

## **Inclusive growth by ‘design’ Bamboo Product success through I-CAN Design Process**

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**Abstract:-** World economy is growing at a phenomenal pace. After the IT revolution, “Design” has caught the imagination of the world. Globally the “Design” based economy has grown multifold. It has impacted the social structure of the global society. India is seeing a paradigm shift owing to this global trend. Indian design talent is being increasingly recognised globally. A good product design is created in a highly complex process which follows a pattern and is divided into various phases or development steps. The *Design Process* forms an integral part of the evolution of a good designed product.

*I-CAN Design*, a *design process* conceptualised and formulated by this author for evolving any product design. Inspiration, Conceptualisation, Adaption and Nurture are the four pillars of this Design Process. Each phase is subdivided into activities which helps in coming out with the optimised solution for the given product problem. I-CAN Design suites product development for any industry or field. This universal design thinking approach optimises the development time and the intended solution.

*I-CAN Design* was deployed in the development of Bamboo products at Bamboo Masters, Pune in the state of Maharashtra, India. A team comprising of designers, artisans, assemblers and marketing experts participated in this activity. Case study was a combination of experimental design and Participant Observation done by the author.

The research questions were:

1. Will *ICAN design process* be successful in a small cottage unit of bamboo products?
2. Will this process be profitable to the entrepreneur and will it improve the skills of the artisans in making bamboo products?
3. Will it improve efficiency of the artisans?
4. Will it increase earnings of the artisans and the profitability of the entrepreneur?

*Terrabamboo* pendant, is a contemporary product for urban use, designed using hand woven bamboo matt, hand crafted terra cotta (backed clay) and bamboo beads. Special focus was to deploy, promote the age old traditional skills of the rural craftsman in these two sustainable and easily accessible natural materials. The design process employed, manufacturing technique & the social participation ensured success for this bamboo product.

**Keywords:-** -CAN Design, Design Process, TerraBambu, Bamboo Matt, Modular, Sustainable, Bamboo Masters

### **I. INTRODUCTION**

It has been established that design process is an integral part of the evolution of a good designed product. Such products lead to consumer satisfaction, better sale and profitability of the enterprise. This author had demonstrated from the qualitative and quantitative data that the ICAN design process achieved a good success in respect of three products designed earlier. It has been demonstrated that the corporate leaders, product designers, marketing personnel and other stakeholders consider design as an important ingredient of the product success.

The present study attempted to find if the *I-CAN Design Process*, can lead to similar results in a bamboo craft industry in the unorganised sector. This cottage industry has negligible capital investment and low working capital and unskilled labour and is without marketing and sales personnel in its employment. Learning from the success of high technology and high worth products, the low tech and high skill- based industries like craft is destined to benefit the most. However, there are no studies to decide if this presumption is true. The present case study is an attempt to find out how the principles of design processes can be exploited for the benefit of the entrepreneur in the Bamboo craft cottage unit, its workers, marketing and sales personnel, and ultimately the consumer.

Many institutions like Bamboo Studio at IDC, IIT Mumbai, NID, Ahmadabad, Cane and Bamboo Center Guwahati, IPRITI Bangalore, KONBAC, Kudal, Bamboo Center, Lavasa, Pune, have benefited by 'Design' for their bamboo products

## **II. OBJECTIVE OF THE STUDY**

The Pune region has a cluster of automobile production centres. Each centre is a multi-crore high tech modern organised industry. Each of these units has large number of highly trained engineers and skilled workforce. Each is capital-intensive activity. These centres deploy design processes that help the centres to be profitable, workers to earn good wages and consumers to get impressive and well-designed vehicles.

The bamboo craft, on the other hand, is a cottage industry manned by untrained and unorganised artisans who were not exposed to product design processes. The industry is not a cost-intensive and high investment business activity.

### **Research Questions:**

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### **Research Methods:**

#### **Case study with a combination of experimental design and Participant Observation.**

This author is an industrial product designer trained at the Industrial Design Centre of the Indian Institute of Technology, Powai, Mumbai and leads a team of product designers at the Mahindra Composites Ltd, Pimpri, Pune. He used the I-CAN Design Process to prove that design is essential for the success of products. He got involved in designing and developing products in bamboo using this process.

