

## **Design, development and technology**

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Designers are today forced to move beyond the traditional role of bestowing form. Design is no longer associated simply with the aesthetics and the emotional factors. “ Development is the future. It is the new definition of Industrial Design” says Mark Dziersk of Herbst LaZar Bell, Chicago adding; “The art of product design has been transformed into the business of product development.” The product development phase, as is traditionally named, is one of the most crucial phases for the designer to make his product ideas see the light of the day. And there also lies the weakness of the designer. Designers are thought to be looking at the products and designing them from the users’ perspective and expect the engineers / technologists to convert their ideas into manufacturable and marketable products. Many of the product ideas do not see the light of the day, not because of any problems with their designs – in terms of their functionality, aesthetics etc., but mainly because they fail to pass through the stringent demands and constraints of the industry / business. There is a vast gap between the product idea/ concept and the product that comes out in the market, and this needs to be bridged. Only an Idea / concept - no matter how innovative that may be, is not enough, it needs to be developed in to a product that is acceptable by both the manufacturer and the market.

Whether it is a simple product like a clip or a consumer product such as mixer grinder or an automobile or an industrial product, they all need to be produced. And they need to be produced within the constraints of the clients and at the same time within the value perceived and therefore the cost that the customer can afford. There is no point talking about the design/ idea if it cannot be produced. Between marketing and producability, the latter is the bottom line; otherwise there is no difference between the artist and a designer. If the designer wants to take his/her project through to a successful conclusion - wants to see

his idea into market, he has to be more than a designer, he also has to be an engineer. As Industrial designers, an intimate relationship with materials and processes is critical. It is the medium through which we communicate our vision, and through manufacture, we realize our design's success or failure. As James Dyson puts it - " Design is the process of product development, researching new technology, conceiving a product, engineering it and designing it." Along with looking at the usability and the aesthetics aspects of the products, designers are also required to be expert in researching technology. It is this creative research in technology / engineering that will help designers to produce products that are revolutionary and can really make the difference in today's highly saturated global market. Design otherwise will simply remain as a styling exercise – cosmetic changes that are used for the last minute changes, and of no real value addition. Industrial Designers therefore, are required to have a sound general knowledge of the technology – the processes and the materials that are available, the skill levels and the tools that are available. As both the materials and the processes that are available today, have been thoroughly explored and exploited by the industries and engineers to survive in today's highly competitive market, designers' are expected to have more and more in-depth understanding of technology and more importantly the manufacturing aspects of the products. Manufacturing is a complex process and involves more than technical decisions, but it has a simple aim – to produce goods at the lowest cost. And materials and processes are the major cost factors that eventually affect the final price of the product. Before starting to design anything, a careful investigation is therefore required to understand the strengths and weaknesses of the production technology – the processes and the materials that are available with the client.

Exploration and developments of materials, manufacturing techniques and design are indistinguishable from one another. Often forms are the results of the birth of a new manufacturing method while in other instances a new technology was created to realize a designer's vision. If one looks at the historical evolution of Industrial Design as a profession, one would realize that, both the

manufacturing technology – the materials and processes, and the Design share the common past. During the 20<sup>th</sup> Century, the era of globalization, as the industry evolved from that of hand- made consumer goods designed and made by skilled craftsman to one of mass production with new materials and new technology, so too evolved the profession of Industrial design. The Bauhaus, started in 1919 to be a “Laboratory for mass consumption”, focused on design and material choices that were appropriate for mass production. Designers were led to experiment with materials and carefully scrutinize their designs for manufacturability and efficiency, often more so than for aesthetics. By taking into account the manufacturing issues into design, designers could also help reduce the cost of the products. This movement towards modern design thus depended heavily on new materials and manufacturing processes along with the new considerations for function.

Whether it was the side chair by Michael Thonet, one of the most famous nineteenth century chair that used steam - bending technology for wood laminates, the famous “Wassily” armchair by Marcel Breuer, that for the first time used standardized steel tubings, the “Fiskars” Softtouch scissors, the famous “Aeron” Chair designed by Herman Miller or the now famous Vacuum Cleaner by James Dyson, they were all the results of careful and in-depth study of materials and technologies so as to take full advantage of their properties and their strengths, thereby bringing in new approaches and new applications of materials and technologies available. In most of these cases, designers were personally involved in developing technology for their designs. These designs also used the production techniques far ahead of their time, pushing materials and aesthetics to the breaking point. It was through the joint evolutions of material, process and design and through these mutual explorations that great products emerged. Most importantly, designers, by challenging the existing technologies, also helped make significant engineering advances of their time. The ‘Palm V’ cell phone designed and developed by IDEO, one of the leading Design Consultancy firm is an excellent example of this. Through their

perseverance and creative engineering they could reduce the thickness of the product to half, made it simpler and elegant. They credit the source for these innovations to their research and explorations in technology and materials. They have a materials library named 'Tech Box' located all over their offices.

