

## Preface

Some of the remarks heard often in the field of design are: What is design exactly? What role does it play in the betterment of society? How does design differ from art, science, or engineering, and are they (inter) connected? In 1972, Charles Eames, an American industrial designer, described design as: ‘... a plan for arranging elements to accomplish a particular purpose’, ‘... it’s an expression of purpose. It may, if it’s good enough, later be judged as art’, ‘... Design is not a craft for industrial purposes, but it may be a solution to some industrial problems’, ‘... Design depends largely on constraints. The designer should have the ability to recognize as many of the constraints as possible, his willingness and enthusiasm for working within these constraints. The constraints of price, size, strength, balance, time and so forth. Each problem has its own peculiar list...’

In academic circles, the most often cited definition of design is not even from a designer. Nobel laureate, Herbert Simon, an American political scientist and economist, asserted in *The Sciences of the Artificial* that design is a meta-discipline of all professions. ‘Engineers are not the only professional designers. Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artifacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state. Design, so construed, is the core of all professional training; it is the principal mark that distinguishes the profession from the sciences. Schools of engineering, as well as schools of architecture, business, education, law, and medicine, are all centrally concerned with the process of design.’

This broad look at design is slowly being recognized in all segments of society. Design is being seen as an essential component in the chain: design – innovation – business activity – economic and industrial development, and in recent years sustainability and empowerment leading even to the domain of national governmental policies. Design is becoming a central aspect of today’s economic activity, at least with business enterprises in Western countries. Academics, policymakers and business leaders are increasingly aware that design – an inherently creative activity that sits at the intersection of art, culture, business and technology – is a critical input into the production of goods and services in all sectors. The driving force is the ever-increasing consumer expectations which are pressurizing business executives to place design at the centre of business strategy and to apply user-centred perspective. Businesses and academic institutions have also noticed the multidisciplinary nature of design. Design is not just about aesthetic qualities – colours, shapes, pixels, fonts, and the like, but it can be an agent of change as Gandhi had quoted in his book *Young India* (1925) ‘... if we want millions to earn a few paise by doing honest and honorable work, the only possible instrument to present them with, in our country, is the gentle and grace-

ful spinning wheel’. For design to be more effective it should address much more than mere aesthetics, requiring contribution from and collaboration with a multitude of disciplines and multiple stakeholders, including the end-users. Other factors such as functional, economic and socio-political dimensions of both the design object and design process need to be considered too. The design process therefore often involves considerable research, thought, modelling, interactive adjustment and re-design.

The design process is being continuously refined and updated in advanced economies, with two basic and fundamentally different approaches: the rational model and the action-centric model. The first model, independently developed by Simon, and Pahl and Beitz, asserts that (a) designers attempt to optimize a design candidate for known constraints and objectives; (b) the design process is plan-driven, and (c) the design process is understood in terms of a discrete sequence of stages. The rational model has been widely criticized as it is argued that; (a) designers do not work this way, and (b) goals are often unknown when a design project begins, and the requirements and constraints continue to change. The action-centric model, on the other hand, posits that: (a) designers use creativity and emotion to generate design candidates; (b) the design process is improvised, and (c) no universal sequence of stages is apparent – analysis, design and implementation are contemporary and inextricably linked. Both models consider design as informed by research and knowledge. These models are also leading several design activities such as: framing (conceptualizing the problem, i.e. defining goals and objectives), making moves (tentative design decision), evaluation (leading to further moves in the design), sense-making (which includes both framing and evaluating moves), co-evolution (the process where the design agent simultaneously refines the mental picture of the design object based on mental picture of the context, and vice versa), etc.

The developing countries are also slowly realizing the importance of design as a strategic tool for economic growth, and providing the field of design a status equal to other fields such as science, technology and economics. Examples of those who have taken action are mainly in emerging markets such as Malaysia (Malaysia Design Council, 1993), Indonesia (Indonesian Design Center, 1995 with assistance from Japan International Cooperation Agency and the Japan Design Foundation), the Philippines (Product Development and Design Centre of the Philippines), Thailand (Office of Product Development & Design for Export), India (National Institute of Design, educating designers and serving industry), Colombia (Artesanías de Colombia), Cuba (Oficina Nacional de Diseño Industrial – National Office of Industrial Design), Mexico (Mexico Design Promotion Centre), Brazil (Brazilian Design Centre) and South Africa (SABS Design Institute). Further in India, design centres were established at the Indian Institute of Science (IISc) and

the Indian Institute of Technology's. Design Innovation Centre at IISc has also been recently established under a national programme of the MHRD to promote a culture of innovation and creative problem solving, and to enhance interdisciplinary design-focused education, research and entrepreneurial activities in the country. Although these initiatives are laudable, such strategic design approaches appear to be directed to addressing the competitiveness of the international market, rather than addressing the needs of domestic markets in terms of alleviating poverty as well as fulfilling the basic needs of the local people. A national design policy, therefore, directed to meet the social and economic challenges of the developing countries and the betterment of their own society seems to be more than relevant and necessary.

