A Conceptual Framework for Opportunity Identification in Product Design Innovation

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by

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– Declaration–

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Abstract

Innovation is being increasingly recognized as a key factor for the growth of enterprises. As Drucker puts forth, every organization – not just business – needs one core competence: innovation. Consequently, it has been recognized that the opportunity identification and implementation phases of innovation are required for continuous innovation. Opportunity implementation stage has been studied extensively and given a lot of importance but there insufficient attention has been paid to the opportunity identification stage. This stage was too important to be left to chance. A planned approach to opportunity identification would help designers contribute towards innovation.

Opportunity identification stage becomes critical since seeding of innovation for new product development takes place during this stage. This has led to the recognition of opportunity identification phase as a creative phase which requires design thinking and approach. It has also been recognized that industries need a framework or a planned process to identify opportunities and develop new products based on these opportunities. This research study investigates the possible role of design in opportunity identification phase with an objective to arrive at a conceptual framework for this purpose. Further, this study considers an open model of innovation wherein industries/organizations collaborate with external designers/ design academia to bring a fresh perspective to opportunity identification of products and has been carried out in this context. The motivation for investigating this area was to gain a better understanding about the role of designers and design thinking in identifying opportunities for

identification for product innovation. What were the approaches and methods which can assist in arriving at various design opportunities? These are some of the issues which have been a focus of this research.

Thus, focus and scope of the research study has been to identify opportunities in an open innovation framework in which industries and design academic institutions collaborate. The objective of this research study is to evolve a conceptual framework which is generic in nature and not intended to provide techniques and guidelines for a specific project context.

The entire research work has been organized and presented in nine chapters. The first chapter, **Introduction to the study**, has introduced the idea of this study and briefly provides information about the objective, issues, scope and methodology of study.

The second chapter, **Literature review** has provided concise information on relevant areas such as innovation, opportunity identification, and design approaches. This chapter has also provided a brief review of literature pertaining to the area to understand the gaps in knowledge as well as extending the existing knowledge further for the research objective.

The third chapter, **Design of research study** has described the nature of knowledge in design and its implications for research query. Since the objective was to study current phenomena i.e. opportunity identification in detail and try to understand the process i.e. how and rationale i.e. why, case study was considered to be an appropriate method for inquiry.

A research framework to conduct this research study and an overview about the research method based on multiple case study method implemented in the research study has been given in 'Design of research study' chapter. This research framework helped in conducting original case studies in academic set-up and further analyzing the same.

These case studies were conducted to investigate various factors pertaining to opportunity identification based on the framework for case studies (Yin, 2009). Multiple data collection methods helped in the triangulation (Yin, 2012). Initial coding for all case studies was done based on research queries. (Saldana, Johnny, 2009). This included investigation into 'what' contributed to coming up with design opportunity/idea; 'how the design opportunities/ideas were arrived at and rationale for the same (Yin, Robert, 2012). This was followed by multiple case studies to replicate findings and draw parallels.

The fourth chapter, **Preparing case studies**, has described case study method and preparing case study in detail for writing and further analysis. Case studies involved collaborative projects between academia and industry/organisations. A criteria of selection was developed through which 10 case studies were selected from 36 case studies which were conducted. These case studies were written in terms of actions and thoughts. The method of inquiry was described in detail. All the 10 case studies were written based on the outline provided in this chapter which then became the basis for initial coding and analysis.

The fifth chapter, **Initial coding of case studies**, presents initial coding for each case study which was carried out based on the research questions put forth after analyzing the gaps in the literature study. The initial coding method used was structural coding.

The sixth chapter, **Single case study analysis**, has elaborated the framework for conducting single case study analysis. Unique aspects pertaining to each of the case studies were noted. The seventh chapter, **Multiple case study analysis**, has both cross case analysis as well as multiple case study analysis. Multiple case study was similar to conducting multiple experiments rather than sampling. This study enabled a more in depth understanding of each of the opportunity identification factors identified previously. Multiple case study also enabled replication logic of phenomena across case studies to further strengthen the findings.

The eighth chapter, **Findings and recommendations**, has synthesized learning from research work and offers a conceptual framework to be implemented by the practitioners to promote innovation in their organizations in the open innovation framework. Based on the understanding derived from the project context, factors for opportunity identification, the rationale for opportunity identification, the role of design and design thinking in identifying opportunities, the relation between developing new opportunity area and product ideas as well as the phenomena of opportunity extension; a conceptual framework was developed. Six factors have been identified to be playing an important role in opportunity identification. Factors such as questioning undefined parameters helped in broadening the scope of opportunity identification. Factors such as building on strength, resolving concerns and identifying gaps helped to identify opportunities based on existing project context whereas considering larger patterns and trends, changing meanings and envisaging future scenarios helped to identify opportunities based on building a future.

The project context had a major implication on the identification of opportunities. Factors within the project context which have an impact on opportunity identification include the

degree of freedom given to the designer determined by undefined parameters in the project context. It was found that the degree of freedom was usually more in start-ups and companies which want to diversify into completely new areas versus established companies.

Design approach played an important role towards using the six identified factors mentioned earlier. Consideration of design thinking parameters such as multiple perspectives, making creative associations and opportunity elaboration/extension while considering the six factors were found to play a significant role for opportunity identification. The most salient feature of the study is the nature of design opportunities and design approach towards identifying opportunities. Making creative connections and elaborations, considering multiple perspectives and a non linear approach can be found throughout the opportunity identification phase.

Process and system opportunity areas became the basis for product ideas. Approaches to 'Opportunity identification to product ideas' and 'product ideas to opportunity identification' and factors which contribute significantly to them were elucidated. This phenomena was found when ideas were elaborated keeping in mind the project/organization purpose or considering possibilities of making product families to increase the impact. Product ideas may also lead to opportunity areas through considering possibilities of exploiting product features or process/material/system associated with it to achieve maximum impact and gain.

The ninth and final chapter, **Conclusions**, has summarized the results of the study. This chapter has also elaborated on the implications of findings in the changing context of design. The research contribution in terms of fulfilling the objective of research study and possible implications of using the findings in practice are detailed. This research study has established major factors affecting opportunity identification for innovation and has also put forth salient features and designerly approaches towards the same. As such, the conceptual framework is expected to help in gaining a better understanding of opportunity identification for design innovation and help towards arriving at a range of diverse opportunity areas from various perspectives. An understanding of various factors contributing to discussions on design approach towards opportunity identification will help by providing an exploratory, creative approach rather than a linear predictable one towards innovation.

Keywords: Open ended Innovation, Opportunity identification, Design approach, Multiple case study method, Conceptual framework

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Chapter 1

Introduction to the study

1.1 Background

In an increasingly competitive world, organizations have been considering innovation as a vehicle for growth and sustenance. In order to survive and grow, industries need to carry forward the activities of new product development and marketing. Consequently, it has been recognized that opportunity identification and implementation phases of innovation were critical for continuous innovation. It has also been recognized that industries need a framework or a planned process to identify opportunities and develop new products based on the same on a continuous basis.

Design has been playing a critical role in new product development. Based on the same, an argument is put forth that design with its planned, creative approach can make a significant difference in the opportunity identification stage of innovation itself. Further, there has been a lack of framework or guideline to arrive at opportunities. This research study investigates the possible role of design in opportunity identification phase with an objective to arrive at a conceptual framework for this purpose. This study considers an open model of innovation wherein industries/organizations outsource outside designers/ design academia to bring a

fresh perspective to opportunity identification of products and has been carried out in this context

1.2 Innovation and opportunity identification

Innovation has been increasingly recognized as a key factor for the growth of enterprises. Every organization – not just business – needs one core competence: innovation (Drucker, 2002). Innovation has often been defined as invention plus implementation/ commercialization. Innovation has involved both opportunity identification and opportunity evaluation. Opportunity identification has been considered to be the explorative creative phase which results in ideas and concepts whereas opportunity realization phase includes evaluation and planning for commercialization.

It has often been felt that innovation cannot be planned; however, it may be equally dangerous to leave innovation to chance. Due to severe competition it has become imperative to arrive at new products on a continuous basis. This requires a better understanding of opportunity identification and planning.

There have been many processes which explain opportunity identification in innovation. The process models deal with recognition of opportunity followed by concept-product formulation (Cooper cited by Gaynor, 2009) or idea generation followed by opportunity identification (Quinn cited by Gaynor, 2009). However there has been a lack of clarity on how ideas actually become opportunities. There has also been a lack of understanding on how opportunity areas lead to product ideas. Opportunity identification stage becomes critical since seeding of innovation for new product development takes place during this stage. This has led to the recognition of opportunity identification phase as a creative phase which requires design thinking and approach.

1.3 Role of Design

Design has been defined as a planned, structured process to arrive at creative products, systems and services. Designers have been dealing with complex realities while working on projects. They routinely need to deal with not only specific problems but also aspirations, issues and concerns. The initial phase of design has often been termed as the fuzzy front end of design because of the vague mixture of intentions and possibilities. It is expected that

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opportunity identification in design would help in bringing clarity to the 'fuzzy' initial phase of design and provide creative design directions for designing products. Design thinking has a critical role to play in identifying opportunities and strategies for industries. There were many industries/institutions which were faced with the challenging task of deciding 'What new product/ service/scenarios can we come up with?" Design methods and approaches may help towards bringing about a collective and creative approach towards opportunity identification within industries.

However, there exists minimal work in terms of methodologies/conceptual framework for this stage of design.Opportunity identification process in the initial phases of design does not seem to have been extensively studied and is still seen to be 'fuzzy'. The fuzzy front end was represented by Darrel Rhea in his article on ' Bringing clarity to the fuzzy front end' as a cloud with a vague mixture of ideas, trends, requirements etc. which gets into the funnel and through insight, gets churned out as a product brief (Laurel, 2003). The first phase of the inverted cone involves discovery and observations, forecasting and identifying opportunities.

1.4 Objective of study

The motivation for investigating this area was to gain a better understanding about the role of designers and design thinking in identifying opportunities for product innovation to arrive at a conceptual framework which may enable opportunity identification for product innovation.

The problem presented by a lack of conceptual framework/guidelines for finding design opportunities was perhaps accentuated in entrepreneurship. What were the approaches and methods which can assist in arriving at various design opportunities? These were some of the issues which have been a focus of this research.

Further investigation was also carried out on understanding the need for identifying opportunities as well as factors which contribute significantly to opportunity identification. The phenomena of ideas evolving into opportunities were also studied. Concurrently, the unique design approach taken by subjects towards identifying opportunities was analysed.

This research study was aimed at bringing about a better understanding of various aspects pertaining to identifying design opportunities and arriving at a conceptual framework which will assist in arriving at new design opportunities relevant to project contexts.

Since the objective was to study current phenomena i.e.opportunity identification in detail and try to understand the process i.e.how and rationale i.e.why, case study was considered to be an appropriate method for inquiry. In accordance with the phenomenon of open ended innovation, industries/organizations often approach design institutions in order to collaborate on and explore a wide range of possible opportunity areas. It was decided to study opportunity identification taking place in this context and frame of reference.

1.5 Methodology

These case studies were conducted to investigate various factors pertaining to opportunity identification based on the framework for case studies (Yin, 2009). Multiple data collection methods helped in the triangulation (Yin, 2012). Research methods included sketches, models, project presentations, observation notes, and interviews with key sources. These methods were used to fortify this study.

Case studies for the research study were selected based on parameters which included availability of project data, projects representing various sectors and projects extending the understanding of opportunities. This was subsequently followed by writing case studies which included writing the project context and background; series of action/events that took place; design opportunities and ideas that were identified/generated for a project and series of thoughts pertaining to the same (Yin, 2009).

