

THE LEVELS OF DESIGN INTERVENTION IN A COMPLEX GLOBAL SCENARIO

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Abstract

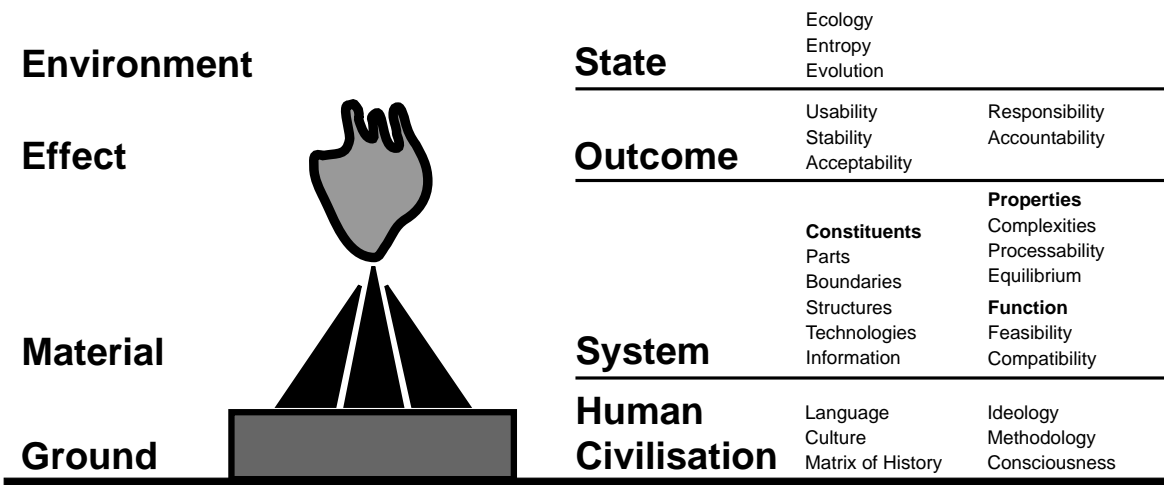
Design is a complex activity that is influenced by a large number of factors that may be financial, technological, socio-cultural and historical and most of all by the changing perceptions and needs of human user groups and their social actions. This complexity is modelled by the systems metaphor of design analogous to the process of fire in a symbolic hearth. The design activity is further being redefined to articulate the four specific levels at which this discipline can be used by industry and society, namely, the Strategic level, the Creative level, the Elaborative level and the Tactical level. The author believes that all these levels are inherent in each and every design task but are not normally perceived as such and in many cases there is a misconception that these levels can be isolated and managed effectively. It is proposed that the Profile of the Emerging Designer therefore needs to change to include a Value base at the core of a set that encompass the Knowledge base, the Skill base and the Cognitive base that define the capabilities of this new genre of designers. The central contribution of design is limited here to providing tangible scenarios for decision making and evaluation of solutions in the context of the inherent complexity of the design situation although some tasks may involve the designer in the further stages of implementation as well. For this it is important to understand the Processes of Visualisation and the emerging tools for team-based participation of experts from different domains and for the involvement of user groups in the design process. Design is therefore being transformed by change in perceptions and needs emerging from the competitive forces of an interconnected world. Developments in Global Economic Liberalisation, Information Technology, Environmental Consciousness and Consumer Rights are key factors that are driving this change.

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We will begin by defining three premises that are central to the main thesis of this paper. The three models that precede the main topic have been discussed elsewhere and are summarised below to provide a backdrop for the topic under discussion. The first is about the nature of the activity of design that is modelled by the metaphor of fire. The second is about the nature and capabilities of the designer that is modelled by the profile of the emerging designer. The third premise is the central role played by the process of design visualisation in the creation and evaluation of tangible scenarios that facilitate design decision making by teams of experts and user groups working in tandem. These premises lead us to the main focus of this paper that is to discuss the four levels of design intervention proposed here and the submission that the three preceding propositions are a necessary condition for realising this complex understanding of design that must be practised in the next millennium for design to remain a relevant and responsible profession.