In the connected contemporary world, designing is not any more restricted to the rich part. Design has a potential to serve the progressive regions of the world as well. Globalizing design would also require attention to the ever-increasing need for sustainability – social, environmental as well as economical. Is the Western model of development, with standardized products and services with high material and energy intensity (and concomitant waste) the right way for inherently diverse developing countries also? At the same time, can the comfortable lifestyle and opportunities of the West be denied to emerging markets (like China, India, Brazil, Indonesia, Mexico, etc.) and other developing countries?

Designers designing products and services for developing countries need to understand what 'development' is. The concept of 'development' is, however, not clear-cut and is in itself under development.

When one talks of development, it is largely economic development which is greatly influenced by the enormous progress made in the economies of the rich and industrialized countries since World War II, when the evidence of abject poverty and inequitable progress surfaced undeniably. International discussions have led to a rethink on development in the 1980s, resulting in adding the concept of 'human well-being' as well to the traditional local economy-dominated definition of development. Human development considers issues such as culture, social equality, health, nutrition, education, etc. In the 1940s Gandhian economist J. C. Kumarappa defined development as '... to co-operate with nature and arrange to maintain the environment in such a form as will guarantee its working at its best'. Further, in 1987, the United Nations, through its Brundtland Commission, introduced the concept of 'sustainable development' pleading the case of the 'needs of the world's poor to which overriding priority should be given'.

In 1999, the Pakistani economist, Mahbubul Haq, introduced the concept of the Human Development Index (HDI) and went on to argue that development is more than GNP alone. To that end Haq included several other aspects in his work such as a decent education, good health, cultural identity, personal security, community participation, etc. As a result of this approach, the United Nations has been measuring HDI to rank countries by the level of 'human development', which also usually indi-

cates whether a country is developed, developing or underdeveloped.

The involvement of the design profession in the development of nations and regions has been slow and relatively insignificant. In the 1970s the United Nations Industrial Development Organization (UNIDO) and the International Council of Societies of Industrial Design (ICSID) signed the Ahmedabad Declaration on Industrial Design and Development (the event was hosted by National Institute of Design, Ahmedabad, India), to promote industrial design in developing countries. At this time the rethinking about development was in its early stages and it is therefore likely that this situation led to the UNIDO and ICSID partnership having a focus on industrial development rather than on poverty issues. Around the same time some thought leaders such as Victor Papanek and E. F. Schumacher had a large influence on thinking about design for development. In fact, Papanek, was stiffly opposing the 'irresponsible and wasteful products for which designers in the First World were responsible and the more meaningful products that he and his students designed for Third World use'. He was sharp in his criticism: 'There are professions more harmful than industrial design, but only a very few of them'. His book received considerable attention and it was subsequently published in more than 20 languages. Although his thoughts appealed to specific sections of the design community, specifically those who question the lack of a sense of social responsibility in the design profession as a whole, the mainstream of the design profession has not yet been widely influenced. Many such as E. M. Foster (1909) and J. C. Kumarappa (1947) have also forewarned the risk of unbridled design force from overpowering mankind from being an enabler of development. According to Kumarappa '... we shall end by hanging ourselves with scientific ropes'.

The design world is changing since Papanek's first words. The rise of developing countries as emerging markets has also influenced their role in global research and development (R&D), and innovation. Ever since the product life-cycle theory was proposed in 1966, the traditional view has always been that industrially advanced countries are the source of global diffusion of innovation. The flow of innovation, both from the market point of view as much as from a technological perspective, was thus thought to be from advanced to developing countries. However, recent examples of products first introduced in developing countries and only later in advanced countries are challenging this paradigm. Natural ingredients used in India for hundreds of years, for instance, have been synthesized in Western pharmaceutical laboratories and sold as Food and Drug Administration (FDA)-approved medicines to consumers in the United States and Europe. Such innovations called 'reverse innovation' are increasingly being practised, indicating the increasing capacity and potential of developing countries in harnessing design and innovation. Other initiatives include 'frugal' or 'Gandhian innovation', in that the product has to be a resource-saving one ensuring affordability.