Initial coding for all case studies was done based on research queries. Secondary coding helped in arriving at broad categories (Saldana, Johnny, 2009). This was followed by within case analysis to understand unique features related to design opportunities within each case study. This included investigation into 'what' contributed to coming up with design opportunity/idea; 'how the design opportunities/ideas were arrived at and rationale for the same (Yin, Robert,2012). This was followed by multiple case studies to replicate findings and draw parallels.

Findings from this study helped in identifying factors pertaining to opportunity identification and also provided qualitative data to understand nuances pertaining to the same. Opportunities related to new markets, new production systems, new processes, new products and new experiences may be identified through the use of factors pertaining to the vision, concern, meaning making and through building on existing trends as well as strengths of the organisation. Phenomena of both pull as well as push innovation was observed. Some other salient features observed were ability of designers to concurrently shape project purpose while identifying opportunities, consider factors from multiple perspectives and ability to integrate in order to identify new opportunities.

Further research contribution included an understanding on the manner in which design thinking can make a difference and contribution in opportunity identification phase; linkages between project context and opportunity identification as well as understanding the manner in which ideas get elaborated to become opportunities.

This research study has also helped in bringing forth many tacit dimensions of opportunity identification for product innovation and making them more explicit. An understanding of the process and rationale behind opportunity identification has helped in arriving at a conceptual framework which is expected to be useful and relevant for those practicing in the 'fuzzy front end' of opportunity identification and design innovation.

1.6 Organisation of thesis

The entire research work has been organized and presented in nine chapters. The present chapter, **Introduction to the study**, has introduced the idea of this study and briefly provides information about the objective, issues, scope and methodology of study.

The second chapter, **Literature review** has provided concise information on relevant areas such as innovation, opportunity identification, existing methods and process, design and creativity and puts across the argument that design can play an important role in the opportunity identification phase of innovation. This chapter has also provided a brief review of literature pertaining to the area and provides an analytical structure to identify gaps in critical knowledge areas and research queries.

The third chapter, **Design of research study** has described the nature of knowledge in design and its implications for research query. Method of inquiry and research framework needs to be conducive to research queries put forth in the preceding chapter. This had led to developing a methodology which was built on learning from practice of design and analyzing the same. Multiple case study method was found to be suitable to carry out these types of research studies.

This research study was conducted in three different phases. A lack of relevant case studies, made it pertinent to conduct these case studies through a process of collaboration between industry and academia. A framework for conducting, recording, selecting and writing the case study was established. This resulted in a selected set of case studies which were then coded to provide initial findings. In the second phase, single case study analysis was carried out to understand the unique features of each case study. In the third phase, multiple case study was carried out which consisted of both cross case analysis to understand the attributes in further depth as well as a study of patterns across case study to further strengthen the findings through replication. A conceptual framework was generated through consolidation of all the research findings.

The fourth chapter, **Preparing case studies**, has described case study method and preparing case study in detail for writing and further analysis. Case studies involved collaborative projects between academia and industry/organisations. Only projects which entailed the opportunity identification process were considered. Triangulation method for data collection was carried out and the case study was written based on the same. A criteria of selection was developed through which 10 case studies were selected from 36 case studies which were conducted. These case studies were written in terms of actions and thoughts.The method of inquiry was described in detail. This would cover generating the case studies, collecting case study data, analyzing the same through multiple case study analysis method and arriving at findings and results.

Development of original case studies was a major component of the research method. This includes process of developing a framework for generating original case studies, networking and collaborating with industries/organizations and conducting the same. Triangulation of data collected through project presentation notes, observation notes, interviews, sketches, and

models further helped in consolidating the data. The chapter also gives a written case study as an example.

The fifth chapter, **Initial coding of case studies**, puts together all write-ups for selected case studies. Initial codes were developed based on the research queries and all case studies were coded in order to arrive at initial findings. The initial coding helped in arriving at broad categories. The chapter contains examples of all case studies written, coded and analysed.

The sixth chapter, **Single case study analysis**, has elaborated the framework for conducting single case study analysis. Unique aspects pertaining to each of the case studies were further elaborated in terms of findings.

The seventh chapter, **multiple case study analysis**, has elaborated on cross case analysis as well as multiple case study analysis across all case studies to further strengthen the findings through replication logic and to describe main factors pertaining to opportunity identification in detail.

The eighth chapter, **Findings and recommendations**, has synthesized learning from research work and offers a conceptual framework to be implemented by the practitioners to promote innovation in their organizations in the open innovation framework. A conceptual framework for opportunity identification in design was put forth based on f indings. The chapter also contains description of findings as well as relating them with literature.

The ninth and final chapter, **Summary and Conclusions**, has summarized the results of the study. This chapter has also elaborated on the implications of findings in the changing context of design. The idea was to weave the findings back into practice. The research contribution in terms of fulfilling the objective of research study and possible implications of using the findings in practice are detailed. Future scope of this study is presented with a view to further an understanding of this area in design.

1.7 Concluding remarks

As mentioned earlier, innovation has been the key to growth and survival for organizations/ industries. Opportunity identification phase of innovation has been recognised to be critical

since seeds of innovation take root during this stage. Considering this, it has been argued that design, through its planned, contextual, creative approach can play an important role in this phase.

This study has aimed at understanding the role of design in opportunity identification phase in order to develop a conceptual framework for the same. One of the critical aspects in the research study has been to review existing literature with the intention of understanding gaps in knowledge as well as extending the existing knowledge further through research study. Accordingly, the research scope and methodology have been defined. Hence, this research study uses multiple case study method to study patterns across case studies in order to arrive at factors which contribute to identifying opportunity areas. The findings of the study were consolidated further through replication logic as well as bridging analytical gaps in learning set forth in literature review. This is expected to enable industries/organizations to identify a variety of opportunities.

Chapter 2

Literature review

2.1 Introduction

Innovation has been increasingly recognized as a key factor for the growth of enterprises. Every organization – not just business – needs one core competence: innovation (Drucker, 2002). In the changing times, with increasing competition, innovation has become critical for survival and growth of any organization. "From an economic perspective, innovation is a matter of life and death. A company must innovate today if it wants to be in business tomorrow" (Esslinger, 2009). Opportunity identification stage has been considered to be a creative phase whereas opportunity realization phase has been associated with planning and implementation. In fact, it has even been argued that the entire strategy innovation process should be considered as the fuzzy front end of an overall strategy creation process, leading seamlessly from opportunity identification and creation to opportunity evaluation and integration (Johnston, 2013).

The creative component of innovation process has often been emphasized. It was further stated that although sometimes innovation in organizations may happen through chance; considering criticality of the same, innovation cannot be left to chance but has to be planned.

A planned, systematic approach to innovation, especially in the opportunity identification stage was required.

Role of design in new product development i.e. designing and developing new products based on design briefs has been well recognized. It has been argued that design with its characteristic planned and creative approach can also play a critical role in opportunity identification for product innovation. Secondly, in spite of the criticality of opportunity identification phase, there has been a lack of a framework or guideline for opportunity identification phase in design and henceforth the need is highlighted.

2.2 Innovation

The root of the word 'innovation; is 'innova' or 'new'. Innovation is an invention that has been commercialized (a definition first articulated by Chris Freeman and Luc Soete in their book, *The Economics of Industrial Innovation*). Innovation has been defined as invention plus implementation/commercialization wherein invention involves the process of taking an idea and developing it into a concept, which finally leads to innovation (Gaynor,2000). The importance of innovation for business in the current competitive world was perceived not only in terms of product innovation but also in all aspects of business innovation. (Mark and Spencer,1996). Innovation has been considered important for sustaining and growth of an organization and is considered to be a core issue in terms of dealing with competitiveness (Porter,2000). As Drucker has stated, except for innovation and marketing, the remaining activities of an organization are only expenditure. Thus, the importance of innovation in today's competitive times has often been reiterated.

Various types of innovation have been stated. The generally accepted innovation categories have included incremental, discontinuous, architectural, system, radical and disruptive. The simplified classification has included three categories: incremental, new to the market/society and breakthrough. Incremental innovation has been described as improvements to current products, processes, services and systems (Gaynor,2000). Breakthrough innovation was often the result of technical invention whereas new to the market innovation aimed to fulfill the needs of consumers for the new markets. A majority of innovation was seen to happen in

incremental innovation – they often reflected changes in market dynamics and issues related to product differentiation to cater to various market segments. This enabled industries to sustain their product range for as long as possible.

The process of innovation also reflected this approach. Innovation often begins with a raw idea, which is developed into a concept, which then yields some type of invention and which is finally implemented and commercialized (Gaynor,2000). Innovation has focused on two strategies: quantum leaps in product performance by breakthrough technologies and improved product solutions by better analysis of user need. The former domain of radical innovation was pushed by technology and the latter domain of incremental innovation was pulled by the market (Verganti,2009).

Further, it was recognized that innovation involves both opportunity identification and opportunity evaluation phases. Opportunity identification was considered to be an explorative creative phase which results in ideas and concepts whereas opportunity realization phase included evaluation and planning for commercialization. After invention is done, second half of innovation begins which is turning the idea into a business success (Pinchot cited by Gaynor, 2000). It is being increasingly recognized that innovation includes the whole organization.

2.2.1 Opportunity identification

Opportunity identification has been considered to be the explorative creative phase which results in ideas and concepts. It is also being recognized that the opportunity identification process being a creative phase requires design thinking and approach (Esslinger, 2009). Opportunity implementation has been given a lot of importance since it involves finances, organizational infrastructure, organizational resources and planning. However, opportunity identification stage is also critical since the seed of innovation for new product development takes place during this stage.

Opportunity identification is seen to manifest in many ways: top down approach wherein the top management decide on an opportunity idea and then involve other people from the organization to explore the possibilities. Conversely, in the bottoms up approach, people from

within the organization arrive at opportunity ideas and propose the same to the management (Gaynor,2000).

The greatest weakness in product innovation was perceived to be the fuzzy front end. New product development has become a core business activity that needs to be closely tied to the business strategy and a process that must be managed through analysis and decision making. Companies generally begin work on new product opportunities often called pre phase zero of the front end process when they first recognize an opportunity in a semiformal way (Khurana and Rosenthal,1997). Thus the process of strategy innovation should be the fuzzy front end of an overall strategy creation process, leading seamlessly from opportunity identification and creation to opportunity evaluation and integration (Johnston and Bate,2003).

2.2.2 Process for identifying opportunities

A lot of study has been done in various aspects of innovation: specifically, opportunity implementation as well as managing the innovation in a firm. Some of the existing innovation process models deal with recognition of opportunity followed by concept-product formulation (Robert Cooper cited by Gaynor, 2009). However, although opportunity identification stage is seen to be a critical phase, there has been a lack of framework which would help in opportunity identification.

Cooper introduced the stage gate system for moving product innovation to the marketplace (Robert Cooper cited by Gaynor, 2009). The six stages included problem identification, ideation, conceptualization, development, testing and launch wherein problem identification began with identifying a particular problem or opportunity. This model was similar to the Robert and Frahmann model which was also a six stage linear process starting with the recognition of the opportunity idea to the technological diffusion stage. It included recognition of the opportunity, idea formulation, problem solving, prototype solution, commercial development and technology utilization and /or diffusion. Although there were linear models on product innovation, it was felt that innovation may not always be a linear process. Sometimes recognition of opportunity and idea generation might happen simultaneously.