Design is a complex activity that requires the creative and responsible resolution of multiple and variable parameters. Design constraints are manifold, with many conflicting ones that demand complex decisions and socio-political support processes. As a business process it requires top management commitment.

Systems Metaphor for Design



Based on educational explorations at NID, 1992
Students: Nipa Doshi, Manish Chandra & Samit Roy Choudhury
Teacher: M P Ranjan

M P Ranjan . National Institute of Design, Aug 1997

Fig 1: Systems Metaphor for Design

Let us start with our new definition of design since the word has acquired so many meanings over the years. I have used the metaphor of fire to define design using a model that was developed with my students. When we look at fire we see that it has various components — Fire (Agni) is a process of transformation—a material is transformed by organic exchanges with the environment and an effect is the product of this exchange. The process is always

situated in a particular context and this context is represented by the ground. The process of burning and the products of light, heat and smoke are all in close interplay with the environment and design too is an activity that can happen only with reference to its own context. This fire therefore represents the kind of complex transaction that I consider an adequate expression for the systems metaphor for design.

This means that we see design as a complex activity. There is not a single product that we can call a simple product. Take for example the simplest of products that you can think of and explore its possible effects. If you look at it only as a product of technology, that is, as some material transformed into a functional shape, then it would seem to be simple. Take for example a wire safety pin. You will say that it is a very simple manipulation of material in a clever way to provide some functional features. But look at the ways in which a pin is used and when you bring the user domain into your examination and also the potential hazards that the pin represents into your purview, the complexity becomes visible. This little pin in the hands of an unsupervised infant child can have disastrous consequences. So there are a whole lot of other issues that are connected with even the simplest of products and these issues also have to be kept in the mind of the designer while he is working on that very product. So it is becoming increasingly evident that design has to look beyond the object itself as a mere artifact, as produced by technology, to the effects that these objects have on a complex set of user-related parameters and finally the effects of these objects on the environment at various stages of their life cycle.

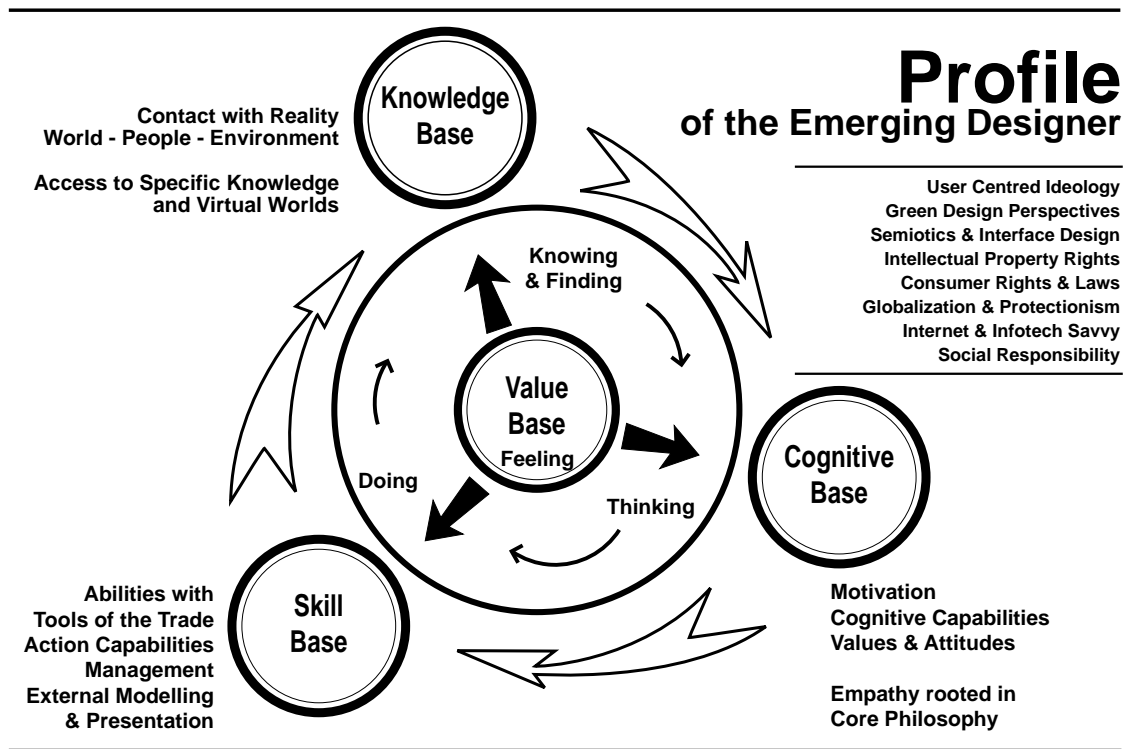
This leads us to re-evaluate the role of design and to anticipate the shape of the design activity in the years to come. This is particularly important because this is not the way that design has been necessarily thought of in the past. We are beginning to understand the complex nature of design which means that you also need a fairly complex method of dealing with it. Design methodologies need to be reevaluated and innovated to cope with this complexity. We usually tend to simplify everything to basic steps in order to administratively cope with them with a degree of ease, but we are beginning to discover that this method of management is not the answer to the problems at hand. A lot of technological development in recent years has created negative results, some with catastrophic consequences. We are certain that the exploitation of technology without the use of design processes that take cognizance of the long term needs of users and environments will lead to disaster. However our governments are yet to understand this lacuna in the manner in which they manage and fund science and technology initiatives in a fragmented manner.