A large part of the design and innovation efforts – whether in the industrialized or in the emerging economies – is focused on their contribution to the economic development. Relatively few efforts are channelled at improving the quality of life or human well-being. With this background in 2008, when the Dutch Science Council called for research proposals within their framework of ‘responsible innovation’, researchers from the Delft University of Technology, the Netherlands and from the Indian Institute of Science (IISc), Bengaluru, India, put up a joint research proposal entitled: ‘Technology and Human Development – A Capability Approach’. Both institutions had amassed considerable experience in researching on how technology-based products can, in a business context, be designed in such a way that they meet the needs of people in developing countries. C. K. Prahalad’s book ‘*The Fortune at the Bottom of the Pyramid: Eradicating Poverty through Profits*’, published in 2006, recommended to consider the four billion people living on less than US\$ 2 per day not as victims to be assisted, but as value-sensitive consumers. If businesses adjust their products to this target group, businesses making profit can at the same time eradicate poverty, was the opinion. This message had been received positively not only by companies, but also by organizations in the field of developing cooperation, where it has become increasingly clear that development efforts require a sound economic and financial basis.

This research experience on design and product innovations both at Delft and Bengaluru demonstrated on the one hand, the potential of such product innovations to contribute to human development, but also identified some pitfalls and problems on the other. First, it should not too easily be assumed that the win-win situation of profit-plus-poverty reduction arises whenever a company successfully introduces an innovative product or technology in a developing country. Issues may arise about who wins and who does not; the distribution of benefits or the larger socio-economic consequences. Secondly, technology is not considered as a neutral instrument to be used at will for either good or bad, but always rather value-laden. This means that the details of the design are morally significant. Not just any design will do. This led to the emergence of the research field of ‘value-sensitive design’ that investigates how we can incorporate our moral values – such as justice or safety – in the designs that we make for new technologies. Thirdly, strong arguments can be proposed that the proper focus for development efforts is not just the reduction of income poverty, but the enhancement of human capabilities, following the arguments of Amartya Sen.

Motivated by such arguments, a research proposal was submitted to the Dutch Science Council in September 2008, with the following summary: ‘Dominant theories of distributive justice, fairness and equality, like that of John Rawls, discuss a fair distribution in terms of amounts of primary goods available to people. The main criticism of Amartya Sen is that it is not the goods that are ultimately important, but the kind of lives they enable us to live, what they allow us to do and be. Giving everyone a laptop or some other piece of technology is no good in and

by itself, according to Sen’s approach. Some people will be able to make good use of it and increase their level of functioning, but others who are illiterate or do not have access to reliable power supply cannot possibly convert their possession of the technology into anything useful in their lives. Human functionings and capabilities are at the centre of Sen’s work, referred to as the “capability approach”. Although it has been widely adopted in development thinking, hardly any work has been done on the interrelations between the capability approach and technology. This is remarkable, since technology is by definition aiming at expanding human capabilities. This project will investigate – by means of, amongst others, conceptual analysis and case studies – how the capability approach can be integrated in technological innovation and engineering design. The context of application will be innovation for the so-called “Base of the Pyramid” (BoP) – the poorest of the poor in developing countries.’

At the end of this project, an ambitious idea emerged: is it possible to attempt to build a bridge between design, sustainability, well-being and empowerment? To address this issue, an Indo-Dutch International Conference was held during 12–14 June 2014 at IISc, Bengaluru. The conference was well received with 28 paper presentations and 26 poster presentations following a double-blind review by an international panel of reviewers. Several distinguished persons delivered keynote addresses, including: Anil Gupta (Indian Institute of Management, Ahmedabad, India); Devi Shetty (Narayana Health, Bengaluru, India); Andy Dong (University of Sydney, Australia); IlleGebeshuber (Vienna University of Technology, Austria); R. Balasubramaniam (Mysore, India); L. S. Ganesh (Indian Institute of Technology Madras, Chennai, India) and Rishikesh Krishna (Indian Institute of Management Indore, India).

Amongst all presentations, authors of 12 papers with recommendation by reviewers for a journal publication, were approached for submitting an extended version. Papers would qualify as an extended version if the re-submission comprised of a significant update in analysis, results, discussions to the conference paper with a restructured outline and revised title. The revised and extended papers were reviewed again. The authors of the selected 12 papers complied with our request and promptly responded with great enthusiasm to all reviewers’ comments. We are delighted that a science journal like *Current Science* has given us an opportunity to publish papers on the multidisciplinary domain of design, including the expeditions towards other domains: sustainability and well-being.

We do hope that the readers of this special section value the efforts made by all authors to make a beginning of building a bridge between design, sustainability and well-being, and are stimulated to make their own contributions to the society at large.

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