James Bryan Quinn referred to innovation process as controlled chaos (Quinn cited by Gaynor, 2009). Quinn suggested that independent innovator as well as bottom up innovation in organization was more innovative than organizational innovators (Quinn cited by Gaynor, 2009). Van de Van and his associates after doing longitudinal research in diverse industries for many years found that innovation involves dealing with unknowns, unpredictable events and ill defined and ambiguous goals. Van de Van believed that opportunity identification happened intuitively and acknowledged that innovation does not occur through some linear process but showed that common elements such as initiation, development and implementation existed in the innovation. He subdivided innovation into initiation period, development period and implementation /termination period. According to him, initiation period was the time of churning ideas and trying to develop the same into workable concepts (Van de Van cited by Gaynor, 2009).

Often, internal or external trigger might shock the industry into recognizing some significant opportunities. It was also seen that majority of creativity took place in idea concept invention stage or the ICI stage (Gaynor, 2000). There were many idea generation methods. Some of these were followed to come up with a number of ideas. Discussions and critical feedback narrowed down the number of ideas that could become opportunities. However there was a lack of clarity on how ideas actually become opportunities. There was also a lack of understanding on how opportunity areas led to (product) ideas.

2.3 Design and design thinking

This leads us to design and how design and design thinking can make a difference in opportunity identification for innovation. Design has been defined as a planned process. It is often understood as creativity with a purpose i.e. contextual creativity. The importance of designers' role in the initial phase of design could be quite critical to the shaping of the project. Designers were not just problem solvers but opportunists who can join others at the initial moments of an effort or a situation (Sabatino, 2005). The term 'design' itself was derived from its Latin root '*designere*', meaning to mark out, trace, denote, or devise. In French, the word *dessein* means plan or purpose. In English, the word 'design' can function as either a verb or a noun. As a verb, it means to mark out and to plan. As a noun, it represents a tangible form. The term design takes multiple meanings in its context of use (Bucciwerelli,1988). As an act of planning it can be applied to a diverse range of experiences.

Design thinking has also been considered to be integrative in nature i.e. it is able to integrate various disciplines to come up with something new or novel. Simon proposed that the science of design could form a fundamental, common ground of intellectual endeavor and communication across the arts, science and technology (Simon,1969). The study of design could be an interdisciplinary study accessible to all those involved in the creative activity of making the artificial world.

Esslinger from Frog Design has categorized designers into four schools of design. According to him, the first school was represented by classic designers who generate individualistic-artistic statements that balance an appeal to the heart with an appeal to the mind. The second school of design was represented by artistic designers who rely on visceral methods to create products with spectacular visual appeal. The third school was made up of those who work in anonymity on corporate design departments (Esslinger, 2011). He further stated that internal designers working in corporate design departments were often mismanaged and underappreciated. They work in organizations that have no consistent approach to incorporating design into their strategic plans or processes and they report to marketing and engineering managers who have a minimal understanding of the potential of design. Therefore, the fourth school of design which was made up of highly creative, strategic designers who were fluent in convergent technologies, social and ecological needs and business were critical for business leaders pursuing an innovation driven business model. Designers working in this area were able to feel and see opportunities that the other may not be able to identify (Esslinger, 2011).

This design approach may also help companies who do not face specific product related problems. Companies and other organizations don't so much seem to have 'problems' that need to be solved, but situations or predicaments that they have to deal with. This requires an approach which to some extent intends to identify opportunities with a futuristic perspective. There were certain approaches in design such as V.I.P. or vision in product design which were futuristic in nature and which try to envisage user-product experiences for the future. One of the aspects of design is the ability to devise courses of action aimed at changing existing situations into preferred ones (Simon, 1996). V.I.P. is a design method which is context

driven and interaction centered. Designing according to V.I.P. was about exploring what was possible tomorrow instead of solving problems of today (Hekkert, 2011). It was believed that designing was not only a making manifest of some physical object but also generation and development of an idea that provides it with a raison d'etre. The V.I.P. method enabled designers to embrace three values : freedom, responsibility and authenticity. Artemide had followed a strategy of design driven innovation that was radical innovation of meaning (Harvard business essential,2009). Meaning was driven by why people need a product than what they need in a product (Verganti,2009). These perspectives on design brought forth interesting dimensions for opportunity identification.

Opportunity identification was also considered from the product family perspective. A product platform has been described as a set of subsystems and interfaces that from a common structure from which a stream of derivative products can be efficiently developed and produced (Gaynor,Marc Meyer and Al Lehnerd,2009). In this strategy, the platform was the innovation: the rest was the execution.

2.4 Need for design in opportunity identification

The literature review has identified the gaps in existing knowledge and the need for design approach in opportunity identification.

2.4.1 Widening scope of innovation

Innovation has been considered to be exploitation of technical invention. Traditionally, this had led to the setting up of research and development departments to come up with new inventions which could then be exploited. Although this approach worked well in a closed protected environment, this model also had many limitations. Research and development activities may result in a few successful inventions. These inventions were patented, protected and exploited to come up with proprietary new products. Entire business could sustain on a single new product for many years. Increase in competition and dynamic market and social trends changed the scenario considerably. New demands of consumers were being fulfilled by new products in short time spans. Organizations have realized that innovations need to happen constantly to fulfill the dynamic needs of the consumers. The business model in which a business could sustain on a single new production for many years may no longer be feasible. Just as exploiting technical inventions was one of the prime means of arriving at product

innovation, identifying and exploring new markets became an important factor for innovation. Understanding various market segments with an objective of fulfilling needs /desires through new product development became important. Product differentiation for various market segments also becomes an important factor in product innovation. Apart from technical and marketing factors, other changes also started playing an important role. Technological changes, socio-cultural changes, changes in product supply chain and environmental issues were a few contextual changes elucidated (Chiapponi, 2005).

It is being recognized that the approach to invention and raw ideas has over the years broadened its scope beyond science and technology. Innovation's criteria is not science or technology, but can also be affected by changes in the economic or social environment or a change in the behavior of people as consumers or producers (Drucker,2002).

2.4.2 Creative aspect of innovation

The invention process covered all efforts aimed at creating new ideas and getting them to work (Cooper cited by Gaynor, 2009). As Levitt says innovation may be viewed from at least two vantage points: 1. Newness in the sense that something had never been done before 2. Newness in the sense that something had not been done before by the industry or by the company now doing it (Levitt cited by Gaynor, 2000).

Invention and innovation require thinking about what could be, about doing things differently and about combining known facts into new combinations. Strategy innovation required a creative process, not an analytical one. The strategy innovation process started with tomorrow and then planned backwards to today. To be successful, the search for new business opportunities cannot be constrained by today's corporate conditions or market conditions. (Johnston and Bate,2003). Therefore it was imperative to consider the future rather than the present alone while identifying opportunities. After identifying potential new business opportunities in the future, planning works backwards to identify the key strategic milestones to get there. New growth opportunities acts as a future pull. Strategy innovation becomes the fuzzy front end of the strategy creation process within a company(Johnston and Bate,2003)

2.4.3 Design and opportunity identification

One of the factors accounting for decline of products and shortening of life cycles was rapid changes in technology. Technological change puts extreme pressures on companies to innovate or decline. Doing traditional market analysis may not help innovation which requires a new way. Innovations often result from combining things that have never been combined before.The creative act consists in combining previously unrelated structures so that one get more our of the emergent whole than what one has put in. This has led to design becoming an important factor. Innovation's criteria is not science or technology, but a change in the economic or social environment (Drucker, 2000). Strategic frontiers were to established companies what corporate visions were to start ups. All ideas may not be opportunities. Therefore, the goal of a vision should be to identify what the company would like to achieve so that it has an important impact for the company (Johnston and Bate,2003).

Designers today are dealing with complex realities while working on design projects. They need to deal with not only specific problems but also aspirations, issues and concerns. Design thinking had a critical role to play in identifying opportunities and strategies for industries. There were many industries/institutions which were faced with the challenging task of deciding 'What new product/ service/scenarios can we come up with?" Design methods and approaches can help towards bringing about a collective and creative approach towards opportunity identification within industries. The problem of a lack of conceptual framework/guidelines for identifying design opportunities was perhaps more accentuated in entrepreneurship. What were the approaches and methods which can assist in arriving at various design opportunities? These were some of the issues which have been a focus of this research study. This research was primarily aimed at bringing about a better understanding of the various aspects pertaining to finding design opportunities and arriving at a conceptual framework which will assist in arriving at new design opportunities relevant to project contexts. Having established the need for a design approach in opportunity identification for innovation, it was imperative to understand and define the context and approach towards the study.

2.5 Need for a conceptual framework for opportunity identification

It was often felt that innovation cannot be planned. However it may be equally dangerous to leave innovation to chance. In scenarios, wherein there was severe competition it was even more imperative to come up with new products on a continuous basis. This requires a better understanding of opportunity identification and planning for the same. This leads us to the thought that recognizing opportunities is a critica issue. (Gaynor,2000).

However, opportunity identification process in the initial phases of design does not seem to have been extensively studied and was still seen to be 'Fuzzy'. The fuzzy front end was represented by Darrel Rhea in his article on ' Bringing clarity to the fuzzy front end' as a cloud with a vague mixture of ideas, trends, requirements etc. which gets into the funnel and through insight gets churned out as a product brief. The first phase of the inverted cone involves discovery and observations, forecasting and identifying opportunities. It was expected that opportunity identification in design would help in bringing clarity to the 'fuzzy' initial phase of design and provide creative design directions for designing products. However, there exists very little work in terms of methodologies/conceptual framework for this stage of design.

2.5.1 Open innovation and collaborative teams

Collaborative team consists of internal and external experts to come up with innovative products. Open ended innovation process recognized advantages of collaborating with researchers, students, experts etc. from other organizations in order to fulfill the objective. Closed innovation was based on the logic that successful innovation requires control. The logic of open innovation was based on a landscape of abundant knowledge which must be used readily for it to provide value to the company that created it (Chesbrough, 2005). Key insight was that useful knowledge had become widely diffused. Companies may not be able to take full advantage of the wealth of information if they were not open to collaborate with outside partners. The value of an idea or technology depends on its business model and companies need to be more open to collaborate and access ideas from outside sources.

Therefore it was decided to study the process of opportunity identification in the context wherein industries/ organizations approach academic institutions for identifying/generating opportunities for them.This brings forth the idea that design with its ability to integrate

various disciplines was suited to be a part of such collaborative teams and work together to arrive at opportunities.

2.5.2 Knowledge funnel and conceptual framework

Knowledge funnel consisted of mystery, heuristics and algorithm. The search for knowledge began with mystery. The study of mystery led to development of heuristic models which further got consolidated into algorithms. Algorithms helped organizations to achieve efficiency since they do require less expertise and can be implemented fast. However the limitation of algorithm is that they are not flexible and do not change with changing context thus harming the organization in the long run (Martin, 2009). Although heuristics require expertise and are difficult to standardize, the advantage was that they were quite flexible and can be quickly adapted to dynamic changes in the context.

Innovators need to be able to act quickly and make decisions in a continually evolving competitive and technological landscape. Simple heuristics were more valuable than involved, complex and sluggish strategizing. Conceptual frameworks help in developing flexibility which would allow them to be used for diverse organizations and varying context at the same time.Therefore it was decided to arrive at a conceptual framework as the objective of this research study.

2.6 Limitations and Gaps

Role of innovation in organisational growth and survival was often emphasised, but role of design in the critical phase of opportunity identification was yet not widely recognized. The broadening scope of invention and idea generation for opportunity identification beyond technology and marketing; the recognition of creative opportunity identification possibilities and recognition of design beyond its role in new product development led to interesting possibilities. Design was already playing an important role in new product development. The extension of this role to the opportunity identification phase would not only help in arriving at new opportunities but would also enable a better understanding of the role of design in both opportunity identification and new product development.

Secondly, opportunity implementation stage was studied extensively and given a lot of importance but there was insufficient attention paid to the opportunity identification stage. This stage was too important to be left to chance. A planned approach to opportunity identification would help designers contribute towards innovation.