Hence, in the model fire as a metaphor for design, there are a set of ideas that are being stated as desirable states when you look at the environment. Some of these ideas have been derived not from the models of the hard systems analysts; rather it has been derived from the principles of ecology. When you are talking of ecosystems they are actually soft systems. There are no hard boundaries for these systems which can be modelled and reduced to very simple and straightforward network diagrams. They have very fuzzy boundaries and they are extremely complex in their structure. The inter-relationships are very deep. Hence I think that this kind of understanding is required when you look into any phenomenon or event. If you are designing a house, there are so many layers of meaning associated with the house. Eventually the synthesis of a form and the appropriateness of that form is followed by the acceptance of that form by the community with which you are working, only if you are able to understand all those layers and map them adequately into the solution. Now, in order to do this you need to develop some kind of holistic model that can manage this complexity. It cannot be fragmented. Eventually for the purpose of analysis you will have to break things down into components and subsystems but you will have to develop a method of synthesis to be able to put it all together as a coherent whole.

The understanding of a technology or an object resides at the interface of the various layers of the system and this understanding should ideally be available to the user at each level of that interface. When you see a chair you should be able to know that it is a chair. So how is this kind of information built into that object? How is it embedded in the language that the user understands? Similarly, when you normally see a traditional house, you know which is the front of the house, there are some markings on it and in some particular way it identifies the entrance and these are the elements that architects know very well with which to compose spaces so that you feel at ease in some areas and you create tension in other areas deliberately because that is the information that is fed by the very nature of the configuration that is presented. Technology as all of us know is also important because you need to know the techniques, the materials and processes that go into building and making products and systems. Similarly there are certain properties which are always present. One of those properties of a system is complexity as opposed to being complicated. Being complicated is not a desirable property; it is not what we want. Complexity, however, is desirable because complexity means that it resolves many interactions and smoothly permits the transmission of information within and outside the system. Like a living tree, it is an extremely complex system, but it is not complicated to comprehend.

Now let us turn to the designer. In the past we had great designers and great artists, all held in

awe by the general population. They used to be labelled the “Great Designer” and we put them on a pedestal and our Design and Art museums are full of such examples. We have had this phenomenon in architecture as well, we have it in industrial design, we have it in the realm of fashion design. A lot of this hero cult or the star designer cult has been an accepted way of life for designers. I do not believe that this will be the direction of the future. The future will be determined by collaborative work of many disciplines because design is a multi-disciplinary activity and in design action teamwork can and will be a necessary condition for designing the simplest of products effectively and responsibly. Unless we are able to work in teams with the designer providing certain critical competencies and the other disciplines from sociology, psychology, anthropology, economics and technology providing the rest of the inputs, we will not be able to meet the complex needs of our society in the years to come. We will need to identify all the disciplines that are required depending on the scope and nature of each task and we must find ways to bring in those sets of capabilities together to carry out that design task.



