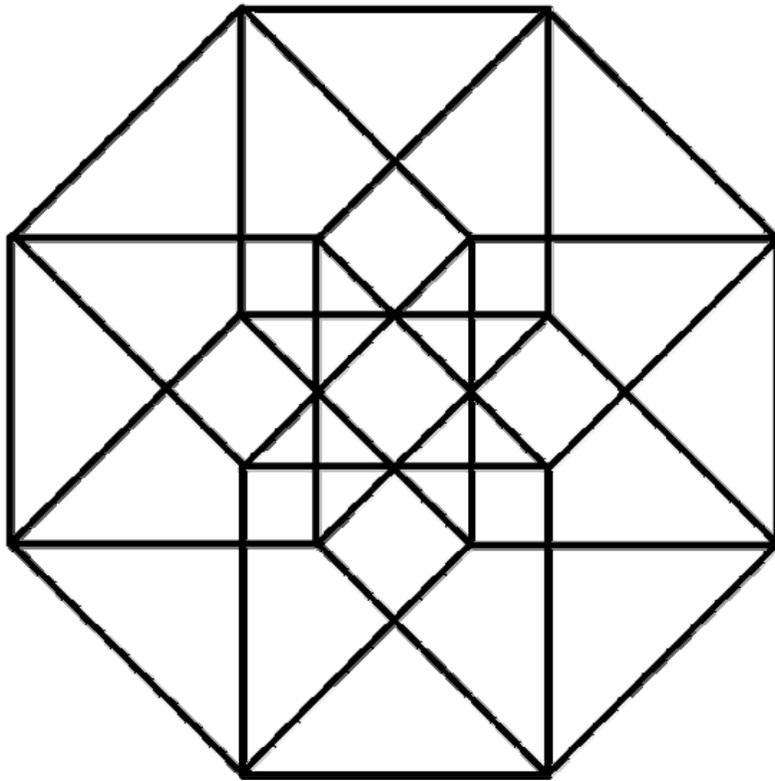


# Design as a Strategy for a Developing Economy

IDC, IIT Bombay

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# Design as a Strategy for a Developing Economy

The working paper presents the Indian as well as international design scene. It is based on our professional conviction that design capabilities encourage economic growth. The paper attempts to build a case for creating Industrial design capabilities in India.

India has made rapid strides in many fields. The industrial climate particularly in the last few years has changed dramatically. The increased abilities of the private sector in India to attract capital, shows the kind of confidence that people are willing to place in the new industries.

In spite of a fairly good growth rate, engineering product industry has relied heavily on foreign technical knowhow and design. Due to its failure to develop indigenous design & development capabilities, the Indian market continues to remain flooded with foreign products that in many cases meet consumer aspirations but not their needs. Such dependence has adversely influenced the export performance.

It is important that we now choose the priorities properly so that the continuous growth is ensured. The present report deals with the role the design, Industrial Design in particular can play in this growth. In fact it suggests using design as a strategy in engineering industry involved in development of products, machines, equipment and other related areas. This is a segment in the engineering industry that could potentially play an important role in economic development, employment generation and exports in future.

Industrial Design is recognized primarily for the value oriented benefits it offers to people. Design ensures that the new products are more efficient, usable, convenient and safe to use and meet the constraints of the environment.

One of the important factors for the achievement of high product quality and economic stability by West Germany, Korea and Japan is their sound base in Industrial Design.

The gallop interviews of over 300 executives of leading U.S. companies indicate

that in small companies \$ 1 invested in Industrial Design activity fetches \$160 in sale. The returns are even higher in bigger companies. The poll also concludes that the contribution of Industrial Designer is estimated to be 60% in success of the product and is even higher in smaller business.

This report attempts to project the need to develop indigenous Industrial design capabilities. However the trained manpower in design will not find acceptance in the society unless its role and contributions are understood and valued. So the act of 'creating design capabilities' must be seen in a broader perspective. Design education will play an important role in generating the manpower. Yet it is equally important to promote design culture in the industry that will absorb them in future. It is also important to create design awareness in the society that will ultimately use the new designs. Both these can only happen with the support of a 'National policy' of commitment to 'design'.

In this report chapter one discusses the role that design plays in the society. Chapter two discusses the international design scene and details of the actions taken by other countries to promote design. Third and fourth chapters present the Indian design scene and available design education programs. The report concludes by listing possible actions that need to be taken for design promotion as well as for creating design manpower and capabilities.

In developing this report, experience of the faculty of Industrial Design Centre (IDC), National Institute of Design and Centre for Electronics Design and Technology who have been dealing with the problems of design is taken advantage of. Yet it would be difficult for any single group to cover all the activities in design, going on in a large country like ours. To overcome this, the draft of the working paper, was circulated for comments to a National Design Committee (Annexure 1) appointed by the government. The Committee included eminent professionals and educationists from design fields. These comments were discussed and deliberated on by a smaller working group. The final version of the working paper and the recommendations take into consideration these exhaustive consultation and deliberations.

The report prepared in 1989 seems to be all the more relevant today with opening up of the Indian economy and design playing an important part in the Indian society. The report has been updated with minor modifications to accommodate recent facts and figures.

# 1.0 Design in a Developing Nation

The standard of 'Design' in a society reflects its intellectual, technological and organizational capabilities. Thus, India 300 years ago exhibited its excellence through its high quality traditional products like 'textiles and other products like 'craft ware' which attracted the West. Today countries like Japan, Germany or France reflect through their products the sound industrial structures they have built.

India has been building its industrial structure rapidly since independence. Import of technical know-how is imperative to catch up with the latest advancements in Science and Technology.

The technological transfer has led to design transfer as well resulting in low development in design abilities. This 'design dependency' has made our products less competitive in the world market.

In addition, continuous transfer of 'Western' design has brought into the country Western habits and value systems, creating a crisis in our cultural identity.

Seen in this broad perspective it is necessary to understand 'Design' as a 'creative force', functioning with the technological and socio-political structures of a society. Conducive structures of society can enable 'Design' to mould society for better 'values'. Thus 'design' has a fundamental role of questioning and assimilating technological advancement for better quality of life in the society.

## 1.1 What is Design?

As an operating term, 'design' is used in many fields. Thus we talk of design in Architecture, Engineering, Craft, Textiles, Jewelers ... all of which deal with 'hardware'. We also see the word used in areas dealing essentially with software like Computer aided design, System design, 'Information design' and Fashion design.

In each of these fields, we see a close link between 'Art' dealing with the psychological world of man 'Craft, technology and science' dealing with material world of man.

In all these areas of design we can see common traits: To start with design is always associated with a creative act. It involves optimization or judgments after examining several alternatives. Design is done in response to a challenge, a problem, or a set of requirements. The final act of design is communicated to others through sketches, drawings, formulae, computer programmers or models.

Thus we may call design a creative problem solving activity within set constraints. The knowledge and skill in each area are necessary to 'design' in that area.

Designing is thus a process of seeking a match between a set of requirements and ways of meeting them.

Design is most effective when it is 'creative' or unusual and surprising. In effect, we do a lot of designing, whatever our role of life, even though we do not think in those terms.

This broad spectrum of Design can be divided into two streams -

## **'Industrial Design' and 'Engineering Design'**

Though both have overlapping functions, Engineering Design essentially deals with engineering and technological aspects of a product, with a bias on product functioning. Industrial Design is concerned with the requirements of use, market and manufacture of the product, with a bias on need satisfaction of the user.

## **1.2 Industrial Design**

Design pertaining to 'products and services' produced by industry may be referred to as Industrial Design. ICSID (International Council of Societies of Industrial Design) has been making efforts to propagate Industrial Design in its fuller meaning. Industrial Design has four main concerns.

1.

It is concerned with improving usability. Satisfying the user needs and offering

him options is a main concern of Industrial Design. Thus utilitarian and ergonomic requirements are taken into account from the beginning.

2.

Industrial Design is concerned with 'formal properties' of products. Making the product 'aesthetically pleasing' and satisfying the psychological needs of the user, is a core function of Industrial Design. Need to exploit the variety of materials, finishes and processes to achieve desired formal properties makes the Industrial Designer a specialist in this respect.

3.

Industrial Design is a creative activity. To be effective, Industrial Design has to be innovative. This is the component that gives the product a competitive edge and brings profits to the manufacturer. Innovative use of technologies, mechanisms, materials and finishes can improve the product quality to a great extent.

4.

Industrial Design is concerned with the marketability of a product. Industrial Design acts as a link between Marketing and Manufacture, helping in product planning and product strategy formulation. It can play a significant role in using technologies to bring out products most effectively in the market. This component of Industrial Design is most significant for 'product success' in internal and export markets.

## 1.3 Engineering Design

Engineering Design essentially is conceptual design involving development of engineering systems or products to satisfy an identified need.

It involves generating alternative solutions, analyzing and evaluating them (including those that are known) for workability, cost effectiveness etc. and coming to a most effective solution to meet the identified need.

Engineering Design includes detail design like development of mechanisms, parts etc. Producing a set of detailed drawings, specifications of tolerances etc. are part of Engineering Design. Quite often engineering design would include making test models and prototypes to test the concepts as well as get feedback to correct the material specifications.

Engineering Design would include economic choice of materials and processes.

The above definitions show a fair overlap of Engineering Design and Industrial Design. Since Engineering Design retains engineering bias and Industrial Design that of Art or Aesthetic bias, the overlaps may help retaining holistic outlooks.

## 1.4 What Design can do?

1.

Design can stimulate developing countries from "technology-stagnation". In the initial stages of development, technologies are imported along with the end-products. Technology to make scooters has reached India in the fifties and sixties. Hardly any innovative designs had been developed using this technology for many decades. New collaborations thus become imperative, endangering the local industries. In such situations 'design' can play a vital role in overcoming the 'technology-stagnation' and that is what has happened in many of the industries in recent years.

2.

Multi-nationals looking for product marketing in culturally diverse countries have started realizing that they can expand their markets in developing countries not by forcing international products in these markets, but by responding to local needs through new product innovation. It is necessary to develop products by understanding current and potential needs of society using local materials and processes. 'Design' talents within the country are essential to absorb the continuous flow of new technologies from developed countries and adapt them to local conditions of manufacture.

3.

In the export of engineering goods, 'design' plays a major role in blending the local technologies with the imported parts. In modern competitive Markets, selective import of 'components' and export of finished products can be achieved through design inputs.

4.

Local product needs of the society are very different from those of the western countries. Design can help in bringing out products to satisfy cultural and social needs of our population. Needs of the rural population can be particularly well taken care through 'Design' which is sensitive to local needs.

5.

Design can be directed towards employment generation.

Industrial Design could play a vital role in innovating products with high market potentials which can be made with local skills. For example, local toy and doll industry with proper design and marketing inputs can generate large employment potentials in the rural and semi-urban areas. 'Craft' based industries can make use of local trades which are often abandoned for'

employment' in cities.