The study was planned as follows:

- The author participated in this activity along with people from the bamboo community under and NGO, BURUD ( Bamboo Utilities, Research and Development ) at Hadapsar, on the Eastern outskirts of Pune city from 2004.
- An independent brand was created as a business enterprise named 'Bamboo Masters' which was spearheaded by the entrepreneur Mr Rajendra Sakpal
- The activities were carried out under the team of 'Bamboo Masters' at every stage of the development and marketing of the products. It was as follows:
  - Conceptualisation of a bamboo product
  - Market study for need assessment, Profile of the potential consumer
  - Product design ideation
  - Production design, survey of the potential customers,
  - Packaging, Marketing

### **1. Data Collection**

#### **2.1 I-CAN Design**

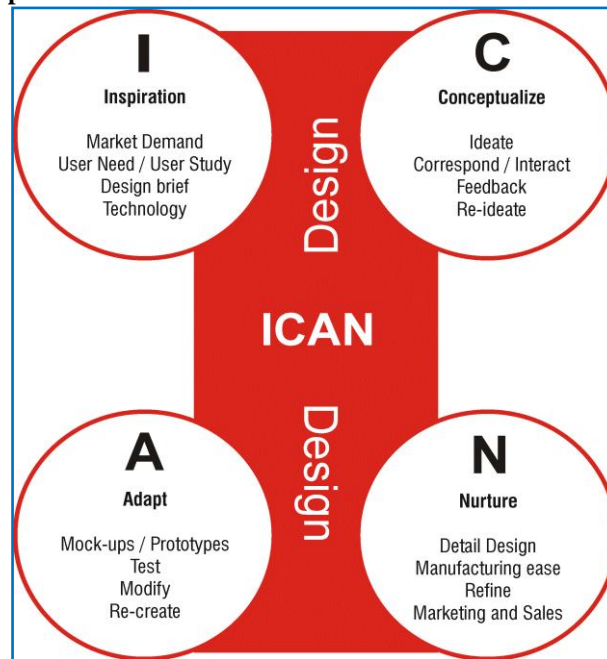
Many practising designers, academicians, and experts have come up with different Design Processes for development of new products. Design Thinking or Design Process has been an integral part of many product successes. The experience of handling different design projects, analysing different types of design process and this researcher's understanding led to the evolution of a design process, which he calls '*I-CAN Design*'.

*I-CAN Design*, a *design process* was formulated for evolving any product design. I-CAN is an acronym of Inspiration, Conceptualisation, Adaption and Nurture are the four pillars of this Design Process. Each phase is subdivided into activities which helps in coming out with the optimised solution for the given product problem. I-CAN Design suites product development for any industry or field. This universal design thinking approach optimises the development time and the intended solution.

Design Thinking or Design Process is a multi-disciplinary activity. Nobody can work in isolation. It has to be a team work. Every member of the team is equally important. Every individual in the design process has to be well equipped, passionate about his/her work and should have the confidence within. The philosophy of 'I-CAN

Design' is that the activity starts with 'Individual' who is expert in a particular field. The input is pooled in for the common goal and at the end that 'individual' is responsible for the delivery of the product aspect which the individual is expert of. Thus, a group along with an individual's identity works for the bigger and common goal of problem solving.

**I-CAN Design process map**



**2.2 I-CAN Design Process – an integral part of the development**

The process for development of a bamboo product was initiated at 'Bamboo Masters', at Hadapsar, on the eastern outskirts of Pune, in Maharashtra.

- a. Initiate it at the Start: Every member of the team was involved from May 2008
- b. User centred approach

The team adopted the User Centred Approach. It related to human behaviour, needs, and preferences to be given equal importance along with technology and business economics. This allowed the development team to differentiate between the needs and the wants of the user. It captured the unexpected insights and helped the team collectively conceive a product which correctly reflects the aspiration of the user.