The literature review gives sufficient knowledge to the understanding of innovation and opportunity identification process; changes taking place in the same and need for a conceptual framework for design as a research contribution.

2.7 Concluding Remarks

It was quite clear from this literature review that innovation was critical to industries and organizations and that they need to structure and integrate the process of innovation in their organizations in order to come up with continuous innovation. Open innovation model suggested that knowledge was abundant and collaboration with partners was encouraged. An industry- academia collaboration to arrive at new design opportunities could be suggested. This will enable industries to avail of new approaches to opportunity identification as well as new opportunity areas and product ideas for innovation.

Considering these changing parameters, gap in literature has pointed at the role design can play in opportunity identification phase. Role of design and design thinking in arriving at new approaches to opportunity identification through creative, visionary approach was established. Although there were strategy designers working in the fuzzy front end of design and arriving at opportunities, there was a lack of sufficient understanding about the same.

The motivation for investigating this area was therefore, to gain a better understanding about role of designers and design thinking in identifying opportunities for product innovation and to arrive at a conceptual framework which may enable opportunity identification for product innovation. Further investigation was also required for identifying opportunities and factors which contribute to opportunity identification. The design of the research study needs to be conducive to the objective of the research and would determine the findings. Further, the characteristics of design as a discipline and the understanding of knowledge within the discipline would determine the method used for research study. The design of the research framework is aimed towards accomplishing the same.

Chapter 3

Design of the research study

3.1 Introduction

Design of this research framework was specifically conceived to answer research queries elucidated in the earlier chapter. Research design has covered a plan and structure for investigation which has included a step by step approach to conduct research study and methodology to be used for preparation for study, methods for case study data collection and analysis through multiple case study analysis framework.

Design has been defined as a practice based profession and is dynamic, contextual and creative. This has resulted in a multiplicity of approaches to design as well as a need for new methods and approaches to design based on the changing context of design. An understanding of design has also led to further linkages between design pedagogy, practice and research. Research to arrive at new methods and approaches in design would need to seek knowledge from design practice to build design theory. Design education is also unique for its pedagogy based on practice. Industries and organizations often approach design educational institutions for fresh perspectives and ideas. It has been argued that establishing

links between educational institutions, industries/organizations and researchers could enable the study of design practice and its various facets.

A research plan was proposed to understand opportunity identification in product innovation.This research plan would help in critical reflection of various aspects of design opportunities in practice and allow study within the complexity of real life situation and context. The proposed plan elaborates the framework to conduct multiple case study method in an educational setting. Researchers could study complex patterns across case studies to build an understanding of methods/approaches in design and create guidelines and frameworks based on the same.

This chapter has elaborated on some of the challenges in design research and proposed a research framework to study certain aspects of design research relevant to this particular investigation and methodology to be used for the same. It further gave an outline on the various steps involved in this research study. This research study began with preparing case studies. It included preparing a framework for conducting case studies, recording the data, selecting case studies and writing the same for further analysis. This was followed by initial coding and single case study analysis to identify unique parameters within each case study to arrive at initial findings. This was followed by multiple case study analysis including cross case analysis to go further indepth and to consolidate the findings through replication logic.

3.2 Problem Conceptualization

Research queries based on the limitations and gaps found through literature review indicated that there was a need for understanding the role of design in the opportunity identification phase of innovation and a further need to develop a conceptual framework to enable the same. It was imperative for industries to consider creative approaches through design for opportunity identification considering the criticality of this stage. Considering open innovation parameters, it would become a part of the process of the industry to collaborate with outside agencies in order to arrive at continuous innovation.

3.3. Challenges in design research

Challenges to design research were primarily related to the complexities of design discipline itself. Research was primarily related to establishing a body of knowledge. In order to make

sense of the same we need to look into the nature of knowledge in design as well as what constitutes design discipline.

3.3.1 Design discipline

Meaning and interpretations of 'design' has varied greatly over a period of time and in different cultures. The word 'design' has often been used both as a noun and as a verb. As a noun it denoted a completed object whereas as a verb it denotes the process of 'becoming'. If technology was 'knowing how' then design is 'envisaging what' (Archer, 1965) . Archer further emphasized the importance of design as the third great defining characteristic of humankind along with tool making and language use for its capacity for envisaging a non present reality, analyzing it and modeling it externally. Other characteristics of design were its ability to meet human needs through practical results i.e.products, process and systems embodying values determined by its functional, commercial and social context. Design is described as intentional to distinguish it from serendipity or discovery by chance (Archer,1965).

Design has been considered to be contextual, dynamic and creative in nature. Understanding can be derived from the whole, so that parts can be understood in light of the whole. Therefore to investigate a process of design, a framework which would encompass the study of design as a 'whole', within a context can be selected. It was observed that design requires to get inputs from diverse fields of knowledge. The challenge was to translate this understanding into a tangible reality- a new design. This involved lateral thinking, creative processes and execution. Together they constituted the core of design – purposeful creativity, lateral thinking and most importantly 'learning by practice'.

Simon proposed that the science of design could form a fundamental, common ground of intellectual endeavor and communication across arts, science and technology (Simon,1980). Study of design could be an interdisciplinary study accessible to all those involved in the creative activity of making the artificial world. This brought forth the dynamic and multidisciplinary nature of design. It was seen that design profession works more and more in multidisciplinary collaborative teams. Idea of multiple stakeholders and inter connectedness of various parameters pertaining to design has been established. Design was seen to be primarily acting as a subsystem of economy or rather marketing though the sociological view

was more towards assuming a network of widely autonomous partial systems that were permanently negotiating their exchange and interaction. Economy was only one subsystem in its network (Jonas, Woalfganag, 2001). Thus design was seen to consider multiple realities: economic, sociological, cultural with equal competence and ease.

Relationship between design and other allied areas such as art, technology etc. and the rapidly changing context in which design operates would need to be considered. This would include studying technological changes, socio-cultural changes, changes in product supply chain and environmental issues as some of the contextual changes which need to be considered (Chiapponi,2005). As the inter-relationships and networking among components in the world increased, there was more effect of macro systems on design. Having a goal and vision on how things should change seems to be an integral part of the design process. Design was basic to all activities – the placing and patterning of any act towards a desired goal constitutes a design process. It has also been argued that everyone who devises courses of action aimed at changing existing situations into preferred ones could be designers (Simon, 1996). As Bruce Nussbaum wrote in Businessweek, these were fundamental changes. Over the years, design profession seems to have shifted its core competencies from drawing to thinking, from styling to innovating, from shaping things to visualizing new business paradigms. (Nussbaum, 2004).

Design has been considered to be the study of the artificial or manmade phenomena. A practice based, evolving nature of design has led to a different notion of 'knowledge'. Further, design dealt not only with materials but also with human phenomena and tacit knowledge. Design dealt with both tangible and intangible aspects – the nature of knowledge in design was fairly broad covering the science of materials, the science of meaning, the science of thinking and doing. Knowledge in design was often embodied, explicit or tacit. Knowledge' in design was based not only on 'facts' but was rather based on the experience of 'inter-relating various elements' based on the context. This also brought forth the idea of the nature of 'knowledge' in design being dynamic.

3.3.2 Design education and practice

Design has been considered to be a practice based profession and design education was expected to equip students to deal with challenges and requirements of professional practice.

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Due to the emphasis on tacit knowledge embedded in the practice of design, apprenticeship model of design pedagogy was prevalent in many design institutions. Even in institutions wherein apprenticeship mode of learning was not prevalent, there was a emphasis on 'learning by designing' which forms the core of design education. Designers often propose a horizontal, more fluid, organic experience based on "learning by designing." This approach saw the educational path as an integration and extension of the professional path.

Due to changes happening in design and design thinking, educational institutions have been conceptualizing new modes of bringing complex designing experiences in classroom situations. Considering the fact that in today's times, 'conventional' design was seen to lose its place and competitive edge was going to those who can innovate, Patel, narrated the experience of starting 'innovationspace' program at Arizona university wherein projects given to students had intentional ambiguity. The project was purposely given to give students the experience of loosely defined design problem that had become common in the real world (Patel, 2005). This need for bringing real life experiences in class room situations has led to closer collaboration between educational institutions and industries.

To break away from the set pattern of in house design departments, industries sometimes tend to bring real life projects to classrooms to get fresh perspectives and ideas from students. This linkage between design educational institutions and industries was often a mutually beneficial collaboration which enriched the students with complex design experiences and industry with fresh new perspective. Open innovation model which promoted industry collaboration with outside agencies also supported this model for collaborative innovation.

Although the word 'design' was often used as a noun, the primary understanding of design is that of a verb, an activity or a process. This understanding of design was seen to be embedded in both design education as well as in design practice. Much of the knowledge constituting design methods was tacit in nature and embedded in practice. However, an evolution in understanding and development of design methods was expected to further help both design education and practice.

3.4 Proposed research plan

Proposed research plan was based on collaboration between design educational institutions and industry. Emerging areas in design often have less corporate support and require new approaches. A research plan was proposed to link design practice and theory as well as design education and practice. This research plan would help in critical reflection of opportunity identification in design and allow the study of within the complexity of real life situation and context. The primary stance taken was that reflecting over design practice could lead to a theoretical framework which in turn would help in furthering the practicing profession (Creswell, J. W. and Plano C., Vicki L., 2006).

Since the objective was to study a current phenomena i.e. design practice in detail and try to understand process i.e what, how and possible reasons; case study was proposed to be an appropriate method for inquiry. A framework to conduct multiple case study method in an educational setting and further use of same as a research plan for a better understanding of design opportunities.
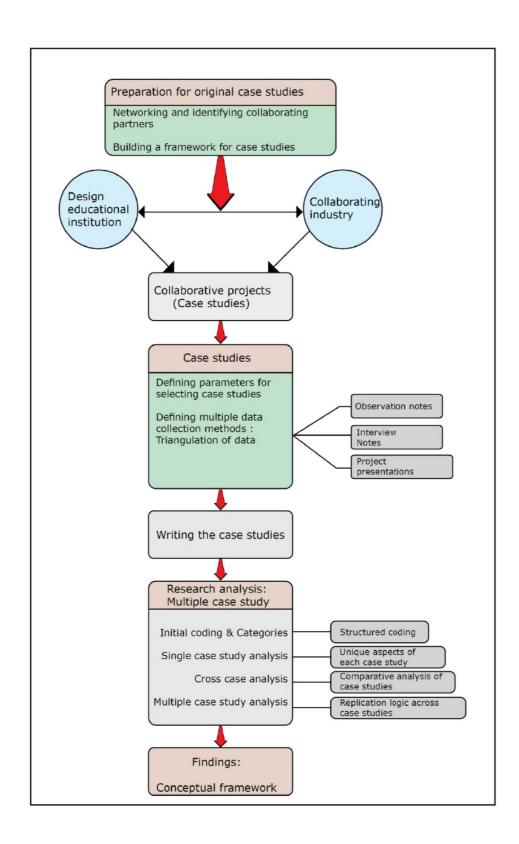
Figure 3.1 : Research study framework

3.4.1 Networking and identifying collaborating partners

Design projects as part of educational curriculum became a good possibility for collaboration. After identifying the research objective, industries were contacted and requirements identified. The internal team consisting of faculty and students, industry team involving personnel from the industry and external experts if required were identified.

3.4.2 Building a framework for case studies

A framework for conducting case studies to investigate various factors pertaining to design practice included defining a common purpose or objective of design projects, specific requirements from the industry including access to its personnel, infrastructure and briefing sessions (Yin, 2012). It also included an approximate duration of design projects and resources required for the same.