6.

Industrial product, or in terms of anthropology, material artifacts, constitute an ever increasing portion of the man-made environment.

'Industrial Design' sensitive to the local cultural heritage can create a cultural identity overcoming the imitative, secondhand culture' Information and communication design' will be playing a vital role in developing such a cultural identity through mass-media like T.V., internet and other new media's.

7.

In a mad rush of development, ecological balance is threatened today with increasing environmental pollution. Design can play a vital role in searching for alternatives and innovating usable products, making use of new energy sources. Designing of solar cookers, stoves, gobar gas stoves etc. making them as attractive as gas and electric appliances can help preservation of environments.

8.

Income distribution is one of the serious and explosive problems of any developing country. The fruits of design in organised structures seldom reach the poor majority.

Industrial Design can help in evolving new strategies of design to reach the vast masses:

For example 'design' knowledge in making one's own things using local materials can be communicated to people through mass media and adult education programmers. Proper 'Information and communication design' can make adult education meaningful and productive.

9.

One of the main problems of a country like ours is its large population. Education of the masses will have to be done through mass media. 'Information and communication design' can play a significant role in social, cultural and scientific education of the masses.

## 2.0 International Design Scene

### 2.1 Need for Review

Current high international standard is a result of several years of careful planning to develop and adopt the new design approach. Reviewing of these developments is essential, if design capabilities have to be promoted in India. Realising the potentials of design, other countries developed programmes to promote design culture in industries, create consumer awareness in design and update design education programmes. Governments played important role in these developments. It is planned to review these efforts here.

#### 2.1.1 Design as a Strategy for Growth

Value oriented benefits of product innovation to the society, is not the only reason to promote design activity. It has far reaching influence on export and economic growth. International trade has long since shifted from raw materials to processed products. It is the design and the technological capabilities that give the competitive edge to the products in international market.

It is not surprising that design was recognized as a tool for development, especially in export trade, by the governments in industrialized countries as early as the first decade of this century. Most governments continue to believe in promoting design capabilities. British government's commitment to design is an excellent example. It is nicely summed up in Prime Minister Mrs. Thatcher's recent remarks.

"For the United Kingdom to recover honoured position in the world economy, it is not only required that British industrial products make further progress but also that further improvements be made in design aspects. For this purpose our entire design system including design education should be revised".

Hongkong further illustrate how design and product innovation can be used not only to ensure industrial growth but also to improve the living standards of people within the country. From a distance, the success of these countries in the international market looks almost instant. However a closer scrutiny reveals

the systematic steps to promote new business approach using design as a strategy. Investments in design education, research and design promotion supported by the policy formulations have together contributed to their success.

## 2.1.2 Role of Product Innovation

Increasing engineering and technological complexities, competition and high investments have made designing highly systematic multi-disciplinary activity. The success largely depended on the flexibility to adopt to the new multi-disciplinary design movement

Product innovation is increasingly dependent on engineering research than ever before. The technological and the engineering contents of the product are increasing rapidly, even in areas which were highly traditional. For instance textiles, fashion and footwear, furniture, sports and musical instruments have changed their complexion with new technological inputs.

Product innovation can no more be based on man's intuition. The systematic multi-disciplinary team approach to product innovation accounts for the Japanese success in the international market.

It is worth looking into the Japanese success story in a greater depth.

### Case Study - Japanese Product Success

It is not just the smart marketing and shrewd business approach, but the systematic product innovation and design that underline the Japanese success. Japanese entry into U.S. Consumer electronics market will prove the point further. Building up consumer acceptance from scratch in 1960, Matsushita (Panasonic) equaled the market share of the two U.S. giants GE and RCA by 1971.

The reason for popularity of the Japanese consumer electronics products was not their lower price or better performance, as one would believe. It is their ability to meet the requirements of the new American lifestyle that made these products popular in young Americans. Japanese designers perceived the new trends towards mobility in young American in the sixties. They offered compact portable high performance products that American companies had failed to offer. Qualitative marketing research into changing consumer needs coupled

with the engineering capabilities to develop smaller, more compact, portable products with high quality performance, gave the Japanese products the competitive edge in the market. It is the ability to adopt technology to produce products people really need and want that marks the Japanese success.

Fairly large parts of the profits were used to bring research talent back into product innovation. The strategies paid its dividends soon. Japan's share in consumer electronics product categories is now as high as 80 per cent. With most leading U.S. manufacturers withdrawing from this area now, the entire market is dominated by the Japanese consumer electronics products.

Japan did go through the process of borrowing technologies and design capabilities in the initial phases. But their example is worth noting for its careful planning of selective investments in research and development efforts.

The initial investments in developing facilities and infrastructure were always directed to developing product innovation capabilities in certain sectors to reach self sufficiency. The emphasis was shifted to newer sectors in a planned manner. From the initial goal of self sufficiency in technology and product innovation capabilities, it has already moved on to the position of leadership. From acquiring a leading position in the foreign markets, Japan is now able to dictate the pace and direction of product development.

Japanese understood the nature of relationship between research, technology development and product innovation, and maintained a careful balance between the three factors with careful planning.

The larger part of the success lies in their design capabilities to quickly convert the engineering and technological breakthrough into new product ideas and applications. Research is now central to Japanese product innovation and is expected to remain so in future. Korean example may vary in detail but it follows a more or less a similar line.

### 2.1.3 Modern Design: a Multi-disciplinary activity

The Japanese case presented here, points to the changing face of product design activity.

Today the term 'product' itself has acquired a new meaning. 'Product' is seen as a carefully positioned marketable 'design idea', taking into account user needs and aspirations and available technology.

Brazil's success with the design, manufacture and supply of 'executive aircraft' to developed countries is a good example. Brazil concentrated on the market gap for aircraft which was not economical for the developed countries to fill up. Innovative product development is now recognised as a multi-disciplinary activity involving product planning, engineering design and industrial design supported by marketing and management inputs.

In the recent times, Industrial designers have played a crucial role of linking professionals in this multi-disciplinary chain. Industrial design serves to link the engineering and research capabilities with the user aspirations. A typical 'product team' in a Japanese company today includes industrial designers, product planners, marketing executives along with the Rand D staff.

## 2.2 Propagation of Design

Acceptance of product innovation within the industries and of new product ideas by the society would not have been possible without active promotional efforts. These massive efforts succeeded only because, the government's came forward with liberal funding to form design promotion organisations. Similarly drastic changes in the traditional design approach found its acceptance by the design community only through systematic efforts in updating design education. It is worthwhile to discuss - the various actions that were taken by other countries to promote modern design approach

### 2.2.1 State Promotion

Western countries were the first ones to recognise design as an area of promotion. United Kingdom, United States, Finland and Sweden established promotional organizations before the Second World War. Majority of the other organisations in Europe and Asia were founded during the fifteen years from 1960 to 1975. It is not a coincidence that this was also the period when westerns trade in engineering and consumer goods started feeling the pinch of competition from the eastern countries. Major design related institutions (promotional and educational) enjoy 30 to 45 years of history. Interestingly, they have expanded on global scale, regardless of the nature of economy. Perhaps the emphases on promotion activities in Asian countries in seventies

reflect the aspirations of the governments to rapidly move from an agrarian to an industrial economy, by promoting design and product innovation.

These promotional organisations undertook programmes such as organising exhibitions, seminars and courses to create awareness of product design. Schemes of certification of product quality and institution of awards for good design were other important activities.

These bodies were primarily responsible for promoting industrial design activities and standards. However, recognizing the increasing technical and technological complexities of modern products, these bodies were forced to look into development of design engineering capabilities. Recommendations such as changing the bias of engineering education towards product innovation and introduction of design subjects in secondary school curriculum show recognition of interdisciplinary character of modern design activity.

The activities of these bodies required massive budgets, which were largely available through government funds.

## 2.2.2 Consumer Movement & Legislation

Much of the product innovation after the post war period was prompted by the survival needs of competing industries. Though competition prompts change, it does not necessarily promote good design. Car industry in the United States during the fifties show how fashion oriented changes prompted by competition made the cars unsafe on roads.

Consumer movements, government policies and legislative protections have played an important role in improving product quality. Product liability laws, product insurance schemes and underwriter's license system have ensured a fair deal to consumers in U.S. market.

An independent consumer organization with facilities to test products and publish their comments through journals has contributed immensely in promoting product quality. These comprehensive assessments of products not only include performance but also aspects such as utility, use, safety and economy.

Such holistic assessments offer guidance to prospective buyers, but in that process also educates the consumers. Nothing can influence product quality as much as intelligent consumers.

### 2.2.3 Design Emphasis in Education System

Increasing technological progress and international competition have resulted in countries introducing many educational changes in design. Separate training programmes in Industrial Design started as early as 1930s. 'Bauhaus' in Germany became internationally famous as a school of design. Soon regular courses started in Europe and U.S.A. Today there are innumerable design schools in most developed countries, offering graduate and postgraduate programs in Design. Tsukuba University of Tokyo, offers a doctoral degree in Design

In many countries engineering education, now emphasizes innovation and problem solving approach.

Stanford University(USA) offers a Degree programmer in engineering with an option to branch off into Industrial Design. Product innovation and problem solving approach are stressed in these programmes. Tufts University offers a graduate programmer of 4 years duration in design with a heavy emphasis on human factors. In some French universities Product design and Product aesthetics are part of engineering curriculum. Again Germany has pioneered in offering separate engineering design programmes at a basic degree level. British Design Council has recommended many inputs into engineering design at various levels in addition to Industrial Design set-ups. Design Council of U. K. also has elaborate schemes which have introduced 'design' at school levels. Design introduction at school levels is most significant considering the advanced technologies reaching the school today.

## 2.3 Emerging Fields in Design

At a philosophical level, design commits to improve quality of life. So restricting the design inputs to products from engineering industry would not be adequate. Ideas of 'product' and 'industry' have changed to include new areas that were mainly left to Art earlier.

Communication media is now increasingly referred as Information industry. Developing software such as audio-visual and video programmes also use similar problem solving approach that is common to product design.

Films, video and audio-visuals and even books are 'products' in a broader sense. Interestingly, the design scene in information industry has several commonalities with engineering product industry, and needs to be reviewed

here.

The world has come a long way from the Gutenberg's era and is rapidly moving on to an information oriented society, relying increasingly on electronics communication. Besides the high technological inputs, the information industry also absorbed the modern problem solving approach. Increasing use of sophisticated technology inputs made information design, an area, outside the scope of conventional art schools. Computer controlled audio-visual communication, computer animation, Interactive medias and video special effects could be managed only by up-dating the design education programs. With digital typeface design and digital printing, even the conventional print media has changed its design approach.