**Fast Prototyping and testing**

The wheelbarrow of ideas was tried out in quick succession. The cycle of rapid prototype, experimentation, re-modification were executed quickly. Small teams of 'Bamboo Masters' members were given sufficient freedom to make quick prototypes to test out the ideas which helped finalise the design quickly

**Expert opinion**

The design ecosystem was nurtured by seeking inputs from experts. This helped in understanding different materials, processes, and methods of creating the bamboo based product.

**Co-create**

The team explored ways to work with several diversified inputs.

**2. Case study of Development of Terrabambu Pendant**

The Bamboo Masters, had already developed and sold Bamboo products without deploying the ICAN process. These were well-received but the production, productivity and quality had limitations. It was also difficult to scale up the activities for replication and higher production volumes.

Following product variants were developed during this process



**Terrabamboo pendant**

### III. PRODUCT EXPLANATION

The **Terrabamboo pendant**, an Indoor Lamp, is a contemporary product designed using hand-woven bamboo matt, hand crafted terra cotta (baked clay) and bamboo beads. Special focus was to deploy, promote the age-old traditional skills of the rural craftsman in these two sustainable and easily accessible natural materials. The various parts were manufactured by women Self-Help groups and assembled thereafter. The bamboo strips required for the product were manufactured with semi-automated machine at a central location. This ensured the right quality, dimensions and finish of the strips. A weaving fixture is given to the various interested people, mostly women, who created the woven mats. This ensures that all the mats were made of the same standard. These mats were bought back from the individual's home or from the Self Help group centres at the central processing location. The terracotta piece was manufactured at the local potter as per the given design and specifications. Converting components into the product was done at the central processing unit. The product was marketed thru various gift shops and interior shops across the city.

This provides a sound business model for the artisans as well as the promoter of the product. More such applications and items need to be created. This will happen only with increasing awareness about this wonder material. The products are developed using the modern manufacturing machines, fixtures and processing techniques. The production approach of subassembly manufacturing at dedicated workstations gives the best inputs from the skilled workmen. The assembly line setup ensures very good repeatability and quality of the product.

#### 3.2 I-CAN Design Process adopted

This time the Bamboo Masters team decided to adopt I-CAN process under the guidance and involvement of this author. It was carried out as per the following steps:

##### A. Inspiration

Inspiration to develop a product in bamboo came from the the resilience of bamboo – an inherent characteristic of the natural material, the traditional skills of the artisans and the possibility of getting to feel nature.



**a. Market Demand :**

The Development team members at Bamboo Masters undertook a survey to assess the market demand. It revealed that

- There was a constant quest of the urban consumers to have something different and new, using traditional artistry with eco-friendly material. Market existed for a product which fulfilled this desire of the user.
- Product applications ranging from table top accessories, jewellery to interior decoration items were in great demand.
- Outlets like Fab India are instrumental in fuelling the growth of this market.
- A methodical approach was adopted to gauge the requirement of the market thru a survey conducted by KARWAK, a speciality store for eco-friendly gift articles. Interior decoration items emerged as the most sought after products which needs constant innovation.
- **Competition:** The survey revealed that there was competition to such products made by machines and other mass-manufacturing methods from roadside, one-off products produced by the unorganised sector-

**b. User Need :**

The study offered the following user profile for the product:

- Higher middle class and above, young middle aged 25 - 45 years, having own house, who spend on exclusive interior use products. He needs gifting items for his friends, family and business associates. Wants to establish himself as a person promoting eco-friendly way of life. He takes pride in displaying his prized possession and considers himself innovative modern by giving such exclusive gifts.
- The product should be easy to use, install, pack and transport. The product has to be rustic yet urban and contemporary. Use of garish colours is a complete no-no. The surface-colour should be subtle. The product should be available easily when required.
- Branding possibility is an advantage.

**c. Understanding the Craft - method of manufacturing**

There were meetings for discussion to understand the available craft forms – Baked Clay and Bamboo.