The rapid advance in science and technology leading to ever changing customer needs have shortened the overall lifecycle of the product. Also the technological developments have today, reached to a level of saturation -has mainly been horizontal rather than vertical, resulting in most companies offering more or less the same quality, in terms of the products performance, reliability etc. and the cost also more or less the same. This has shifted the entire focus of the companies from that of production and quality aspects of the products to the R&D and its overall time to develop new products. The emphasis today is on reducing the 'mind to market' time – the time that is taken for converting idea into marketable product. This calls for concurrent process at the product development level so as to come out with new products at faster rates. This requires companies to develop the design methodology that helps them visualize the entire lifecycle of the product – in terms of the problems that might arise at each of the levels – at the production level, at the assembly level, at the packaging level, at the transportation level and also at the user level, so that they could be taken care at the very initial stage itself. The companies cannot afford to take risk of failures, both in terms of time and in terms of resources, at any stages. This, thus not only requires the designers to have more and more specific knowledge of the technology but also to be a team member and have a distinct ability of networking with other members.

With the advent of new materials and processes, designers have gained immense freedom to venture into new areas never explored before. Designers have gained power to create products that effectively synthesizes both the art and the technology. Designers' ultimate dream of marketing products with their names has now been realized. Designers such as Philip Stark and Alberto Alessi

have today become the brand names in Europe. The latest technologies such as Rapid Prototyping and 3D Printing are changing the entire concept of production. The famous shoe brand 'Nike' offers possibility for the customers to design their pair of shoes, on their website, which would then be produced by the company and send it across to the customer. The industries are thus getting transformed from that of mass-production into mass customization era. It is now possible to design the product in one country and produce the same in another country for it to be marketed and used in completely different country. As it is said – in today's scenario the global product is one that has American attitude, European Design and Taiwanese Speed. All these, while making it easier to manufacture will bring in completely new challenges for the designers. As the industrial design as a profession shifts from the era of "Form follows function" to that of 'Form is Function', it will be the materials of the product and how it is formed that will communicate not only the product's functional and aesthetics qualities, but also its sensual and emotional character.

Product Development, in the context of India and other Asian countries, forms a crucial element in any Industrial design activity for this region. Majority populations of these typically highly populated countries form the middle-income group consumer segment that is aware but conservative and conscious towards new changes. This is therefore a highly cost sensitive market segment. Here, the products are expected to perform for prolonged use, necessitating frequent repairs and services, and finally may be resold to be reused or recycled.

Production criteria that affect the product's performance, quality and finally but most importantly the cost of the product, would therefore dominate the industries and thus also its design. There are large number of small-scale industries and auxiliary units that create enough competition among them, for constant refinement and up gradation of their products. Industrial Design here would therefore invariably begin with understanding the technology and most importantly the manufacturing constraints. Design here means developing the product together – with the client, who may be the self-made entrepreneur, with

the workers at the shop floor, besides the vendors, etc. Designers through their wide exposure and experience and through their ability to take holistic view are expected to perform as a catalyst to bring in new changes and new vision for the industry. These industries provide enough opportunities for the designers to develop completely new designs – as is easier at this level, or refine and improve the existing design entirely from the materials and processes point of view. A small saving either in terms of materials, reduction or elimination of a process, reduction in the assembly and / or production time of a worker, reduction of inventory, small improvement in packaging that results in lower breakage and wastage or can transport more products, can provide vital breakthrough for the success of the industry. Designers' problem solving ability and ability to effectively communicate at various levels gets tested here. Therefore the designer must have the clear understanding of in terms of manufacturing that is the materials and process capabilities of the client, skill and experience level of the workers and vendors and also the financial capabilities of the client and converting these constraints into a unique opportunity becomes a crucial challenge for the designer.

It is therefore only the in-depth understanding of technology that would provide, in today's context and also in future, the much-needed direction for explorations for new and meaningful designs. Ability to do in-depth research, hands on experience, explorations of new materials and processes, prototyping and testing them, are therefore the vital skill sets required by the Industrial designer if s/he has to succeed in the future. It is important therefore for the industrial designers to attain the capability to creatively capitalize on technology to produce spectacular products.

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