues of access to credit, security of earnings, and creation of viable enterprises.

GuildNet

Scores of urban poor continue to live in impoverished conditions because they have no access to financial services. The cash-based, informal economy further exacerbates this problem because of issues around the lack of transaction records and security of savings, which hinders professionalism and limits business growth.

GuildNet is a service facilitated by a bank that would encourage individuals in similar professions to form business alliances called GuildNet groups. GuildNet hopes to leverage existing cultural factors in South Asia that encourage working in groups. Some of the more successful recent initiatives in India have involved SHGs (self-help groups), which are composed of members of an area or village and work as a collective to better their opportunities for loans, credit, and other living needs.

Each GuildNet group would function as a small firm. A small percentage of the group's earnings will be saved in the group account; what remains would be transferred into individual worker accounts within the group. Group members will be able to view the group account

but will not be able to make any transactions within it. The group account will be facilitated by the bank and could only be used for business purposes with the agreement of all group members. Expenditures and transactions for individual accounts would, of course, be at the discretion of the guild member and not accessible to anyone else. This would create an incentive for the accumulation of financial assets and also provide access to financial services.

GuildNet members will be given smart cards and shown how to operate their bank accounts. The wide availability of ATMs in urban areas allows them to access their accounts anytime and anywhere, and reduces the frequency of cash transactions while providing greater security for their earnings. It will also address issues of credibility for the workers and, as savings grow for the group, as well as the individual, provide collateral for making investments and taking loans for housing and other social needs.

GuildNet addresses financial issues and the creation of sustainable enterprises directly, while indirectly addressing issues of professionalism and the means to land ownership.

GuildNet: Scenario of Use



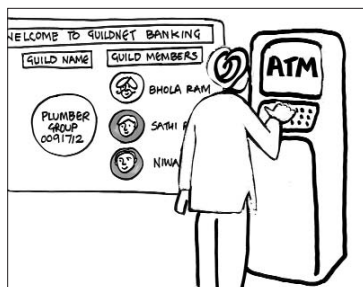
1. Bhola Ram, a plumber, decides to join GuildNet. For a small sum of money, he can open a GuildNet bank account.



2. He is given his bank card and shown how to access his account.



3. A few days later, he is introduced to the GuildNet Plumber group. They begin to work together as a team of professionals.



4. Over the next few months, Bhola periodically checks his account balance using an ATM.


JOB DETAILS			EARNINGS		
DATE	CLIENT	JOB	TOTAL	GUILD	PERSONAL
01/15	MR. SWAMI	TOILET	450	50	100
01/18	MRS. NAMI	KITCHEN	450	50	100
01/25	MR. PATIL	TOILET	250	10	60
02/06	MR. & CO.	NEW HOUSE	450	50	100
03/09	DR. V. CO.	DRAINAGE	450	50	100
04/17	MR. BAPI	TO			
			GUILD: \$210.00		
			PERSONAL: \$460.00		

5. Ten months later, he decides to send some money back to his parents in the village so that they can repair their house.



6. Bhola Ram is elated that his hard work has paid off, his savings have grown. Now he can help his parents, as well as plan for his own future.

Photograph



Description of photograph
(Highlight important aspects of image)

Walking through a busy street.

Design Factors
(Issues and problems that are faced by the user while conducting this specific activity)

- very strenuous to carry
- all that weight on the head

Design Criteria
(What could help alleviate this issue?)

- May be they can collect
- all these sacks at one place and some levy can take it together to the Kabadiwala.

Activity: (be as brief and specific as possible) *on their way* **Time:** *1:00 p.m.*

Description of activity scenario: (what is going on within activity area)

Carrying the heap and walking on the main road with all that weight.

People	Objects	Environment	Messages	Services															
<table border="1"> <tr> <td></td> <td>F</td> <td>M</td> </tr> <tr> <td>Child</td> <td></td> <td></td> </tr> <tr> <td>Youth</td> <td></td> <td></td> </tr> <tr> <td>Adult</td> <td>X</td> <td></td> </tr> <tr> <td>Elderly</td> <td></td> <td></td> </tr> </table>		F	M	Child			Youth			Adult	X		Elderly			(What objects does the user interact with to conduct the activity?) <i>heap of garbage on the head.</i>	(Describe the setting or location where the activity is taking place) <i>busy road</i>	(Is there any information transfer during this activity?) -	(A person or system enabling this activity) -
	F	M																	
Child																			
Youth																			
Adult	X																		
Elderly																			

Comments
(This can be used for anything you feel you need to add to the framework- describe specific products and activities, making location maps, making sketches of things etc.)

Sometimes when it rains all the garbage gets wet and still these people walk with all that stuff on their head.

The POEMs framework helped researchers do rapid ethnography and work within research parameters pertaining to the topic. This is part of a “day in the life” study of women who sort through garbage each morning for plastic products. They stuff the found plastic into large jute bags and carry it on foot to a plastic wholesaler, who will buy it from them. Through our research, we came across many such examples, in which either the physical exertion nor the meager monetary gain justifies the activity.

Down the Road

The base of the pyramid project currently focuses on communities in India, showing ways that design can help create innovations that improve people’s lives and create sustainable economies. Through activity-based research, we were able to identify opportunities for innovation that form a system of solutions that together help to support and encourage a sustainable economy, as well as lead residents toward improved living conditions. The next phase is to create working prototypes of these products and services in India. We expect these prototypes to catalyze additional projects in India, and we hope the groups we are working with will create new innovations we have not yet imagined.

In addition to growing the projects in India, we envision doing similar projects in Brazil, Mexico, and other countries in which urban slums are a serious problem. There are types of problems in slums that cross national boundaries and, of course, some problems that are unique to particular countries and cities. However, in essentially all major areas with urban slums, it is clear the problems are too big and growing too fast to be solved by charity and government programs alone. The larger goal is to create approaches that, using the energy that already exists in many of these slums, lead to a new type of social program that is economically sustainable. ■

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