Based on lecture modules developed for Foundation Students at the National Institute of Design, Ahmedabad, 1988 - 1997

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Fig.2 Profile of the Emerging Designer

The designer will therefore need to be equipped to learn new skills and areas of knowledge to be able to work with a diverse set of other professionals and also be directed by his acquired value base that is rooted in good practices and on empathy for the user who is the eventual

client. Design education will need to equip the designer with knowledge, skill and cognitive capabilities as well as a degree of motivation to make choices that satisfy the self and the task. Giving meaning to the design effort will be one of the guiding principles that will then temper design action. The tools of the designer are also undergoing a dramatic change with the mediation of digital tools at all stages of the design process. While subject competence and knowledge of particular industry practices and norms will be desirable for working with that industry we will increasingly be called upon to address new and complex design tasks that are being perceived or enabled in an era of global awareness and information access. The climate for design action will also need to take into account social responsibilities and emerging issues that will hold the designer accountable as never before. Some of these can be expected to be codified into the legal framework just as we have seen in the impact that the consumer acts and the environmental acts have had in recent years on various forms of economic and industrial activities. The dominant ideology for design would be increasingly user-centred and the forces of global competition will add their own levels of complexity that the designer must learn to cope with.

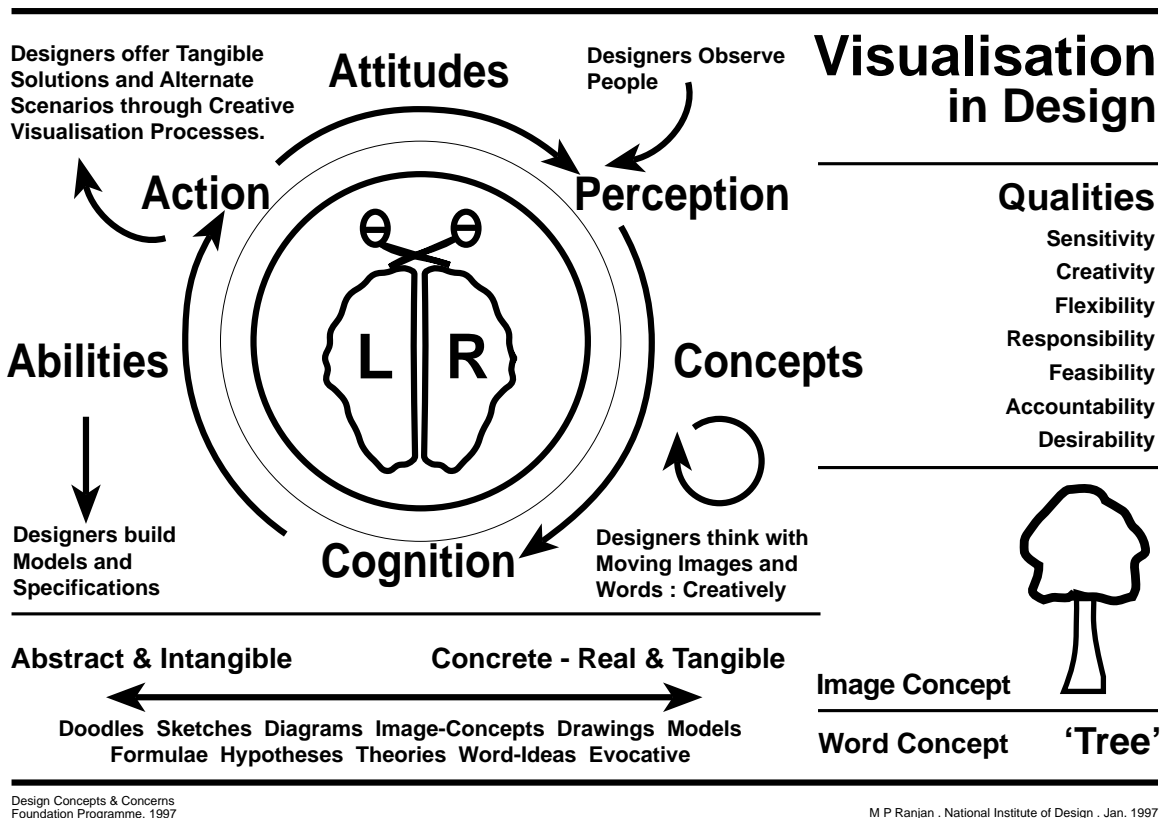


Fig 3: Visualisation in Design

This brings us to the key capabilities that a designer will be expected to bring to the efforts of the team. This is the visualisation of tangible scenarios, progressing from the abstract to the

concrete, enabling decision making by those who may have commissioned or caused the design task to be executed. The designer is expected to be sensitive and creative in the process of synthesis that which lies at the heart of the design process. Perception of challenges and opportunities and the subsequent translation into viable concepts and solutions are shrouded in myth that needs to be de-mystified. Understanding this process of visualisation will need the efforts of serious design research groups and this will help mobilise the extensive use of design by government and industry to address real life problems and business opportunities alike. Designers too will need to contribute to this understanding by the sharing of case studies far more than has been the practice in the past. The focus in these case studies will need to be on the process rather than on the end results alone as is the familiar practice in most design journals. That we are able to develop tools for visualisation that will enable the designer to share the process and the products of the intermediate stages of the design process are critical to the realisation of the larger objectives of effective design practices in the face of mounting complexity.