3.4.3 Multiple data collection method

Information collected for case studies needed to include multiple data collection methods in order to help in triangulation of data (Lewis, 1998), (Yin, 2009). Methods include project presentations, observation notes, interview notes, sketches and models.

3.4.4 Defining parameters for selecting case studies

All case studies were not found suitable for the study purpose. Parameters for selecting case studies were identified which included criteria such as project data that provided a lot of elaboration and details; projects which were completed; projects which represent various sectors; and projects which extended the understanding of research area etc (Yin, 2012). Based on these criteria, case studies for this study purpose were selected for further analysis.

3.4.5 Writing case studies

Write up of case studies included project context and background, series of action/events that took place and rationale for same in terms of a series of thoughts pertaining to the same (Yin, 2009).

3.4.6 Coding of case study write-up

Initial coding was done based on research queries. Secondary coding helped in arriving at broad categories (Saldana, 2009).

3.4.7 Analysis

Within case analysis to understand unique features related to the research area within each case study were analyzed through single case study analysis (Yin, 2012). This was followed by a multiple case study analysis approach to replicate findings in order to further strengthen findings and to extend its theory.
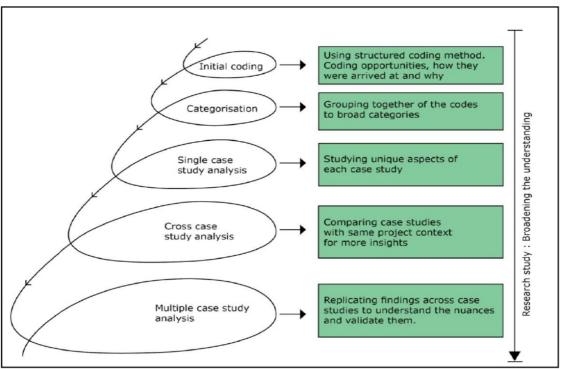
Figure 3.2 : Research study analysis – a step by step process

3.4.8 Findings

Findings of this study was in the form of a conceptual framework. The intention of the study was primarily to make tacit, often intuitive process of designing more explicit to further understanding of the domain.

3.5 Implementation of research plan

Since objective was to study current phenomena i.e. opportunity identification in detail and try to understand the process i.e. how, case study was considered to be an appropriate method for inquiry. In accordance with this phenomena of open ended innovation, industries/organisationa often approached design institutions in order to collaborate and

explore a wide range of possible opportunity areas. It was decided to study opportunity identification taking place in this context.

Considering the gap in design literature pertaining to identifying design opportunities and relevance, an investigation to understand various facets of opportunity identification was undertaken. Dearth of written case studies in this area led to working out a framework for conducting, documenting and writing case studies. Case studies were conducted to investigate various factors pertaining to opportunity identification based on framework for case studies. Multiple data collection methods as suggested by Lewis and Yin, helped in the triangulation of data. The methods include sketches, models, project presentations, observation notes and interview notes with key sources.

Case studies for research study were selected based on parameters which included project data that provided a lot of elaboration and detailing in terms of documentation, projects which represented various sectors and projects which extended the understanding of opportunities. This was subsequently followed by writing the case studies which included project context and background, series of action/events that took place, design opportunities areas and ideas for the project and series of thoughts pertaining to the same (Yin, Robert,2009) .

Initial coding for all case studies was done based on the research queries. This was followed by within case analysis to understand unique features related to design opportunities in each case study. This included investigation into 'what' contributed to coming up with design opportunity/idea; 'how' the design opportunities/ideas were arrived at and a rationale for the same (Yin, 2012). Secondary coding helped in arriving at broad categories (Saldana, 2009). This was followed by multiple case studies to replicate the findings and draw parallels.

As per the open innovation framework, collaborative projects involving Industries/organizations and design academic institution as part of classroom project activities for senior industrial design students were undertaken and studied.

Each project was carried out for a duration of 8-10 weeks under the guidance of a design faculty. Design team was briefed by the industry and all facilities to study the context were provided. A total of about 16 design projects were undertaken resulting in 36 original case

studies. Guidelines for selection of case studies led to 10 case studies being taken forward for detailed write up and analysis. It was also made possible to interact, interview and observe the industry personnel, design students and design faculty who were a part of the project. Triangulation of data led to the merging of data from different sources including sketches, models, project presentations, observation notes, and interview notes with key sources and writing of the case studies for these 10 selected design projects. At the end of the project the opportunity areas identified were discussed.

Ten projects were selected and the initial coding was done based on the research queries. Initial coding helped in arriving at broad categories. Within case analysis was undertaken to understand unique features related to design opportunities within each case study. This included investigation into 'what' contributed to coming up with design opportunity/idea; 'how' the design opportunities/ideas were arrived at and rationale for the same. At the next stage, multiple case study analysis was carried out to further understand the identified factors in detail and to strengthen findings through replication logic.

3.6 Concluding remarks

This research framework has been built on the understanding of 'knowledge' in design discipline, objective of the research study and the gaps of knowledge in existing literature. Multiple case study method was selected as the primary research method to investigate this area. This method would also help to link design practice and theory. Researchers could study complex patterns across case studies to build an understanding of methods/approaches in design and create guidelines and frameworks based on them. It was envisaged that such guidelines/framework would help in conducting explorative studies to further the understanding of this design phenomena. A proposed research model and an overview about the research method based on multiple case study method implemented in the research study has been given in 'Design of research study' chapter.

The proposed model has also elaborated the framework to conduct multiple case study method in an educational setting, in accordance with open innovation approach. This has further led to elaborating guidelines for conducting and analyzing the case studies. This research framework will be of help in conducting original case studies in academic set-up and further analysis of the same.

Chapter 4

Preparing the Case studies

4.1 Introduction

Some of the features of case studies used for multiple case study analysis were that they can be spread over a period of time and were real life based often with multiple actors. Case studies conducted and written by others could also be analyzed. Due to the dearth of written case studies in this research area, it was decided to develop an experimental set up and criteria for conducting the case studies. A major part of the research project was to generate original case studies.

4.2 Criteria for conducting case studies

A framework for conducting case study was established which was suitable for the purpose of this study as well as to control extraneous variation and help define limits / scope of the study. In accordance with the open innovation model, all the case studies were based on client/industry/organisation initiated design projects carried out in an academic set up. According to this framework, only clients/industries/organisations looking for new design opportunities and who agreed to provide necessary access to its personnel, infrastructure etc. were considered. Clients/industries/organisations also agreed to take part in initial design

briefing and feedback meetings. Projects were carried out by final year post graduate industrial design students of a design institute (National Institute of Design, India) as part of their academic studies.

- Duration of each project ranged from 2-3 months.
- All case studies involved a visit by students at the client's/industries/organisation's location to familiarize them with the organizational set up, infrastructure, meeting key personnel etc.
- Provision was also made for the students to meet various stakeholders as identified by them.
- Opportunity identification and conceptualization phase was shared with the client for feedback and discussions.

Actors who participated in this project include design students, faculty and client as the core team. Internal team consisted of various persons like marketing manager, production manager, sales and distribution personnel, research team etc. External team identified by individual student designer consisted of a variety of actors including therapist, technologist, primary user, secondary user etc.

4.3 Conducting case studies

Based on defined criteria, case studies were conducted over a period of 3 years. Four to ten case studies were considered ideal when using original case studies for induction (Eisenhardt,1989). With less information per existing case or a desire to increase case diversity, it has been suggested that 20–30 cases may be used for iterative triangulation. Eight projects resulting in Twenty one case studies were carried out in 2006-2008.

- Bankura craft project   3 case studies
- Ferozabad glass project   3 case studies
- Weldecor sanitaryware   3 case studies
- INBAR bamboo toy   2 case studies
- Craft education in school   2 case studies
- Borosil projects   3 case studies
- Thane ceramic project   2 case studies
- M P Craft project   3 case studies

    Total Case Studies   21 case studies

Four projects resulting in ten case studies were carried out in 2008-2010.

- Robotics for education   3 case studies
- Merchandising products   3 case studies
- Inclusive education for B.P.A   2 case studies
- Educational aids for TIS   2 case studies

Total Case Studies   10 case studies

Three projects resulting in eight case studies were carried out in 2009-2010

- Educational aids for TATA Interactive   2 case studies
- Merchandising toys for Eeksarus   2 case studies
- Learning about Robotics for CIIE   2 case studies

Total Case Studies   6 case studies

These 37 case studies provide sufficient sample size to select and come up with a framework for multiple case study analysis.

4.4 Selection of Case studies

For analysis purpose, initial selection of case studies was based on following criteria;

- Project data which provided richness of material from design point of view.
- Projects which were concluded till the last stage
- Projects which represented diversity of sectors

Thus final selection of case studies was

1. Bankura: craft project   1 case study
2. Ferozabad: glass project   2 case studies
3. Weldecor: sanitaryware   2 case studies
4. INBAR: bamboo toy   2 case studies
5. Borosil: glassware project   1 case study
6. Robotics for education   1 case study
7. Eeksarus : Merchandising toys   1 case study

Total Case Studies   10 case studies

4.5 Research : Data collection and Analysis

Experimental set up for conducting case studies helped in triangulation of case study data. Sketches, models, project presentations, observation notes, and interviews with key sources were considered in order to write these case studies. Observation notes as well as short interviews were taken through the entire duration of the project. This was followed by a semi structured interview at the end of the project when required.

4.5.1 Project presentation : Project presentation points alongwith notes contained a summary of all actions carried out by the students during this project and also analysis and thinking which helped them to go from one action to another.

Garvi Gurjari :

Shop concept : Keeping tradition, no modernization

Crafts from all over India in one place, emphasize on Gujarat craft

Working with governmental support

Customer Profile : tourist mainly because of their interest in tradition

Upper middle class

Product Range : Furniture and home accessories, cloths, toys

Materials Used : Textiles, lathers, papers, clay, wood and metal

Figure 4.1 :Sample page of project presentation

4.5.2 Presentations and observation notes

Regular presentations took place during the course of this project work. Observation notes were written down to help in verifying and getting detailed inputs during the course of work

4.5.3 Interviews

Interviews helped in clarifying and validating the thought process followed during the project. The questions were semi-structured so as to give adequate understanding of the rationale

behind taking decisions during the project. Interview notes were written down from the short interviews carried out during the entire project.

4.5.4 Sample questions

1.How did you arrive at your design opportunity?

"When I visited KONBAC, I found the KONBAC model to be high investment oriented and not providing as much help as expected at the rural level. I looked at the machines and it made me think of a scenario in which rural semi skilled artisans can make toys using hand tools. INBAR could open bamboo centers for semi skilled rural employment."

2.What did you finally propose to the client? Describe the design opportunity identified

"I wanted to make the bamboo toys in such a way that unskilled or semi skilled people in villages were also able to make them. Apart from simple process, I also tried combining with easily available coloured rope to give a colourfulelement to toy without using colour on bamboo. This will help them to get an income. I thought of making developmental and educational toys because adults prefer to buy educational toys. Also there were many preschools which would want to buy the toys. The toys deal with role playing which children really enjoy during this age."

4.6 Writing the case study

Based on data collected during the project, case studies writeup was carried out. The case studies were written in a linear order for establishing the context of study, series of actions which took place and a series of thoughts expressed in first person.

Sample write-up for each of the above is given below:

4.6.1 Sample write-up: Project context

About the client : INBAR

The International Network for Bamboo and Rattan (INBAR) connects a global network of partners from the government, private, and not-for-profit sectors in over 50 countries to define and implement a global agenda for sustainable development through bamboo and rattan. The Centre for Indian Bamboo Resource and Development (CIBART) had been facilitated by INBAR as a dedicated agency for bamboo development in India.