- The craft skills and the facilities available were analysed. The method of manufacturing was studied.
- Bamboo strip making is a traditional art with the ‘Burd’ community in Maharashtra. It is used extensively to make utility baskets. This skill was taken as a source for designing the product.
- The art of making pots on a potter’s wheel was another probable craft which was studied. The possibilities of various forms getting manufactured with what accuracy was explored.
- The artisans’ limitations and strengths were analysed to aid him to create the product.
- The artisan was considered the focal point and the first consumer of the ‘Design.’
- Mr Rajendra Sapkal, the leader of the organisation, and his team were the key members of this activity.

**d. Product Integrator :**

The establishment or group of facilitators who would be instrumental in integrating the product was identified. Their requirements for manufacture of these products were studied. They, thus, become a vital ‘user’ of the product before it would go out in the market.

**e. Marketing and Sales :**

The front face of all the activities is the Marketing and Sales force. This user is of paramount importance, whose requirements were noted down. They required a detail account of the nature of the product, its unique selling propositions, and product differentiators to aid them to market the product.

**f. Design Brief :**

With these user expectations, a design brief was created for an indoor LAMP as follows:

1. Product for the urban house hold
2. Modular construction
3. Easy to install and maintain
4. Unique / different from competition
5. Should have terracotta (baked clay) and woven bamboo as a material of construction

**g. Technology :**

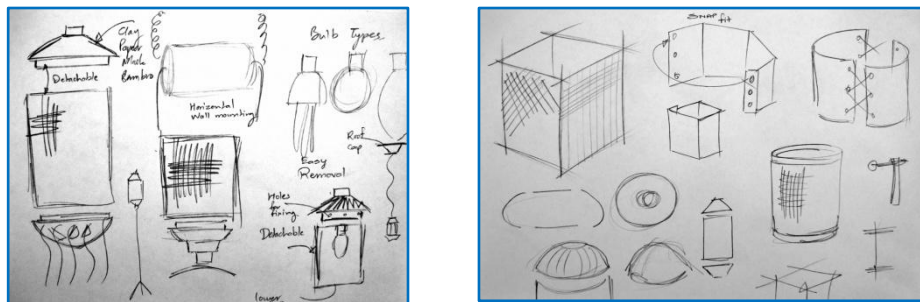
Manufacturing process considered was the traditional potter's wheel for the clay component and bamboo sliver ( thin strips of bamboo to make matt ) making and weaving for the bamboo component. These manufacturing methods, its advantages and limitations were studied and analysed before the start of the conceptualization phase.

**B. Conceptualize**

**Ideate:**

Multiple concepts were evolved for the product. This ideation phase did not have any restrictions as far as feasibility was concerned. The wheelbarrow of ideas was evaluated for various criterions. Feedbacks from various stakeholders on the product ideas were sought. The artisans were the primary source of interaction and feedback in this development phase. In addition, the product integrators and the marketing team gave in much needed inputs.

Concepts for the method of construction of the main body of the lamp were created. The interdependence of the baked clay component, the diameter of the bulb and the end caps were ideated with different construction. Various shapes, sizes were explored as follows.



**C. Adaptation**

Quick prototypes were created using the available material – paper. Various permutations and combinations were tried out to confirm the thought process. These mock-ups were tested for its intended purpose. The adaption of the design for the product was strengthened by re-creating and modifying the test results. The material and process to be used was analysed for ease of manufacture considering the appropriateness of the intended design.



Various options in the Bamboo matt pattern were tried out to aid the proper throw of light from the lamp. The possibility of foldable cylinder was also explored. The edge detailing for the cylinder of a specific diameter was arrived at. The diameter of the cylinder got decided in relation to the diameter of the light source. To help achieve the desired diameter of the bamboo matt cylinder, it was decided to use the available PVC water pipe as a reference for its repeatability.

The terracotta end caps were made accordingly. The dimensional tolerance achieved after the clay gets dried up were tested and finalised. For fixing the bamboo cylinder various options were tried out.