Realising the potentials of the new problem solving oriented design approach in communication, almost all the advanced countries concentrated on developing the design capabilities. Though much of the design efforts go in persuasive communication such as advertising, the emphasis is now shifting to exploiting new potentials in information and educational fields.

Seventies saw high quality educational programmes made for television. Computer oriented education modules, instructional literature and better designed educational books followed immediately after.

Seventies also saw emphasis on environmental issues. At broader level, it dealt with larger issues of environmental cost of design actions. At micro level, the emphasis shifted to more systematic handling of public environments and developing products and communication material for the immediate environment of man.

Perhaps the most important aspect that underlines the modern design activity is its concern for the man, who is expected to use the design output, whether it is product, a video programme or an environment. Sharing this common philosophical basis, most industrial design schools diversified into developing capabilities in Information design and environmental design areas.

Treating 'man' as a focus for design innovation also means it is possible to only share an approach but not the contents. We can transfer technology but not design.

## 2.4 Summary

1.

Design and product innovation has been recognized as a tool for economic growth by many governments.

2.

In keeping pace with modern times and increasing technological complexities, modern design is now seen as a multi-disciplinary activity, which includes professions outside engineering. Actions for development of design manpower must recognise this reality and cross the boundaries of disciplines

3.

Considerable promotional efforts are necessary to inculcate design culture in industry and design awareness in society. Most of this work was shouldered by government funded promotional bodies and design schools, in other countries.

4.

Consumer movements and government legislation have contributed to promote product quality and safety.

5.

'Design' education at university level and school, has been recognized as a prime factor to sustain high quality of design.

6.

Commitment to design in most advanced countries is not restricted to engineering products. Information design and environmental design received similar emphasis.

## 3.0 Indian Design Scene

The rich Indian design heritage is reflected in its architecture and crafts of the pre-British period. Afraid of our craft talents in textiles and other products, the British demolished the rich native designs, by actively discouraging its development. They established the supremacy of machine made products, which the industrial revolution in that country had started producing.

Fortunately the craft industry and its design tradition did not fully succumb to these pressures. The transition from craft to modern industries was never really complete. So the review of the Indian design scene and design capabilities considers this reality and attempts to span these two ends.

### 3.1 Design Innovation in Indian Industry

Product innovation does not seem to be a key issue in the Indian industry. However it would be unfair to make a statement that the industry is not at all interested in product innovation. In the organised sector some of the industries have invested in product development work and have brought out new products as an answer to typical Indian needs and conditions. Rear engine three wheeler Auto is a good example of efforts culminating in an appropriate product

Interestingly, small scale industries have also continuously updated their product designs to meet consumer needs. Yet, considering the industrial base that exists in the country, these efforts are too few and infrequent.

Product Innovation has not really caught in the Indian industry. The environment required for product innovation is yet to develop in India.

It is planned to review some of the important problems faced in achieving such an environment.

#### 3.1.1 Design Transfer under collaborations

Most industries that started with foreign collaborations have unfortunately remained dependent on the parent companies for new designs.

Collaboration agreements do not easily allow design changes or encourage it. Since the designs produced are already proven elsewhere, this 'good will' itself is used as a selling strategy. Collaborations may ensure quicker returns with minimal risks, but do not encourage development of design capabilities.

Collaborations are limited to the organised sector. We cannot forget that small scale industries do not have the abilities to strike such arrangements with foreign companies. They have to necessarily use internal design capabilities.

It is an irony that smaller entrepreneurs with limited resources and risk taking abilities must invest in a costlier product development activity. No wonder they turn to plagiarism.

Example of Indian oil's effort to promote a more efficient kerosene stove perhaps suggests a possible direction. Indian Oil organised and funded research and design of an efficient kerosene stove and this was later offered to several small scale units for production and marketing.

### 3.1.2 Design - a Long Term Investment

Most of the efforts in Indian industry are concentrated on short range plans. With the result, the priority is on maintaining and increasing production levels, which ensures cash flow and profits. Design is a poor short term investment, particularly in high technology fields.

Development of internal design capabilities must be viewed as a long term measure. Besides, the investments can be recovered only when the market size is substantial. With typical conservative estimations of market size, the return on investments in design are always projected as slower.

Unless the industry takes the initiative to aggressively develop new markets with innovative product ideas, the environment is unlikely to change.

Recent introductions of products like 100 cc two-wheelers, moulded luggage, Hot shot camera and gas ranges have shown how the market can be developed and tapped.

### 3.1.3 Design Prompted by Competition

Much of the innovation in advanced countries was prompted by intense competition. In such situations marketing strategies themselves are not sufficient to give the competitive edge.

Only an innovative design can offer a unique proposition to users and capture a sizeable market segment. In India, even in the few sectors where competition is expected to be based on design strategies, it is unfortunately between designs developed by foreign companies. For instance in the colour T.V. market, designs of Japanese and Korean companies are intensely fighting in the Indian market! The picture is not very different in two wheeler as well as light commercial vehicle industry.

The western tradition of inventors turning into entrepreneurs did not exist in India. Indian industry, mostly run by the business community, prefers to compete with a market intensive entrepreneurial approach.

The emphasis is on market strategies and advertising, instead of product development. While the need to emphasise this aspect is undisputable, complete dependence on this approach is dangerous to product quality. (American car industry in the fifties is an excellent example.) In most cases, if the product innovation efforts are not continued, the competitive pressures require drastic cost reduction measures, mostly sacrificing product quality.

### 3.1.4 Public Sector Industries

Public Sector Industries have been an integral part of our political convictions after independence. They have played a vital role in developing self-reliance in heavy engineering industries. Our public sector organisations have developed manufacturing abilities in machine tools, power generators, heavy machinery etc. Design capabilities have been restricted to large plant constructions.

Some of our public sector industries have large organizational set ups to match multinational companies and yet till today, in spite of large R & Ds, innovative design capabilities are lacking in public sector industries.

Even though public sector industries work in a non-competitive situation, Industrial design can play an invigorating role in these industries in product development and in product strategy planning in their approach to internal as

well as international markets. India can make use of its advanced industrial base and a well worked out product strategy approach to enter the competitive international market. A developing country like Brazil, by designing and manufacturing an 'executive aircraft', managed a successful entry in this market.

With good industrial design set-up our public sector industries can venture to bring out innovative products that can compete in international markets. Large scope exists for such an approach in many engineering product areas where the quantum of internal demands and investments inhibit private industries to enter these fields

Industrial Design can also play a co-ordinating role between Rand D, Production and Marketing divisions in these large set-ups. Such a lack of co-ordination in the public sector industries has been one of the reasons for the lack of innovative product development in public sector industries.

### 3.1.5 Public Services

Our Public Service Organisations like Railways and Posts are among the largest in the world. They have been able to meet the core functional demands of the public.

However, due to the non-competitive nature and bureaucratic insensitivity to the emotional demands of the 'consumer', seldom have consumer comfort, good communication, and pleasing environment been the concerns of these services.

Today, it is a political necessity to satisfy the demands of common man through these public services. State run Railway Services in Britain have greatly benefited by hiring industrial designers. Our Airways, Railways, Post and Telegraphs, Doordarshan can greatly benefit through involvement of professional industrial designers and visual communicators (information designers).

There is another important cultural factor which these services can promote. A sensitive design effort can promote an 'Indian identity' through these public services. Such 'identity' through images and services are psychologically essential to reflect the national aspirations for self-reliance.

### 3.1.6 Design Based on Indigenous Research

Input into fundamental and frontier area research has put us in a unique position amongst the developing countries. The present research infrastructure within the country is a result of careful planning and correct investments in developing indigenous research capabilities. In spite of other pressing priorities the government investment in research and development efforts has steadily grown in the past years. Private sector industries also have stepped up their investment in R & D efforts in the last five years.

Technological potentials of research institutions like ISRO, TIFR, BARC, IISc, IITs and R&Ds in public sector industries like BHEL, BEL, Defence labs could be tapped. Even though the interaction between research labs and industries is increasing, it is important to strengthen it further.

If the export market is to strengthen it further, it is essential that this interaction be directed towards product innovation.

### 3.1.7 Dearth of Design Standards

In absence of competition, quality monitoring mechanism, legal protection to consumers and safety laws can promote product quality. I.S.I. restricts its codes to detailed standards for safety in operation of products.

### 3.1.8 Design Manpower

Design does not get the priority status in industry. With the result, design jobs do not have the glamour that other command, nor is the industry able to promise future to a young designer, if he/she want to stay in the design field. Most graduates from IITs are not inclined to work as designers. Industries do not have positions such as design managers and design directors.

This has undoubtedly affected the manpower development in the design area. Design is fighting a losing battle in engineering education, a topic that is dealt with separately later.

## 3.2 Current Status of Design

A short review of the status of design in Indian engineering industry is in order. The discussion includes our own perception as well as views of eminent persons connected with design in industry.

### 3.2.1 Engineering Industry

Current trends in product innovation have blurred the distinctions between the various the various industrial sectors. Traditional mechanical industries, which were initially influenced by electronics development, to an extent that they can now be described as 'Mechatronics' industries. Take an example of machine tool which was a mechanical engineering forte. It now needs inputs from electronics and in the future, digital electronics.

Products are also becoming compact close knit assemblies, and also now far more refined and sophisticated. Materials that make these products are also rapidly changing. Most products have a very high component of synthetic and composite materials. Demanding product performance requires inputs from material science.

Due to the highly competitive international markets and increasing complexities of modern products, the cost of product development in industries is considerably higher than before. These costs as well as the high lead time, are discouraging product innovation in this field.

It is easier and quicker to introduce new products through collaboration agreements, than to take a harder and somewhat uncertain path of developing the product using internal capabilities.

Much of the design inputs in this field are concentrated in design and building of special purpose machines. The capabilities in this area are good. Similar design inputs also go in design of machine tools, where it is difficult to take up collaborative ventures.

Engineering machinery, equipment and instrument sector is a steadily growing segment of manufacturing in India. While it may have shown progress in many respects, it has neglected product innovation and development. Lack of innovation and consistent quality has reflected in our inability to make inroads into export markets to the desired extent. Handicraft products have a high design differentiation and that itself gives it a competitive edge in international market.

Engineering product industries has continuously looked towards the West for product ideas and have not been able to innovate products with strong differentiation which will give then a competitive edge in the international market.

### 3.2.2 Electronics Industry

Electronics industry faces a different situation and needs a special mention. Large industries in organised sector have been able to develop the design capabilities and also have bought new technologies to support their effort. These industries often interact with IITs and universities to develop new products.

Small scale units find it difficult to match with these modern developments in electronics and manufacturing technologies.

They do not have access to technologies such as wave-soldering and hybrid circuit manufacture.