We can now focus on the core theme of this presentation: the spectrum of design interventions in a complex global scenario. I propose four levels at which the design profession can work, each dealing with its own sets of tools, capabilities and influencing factors. However, I believe that these levels are inherent in each and every design task, but these may be addressed either sequentially or simultaneously, that is, by different individuals within an extended design team or that these may be the key areas of focus at different stages of the design process. Therefore, these levels could occur either in a sequential manner with the design task progressing from one level to another in time or they could be parts of a distributed set of tasks being simultaneously handled by different groups on a large design team. Clients do not necessarily see value in all these levels of potential contribution and could consequently treat the design interventions in a fragmented manner due to varying perceptions of the design activity. This reduces the effectiveness of the design contribution and restricts the designer to a very limited frame of reference in many such instances. Particular design projects may be largely dealing with only one of the levels proposed in the model and some specific industries may have a greater emphasis on a particular level due to the perceptions of the role of design in their particular circumstance. Design is being increasingly perceived as a key capability that can be used by industry and governments to create solutions to complex problems and communication needs of a highly information mediated society.

Design is recognised as an effective tool, in Europe, America and in parts of Asia, for introducing new products into our lives and to give companies an edge over their competitors. This is not

the case in India and in several other developing economies. Here there is a great deal of emphasis on the role of science and technology and on the use of management as a means of generating innovation and strategy, and these efforts are bound to fail if the integrating nature of the design discipline is ignored by industry and the government. It seems that industry recognises the role of advertising, at least in the use of advertising, going by the investments made in this sector. The use of industrial design has languished due to a lack of understanding of the various dimensions of the design process and from an inability to place the young profession within the flow of development tasks that are critically needed. In some cases there is a lack of self-confidence that an indigenous team can create world class products and services and this prevents investments being made in this capability unless the competitive forces compel the industry in question to taste the fruits of such innovations. When I complain that design is not used adequately I mean that in the context of our experience of the past thirty-five years at NID of trying to introduce this discipline into the country and to extend its use into all sectors of our economy. The role of design is largely perceived as a tactical one dealing with the improvement in the quality and the performance of products and services through the process when the easily recognised skills of the designer are employed to improve looks, finishes or other aesthetic characteristics of the product or system. But this recognition fails to address the three other levels at which the design discipline can be effectively employed and this realisation leads us to the fourth model, the topic of this paper.