**D. Nurture**

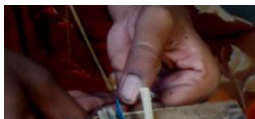
The crucial stage of the development process is Nurturing the ‘design’ which gets created to achieve the task at hand. The detailed component design, its detailing was worked out. Design for manufacturability is the focal point of this phase. The decision of the manufacturing flow, assembly details, and finalisation of the bill of materials (Product ingrediants) was taken here. Refinement in design in terms of the surface texture, finish, colour, embellishment was done.



**Product components**

The design was refined with all the considerations and various modular versions were created. The different fitment methods were made as per requirement for vertical, horizontal, and table top mountings. Once the product was fully built, the communication material for its marketing was conceptualised and created. The pitch was for the corporate buyer as well as the individual buyer. The appropriate packing material was devised.

**Production Value chain**



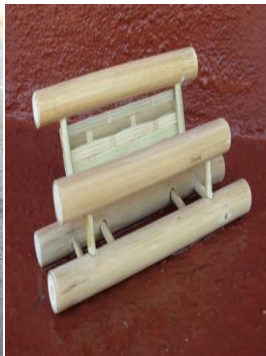
Ensuring quality, repeatability using Appropriate Tools for making strips used for matt making

Equal Strips for Matt weaving

Raw material inward outward register

Training for matt weaving at factory

Matt weaving at individual's house





Quality check before Matt in-warding



Conversion of Matt to cylinder using standard fixture



Assembly line for converting components into final product



Product Packaging

### Launch in the market

The product was introduced in the market in 2009, through Karwak, a marketing consultancy, in Pune. It had already helped establish a network of workforce who got the opportunity of working from their own homes and was still part of a bigger chain of manufacturing this unique product.

Mr Rajendra Sapkal, the master craftsman, became the focal point of the creation of this product. He managed the activity with the help 4 full time workers, who assembled the entire product. A cluster of 20 to 30 women who feed in the components to the main assembly station was evolved. The success of the activity was multiplied by the number of people who have been impacted with livelihood development due to 'Design'.

### Product Economics

The economics of one of the orders of 1500 nos for corporate gifting this Diwali

Selling Price : Rs 400 per unit

Cost Price : Rs 210 per unit

1	Strip Cutting	20
2	Matt Making	45
3	Cylinder making	30
4	Terra Cotta end caps 2 nos	30
5	Assembly	35
6	Packing	50
	Total Expenditure	190

The cost of marketing, capex, overhead along with the profit was recovered from the selling price of the product. All the stake holders in the production value chain gained a lot of insight, learning and a decent remuneration for the collective efforts put in by them.

The ICAN product design process was subsequently used to develop following products

## IV. SUMMARY AND CONCLUSION

The product developed using the *ICAN Design Process* created value in the following manner

- Simple throwing on potter's wheel and bamboo matt-weaving technique were used to design this 'terrabambu' pendant.
- Adequate provision was made in the design of the product and selection of production process to ease manufacturing, assembly and installation.
- Peg and hole detailing to assemble the bamboo matt component and the terra cotta top/ bottom component was incorporated.
- Variants were developed using the basic top bottom piece in terracotta and the bamboo matt cylinder.
- Modern yet simple methods of jigs and fixtures were deployed and taught to the traditional artisans as well as first time workers.
- Individual components were manufactured at various locations – at the homes of every craftsmen.



- Final assembly and finishing was carried out near the point of sale. This was a typical example of a 'Spoke and wheel' arrangement.
- This helped decentralise the manufacturing process and achieve a perfect assembly line approach. The expertise of the individual was put to maximum use where ever it was required the most.

The I-CAN design process proved to be successful in a small cottage unit. The success could be measured in terms of profitability for the entrepreneur, Mr. Rajendra Sakpal, who was in the business for over two decades. For him it was the first systematic approach to design, develop and produce a bamboo product. The artisans were able to earn better and could improve their skills. That they were happy with the approach was proved by their continued participation during the production process of subsequent products, The confidence level of the sales and marketing team to take in such challenging orders increased. Corporate gifting requirements at KARWAK saw an upward trend. The I-CAN Design process proves to be applicable to low tech high human skill products similar to the high technology – machine manufactured products.