It is relatively easy and less expensive to realize new product ideas. However, component support is not always available. Suppliers, for quick deliveries of quality multi-layer PCBs are not easy to find. There is no local support to obtain custom designed chips. The industry at the moment depends on imports of a number of important components.

It is difficult to assess the effect of recent liberalization of imports, on the design activity in this sector. It may have initially discouraged indigenous product development, but its full impact on 'design standards' would be obvious only later. Lot will depend on the future policies on import of technologies and design.

### 3.2.3 Information Industry

With rapid developments in communications, India is entering the information age now. Goals to use the T.V. and computers for educational purpose pose new challenges in information design. Computers have already entered schools as a new educational tool. These new tools are creating possibilities of presenting information in totally new ways.

This sudden expansion of dimensions has its problems. The Western countries saw a slow and sequential development of the new media, which helped the designers to understand and utilise the potential of these media.

In India, these developments must happen simultaneously. Information design

must exploit the traditional print media with better designed instructional materials, books and even story-boards. At the same time it is necessary to exploit modern tools like audio-visuals and computers.

The current capabilities in developing audio-visual (video) programmes are limited and mainly handle social themes. Educational programmes based on science and technical education are restricted to projecting simple class room situations. However these themes need a different approach backed by a different kind of facilities. With proper manpower and facilities development programme, it will not be difficult to generate educational software.

The information industry in India also lacks research support in different areas of communication.

For instance, standards for legibility and text readability for Indian scripts in print and television displays are yet to be developed.

Existing programmes in graphic design are too advertising oriented and will not be able to cope with these challenges. Massive efforts will be necessary to update the educational programmes. At the moment, Industrial Design Centre, National Institute of Design and the new schools of design offer educational programmes, which are planned to handle these new areas.

### 3.2.4 Craft Based Industry

In India, we must recognise the fact that craft is an industry employing several thousands of workers. The product that they make is a source of endless variety. However at present, except for handloom products, craft objects have lost the role they used to play in daily life.

Craft remains a neglected area in development efforts. If craft products are not related to everyday needs, the industry may turn to manufacturing of 'curio' articles for home market and exports.

If crafts have to return to their old role in daily life, the craftsmen may have to update their knowledge and skills as the craftsmen in Scandinavia and Japan did. These craftsmen accepted the modern materials, tools and methods and were successful in maintaining their positions in the market.

In India, similar efforts in handloom products have shown excellent results.

There is an obvious need to generate new design capabilities in craftsmen, so

that the products can be updated. The product range can also be extended to suit new needs. It is also important to offer simultaneous inputs to improve the technology used. However, it is doubtful if the standard educational approach is relevant in this area. Craft designs display styles that are highly specific to regions. Craftsmen are also proud designers themselves.

A centralized and universal educational or design assistance approach may only lead to crafts losing their regional flavor.

Though the issues are sensitive, there is a strong case for educational input with design orientation. The setting up of the 'Indian Institute of Crafts and Design' at Jaipur seems to be in the right direction. The system of family trade is rapidly dying and with it the entire craft and trade training culture. The skills and the decision making system learnt through several years of working with senior family members are now being replaced by formal intensive training programmes in specific trades such as carpentry, smithy, metal working etc. This training is only to learn the trade and does not bring out the creative potentials of the individual nor impart product innovation abilities. In short, it does not aim at creating craftsmen. Yet as trained manpower, they have an important role to play in maintaining and promoting product quality and product design. Design orientation in these training programmes will create a new breed of technological craftsmen in the future.

### 3.2.5 Institutional Design Assistance

Indian industry is often not in a position to employ a full time designer on its staff. Design institutes are taking up the role of consultants to provide this input. Industrial Design Centre (IDC) and National Institute of Design (NID) have been actively offering services to Indian industries in Industrial Design. A number of industries look forward to design inputs from these institutes. These institutes can only cater to a limited number of industries, compared to the need for such services in the country. Their major contributions to design are indirect, when the students passing out from there join design units in the industries.

Small scale units in electronics find it difficult to get product design inputs in mechanical and Industrial Design areas. Design assistance in product housing design, product aesthetics and mechanical subsystems and mechanisms is not easily available. With the result, when the product is seen as a whole, it does not reflect quality.

CEDT has done commendable work in helping the small scale sector with inputs in electronics as well as in mechanical and product design areas.

NID was involved in a programme of offering local design assistance and technical inputs to weaving and leather goods industry. IDC is currently working with pottery and bamboo industry to evolve new designs. NID has also conducted training programmes for craftsmen. These efforts need to be strengthened.

### 3.3 Case Studies: Indian Experience

Industrial Designers in India work in an all together different environment compared to the well-developed technological environments abroad. He must account for the fact that the other supporting functions of the multi-disciplinary design activity have not been developed fully. With the result, the Designer is forced to fill-up some of the gaps left in the product development process. Obviously he is required to work with a broader base than his counterpart designers in other countries.

In India, diversities in the problem situations are so vast that the Industrial Designer must be equipped to meet the extremities demanded in his design skills. While working as a product consultant on high-tech technology mission or in export oriented projects, he is required to develop product concepts that can compare well with international standards. On the other hand he may also be called upon to work on the products of small scale industries, who have moderate manufacturing facilities, can offer limited technical and often have limited resources to the design service.

Craft Industry is an important variable in Indian scene. Designers working in the craft sector must face a totally different situation. To develop craft based products, the designer must go through a new learning process and understand the relationship between craftsmen, products and the culture.

He must get an acceptance in the craft guilds and win their confidence before they can accept his ideas.

In fact this diversity in the nature of design problems is a challenge to the Industrial Design profession. The case studies included in this section reflect this diversity. They do point to a fact that the development of Industrial Design capabilities in India must be rooted in its own context. It must be seen as an

opportunity to develop originality in approaching the Indian situation.

### 3.3.1 The Range of Design Experience

Industrial Design support in indigenous efforts in high-tech areas are brought out in the telephone design case study. C-DOT's attempt to offer indigenous know-how in telecommunication to Indian industry on a turnkey basis is supported by development of modern electronic telephone instruments for general and office use. Aims of offering state of the art design and technology required a long range view in selection of components and processes which would also be developed within the country. Since the dies and components were also to be developed through S.S.I., the Industrial Design services had to break the traditional boundaries and contribute in the production phases of product development.

Small scale industries with limited capabilities can benefit from Industrial Design services.

Smoke detector case included here is -an example of Company's intense efforts, supported by the work of hired industrial Design consultant, to bring out a product comparable to international standard. This aspires to be the only product to receive approval of safety authorities in U.S. (U.L. Licence).

The case study of design of gas stove supported by Indian Oil shows how to overcome the resources limitation of S.S.I. to support design activity. A model scheme, where the parent company invested efforts and resources in product development and used consultant Industrial Designer is now licensing several SSI's to manufacture and market the product.

Case study on leather products and wooden toys shows the potential of product innovation in traditional materials. New products can be developed in partnership with skilled craftsmen, tapping new markets in urban areas. A leather bag is an interesting design effort to enter craft segment.

The choice of the case studies is limited by the access to the material and covers few areas of Indian Design Experience. The selection is based more on explaining the range of possible industrial design contribution than on market success of these products. We hope that they will be seen in this context.

### 3.3.2 Design can Support the Technology Mission

#### Push Button Telephone

The telecommunication sector in India is poised for rapid development. Realizing that access to information will be a key to future growth, government promoted a technology mission 'C.DOT' to develop state of the art technology in telephone exchanges through indigenous research and development efforts.

Industrial Design interaction with the technology mission started with a challenge of converting the technology developed at C.DOT into an inexpensive and sturdy phone. After intensive efforts a compact phone, keeping the Indian user and manufacturer in mind was developed. This push button phone is designed as a table model but can also be wall-mounted.

Careful ergonomic study and optimisation led to the design of the hand set. Observation showed that people use phones in diverse circumstances and moods: They may telephone a friend in a relaxed and casual mood or in hurry and panic. These extremities suggest a handset grip that allows variations in holding to suit the context and the moods. A comfortable grip was developed which allows the user to hold the telephone in many ways to suit his moods. Several plaster and wooden mock-up models were made and tested for comfortable handset weight and flexibility of grip before finalising the design. Weight of the hand set was also optimised for the definitive operation of the hook switch while disconnecting the phone.

Hygienic factor was another consideration in deciding the configuration of the hand-set. The mouth piece stays to the side rather than in front of mouth while speaking, which ensures the hygienic state of the phone.

The set as a whole has been made compact with indigenous components. Likely changes in the sizes of electronic components like speakers and microphones have been taken into account in the body design. This would save expensive retooling and delays at later stages.

The injection moulded body is directly used to fix the components making the assembly easy. A compact back-plate and a specially designed foldable hook convert the table model into a wall-mounted telephone. An exclusive, compact, simple lever-mechanism was developed after several trials to suit the switches made indigenously.

The model will be introduced in several colours to suit different user preferences and environments.

An intensive interaction of the design team of C.DOT with the design team at I.D.C. and tool makers ensured the completion of the project in a very short time. To maintain quality and exact transfer of design ideas, close interaction with tool makers was maintained till the first stage of production. Tool makers, who are small scale manufacturers were given inputs in systematic methods of

mould making, checking and finishing. Final shapes of the copper masters were finished by the designers to ensure the exact transfer of shapes.

The telephone was designed by Industrial Design Centre for Centre for Development of Telematics ( C.DOT). The product development cell of IDC carried out the development of the design further to the production stage.

## Feature Phone

The modern office telephone must provide a number of new functions. With the new capabilities of the EPABX developed by C.DOT, user oriented features like call transfer, auto call back, hands free dialing, conferencing etc. will be available to Indian users as new push button functions.

Observations showed that for quick and effortless access, the conventional arrangement of receiver positioned on the left side of the phone body was most suitable. Using this as a basis, a distinct product image was evolved to appeal to the executive class, who are expected to use it initially.

The phone body has separate compartments for circuits and battery housing, making sure that accessing the circuits and other components require special efforts.

Providing an updatable record of name and numbers in the electronic memory under the lid ensures quick access to numbers and yet promises complete privacy and ensures hygiene.

The receiver is designed to ensure that the modern and extremely sensitive microphone is at a reasonable distance from the mouth to avoid breathing being transferred across the line. Its ergonomic form also suggests a way of holding the receiver while speaking and ensures hygiene.

Industrial design services included evolving product concept as well as product development, which included modifications in the earlier design decisions to suit production constraints.

The product was designed for Centre for Development of Telematics (C.DOT) by Industrial Design Centre. The product development cell of I DC carried out the development of design further to the production stage. The entire knowhow would be transferred to Indian industries for production and marketing.

### 3.3.3 Design can Benefit Larger Organised Sector

#### Direct On Line Starter

The company had developed the inside-guts for a Direct On Line starter. A new enclosure was designed for this starter.