Initial design brief :To design a range of bamboo toys for INBAR for the National/ international market.

4.6.2 Sample write-up : Series of actions/events

The series of actions and events carried out during the project was observed and noted down.

- Visited KONBAC : infrastructure, production system, marketing linkages, product range studied.
- Internet survey on bamboo toys available in the market was carried out.
- An user study was carried out for children aged between 3 to 7 years
- Various techniques were explored to colour bamboo.

4.6.3 Sample write-up : Series of thoughts

The actors involved in the case study were interviewed during the course of the project using unstructured as well as semi-structured interview formats. The thoughts were written based on the first person interview.

Sample:

1.How did you arrive at your design opportunity?

"When I visited KONBAC, I found the KONBAC model to be high investment oriented and not providing as much help as expected at the rural level. I looked at the machines and it made me think of a scenario in which rural semi skilled artisans can make toys using hand tools. INBAR could open bamboo centers for semi skilled rural employment."

The following thought points were written based on the above interview

- The KONBAC model was analysed and found to be high investment oriented and not providing as much help as expected at the rural level.
- A scenario was envisaged of toys being made by rural semi skilled artisans using hand tools.

Based on a series of actions/activities and thoughts, a sample write up of case study has been given below.

4.6.4 Sample write-up of case study

Case study1 "Bamboo toys for INBAR"

The International Network for Bamboo and Rattan (INBAR) connects a global network of partners from the government, private and not-for-profit sectors in over 50 countries to define

and implement a global agenda for sustainable development through bamboo and rattan. The Centre for Indian Bamboo Resource and Development (CIBART) has been facilitated by INBAR as a dedicated agency for bamboo development in India. CIBART's main area of focus was to achieve livelihood development, ecological security and economic development through the sustainable use of bamboo and rattan. Its primary focus was on benefiting poor rural communities. CIBART had four major centres in India in the states of Maharashtra, Tripura, Himachal Pradesh and Assam. They were also planning to start bamboo centres in other parts of India for income generation in rural areas. INBAR through its KONBAC centre produces furniture, accessories etc. They wanted to diversify into the area of toys and approached with a project brief towards developing bamboo toys.

A study of INBAR, its organization structure, its networking linkages, vision and mission was carried out. The partner organizations of INBAR in India and the location and work carried out by them was also studied. This helped to understand the client perspective. INBAR facilitated a field visit to KONBAC, a partner organization at Kudal, Maharashtra. The type of bamboo, raw material procurement, bamboo preservation methods, tools and machines, hand weaving techniques, marketing linkages etc. were studied. The product range made at KONBAC consisting of furniture, accessories etc. was also studied.

INBAR had no direct control over the manufacturing and marketing. So the study also helped to understand the linkages between the user/consumer, manufacturing and marketing and the product flow. Since INBAR was a networking organization, a visual representation of the functional parameters related to user, manufacturing and marketing helped in making connections. The KONBAC model was found to be high investment oriented and not providing as much help as expected at the rural level. The designer questioned the benefit of existing model for people in rural India and envisaged a scenario of toys being made by rural semi skilled artisans using hand tools. INBAR could open bamboo centers for semi skilled rural employment.

Designer's perspective/approach that rural semi-skilled people should benefit from making the toys led to a study of materials to make it possible to make toys with minimum infrastructural resources. In order to understand the properties of bamboo, material exploration was done. Playfulness, interactivity and ease of production were the main criteria

in carrying out the material exploration. This consisted of cutting, drilling, experimenting with half slits, etc. The elastic property of the traditional bow became the inspiration to explore elastic property in bamboo by making a half slit on the same.

Existing Bamboo toys in the international market were also studied. Industry-made Bamboo toys by Hape international were found to be good in quality. Study of changing patterns in toy market for young children led to the finding that there was a growing market of eco-friendly toys. This resulted into incorporating eco-friendly features in the design. Internet survey on bamboo toys available in the market was carried out. A survey of other popular toys in the market made from wood, plastic etc. was also done. Majority of toys were found to be for the age group 0-7 year old.

An user study was carried out for children aged between 3 to 7 years study of children's behaviour led to the observation of children stacking spoons, clothes etc. one on top of another. The designer met an occupational therapist. He elaborated and emphasized the importance of social-emotional development of child including role playing, storytelling etc. This led to a further user study during which various facets like role playing, possessiveness etc. were studied. Both primary research in terms of doing field visit and meeting children and experts as well as secondary research involving reading about child development and psychology was carried out. This led to the development of ideas based on social-emotional development of child which was not thought of before. In-depth exploration of the material led to use of elastic property of bamboo as a play feature for toy. Study was done on safety regulations. It was found that safety rules for 0-3 year old were quite stringent. The age group was selected to be from 3-5 years.

Study of children's behaviour led to the observation of children stacking spoons, clothes etc. one on top of another which led to the development of a stacking toy. The material explorations were combined with characters to come up with a range of toys.

Various techniques were explored to colour bamboo. Alternatively, combination of material using bamboo and coloured rope was also tried. A range of interactive toys emphasizing role playing and storytelling for children aged between 3-7 year old keeping in mind production possibilities by semi skilled rural artisans were developed. Three toys were conceptualized

which included a row of turtles which can be stacked; a crocodile with an elastic property and a family of characters whose body parts can be rotated to show different features. The toys can be sold online by INBAR.

Figure 4.2: Product opportunities pertaining to "Bamboo toys for INBAR" case study

Design opportunities were found at different levels: at a systemic level, the system of producing handmade bamboo toys by rural semi skilled artisans could open up new possibilities such as opening of new decentralized centres by INBAR; at a process level, the techniques of colouring bamboo with non toxic colours could have application in a wide range of toys/children products; at a product level, the toys can be used for role playing, storytelling, learning etc. The interactive elements in the toys were also interesting as they make play more dynamic. The toys were easily producible by even semi skilled craftsmen.

4.7 Concluding remarks

Based on the research framework elucidated in the earlier chapter, preparing original case studies formed a major component of this research work. This included organizing, conducting, selecting and recording the case studies. Industries approached the academic institution or were approached. Framework for conducting the projects, defining the project parameters and preparing a guideline for data collection helped in preparing the selected case studies for write-up and further analysis. Data collection helped in writing the case studies in the form of project context and in a linear time line as a series of actions and thoughts. All the 10 case studies were written based on the outline provided in this chapter which then became the basis for initial coding and analysis.

Chapter 5

Initial Coding of case studies

5.1 Introduction

The case study write-ups of the 10 selected case studies became the basis for initial coding. Since this research study is qualitative in nature, coding was found to be appropriate wherein the code a word or short phrase that symbolically assigns a summative, salient, essence capturing and /or evocative attribute for a portion of language or visual data (Saldana, 2009). The initial coding for each case study was carried out based on the research questions put forth after analyzing the gaps in the literature study. The initial coding method used was structural coding. Structural coding is a question based code that acts as a labeling and indexing device allowing researchers to quickly access data likely to be relevant to a particular analysis from a larger data set (Namey, Guest, Thairu and Johnson, 2008).

5.2 Writing case studies

All 10 case studies were written based on the framework defined in the preceding chapter.

Selected case studies	Case study code
Case study 1 : (Educational) bamboo toys for INBAR	CS01
Case study 2: Bamboo toys (War plane construction kit) for INBAR	CS02
Case study 3: Terracotta office accessories for Bankura cluster	CS03
Case study 4: Glass products for Borosil	CS04
Case study 5: Merchandising products for Famous studio	CS05
Case study 6: Glass products for Ferozabad cluster	CS06
Case study 7: Glass products (Jewellery) for Ferozabad cluster	CS07
Case study 8: Educational robots for Robots Alive	CS08
Case study 9: Sanitaryware (Children's commode) for Weldecor	CS09
Case study 10: Sanitaryware (Washbasin) for Weldecor	CS10

Table 5.1: List of selected Case studies with case study number

5.3. Initial coding

The research questions were based on the gaps in the literature review pertaining to the objective of this research study. Based on the structural coding approach, initial coding was done for the following research questions:

- What was the organisational objective?
- What was the organisational need for new opportunities?
- What opportunity areas were generated?
- How were the opportunity areas arrived at?
- What factors contributed to opportunity identification?
- What product ideas were generated?
- How were product ideas arrived at?

The initial coding has been done for the case study write-ups.

5.3.1 Case study 1 : (Educational) bamboo toys for INBAR

The International Network for Bamboo and Rattan (INBAR)connects a global network of partners from the government, private, and not-for-profit sectors in over 50 countries to define and implement a global agenda for sustainable development through bamboo and rattan. The

Centre for Indian Bamboo Resource and Development (CIBART) has been facilitated by INBAR as a dedicated agency for bamboo development in India.CIBART's *main area of focus is to achieve livelihood development, ecological security and economic development* through the sustainable use of bamboo and rattan. Its primary focus is on benefiting poor rural communities.CIBART has four major centers in India in Maharashtra, Tripura, Himachal Pradesh and Assam. They also plan to start bamboo centers in other parts of India for income generation in rural areas.

Organisational vision : multiple user segment not specified

INBAR was manufacturing bamboo and rattan furniture and were *planning to diversify into the area of toys*. They had already decided to sell their products online and wanted to explore new design opportunities in the area of bamboo toys for their existing market

Organisational need: Aspiration (Product diversification, Market opportunity)

INBAR was manufacturing bamboo and rattan furniture and were *planning to diversify into the area of toys*. They had already decided to sell their products online and wanted to explore new design opportunities in the area of bamboo toys for their existing market

After studying about INBAR, a *visit was made to one of their centers KONBAC* in Maharashtra. The type of bamboo, raw material procurement, bamboo preservation methods, tools and machines, hand weaving techniques, marketing linkages etc. were studied. The product range made at KONBAC consisting of furniture, accessories etc. was also studied.

Activity: Visiting organisation

The KONBAC model was found to be high investment

oriented and not providing much help to the artisans as promised in the *organizational objective*

"Why should the bamboo toy production model be an industry model? Why can't the production be taken to semi skilled rural craftsmen so that they can get employment?" the designer thought.

Why: Concern (s)
Organizational vision
How: questioning status quo

A *scenario was visualized in which rural people living near forest areas were trained to work with simple bamboo hand tools* to make toys. There could be a production system in which workshops could be conducted in rural areas – they could be trained to produce bamboo toys using simple hand tools – the toys they produce can be collected and marketed by INBAR through their online portal. *This production system can be an opportunity for income generation for many rural artisans.*

How: envisaging scenario
(production system)

Opportunity area:
production system

In order to understand the properties of bamboo, *material exploration* was done. Playfullness, interactivity and ease of production using simple hand tools were the main criteria in carrying out the material exploration. *This consisted of cutting, drilling, experimenting with half slits, etc. The elastic property of the traditional bow was replicated on bamboo by making a half slit.*

Activity: Material exploration

Internet survey on bamboo toys available in the market was carried out. A survey of other popular toys in the market made from wood, plastic etc. was also done. Majority of toys were found to be for the age group 0-7 year old. Study was also done on safety regulations. It was found that safety rules for 0-3 year old are quite stringent. *The age group was selected to be from 3-5 years since this group buys a lot of toys and safety regulation is less strict.*

Activity: Market survey

Why? Increase impact –
(maximize sale)

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One of the major focus for the 3-5 year age group was education since this is a pre-school group. After doing the study it was also found that there was *a good market for toys which are related with development/education.* Parents want some sort of education/development factor in the toys.

Opportunity area: market segment (user age group with educational context)

They met with an external expert/occupational therapist who *explained the importance of social-emotional development of child including role playing, story telling etc.*during that particular age group.