One of the reasons for the low spread of design use in the Indian economy in the years after Independence was its highly regulated nature that gave no incentives for innovation and competition. It was rarely in the marketplace but focused on the collection of government licences and permits that regulated the economy. All this has thankfully changed to a great extent in the past few years and design is being aggressively pursued by a few leading industries that have felt the heat of international competition impact their sector of the economy. The garment export trade and the jewellery trade in India which are major export oriented sectors of the economy have made major investments in design that are paying rich dividends to those who have made them. In the intervening years, the use of Industrial design, in particular had lagged far behind that of other design disciplines such as graphic design and textile design by the bulk of the Indian industry and by the government sponsored investments for development oriented tasks. This was because of a lack of understanding of the design discipline and misconception that design deals largely with cosmetic details that are not that critical to a developing economy. This perception must change and the use of design must spread to all sectors of our economy if the real benefits of this discipline are to be enjoyed by our peoples. Design is a critical capability in the generation of the wealth of nations and in the creation of

usable products, technologies and services that are accepted and used by its population. The tactical level is generally recognised by industry and is therefore used more widely but it is only one of the effective ways to use design and the other levels of intervention address higher degrees of risk reduction but the returns too are proportionately greater. We will examine each of these levels of design intervention with the help of a few illustrative examples.

The Spectrum of Design Interventions: Industrial Design in the Global Context

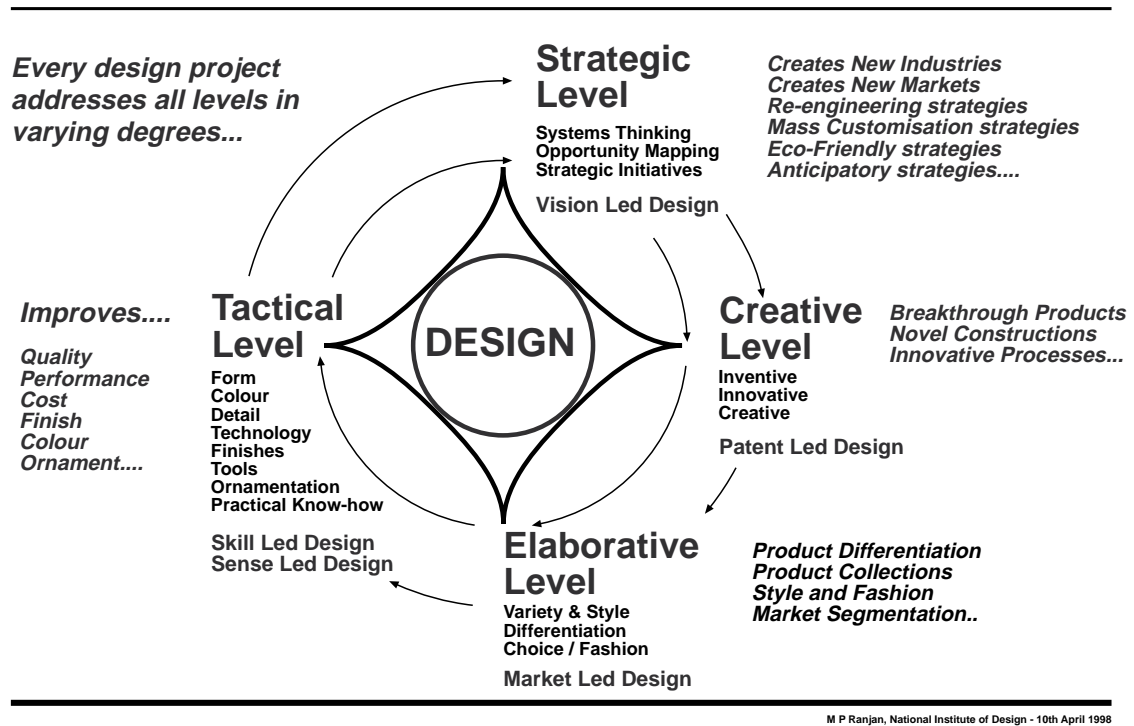


Fig 4: Spectrum of Design Interventions

In the ten years, between 1981 and 1991, that I headed the NID’s consultancy division called the Design Office I had the opportunity to meet some of the country’s leading industrialists and to administratively supervise several hundred design projects that were commissioned by Indian industry and the government development sector. These projects were carried out by the Institute’s faculty and these projects set standards of excellence and explored several unexplored facets of design service that only a teaching Institution that was research oriented could possibly have undertaken in those days. These project experiences gave me a ring-side view of the design processes and strategies employed by my colleagues on the faculty at NID due to the design management function that I had to play on their behalf. My own teaching and professional design commitments helped develop deep convictions on the various levels of design interventions that were possible.

A large number of these projects dealt with the tactical level of design intervention that designers contributed to by virtue of their special skills and sensitivities in form, colour, detail, and ornamentation, to name only a few. These dealt with a wide range of industries and subject areas such as symbol design, trophies, the organisation of visual elements in electronic and machine tool products, print media products, woven and printed textiles and on packaging and branded consumer products. These projects were seen as the 'bread and butter' of design tasks. Several alternatives were generated by the designers at the concept presentation stage, each based on an approach that gave some specific advantages over the others that were explored. The client and their representatives participated in the process of deciding the particular concept that would be carried forward to the next stages of development. In some cases the designers choice was not considered for some reason or the other, sometimes because it was considered too far ahead in time or that the market was not ready for it.