Industrial design of the enclosure became important as the company wanted to tap new market segments like starters for air-conditioners, domestic pump sets, refrigerators, washing machines, machine tools etc. Product appearance became important because in addition to industrial markets, the starter was to be positioned for the domestic market at a price almost identical to that of the market leaders.

The company made an investment of Rs. 11 lakhs on tools and fixtures. Industrial design cost compared to overall cost was about 30%. In the first three years 55,000 pieces have been made and marketed.

The company had to change the inside guts after the acceptance of the design presented by the Industrial designer. This resulted in changes, which could have been better integrated if the designer had been involved throughout. The photographs show the initial design proposal and the final product as it was later introduced in the market.

The starter was designed by Industrial Design Centre for Crompton Greaves Ltd.

### 3.3.4 Design can contribute in Marketing of S.S.I. products

#### Smoke Detector Enclosure

With increasing investments in sophisticated modern installations and buildings, It has become important to protect them from fire hazards through early fire warnings. The smoke detector is the important sensing part of the fire warning system and must meet stringent international specifications.

The company, though small in size, invested considerable money in development efforts and testing equipments. The Industrial Design contributions include enclosure design that maintains an unobtrusive appearance in the office environment and is designed against deliberate tampering as well as potential installation errors.

The product was a result of in-house design efforts complemented by services of Industrial Design Consultant. The housing is injection moulded to meet the high future demand. In spite of higher initial investment a three part housing was

opted for to allow colour variations in the bottom part to match various office decors. Photographs show the initial design along with the final production version after moulding. It has successfully completed most of the

rigorous U.L. (underwriter's license) tests for consumer safety and product quality and hopes to be the first smoke detector in India to get the prestigious U.L. certificate.

The immediate market is expected to be 25,000 detectors annually and may go up to 50,000 in near future. With U.L. license, it can enter the growing export market. Product was designed by Industrial Design Centre for Universal Fire Apparatus Company, Bombay.

## Gas Stove

The increasing supply and availability of L.P.G. for domestic cooking has created a boom in gas stove market. Its efficiency and relative convenience suits the modern pace of urban life and accounts for its increasing popularity.

This design of stove primarily aims at the growing middle and uppermiddle-class market for a simple and efficient gas stove. Besides 15% higher efficiency, the product is more convenient to use and easy to clean. Use of press formed M.S. sheets has also made the product lighter and more marketable.

Indian Oil after initiating the development of the design is now licencing various small scale industries in India to manufacture the product. The product was designed for Indian Oil Corporation by National Institute of Design.

## Knock-Down and Stackable Wooden Furniture

The wooden furniture market is dominated by small scale industries manufacturing non-standard items of furniture. These are often developed through imitations from foreign catalogues. The designs do not display the stringent structural and constructional logic applied to the original products nor do they reflect a rational use of wood-working machines.

TAARU range shows domestic furniture that is systematically designed, blending the functional, structural, and aesthetic aspects with the economics of machine production. A range of eight wooden furniture items that are either stackable or knock-down were developed and production tested. The product range was designed for T AARU New Delhi, by National Institute of Design in 1982 and the range has been in production since then.

### 3.3.5 Design can Revitalize Craft Sector

#### Jawaja Leather Products

Leather crafts in the Jawaja Block of Rajasthan represent the typical problems faced by the traditional craft communities in developing countries. Changing modes of production and the arrival of new materials were increasingly making these craftsmen and their special skills redundant.

In order to discover the role of trained designers in such traditional "industries" designers working closely with management groups started interactions with this community. A range of leather products were developed by the

designers working closely with a group of local Jawaja craftsmen. This interaction commenced in 1975 and now the group produces a range of 40 products which are marketed widely. The product range designed for Jawaja Leather Association by National Institute of Design.

#### Turned Wood Toys

There are number of craft centres in India specialising in the turned wood craft. Most of these centres manufacture traditional "toys" which are more like curio pieces than creative playthings for children. There is an good potential market for well designed toys that are made from wood.

In order to demonstrate this possibility a collection of turned wood toys were designed specifically to meet the needs of Chennapatna craftsmen of Karnataka. Designed in 1976 the collection was first produced by number of craftsmen of Chennapatna. Other similar craft centres have later imitated these products.

The toy range was designed for D. C. Handicrafts, Government of India, by National Institute of Design.

## 3.4 Summary

1

Organised sector is dependent on collaboration. Design transfer, occurring as part of the industrial collaboration agreements, do not encourage changes in design.

2

Collaborations are difficult for small scale industries. So, in spite of the handicap of limited resources, small scale sector is forced to invest in product development.

3

Development of inhouse design capabilities will always appear as a poor short term investment, if entrepreneurs are not willing to develop the market by new innovative product ideas. Exclusive dependence on market intensive approach typical in Indian industry is not conducive to product development and can adversely affect product quality and design.

4

Increased technology intensity in modern products has made design transfer through collaborative agreements an attractive proposition. Interaction of industry with research organisations is inevitable to develop indigenous capabilities in technology intensive product areas.

5

Public sector undertakings, which account for a large part of production, have not developed a

6

Government policies should actively favour indigenous development of products.

7

Information industry has not kept pace with modern developments. Information design capabilities have not been updated to handle modern information media. It would be possible to develop educational packages such as well designed educational kits, books, audio-visuals, educational video programmes and films. Such packages can be effectively used to develop education within India as well as in neighboring countries.

8

Design capabilities of craft based industries must also develop. It is important that they extend their product range to meet the requirements of day to day life.

## 4.0 Design Education · Indian Efforts

India had a rich heritage in 'Design' with its sound philosophical and cultural roots. Magnificent temple architecture, high quality textiles and craft products are examples to show how 'design' knowledge and aesthetic sensitivity had percolated to grass-root levels in society. In the process of assimilating modern technology under a colonial rule, much of our design talents were up-rooted. Design skills and knowledge resting with the craftsmen were kept out of the main stream of education. Engineering education was restricted to classes belonging to upper castes who took to 'English' learning.

Consequently Engineering education in India has moved away from ' things to do with hands '.

Local 'Arts' were never fully understood or appreciated by British rulers. 'Art' institutes attract very little talent today. These handicaps resulting from a colonial rule have caused continuous intellectual and cultural dependence in addition to technological dependence in the country.

Formal design education in India has a longer history in Applied Arts and Architecture. However, Industrial Design Education is relatively new, with the first batch of students coming out only in 1970 from NID. The second programme started in IDC at IIT, Bombay. While both the institutes have remained active in design education, the number of students that these institutes can handle is lower than what the country can absorb.

Product design and development equally rely on engineering design capabilities. However Engineering education during British rule was moulded by the employment potential which was mainly in maintenance and running of industries. Product innovation or design had no scope. Even in recent times Management and Technical salesmanship have been attracting engineers. Consequently more and more engineers are taking up 'Management subjects' for higher studies.

Increasing Specializations have caused fragmented education of engineers all over the world. This has been realized some time back and increasing emphasis is being laid on interdisciplinary subjects. Engineering design education in India is still bogged down with rigidity in general.

Interdisciplinary subjects like environmental engineering have just made a beginning. Design as a multidisciplinary subject is yet to be recognized. A short review of Industrial Design and Engineering Design education will be in order.

## 4.1 Industrial Design Education

With this background, the need and what has so far happened in Industrial Design education at the University level, can be reviewed. To start with, it is imperative to compare ourselves with other nations to get the dimension of the problem of design education. Two charts below give the international scene in terms of designers per million populations and the design graduates turned out.

From the charts it is clear that 'number of trained designers' in our country is rather low. Nevertheless some foundations have been laid by our late Prime Minister Pandit Jawaharlal Nehru. National Institute of Design was started in 1961. Later Industrial Design Centre at I.I.T. Powai was established in 1969. Now there are around 15 institutes involved with the education of Design.

### 4.1.1 National Institute of Design

NID offers a five and half year diploma, equivalent to bachelor's degree, in Industrial Design (Product, Furniture, Ceramic and Textile) and Visual Communication with a total intake of 100 students. NID has an advanced entry programme for engineers and others in with specializations in 15 fields with an intake of 200 students. Training programmes for 'craftsmen' are also conducted from time to time at the Institute.

NID has been offering consultancy services to Government and Industries in these areas. It has many exhibitions to its credit. NID has full fledged facilities for printing and making animation films and video programmes, in addition to workshop facilities.

NID has extension centers at Delhi, Calcutta and Bangalore to offer design services for small scale industries and craft industries. NID research programmes have been mainly in craft areas. Two projects, Documentation of bamboo crafts and Rural toys have significant. NID has also done commendable work in introducing design concepts in school education. Recently NID has got a sizeable financial aid from UNIDO for facilities in video and craft areas like leather and glass.

## 4.1.2 Industrial Design Centre

IDC at IIT (Bombay), starting with a DIIT progress, now offers M.Des in Industrial Design, Visual Communication, Animation and Interaction Design with an annual intake of 60. Graduate engineers, architects and graphic artists are eligible for entry. IDC has been active in interacting with industries. Consultation projects are undertaken by all faculty. Several short term courses are offered by IDC to middle and top management cadres and development engineers. Special inhouse programmes in various areas like Industrial design, Product detailing, Creative problem solving, Product planning have been conducted for organisations like BHEL, SAC, Jyoti Ltd., Crompton Ltd. etc. IDC felt the need for such courses to reinforce design culture in industries where consultations are offered or IDC trained graduates are working.

IDC has a well developed instructional package for continuing education programmes.

IDC has built a unique ergonomics laboratory with UNDP assistance. Research on school furniture, and on typography using eye movement recorder is going on. Many of the student projects have a research component.

IDC has benefited by IITs research culture and technology orientation. It continues to maintain a close relationship with industries. However there is a need to further promote field orientation and greater interaction with industries.

Though IDC has made some beginning in promotion of industrial design culture, its principal commitment to education does not permit diverting more resources to promotional efforts.

In spite of active interest of the faculty of both the institutes in pursuing research in theoretical as well as applied areas, it has been difficult to get funding for design oriented research topics through current funding mechanisms.

Considering the Industry's demand as well as the need to promote independence in design in the country, the number of graduates passing out from these institutions is very small. Not surprisingly these graduates are in high demand. NID graduates have preference for free-lance consultancy services. Most of the IDC graduates are in Industry.

## 4.2 Engineering Design Education

Engineering design courses at the undergraduate level are mainly oriented towards the design of components and subsystems. Such a 'bottom up' approach does not encourage innovation at a 'product' level, nor does it help to develop a holistic approach to product development. The courses and the associated lab work do not offer opportunities for development of innovative product ideas and mechanisms.