Activity: Meeting experts, user study
How: association (role play with Indian stories)

It was also found during user study that children like story telling with toys. India has a lot of folk stories and that could become the inspiration for such toys and *will make toys unique.*
It was decided to make *toys based on folk stories* and give sample stories alongwith the toys.

Changing meaning (product)
Identifying gap (product feature)

Opportunity area: Product range (toys based on folk stories)

The material explorations were combined with characters for story telling and this helped in arriving at a range of toys.

How: combining (material exploration and characters)

An user study was carried out for children aged between 3 to 7 years. Study of children's behavior led to the observation of children stacking spoons, clothes etc. one on top of another. This led to the idea of a row of turtles which can be stacked (inspired by folk tale and learning numbers). *Material exploration* on elastic property led to the idea of a *crocodile and a frog with an elastic property (inspired by a folk tale).*A family of characters whose body parts can be rotated to show different features (inspired by

Following trend (product and user segment)

Product Ideas: combining (production system, process, user, product feature)

children role playing with toys)

Since use of toxic colors was a *major cause of concern,* various techniques were explored to color bamboo. Alternatively, combination of material using bamboo and colored rope was also tried. The organisation liked the ideas and also felt that the techniques of *coloring and combining bamboo with colored rope can be used for a wide range of toys/products and was therefore a relevant opportunity area for them.*

Why: Concern
How: Resolving concern (Exploring new process) Opportunity area extrapolation/extension: Process (coloring technique) product families following same opportunity areas

Figure 5.1: Case study 01-Product idea models and prototypes

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5.3.2 Case study 2. Bamboo toys for INBAR

The International Network for Bamboo and Rattan (INBAR) connects a global network of partners from the government, private, and not-for-profit sectors in over 50 countries to define and implement a global agenda for sustainable development through bamboo and rattan. The Centre for Indian Bamboo Resource and Development (CIBART) has been facilitated by INBAR as a dedicated agency for bamboo development in India. CIBART's *main area of focus is to achieve livelihood development, ecological security and economic development* through the sustainable use of bamboo and rattan. Its primary focus is on benefiting poor rural communities. CIBART has four major centers in India :Kudal, Maharashtra, Tripura, Himachal Pradesh and Assam. They also plan to start bamboo centers in other parts of India for income generation in rural areas.

Organisational vision : multiple user segment not specified

INBAR was manufacturing bamboo and rattan furniture and were *planning to diversify into the area* of toys. They had already decided to sell their products online and wanted to explore new design opportunities in the area of bamboo toys for the national/international market

Organisational need: Aspiration (Product diversification Market opportunity)

After studying about INBAR, *a visit was made to one of their centers KONBAC* in Maharashtra. The type of bamboo, raw material procurement, bamboo preservation methods, tools and machines, hand weaving techniques etc., marketing linkages etc. were studied. The product range made at KONBAC consisting of furniture, accessories etc. was also studied.

Activity: Visiting organisation

"*During the market survey* I found that *there were no craft*

Activity : Market study

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toys which would be typically liked by boys such as planes, cars etc. I also liked model planes in childhood, and felt the same may be liked by children today and can be made in Bamboo. It would be *something new in Bamboo'.* The	How: Identifying gap (Market gap) How: Identifying gap (product gap)
designer further thought, "Bamboo seems to be a versatile medium and toys made from other materials can be easily replicated in bamboo. So I came up with the *idea of making war planes in bamboo."*	Designer's interest Product Idea
Information in the form of visuals was collected from the internet on various types of modeling planes.	Activity: Prototype making
World war 2 planes were selected for their strong form and comparative ease in making the same from Bamboo. Two of the planes *were simplified in terms of form to be made from bamboo. Bamboo was handcrafted to make similar war plane.* Bamboo joinery was also worked out so that all the parts could fit with each other.	How: associating play feature with form Product Idea
Suggestion was given by design expert to make a construction kit so that *children can enjoy playing* with it. A kit made with bamboo joinery and body parts which could be assembled by the child to make the plane was conceptualized.	Following opportunity (product)
During discussion with client, it emerged that the concept of model plane is interesting since there are not many such toys, especially for boys in the craft segment. However there are issues of feasibility with the actual concept. The project does not connect with the context. Each part is hand crafted and can be very time consuming and lead to a lot of wastage. Also there is no product graphics on the	Activity: Discussing with client Opportunity area extrapolation: Product -user segment

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war plane models which might make it less attractive in the market. However a *new range of toys such as war planes as a segment of toys for boys was found to be a good opportunity.*

product families following same opportunity areas (market)
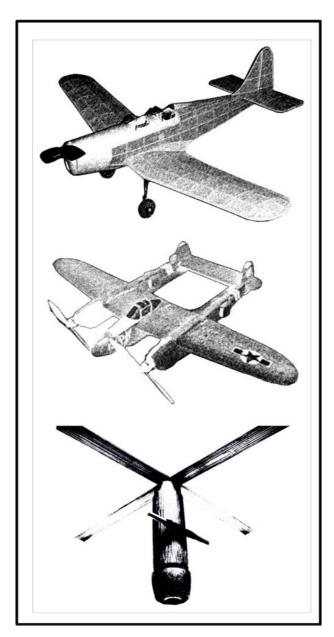
Figure 5.2: Case study 02-Product idea mock-ups

5.3.3 Case study 3: Terracotta office accessories for Bankura cluster

Cottage and small Scale Industries, West Bengal works for the overall development and growth of the sector. CSI approached NID for Design intervention in the terracotta cluster located in Panchmura village in the district of Bankura. The objective of the organization is to develop the sector through *design and technical intervention. Bankura craft is dying and needs to be revived.*

Organisational vision : multiple

Market segment not specified
Market not specified
Organisational need: Problem (of dying craft)

An initial study was carried out before going to the cluster. The study included market study of terracotta articles and study of users.

Activity : user study, market study

"Terracotta is seen mainly in decorative articles kept at homes. *Why cannot* terracotta be perceived as a modern material in offices?" the designer thought. A range of terracotta products could be designed for *corporate offices* to *change the perception* of terracotta by placing terracotta products in a corporate environment.

How: questioning the status quo

How: Changing perception/meaning

Envisaging scenario(Changing material meaning)
Questioning trend (material meaning)

This led to the study of the office scenario and observing user activities in the office space.

After the initial study and observation of spaces, it was concluded that the office staff like to personalise their space by keeping photographs and also prefer to have some product to keep their things in an orderly way. This resulted in initial ideation of designing tabletop accessories like photo frames.

Opportunity area:Market
Activity: observing user
Product Idea
How: associating user needs
How: Following opportunity area (market)

After the initial study, the cluster located in a village called Panchmura, in Bankura District was visited. It was

Activity: visiting cluster

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found that over the years the markets for this cluster has gradually reduced. The reasons are several such as non availability of new designs, quality standards of the product, strength of the material to sustain the transportation from one place to the other etc.

Terracotta products from Panchmura (Bankura District) hold *a very strong identity of its own*. It was felt important to retain this identity of the craft.

It was also observed that *slowly the joint family as a unit is breaking up* into nuclear families resulting into *lesser number of hands to share the work load*, while the production processes remain the same. The men folk have been *moving away from wheelwork to work as laborers* or to contribute to their own farms, the women worked only as a supporting factor. The women were *good at coiling and slab work*. If products are designed so that the women can make them only using coil work and slab work then they would be able to *earn income independently*.

Also the younger generation was *better at coil and slab work* rather than wheel work. We were concerned about the *revival of the craft* and if we explore new designs using only coil and slabwork, then youth and women will be easily able to *make them and earn* from the same.

Terracotta being a highly brittle material, breakage was one of the critical issues to be dealt with. Breakage occurs at many stages, while drying, firing and most importantly while transporting.

Activity: analyzing strengths and problems

How: building on existing strength (exploring and Identifying skill)
Designer's Concern (social)
Why: Designer's Aspiration (for women to earn income)

How: strength (skills)
Why: organisation's Concern (revival of craft)

Opportunity area :
Production system

How: Resolving concern (technical)

Therefore, after *experimentation with the raw material,* technical changes were made in the kiln to achieve higher temperature so that all the new designs can *achieve better surface finish and will not break during transportation.*

Opportunity area: Process (Technical improvement)

A *range of office accessories including photoframes, paper weight etc. were designed* for corporate offices. They were designed in such a way that *visual identity* of the craft was retained. They were made *using coiling and slabwork* and were small and *easy to transport* for selling in exhibitions or directly to offices.

Product Idea

How: Combining opportunity areas (market, process, production)

Figure 5.3: Case study 03-Product idea prototypes

5.3.4 Case study 4: Glass products for Borosil

Borosil is a well known glass industry making a range of tableware and lab equipment in glass. Due to its technical expertise in making high temperature resistant glassware, Borosil had a monopoly in this sector. However with *increasing competition* in this sector, they were finding it more and more *difficult to sustain themselves* in this position. Borosil was keen to explore new opportunity areas especially for their tableware range of products.

<div style="text-align:right">

Organisational need:
Problem (facing competition)

</div>

During the *industry visit*, the production process was studied and a meeting was held with the production and marketing team. It was felt that the company was averse to taking risks but were open to new ideas and opportunities.

<div style="text-align:right">

Activity: Visiting industry, studying production process
Product not specified
Market not specified
Marketing and promotion not specified

</div>

A study of market competition as well as study of existing glass products was done.

1.A study in the home and office scenario was carried out in order to explore potential user group.

<div style="text-align:right">

Activity: Market survey
How: Identifying gap
(Market segment)
Why: user's concern

Opportunity area : New Market segment

</div>

Office was taken as an opportunity area.
It was observed that in offices, tea or coffee intake is more because of long work hours.
Considering the *problem of shortage of space*, a *cup with a heating mechanism which can be directly plugged in can be envisaged*. The idea will need technical detailing and new links will have to be sourced for the heat plate

<div style="text-align:right">

Product idea

How: envisaging scenario
Solving problem

Why: user's concern
(about material)

</div>

2.It was *observed that people* avoid keeping hot stuff directly on glass table top. The *problem is that people*

<div style="text-align:right">

Resolving concern (Changing

</div>

perceive glass to be fragile.

Something which can provide matting to the surface can be looked as a opportunity area *to change the perception of glass* since transparent glass looks fragile

material perception)
How: changing perception (material)

Opportunity area : New material

3.It was observed that people are *opening up to different cuisines* which they cook at home and also go out for dinner

Sizzlers *are becoming popular*. Since sizzlers are supposed to be *served hot*, sizzler plates can be made from *borosilicate glass which can withstand high temperature.* The glass sizzler plates can be used in *restaurants as well as at home*s and can be a *new opportunity area*.

Activity: user study
How: following trend (product)
How: associating (material property with product requirement)
Opportunity area : product, market

4. It is found that a lot of *products are being sold alongwith other brands* during market study. For example mugs along with Rasna drinks. Borosil can enter into the market through other brand so that they can *introduce their range to customers loyal to other brands.* So if Borosil produces *a cup for Nescafe*, in return Borosil will get profit through Nescafe advertisement and *user will understand properties of Borosil in better way.* So, *marketing and promotion through other brands* could be an opportunity area.

Activity: market study

How: following trend (market)

How: following trend (User activity)
Opportunity area: Product, Marketing and promotion

5. Market survey shows that *drinking glasses* are more in regular demand (regular) and *sell in large quantity.* A range of *drinking glasses for hot drinks* can be introduced in market which will also do proper justice to the material properties of borosilicate. This can be a good *opportunity area* to *ensure high volume sale*

How: following trend (sales)
Product idea
How: associating (property of material with product feature)
How: to increase impact
Opportunity area: product

6. It was observed during home visits that people are *more*

Activity: user study
How: identifying trend

conscious about health and measure oil when using it in the kitchen. The existing lab ware range of borosilica is also used for measuring purpose so that they can be modified as oil containers.