While such practical know-how was being transmitted to the captains of Indian industry our classrooms were teeming with experimental projects that students and faculty defined based on their perceptions of the design opportunities in a vast and complex country like India which supports such a great variety of people and geographic terrains and climates. Some of these had the support of industry or government funding and in recent years it has become a routine feature to get project sponsorship from industry, which was not the case in the early years. Many of these exploratory projects dealt with the generation of design collections. Several of these were in the craft sector or the small-scale industry sector where there was a greater degree of flexibility in making investments in new product collections since the level of investment need for tooling was minimal or affordable even in small batches. Several collections of furniture, toys and textiles were developed for varying client groups, many self-financed by the Institute as part of its awareness building efforts. Such collections were directed by perceptions of markets and of the need in some industry categories to provide variety and product differentiation and for market segmentation.

One such prominent example has been the variety offered by the branded moulded and soft luggage industry in India. Several of our design graduates were employed by the leading manufacturers and this sector has of late started challenging leading world producers for market share in highly competitive export markets. Similarly, the leading Indian watch and jewellery maker launched a veritable barrage of design variations and market presentation and image building strategies to subdue, in the local market, competition from a very established player in the public sector that had dominated the Indian scene for many years. The company has extended their presence into the European market, particularly in Switzerland, only to

attract protectionist pressures sponsored by the local industry. Both these companies used designers trained at the Institute to carry out their design objectives with a fair degree of success. These are examples of market led design in action. Variety and style, product differentiation and market segmentation are the guiding principles for the generation of the requisite variety. This is supported at many points in the marketing chain by the design of products, point of sale displays and the shops themselves to name only a few of the elements that are to be co-ordinated for good effect, the heat, the light and the cosiness of the symbolic fire mentioned above. The Indian textile industry is another example for the extensive use of the elaborative level of design intervention where one basic product is offered to the marketplace in a vast range of options.

In India, the next level of design intervention is retarded by the absence of a strong intellectual property rights protection regimen and the unwillingness of industry and government to invest in design at that level. In spite of this there have been several examples of product innovations and patents that have resulted in remarkable products that have shaken up the competition in the respective product segments. India has over the years invested very heavily in research laboratories and science establishments without a corresponding investment in design. This has effectively retarded the creation and delivery of breakthrough products although a large number of innovative basic technologies have been developed by the science and technology initiatives. It is only in the defence sector that have we seen the large-scale conversion of these basic technologies into product systems to be introduced into active service. This too has only happened because the developed nations were reluctant to part with their know-how in these areas compelling the Indian defence administrators to make the necessary investments in product level design and development. Design can be a very powerful tool to convert these innovations in materials and processes into products and systems that are usable and acceptable to the user. Corresponding investments must be made in design to realise the full benefits of the investments that have been made into science and technology over the years.