It appears that engineering education in its tilt towards the sciences has moved away from 'things to do with hand'. Whatever is left of practical courses like workshop practice, are far removed from creative thinking and innovation. Similarly courses like engineering drawing do not insist on development of visualization nor are they treated as a language of engineers.

Not many students venture into design projects in the final year. Those who do, seem to take projects for which the answer is fairly known. With the result, the spirit of developing something new and innovative is missing in the project, 'nor is it insisted in evaluation.

Postgraduate engineering programmes do offer little more ambitious design involvement. However considering that only 15 per cent students opt to go through master's programme and a small number from this specialize in design, their strength remains small.

Electronics area has been a little more cautious of these trends in engineering education, and took steps to promote design along with technology by setting-up CEDTs.

### 4.2.1 CEDTs and other Institutes

Centre for Electronics Design and Technology (CEDT) was first started in 1974, at IISc., Bangalore with Swiss collaboration, with an intake of 20 candidates every year. Two more CEDTs are being started, one at Srinagar and the other at Aurangabad. These centers deal with design and prototype making of electronic instruments. Sponsored candidates from industries are admitted to the courses. The courses have a holistic approach with inputs in product design in addition to the main thrust on electronic design and technology.

CEDT has been active in publishing many booklets relevant to the electronic

industry in design areas. The centre at Srinagar is expected to start soon with an intake of 30. Aurangabad centre will specialize in medical and agricultural fields.

Many other institutes are offering some courses on design as part of their programmes. Product Development Centre, at J.C. College of Engineering (Mysore) has courses in Instrument design and has plans for full fledged courses. Similarly, PSG College at Coimbatore has been giving design courses at elective level. Madras Institute of Technology (MIT) has elective courses in Industrial Design. Jadhavpur University and BITS, Pilani have a strong base in Electronic Design.

### 4.3 Vocational & Technical Training

Vocational training is in a crisis in the country today. School education has created 'values' not so conducive for jobs involving skilled manual work. In one village near Bombay it was observed by the school headmaster that his pupils after schooling refuse to take up their traditional trade of fishing, though it is quite remunerative.

Traditionally crafts and trades were learnt from the family. In places where crafts still flourish, such practice continues.

The main problem of education in this sector has been how to impart 'modern' technological inputs into these trades. Design knowledge was inherent in traditional learning. Such 'design' inputs have been meager in the organised training programmes in this sector. Two large networks of training institutes exist in this sector right now.

### 4.4 Training at Industrial Training Institutes

Industrial Training Institutes (ITIs) train candidates after school education in various trades like turning, smithy, carpentry, electrical wiring, electronics, etc. There are no design inputs as such. In some trades like turning or electronics this does not pose a problem as they can be only absorbed by an industry. But other trades like carpentry can very profitably be practiced by free lancers. Design 'input' into organised training can generate self employment potentials. Such inputs in these trades will also improve the general quality of these trades.

## 4.5 Craft Training

Khadi Industries run many training centers which train people in pottery, bamboo work, etc. Again design inputs in this training are meager. The candidates are often not exposed to the rich craft traditions which may be present in other parts of the country. It is obvious that such training in crafts should include design, marketing and study of consumer needs in addition to financial management, if the candidates are expected to practice as independent, 'educated' craftsmen who can flourish better than a traditional craftsman.

Design inputs have to go hand in hand with inputs in entrepreneurship in this sector. Unfortunately there is a dearth of educational material in design, specific to the needs of this sector.

In a 'National Seminar on Pottery' at IDC, it was noticed that one training institute in pottery just trains them in one 'design'. The trainees coming out will just be able to 'throw' a single design of a 'pot'. Reading drawings, making things as per adopted designs which they see, are not part of the curriculum.

National Institute of Design has been making attempts to train craftsmen. Research projects of documentation type in Bamboo, Toy making, have been completed by NID. Industrial Design Centre is also working on a project of developing market oriented pottery, gaming and bamboo products.

## 4.6 Design Education at School Level

Design education at school level needs urgent attention. Present school education in our country is known for its lack of creative involvement of the pupils. Education is often alien and unrelated to children's environment. Making school education meaningful and useful to vast majorities who cannot pursue further education is a serious problem for the country. Children are loaded with more and more subjects and text books. In this respect design has a positive role to play.

Design education is the converse of traditional education by subjects: it brings subjects together instead of separating them. Design introduction at school level can benefit our school education in many ways.

It can develop problem solving ability. Every educated person will be solving

problems, as a specialist or in his own life. 'Problem solving ability' is a must for every child, whether he goes for higher education or stops at school level.

Doing things with the hands develops skills and inculcates respect for crafts and technological workmanship.

This would help in employment generation through vocational education.

Natural creative abilities of the children will be nurtured. Design education can act as a 'changing agent' to make teaching of other subjects creative. It will further help in assimilating various subjects and relating them to one's own surroundings. It can create responsible citizens who look for creative solutions for problems in society.

Right inputs into Design education can prepare the educated sections to deal with the 'Future technological and cultural shocks', the country will have to face.

Meager inputs have so far been made regarding design at school levels. Both NID and IDC have taken up projects on an experimental basis to develop Art and Design Curriculum for secondary schools.

## 4.7 Summary

1

The number of trained industrial designers in the country is rather low compared to other nations. A sound foundation has been laid in National Institutes in terms of facilities and quality of education. These institutes are acting as centers to fill up the gaps in design education at various levels.

2

Current engineering education curriculum does not encourage product innovation. Design is fighting a losing battle in the majority of engineering colleges.

3

Design inputs in vocational and technical training can generate self employment and increase the quality of technological craftsmanship.

4

There is an urgent need to incorporate 'design inputs' at school level to make education meaningful and to meet the future technological demands on society.

## 5.0 Recommendations

Today, India is a leading nation among the developing countries. The leadership role among the south countries has become inevitable for India due to its intellectual caliber and the political policies. The scientific and technological achievements of the country in the Nuclear field, Space explorations and Oceanography have been impressive. A sound base has been built in Agriculture and Industry.

At this juncture what is called for is a 'Design revolution', to bring the benefits of these achievements to the common man. Other developing countries are looking towards India for inexpensive and well-adopted technologies suitable to local economic and cultural needs.

India can provide an example with the new plans and present policies of the Government. For such a task, 'design' can provide a new cultural identity through the modern products, inheriting aesthetic richness of our traditional Arts and Crafts.

The recommendations and action plans which may look 'ambitious' are made keeping in view the 'technology shock waves' which will reach our society through computers, T.V. and genetic technology. 'Design' can prepare our younger generations with the 'attitude change' and 'quality adherence', which will be required to absorb the new technology and information invasion.

The recommendations are evolved keeping this future scenario in mind. They are categorized into two main parts. The first part deals with the promotional efforts required, while the second part refers to the new efforts required for propagation of design.

### 5.1 Promotion of Design

#### 5.1.1 Design as Part of Government Plan

Design is an activity related to planning and policy making. It is important to correlate design requirements with major government development plans and actions. Particularly in case of bigger projects, requirements of the design components can be incorporated in the document itself.

For instance National Instrumentation Board could plan an inhouse Industrial

Design cell to bring out the high quality of integrated design.

Similarly, public sector organisations like 'Educational Consultants India Ltd.' could have a sizable 'Information Design Cell', to deal with producing and exporting audio visuals, educational video tapes and well designed text books for their client universities, as the cost constraints will not be an inhibiting factor in such Endeavour's.

There are number of policies and actions initiated by government which have a 'product component'. If 'product elements' are identified in advance, products could be evolved with sufficient research and design efforts to support government actions.

Industrial Design can play a significant role in projects of national importance like 'Operation Blackboard'. Designers can develop functional and yet inexpensive products, furniture and educational materials and in the process establish minimum design standards for these items in schools.

Furniture requirements of 'nationalized banks' will be another example. Design and basic plans, well thought out from the point of view of user comfort (ergonomics) and material use, can introduce a visible change in bringing about an aesthetically pleasing environment in such organisations. Such schemes will also bring a new 'visible image' to the government actions.

Many government policies can be supported by Design. For example the recent policy announcement of 'switching over to steel furniture by government offices' to preserve wood 'in the country' needs to be supported by innovating new steel furniture that can compete with wooden furniture in all respects.

### 5.1.2 Indigenous Design in Foreign Tie-ups

It is necessary to evolve a 'design policy' in technology collaborations. Design transfer need not be part of technology transfer. Even when a design is transferred along with the technology initially, a suitable 'clause' needs to be incorporated in collaboration agreements to allow and encourage 'design changes'. In fact, in some cases, the principal companies can help in establishing Industrial Design cells in the counterpart Indian companies. Where such agreements are there, demand for Indian designers will be felt automatically. 'Swaraj Hazda' is one such example where Indian designers are recruited to work with experienced Japanese designers.

This will help to develop products to suit local conditions of use and manufacture. Electronic industry can benefit to a large extent with such policies. Over a time this will help Indian designers to export our designs based on imported technology.

As a policy matter, Government can give license preference to those foreign-tie ups of technology transfer in 'which' developing design capabilities in that area will form part of the collaboration.

### 5.1.3 Design Cells in Research Labs

Technology oriented research units in India should have a product development cell, which will use the research base to generate new product ideas and applications.

The cell should have expertise in long range and immediate product planning, industrial design and engineering product development. The cell could 'audit' the product research efforts, to evaluate their market potential.

Initially such cells could be started in product areas where sufficient research background is already available. Considerations such as availability of modern manufacturing technologies and immediate marketing opportunities, within and outside the country, are equally relevant in choice of product areas. A beginning can be made by associating Industrial Design with some of the Technology Missions being planned.

A long range perspective can be worked out to evolve a gradual switch over to using internal design capabilities in specified areas, with details worked out as five year proposals. Such an exercise can help to bring out not only commercial products but also products which are strategically important.

### 5.1.4 Financial Assistance for Design Projects

'Product Innovation and Design' are expensive ventures. Indian industry considers them risky. Small scale industries find it difficult.

Efforts in 'Product Innovations and Design Projects', need to be financially aided by the government. The Canadian government has a scheme to support 'new products'. The Government gives 50% of the development cost of 'new designs' provided the industry engages a qualified industrial designer.

Specific schemes such as proportionate government contribution for private industries consulting industrial designers and recognized design and engineering

institutions need to be evolved.

Present framework of funding organisations like DST which fund research efforts does not cover product design and development. New schemes can be introduced to support innovative, product design and development projects. Industry and academic/research organizations can make combined project proposals for such support. The participating industry can get the benefit of the development funding with an obligation to bring out the product in the Market. These industry linked projects would have considerable influence on our export capability as well as meeting internal needs, and should receive priority in project funding.

Application orientation, value oriented benefits and the need to develop self-sufficiency in design and development efforts makes it imperative that the Government recognizes 'Design' as a 'THRUST AREA' for priority funding.

### 5.1.5 Design Assistance to 5.5.1

Design Assistance for small scale units need special attention since they cannot spend their limited resources for design development. They are forced to continuously up-date their products so that they can compete in the market.

It is possible to spell out product opportunities in most of the government schemes that have major product component and project them well in advance. The development of these products can be funded by the government by offering them as projects to one of the research organizations. Documentation of these projects could be made available to SSI Units. Who could later be licensed for manufacturing of these products. Giving the same design concept to several units simultaneously will help recover the investments in product development.

Schemes such as subsidizing design service cost mentioned earlier, are in fact more relevant to small industries. However, it will be even more beneficial if the entire package of design, marketing and management assistance is offered to them along with bank loans.

### 5.1.6 Design Promotion in Industries

While education must play an important role in creating design manpower and capabilities, it is equally important to create environment which is conducive to new ideas.

Managing innovation requires change in the techniques. Industries have to reorient their approach to use design as a component in marketing strategy. This is by no means a small change. It involves developing a long term perspective and product plan. It also means creating an image, as innovators, so that people accept and rely on the new product ideas. There is a need to create awareness of design and its benefits, in industries which are expected to manufacture and market the new products, and, in the people who would buy them.

Conditions in India are similar to what existed few years ago in other countries. It is through extensive promotional efforts, that these countries managed to gradually create the design culture. Realizing the futility of design efforts in conservative management set-ups, design promotion bodies continuously organised exhibitions on modern design trends, conducted seminars and arranged public-talks to discuss design issues with managements in industries.

Annual awards for design excellence and selection of well designed products for 'G Mark' Certificates also promoted good design. With increased awareness of design and design activities in society, manufacturers were able to use 'G Mark' selections for boosting their product sales.

In India the design awards could be funded by the government through professional bodies like Association of Engineering Industries, Institution of Engineers and Society of Industrial Designers of India. Involvement of these bodies will help maintain the competition at professional level. Design awareness programmes are as important in a developing country like India, as they were in the west a few years ago.

This aspect was well brought out by the UNIDO-ICSID INDIA meeting (1979) in ratifying the 'Ahmadabad Declaration' at I.I.T. Bombay (Refer Annexure II). It lists in the action plan, establishment of design institutions, design centers and/or other design-practicing and promotional institutions to spread design methodology, awareness and consciousness. It also appeals to the government to financially support design institutes.

Number of these tasks can only be organised by a professionally managed promotional body. It is important that a Design Promotion Body like InDeAs and AIDI help create public awareness, promote design culture in industry and update design standards.

Even though it may not be immediately possible to set up Industrial Design promotional body on an ambitious scale, alternative mechanisms can be worked

out to support some of the promotional activities. In fact the existing promotional bodies should also be funded for such work.

### 5.1.7 Support for Design Research

Cultural differences and living style demand different kinds of products for our conditions. Designs prepared in other countries are not necessarily suitable here. Similarly, limitations on resources, technological capabilities and purchasing power, demand that the design activity must retain its value orientation in India. Design projects need a serious and exhaustive research approach. It is unlikely that such research projects can be funded by industries.

One example, typical to rural India, is the use of bicycles. Bicycle in the advanced countries is no more used for carrying loads. The Indian villager carries milk, vegetables, hay, cloth, grains, etc. on bicycles which were not designed for carrying loads. Such problems need basic ergonomic and engineering research to innovate new products. A project, 'Design of a load carrying cycle', sponsored by DST, was successfully turned into a prototype of new design of the bicycle, on which a variety of loads could be easily carried.

It is possible to identify a number of similar projects, where the products required must be fully developed indigenously. For example, cooking and food preparation devices, water-closets, wash basins and other cleaning aids demand totally different products that must meet severe cultural as well as economic constraints. Such projects need funding, flexibility and link up with industry from the beginning, to quickly bring the developed products to market. Once Design and Development are recognized as thrust areas, funding mechanisms can be evolved to support project efforts. (Also refer 5.4 - Financial Assistance to Design Projects.)

Designers work in a different environment in India and must adjust themselves to the fact that basic data required for design is often not available. For instance, anthropometric data on Indian population is yet to be generated and documented. It is also difficult to get access to international market intelligence data, when designing for export conditions.

It is essential to spend efforts to create data banks on topics that are useful to design activity.

To begin with, organizations must be identified to generate, compile and publish data in important design support areas like:

1. Anthropometry and Safety (Ergonomics)
2. Product Market Information
3. Materials Information

The organization undertaking these tasks could be supported with modern information storage and retrieval devices and also encouraged to publish the information through traditional media like brochures and catalogues as reference material for design departments.

The standard of design will largely depend on the quality of education available to the students. This can be achieved by creating continuous research activity in the educational institutes. Professionals also look towards educational institutes for new thinking and trends.

It is essential that the research activity is nurtured through adequate funding to educational institutes and design organizations.

### 5.1.8 Design Policy for Public Sectors

Public Sector Industries particularly need a design policy since their performance has a bearing on Government image. The Management has to be exposed to the potentials of 'Design' through short term programmes. Industrial Design and Development Departments of sizable dimensions have to be started in Public Sector Industries.

A major company in Japan today employs 200 Industrial Designers (in addition to an equal number of Engineering Designers). Our public sector companies, which have to compete internationally, immediately need such back-up in Design.

It is surprising to note that our public sector organizations like HMT, BHEL, BEL, BEML, ECIL and others have hardly any in-house industrial design units. A sizable Industrial Design set up with 30 to 40 designers in each of these organizations would be a necessity if we expect these organizations to meet international competition.

A policy directive from the Government emphasizing 'Industrial Design Activity' to ensure product design quality would be essential to make the necessary beginning.

Pollution free battery-run buses have been manufactured at BHEL and introduced in Delhi with the political vision of the Government. Though the

vehicles may be successful technically, they lack the exclusive identity such unique vehicles could have offered. They are also inferior to other buses in terms of passenger comfort. The user of these vehicles, a common man, often is only concerned with the comfort and price he may have to pay, and may reject the pollution free alternative offered to him. An Industrial Design Cell at BHEL would have been precisely engaged in dealing with such customer perceptions of today and tomorrow, and satisfying them through the technology available to the company.

A policy decision by the Government at the highest levels is required to set up industrial Design units in each of the Public Sector Industries.

### 5.1.9 Design Policy for Public Services

Our Public Services are some of the largest in the world. With the introduction of greater consumer awareness, due to mass media like T.V., there will be massive pressure on public service sectors to satisfy consumer demands. Industrial Design Cells in these set-ups can satisfy these demands in the best manner possible. Good design here can help to improve the 'much tarnished' image of some of the services. Design can also act as a moral booster for the service personnel.

An Indian identity needs to be projected through 'design' in many of the public services, which carry on the 'colonial images'. Such 'cultural identity' will greatly enhance tourist trade as well.

Comfort in the trains, easy luggage handling systems at the stations, and good catering systems are much desired services in the Railways. Successful design intervention can offer the above services with an exclusive Indian identity. At present the image of these services in the common man's mind is mostly negative. Public service organizations like Railways and Posts have yet to introduce communication graphics which can be understood by the Common man throughout the country. Use of symbols and multilingual graphics are essential for good communication.

Setting up in-house design units and involving well known designers will be necessary to transform the tarnished image of these services. A policy cell at the government level can ensure such implementation of design activities in these services.

## 5.1.10 Design Needs of Craft Industries

Craft based industry needs to be supported, in evolving design based market strategies.

Application of craft techniques in high priced industrial products, especially for export, needs to be explored.

For example products like Fans, Clocks, Watches etc. can conveniently use metal craft decorations like bidre work. In some areas like bamboo work, products for daily use need to be developed. Japan has done a commendable job of modernizing bamboo craft, by selective mechanising of components and evolving new products of high quality. Initially, research and design projects sensitive to traditional craft qualities need to be funded. This can lead to resource material (an exhibition of various possibilities with samples) that can be exposed to Industry and Craftsmen.

## 5.1.11 Centers for Science & Technology Communication

India has a large number of scientists and engineers. We have made an extensive investment into educational institutions. Educational bases like I.I.Ts are of international standard. Our abilities in science and engineering are well established. Our graduates from I.I.Ts are well accepted in developed countries. Yet, these educational potentials of the national institutes have been under utilized for the Nation's benefit. A good possibility is to create educational material like audio-visuals and video tapes, books etc. in Science and Technology.

This material can be utilized within the country to spread Science and Technology at various levels: in schools, vocational and industrial training centers and local engineering colleges. This material can be also exported to other developing countries. If the information design standards increase such material may have markets even in developing countries.

Proposals such as developing of regional science centers as part of National Science Communication plan can be effectively supported if a specialized requirement of manpower development is attended to. It is important to support manpower training programmes in educational and information technology areas.

## 5.2 Propagation of Design Education.

Efforts towards innovative design development must be supported by suitable changes in manpower development programmes. For instance, engineering education must be reoriented to accept design innovation as one of the important inputs. Similarly current manpower development programmes need to be extended and/or complimented so that an adequate number of Industrial Design graduates are available. Similar manpower development plans must also be made in related design areas and in professions supporting design activities.

### 5.2.1 Industrial Design Education

The information presented earlier and a comparison of manpower development programmes in design in other countries suggests that we need to train more industrial designers. The unfulfilled demands of potential employers and the high mobility of newly employed Industrial Design graduates support this view further.

Manpower development projections in Industrial Design presented here take into consideration the needs of the industry as well as the feasibility of reaching the targets without losing the quality of design education.

Industrial Designers in engineering industry must work in a team with engineering designers working in research, design and development departments. Unfortunately, education in Industrial Design has not kept pace with the rapidly increasing number various engineering disciplines every year. A conservative estimate indicates that 15% of these graduates (60,000 graduates) are employed in research, design and development activities. Approximately one third of these graduates (20,000 engineers) are specialized in the mechanical, electrical and electronics areas that are directly related to engineering product development and their work can be complemented by Industrial Design activity.

For innovative product development, ideally one industrial designer per every four R & D engineers would be required. This suggests that we need a manpower plan to educate 5000 Industrial Design graduates every year. However these projections must be reviewed to take into consideration the nature of design activity within the engineering industry.

A A large number of engineering products produced in India are licensed under collaboration agreements. Needs for design, inputs are relatively low in these industries. While the government has recognised the need to promote indigenous design and development, it may be a decade before the Indian industry can catch-up with the 'State of the Art' products and switch over to totally indigenous product development. Till such time the demand for graduate industrial designers is not likely to reach the projected level.

### 5.2.2 Strengthening Existing Programmes in Industrial Design

NID in Ahmadabad and IDC at IIT Bombay have been in the field of design education and have done commendable work as pioneering educational and service organizations.

However it is important to strengthen their infrastructure to absorb the new areas that these institutions are trying to absorb in their educational process. Computer orientation and modern information technology are some of the new areas that need development support.