With India joining the World Trade Organisation this too is likely to change especially since the economy has been rapidly opened up to international competition. Design opportunities will snowball in a number of industry sectors just as we have seen massive investments being made by the pharmaceuticals sector in recent years due to the heat of intense competition in that sector. A large number of concepts have been developed in the classroom assignments that await industry support to carry forward to their logical conclusion. We are now beginning to see design investments being made in sectors such as the automobile sector, the electronics sector and the consumer durables sectors. However the dominant approach in Indian industry

is still the importation of design and technology as an undifferentiated package that will in the long run retard the country's capacity to compete in a fast changing world. Investments in design at the innovative level will also generate long-term strengths that will be critical for the profitability of several industrial segments in our economy. It is gratifying to note that the software sector in our country is beginning to make such investments in end product development and in the creation and delivery of branded products and services after having offered cost based services all these years. This move up the value chain has seen several companies deriving enormous benefit and in the near future we can expect to see global level players emerging from the Indian subcontinent in this sector that uses design as the principle tool of competitive advantage. Interface design of user-friendly software products, development of durable brands, and the creation of computer-based training and education systems are directions that are indicated for rapid growth. Some of our companies are particularly well placed to exploit the Internet for e-commerce initiatives if the supportive infrastructure can be provided at a reasonable cost. The next level of design intervention creates whole new industries and new markets. At the strategic level it is the vision of the design thinker, be it the designer or the entrepreneur, that maps new opportunities and visualises strategic initiatives that open up whole new markets.

I must point out here that it is not sufficient to have a bright vision of some future product or system but the design teams must be able to mobilise the supports and the energy needed to realise the vision through a long and complex process of exploration and realisation that invariably involves considerable work at all the other levels of design intervention as well. An infrastructure for venture finance is critical for the success of such an initiative. We have seen that a burning desire to create something different or useful is normally associated with most of these efforts and in many cases the driving forces are ideological convictions. The search by design students for meaningful projects in the Indian economy has resulted in the development of a large number of very interesting concepts that promise to make life easier for the user groups that were addressed by these projects. One project initiative that stands out is the Jawaja initiative of Prof. Ravi J Matthai where designers from NID and managers from the Indian Institute of Management went to the villages of Rajasthan to test their skills at the creation of viable and durable options for communities of village craftspersons. This strategy echoes the one initiated by Mahatma Gandhi by creating the Khadi movement (self-reliance through handspun and hand-woven fabrics) across the country when leading up to the struggle for India's independence from British rule. The processes and tools of Industrial Design can work at various levels of industrialisation, from the handcrafts sector all the way to the capital intensive processes of automated production and across a wide range of materials and processes.

Companies, countries and local communities can use these design processes to envision new scenarios for their future selves in the complex and changing world order. We are looking at the possibility of the new genre of designers assisting the crafts sector of our country to face the global challenges through the setting up of a new design school in Jaipur that will focus on the needs of the crafts sector and other design initiatives that are led by industry vision hope to create the human resources that are needed by their industry sectors in the years to come. The focus of design is on the users and their aspirations. New areas of emphasis are the concern for the environment and on the social responsibility of the designer that will be increasingly discussed in the years to come.

Two recent projects done by our students under my guidance as part of the invited Apple Student Design Competitions in 1995 and 1996 subsequently won the Du Pont award at the Human Village Congress of the International Council of Societies of Industrial Design (ICSID) in August 1997. These projects, INFARM – an agricultural pest monitoring system for the illiterate Indian farmer anticipates the use of sophisticated technology in an extremely user friendly manner and uses available technology to address real needs of the people, and the other project, MANDALA – creates and visualises a new product system that gives new meaning to retired middle class urbanites who are trying to cope with the problems of aging. Both these represent the design opportunities presented by the rich fabric of our society and the need for design at unconventional levels of intervention. The investments needed are substantial to take these concepts to the field level implementation but the results can be very sweet indeed. Any takers?

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