Strengthening of these premier institutes will help them to participate actively in the development of new educational programmes elsewhere, through faculty training and curriculum development.

### 5.2.3 Engineering Design Education

The traditional orientation in engineering education towards design and product development is changing to the more dominating engineering sciences, analysis and simulation. The present curriculum should be modified to give greater design orientation.

Some of the recommendations are -

**A** Courses in Engineering design should be reoriented towards product conceptualization and detail development. For those who undertake their final year project in design, it should offer a holistic experience of the design process that ends in a developed product idea.

**B** Similarly other courses like machine design and theory of machines (or their equivalents in other branches) should be complemented with design labs that

insist on developing and building something new and innovative.

C Greater emphasis should be given to creativity, visualization and building by hand, by restructuring workshop and drawing courses.

D Industrial Design should be offered as an elective, for those who are likely to take up design projects in their final year.

## 5.2.4 Design Education in Related Areas

The modern design approach needs support from many other fields. A large number of professions and expertise are involved in developing and introducing new products in the market. Developing design capabilities, without attending to these supporting inputs will definitely influence the final outcome.

The product is seen as one of the manifestations of the marketing and business strategy of a company. The product design approach is intricately related to marketing, product planning and new product management. No doubt the designers understand these areas, but it is even more important that professional managers understand the modern design approach in its full complexity. A design and technology intensive approach to business is possible only if future managers understand the role of design.

A chair can be created in one of the IIMs, to develop material on the relationship between design and business with emphasis on product planning and design management.

The efforts should ultimately lead to a theoretical approach, methodology and information system that would enable design and business to help each other. It would also lead to promoting design based entrepreneurship, which has been at the root of much of product innovation elsewhere. In future the approach can also lead to recommending strategic decisions on emphasizing various areas in design to meet international competition.

The design profession also generates a number of new job profiles to support itself. Prototype building, drawing and detailing as well as model making support is extensively used by designers.

It is possible that polytechnics could play an important role in developing a cadre of people who can undertake sophisticated prototype building and pilot production tasks. These tasks need drawing, detailing and organizational

support that can only be offered by a creative, production oriented technical person. ITI's will be required to play an important role in taking up this challenge.

Model making is another profession that is not backed by any developed educational programme. Product development needs extensive support from model makers during the initial part of product conceptualization. It is possible that ITI's could selectively add this as one of the trades in their list.

### 5.2.5 Design Education at Secondary level

Introduction of Design at the school level is of utmost importance for the future. As the task is gigantic, initially a few schools may be selected. Teaching material, training programmes and workshop facilities, for such schools need to be provided.

Several experiments in school education are going on in the country to develop more meaningful education. 'Kishore Bharati' at Hoshangabad, schools run by the Krishnamurthy Foundation and Government model schools are some examples. A new 'Art and Design' curriculum can be introduced in these schools. Through proper documentation, on-going experiments can be beamed to the whole country through T.V. media. A lot can be learnt from the Design programmes introduced by the Design Council in British Schools. The facilities at NID and IDC for planning and developing Art and Design curricula for Indian schools can be utilized.

In an already crammed school syllabus, design need not be introduced as a new subject.

What is important is to give a design orientation to existing subjects and introduce important elements like creativity, innovation and problem solving through them.

Children spend up to 20% of their time on subjects like work experience. Design oriented project assignments can be introduced to invigorate the child's creativity. Similarly, the present rote learning oriented art and design curricula at the primary level could be revamped to allow full expression of feeling to the child. The time presently allotted to Drawing and Work Experience in the school curriculum can also be conveniently utilized to introduce 'design inputs' at the school level.

This subject in later years in the secondary school should offer problem solving design challenges and encourage the creative efforts of children. The subject

should cover design areas like diagrams and maps, book covers illustrations as well as simple products like solar cookers, coal chulas, etc. so that it will complement the other subjects taught in schools. Art and design along with work experience should aim at making the child design conscious and more critical of his/her environment.

Expertise available at NID and IDC can be utilized for planning and developing of the curricula for schools. The programme can be evolved and later implemented through NCERT. 'Design talent search' competitions, Design project competitions and Design publications for schools can greatly enhance the process of consolidating a value for 'design' at schools.

### 5.2.6 Design Inputs in Vocational Training

Industrial Design inputs in Vocational and Craft training is important to develop the local economy.

Inputs which should go into these sectors are educational material, training of vocational teachers and facilities. A design approach in vocational or craft training to create new products, to know user demands and packaging requirements, needs to be developed.

This can again be done initially by developing the educational 'contents' in selected areas, such as bamboo work or pottery, and convey them to the training centers through exhibitions, workshops for teachers and audio visuals. The few existing training centers run by Khadi and other voluntary agencies can be selected for initial work. The other programmes must run with the co-operation of State Councils for vocational education.

Again the capabilities of NID and IDC can be used for pilot projects. It may be a good idea to couple these vocational training programmes with the employment generation schemes of the Government. Management and marketing support to such schemes can make the whole venture a self generative process.

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Parts of the contents of this report are also based on two earlier reports prepared by Industrial Design Centre.

# 7.0 Annexure

## Annexure I

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## Annexure II

In April 1977 a Memorandum of Understanding was signed between UNIDO and ICSID to accelerate jointly industrial design activities in developing countries in order to satisfy urgent needs in this field, and to carry out as extensively as possible the promotional activities necessary to alert developing countries to the advantage of including industrial design in their planning process. It was to aid such awareness that a Meeting for the Promotion of Industrial Design in Developing Countries was convened by UNIDO in January 1979 in close cooperation with ICSID and the Indian National Institute of Design, in line with the Lima Declaration and Plan of Action and in pursuance of the Memorandum of Undertaking between UNIDO and ICSID. This Meeting was a significant milestone in the progress of the industrial design profession, marking the first design gathering ever to be held under the auspices of the United Nations. The meeting adopted the Ahmadabad Declaration on Industrial Design for Development which set forth a Plan of Action, and made major Recommendations in support of this action plan.

# Ahmedabad Declaration on Industrial Design for Development

## A. Ahmadabad Declaration

1. The Meeting for the Promotion of Industrial Design in Developing Countries convened by the United Nations Industrial Development Organization (UNIDO) in close cooperation with the International Council of Societies of Industrial Design (ICSID) and the Indian National Institute of Design in January 1979, in line with the Lima Declaration and Plan of Action and in pursuance of the memorandum of Understanding signed between UNIDO and ICSID on April 26, 1977 to accelerate jointly industrial design activities in developing countries in order to satisfy the urgent needs in this field, and to carry out as extensively as possible the promotional activities necessary to alert developing countries to the advantage of including industrial design in their planning processes.

### Adopts

The Ahmadabad Declaration on Industrial Design for Development.

2. Having reviewed the situation with respect to industrial design in a number of developing countries.

3. Bearing in mind that the design improves function, enhances communication, simplifies manufacture, use and maintenance.

4. Recognizing that the problem faced in most developing countries is that although design is a real need, it is not yet a sufficiently felt need.

5. Noting that design methodology is inadequately known and insufficiently used as an economic resource.

6. Aware that few countries have the organizational, financial and personnel resources which can enable industrial design to assume its proper role.

7. Convinced that design can help raise the quality of life within economic planning and that the designer can become an agent of progress.

8. Recognizing that through design, relevant cultural traditions can be preserved and utilized to current advantage.

9. Recognizing that cooperation between UNIDO and ICSID should not only further the transfer of technology, know-how and information in the field of industrial design, but should help to stimulate self-reliance.

10. Noting that UNIDO and ICSID have agreed to carry out as extensively as possible the promotional activities necessary to alert developing countries to the advantages of including industrial design in their planning processes.

11. Bearing in mind that as a first step towards achieving these objectives, this Meeting was convened to help initiate meaningful cooperation and exchange between institutions and designers concerned with problems of the developing world.

12. Having decided to adopt a common position and a line of action, the Meeting

**Solemnly declares**

13. Its firm conviction that design can be a powerful force for the improvement of the quality of life in the developing world;

14. Its firm belief that designers must have a clear understanding of the values of their *Olqn* societies and of what constitutes a standard of life for their own people;

15. That design in the developing world must be committed to a search for local answers to local needs, utilizing indigenous skills, materials and traditions while absorbing the extraordinary power that science and technology can make available to it;

16. That designers in every part of the world must work to evolve a new value system which dissolves the disastrous divisions between the worlds of waste and want, preserves the identity of peoples and attends the priority areas of need for the vast majority of mankind;

17. That in view of the foregoing, the Meeting adopts the various measures set forth in the following Plan of Action.

## **B. Plan of Action**

### **Measures**

1. Developing countries are encouraged to consider the establishment of design institutions, design centers and/or other design-practicing and promotional institutions to spread design methodology, awareness and consciousness.
2. These institutions should develop close and sustained links with industrial activity in government and in the private sector, at every level including heavy industries, medium-scale industries, small-scale, rural and craft industries, as well as with educational and research institutions, and with people who are the ultimate users of design.
3. In developing countries, the establishment of professional design associations which can function parallel to the design promotional institutions should be seriously considered, and such efforts assisted.
4. Design institutions are worthy of financial and other support by their governments, which must be their prime source of succour at this early stage of development.
5. These institutions must work to establish a priority for industrial design through the creation of a national design consciousness. They must hasten the

awareness that in all areas of public expenditure, the integration of design in the planning process can ensure optimum quality and utilization of resources. They must communicate that industrial design is concerned with the improvement of our environment through the appropriate use of raw materials, increased productivity, with the protection of health, human safety, natural and cultural resources, with the enhancement of working environments, and with expanding work opportunities and earnings at all levels, including exports. Therefore design considerations should be incorporated in plans for national development.

6. To achieve these purposes, such institutions in developing countries may consider the importance of articulating a statement on the importance of design which can serve as a national consensus on the need for creating design awareness and for utilizing design as a discipline for better planning.

7. Such institutions must stress the importance of establishing and improving facilities for design education and training, upgrading design experience, as well as assisting designers to act as trainers and as catalysts for design awareness wherever they work, so that design skills can be disseminated at several levels simultaneously, and thus influence industrial activity on a broad scale in the developing world.

8. The establishment of national design awards, exhibitions, documentation and publication programmes should be encouraged as aids to a wider understanding of industrial design and of design traditions and resources.

9. Systems of active cooperation should be established and promoted between design institutions in the developed and less developed countries, and between these institutions in the less developed world.

10. These cooperative arrangements could be bilateral as well as multilateral. International organisations including ICSID, UNIDO, UNESCO, UNCTAD, WHO, UNEP, IBRD, the Asian Development Bank and the African Development Bank, IADB and others should be encouraged to provide active support to such cooperative arrangements.

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