(health, food habits)
How: associating (property of material with product feature)

The *opportunity* of designing *oil containers* modified from borosilicate lab ware will *not require much investment* and there will be low risk. The containers will have a minimalist look and feel and can be used to both store and measure oil. The opportunity was liked since this can be worked with present infrastructure only with existing market links.

Product idea
Following opportunity (product)
Opportunity area :
Production system
Opportunity area:
Extension of opportunity
Envisaging product families following same opportunity areas (market)

In a similar way a set for Chinese sauces can also be introduced.
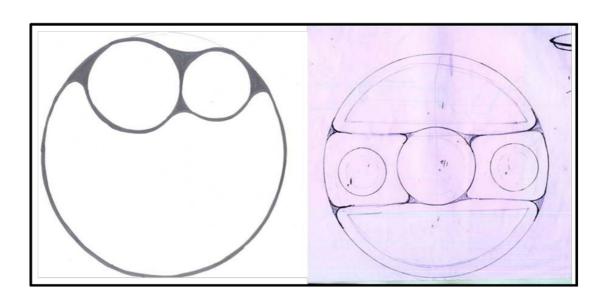
Figure 5.4: Case study 04-Product idea sketches

5.3.5 Case study 5 : Merchandising products for Famous studio

Famous studio is an animation company which started with 2D Animation in 1998. They also work on 3D Animation, clay motion, stop motion and also mixed materials. They do production as well as post production. Their main focus is on good concept with strong story, screenplay and good quality of animation work. They have started making their own animation films for children and were interested to *explore the connection between merchandising products and animation films through the start-up*. In fact, they found that TV channels are more likely to telecast their films if they also have a *range of merchandising products*. This led them to consider developing a range of *merchandising products* based on TV show 'Sea squabbles' meant for pre school children for both *promoting the show and for economic value*

Visiting the company and meeting the people involved in making the animation series gave a better idea about the development of characters and storyline.

1. Since *materials, process and marketing channel was open ended and not fixed,* a *brainstorming* was done on the various possibilities pertaining to the same. *User study and market study* was also carried out to understand the scenario.

One of the *trends in marketing is to give a toy along with a children's product* for e.g. Bournvita, Happy meals by Macdonalds etc. This resulted in a product *opportunity based on current trend in marketing channel/distribution.*

They would be given as a free item with a popular eatable

Manufacturing method not specified	
Marketing and promotion not specified	
Material not specified	
Organisational need: Aspiration (start-up)	
Opportunity area	
New product	
Organisational vision : multiple (sale of toys, promotion of film)	
Activity: Visiting organisation	
Why: Undefined parameter (marketing system, production system)	
Activity: user study, market study	
How: following trend (Marketing and promotion)	

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since popular eatables will be bought by many children of different age groups. *These small toys would promote the show and information about the show timings can be given alongwith the toy*. After playing with it, the kids would be able to relate to the character once they start watching it on TV.

Opportunity area : product

These could be small toys which tell about a specific *visual attribute of the respective character*. The attribute will be depicted through the use of the toy.
According to the *selection of material*, the product could be made at a certain place. Since the products are being made from cheap material they could be produced at low cost industries.

How: Associating (Character attribute with product feature)

Opportunity area : material (low cost)

It was important that the children remember and recollect the form and look of the character. Also it was observed that *children like dynamic interactive* toys.
A *synthesis of various elements* pertaining to toy safety, materials, process and user interest helped in arriving at ideas.

How: combining (Character attribute with product feature)

It was observed during *user study* that *children like to construct and collect* charcaters. The set can tell about a form and look of the respective character. Children can *give expression to the figure once made and place it as an action figure on the desk*. Slight movements for different postures is also possible.

Activity : user study
Why? User interest/activity

How: envisaging scenario (usage)

It can be made using wood, organic fabric, stuffing, velcro etc. There are places which farm organic material and also produce toys made from those materials like Padmavati, Tamilnadu. *Organic material* will be safe and eco-friendly

How: envisaging scenario (production centers)

Opportunity areas: Production system

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and *can be selected* for making the toys. *Toy companies who have their own retailing section can also be approached for linking with them.*

There are *new materials that have a wobbly feel to them like jelly rubber*. Children aged 5 to 9 years also *like to construct things* on their own. Once constructed the figures can be given expressions and attachments. The set would be sold in the name of the show and hence would promote the show.

Since the characters of the story live in a water world, a brainstorming was done based on the same. New material trends were studied.

Since the company does not have a production or distribution system it was thought to make *linkages with existing producers and distributers* with whom they could collaborate to make the products. Since the characters were living in a water world, it was decided to approach *companies with a product range associated with water.*

Climate based accessories like Raincoat was conceptualized. Raincoat can have characters embossed on it in a way that they get filled with water when in the rain. These characters would swell up when they come in contact with water because of *form changing material* placed in the pockets and *because of the new material, the raincoat will also become unique and interesting. Transparent raincoat with such small horns could be made by companies* which make children's raincoats. The small horns would be extra attachments which could be fitted into slots. These small horns are widely used in toys and

How: associating (product idea with other toy companies)

How: following trend (materials)
How: building on strength (material)
Why: aspiration (user)
Product Idea

Why: undefined parameter (production system)

Opportunity areas:
Product
How: associating (with other companies)

How: following trend (materials)
How: building on strength (material)
Product Idea

Opportunity area:
product

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are easily available. It would be sold at popular kids garment shops which sell raincoats during the rainy season

Rain coats are a need for children which usually parents buy for them. These can be worn to schools or simply for playing in the rain. The characters are an added value to an already existing product.	Opportunity areas: Product How: associating (with other companies)
Aquarium accessory can be given form of characters and can be made from rubber or plastic. It can act as a nozzle from which bubbles are released. It *can be made and sold by the aquarium accessory manufacturers.* The aquarium accessory manufacturers can also retail it. Its presence in the children's fish tank would promote the show.	Opportunity areas: Product How: associating (with other companies)
Table lamps can be designed in the form of characters. The lamp could also double up as colourful night lights. The characters have bright colours and a shiny and glowing visual appearance. The *lamp manufacturers can produce and can also retail them.*	Opportunity areas: Product How: associating (with other companies)
Children like playing with water in the summers. *Water squirting toy was conceptualized which could have a character shaped nozzle, a water container and a water pumping mechanism. Water toy manufacturers with a good retail chain or section can be approached with this concept.* It can be easily made by local toy manufacturers.	Opportunity areas: Manufacturing and distribution systems How: associating (with other companies)
Children swim wears that would be in the form of the characters and would remind them about the characters. Children can play in these costumes while in the pool or in the rain. It can be easily *made and sold by swim wear manufacturers.*	

Figure 5.5: Case study 05-Product idea mock up models and renderings

5.3.6 Case study 6: Glass products for Ferozabad glass cluster

Center for development of glass industries CDGI was set up by the Govt. of India *for the overall technical and economic development of the glass sector* in India. A number of glass industries are located at Ferozabad. This cluster was first established in the 16th century and mainly produced chandeliers and phials for scents, cosmetic products etc. which were in great demand during those times. Since 1989 it started production of artistic glassware in different colors and shades used in chandeliers and other items. About 480 glass industries are registered in Ferozabad and currently they are making a variety of glass products. 50 % productions of these units are exported to different countries.

Organisational vision : multiple
Market not specified
Product not specified

The Ferozabad cluster was *facing a lot of competition* from Chinese glass products and *were not doing well in the Indian marke*t and therefore CDGI was interested to explore design opportunities for Ferozabad cluster.

Organisational need: problem (facing competition)
Organisation's aspiration

A meeting was held between the CDGI, marketing people, master craftsmen and skilled blowers/craftsmen working under the supervision of master craftsmen and design team at Ferozabad. Various infrastructural facilities, processes etc. were observed during the visit.

Activity: Visiting organization, production facility

1. During the visit, there *was a concern about the wastage of glass and high energy consumption. A range of products by heat fusing waste glass was thought of since glass consumes a lot of energy when melted to recycle-this opportunity will be very environmental friendly* . However,

Why: Designer's Concern (for environment)

How: resolving concern (Exploring new process)

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it was felt that the Ferozabad industry was not yet ready for the same and will not be able to take it further.

Opportunity area: production system

2. Market and retail outlets dealing with glass products at both Delhi and Ahmedabad were visited. An influence of Islamic culture on the glass products was observed.

Activity: Visiting market and retail outlets

Many industry people pointed out that they were facing stiff competition from Chinese glassware products in India and *they wanted to sell their products abroad to get a better price* for the same.

Why: organisation's Aspiration

 "I thought if I design glass products catering to Islamic culture, then I would be able to sell them both in India and the Gulf countries. So the risk will be less and they will get better income through export" thought the designer.

The *strong point of Ferozabad was the ability to make hand crafted glass products made by blowing technique so it was selected.* It was decided to design products using blow moulding technique inspired by Islamic culture.

How: Building on strength (process)
Identifying gap (market)
Opportunity area
market and process

Next a user study was carried out to understand aspects of Islamic culture. The observations regarding user behaviour and activities were noted down and insights were derived from the same. Patterns of socialisation and customs-traditions was given importance.

Activity: user study

Some of the inferences derived were *the use of itar for sprinkling during gatherings, the regular use of saunf, dry fruits etc., the custom of eating meals together from one huge plate and family gatherings occurring* till late nights often took place.

How: associating (user experiences with product features)

Product Idea

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Based on these observations, the idea of a product with features to create an experience of aroma, lighting and serving dry fruits was developed.

Following opportunity area (market, process) and user experience

A modular *blow moulded* glass product was designed which could *create a multisensory experience* – it could be lit up and spread aroma from the center and which would be surrounded by platters to serve dry fruits. The amount of light could be controlled by controlling the light outlet which was in the form of moon.

Product idea

The product is easy to produce with the help of blow moulding. The modularity of the product would help in its packaging and transportation. The concept was found to be marketable and accepted.
However in order to bring it in the market, *a range of similar products may be envisaged as one product was not sufficient.*

Opportunity area: extension
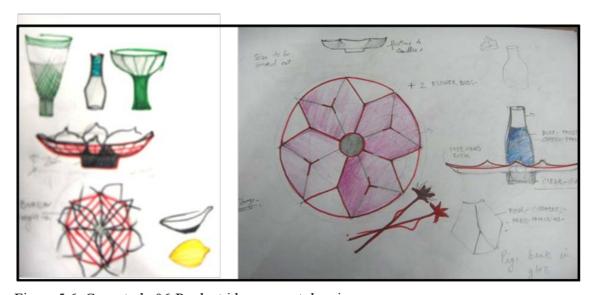
Figure 5.6: Case study 06-Product idea concept drawings

5.3.7 Case study 7: Glass products (Jewellery) for Ferozabad cluster

A meeting was held between the CDGI, marketing people, master craftsmen and skilled blowers/craftsmen working under the supervision of the master craftsmen and the design team at Ferozabad. *Various infrastructural facilities, process etc. was observed* during the visit.

User segment not specified

Market and retail outlets dealing with glass products at both Delhi and Ahmedabad *were visited*. There were *no silver and glass jewellery existing* in the market. The designer thought, 'I was interested in designing jewellery and thought that since they don't have it, it will be a new range for them" This area was taken as the design project.

Activity: Visiting organisation

Activity: Market study

How: identifying gap (product)
Why: Designer's aspiration/liking

Flamework was selected as a technique because it can be used to make glass jewellery. Teenagers were targeted as the primary user because of their liking towards jewellery and willingness to experiment.

It was observed from their existing jewellery and clothes that they like funky style.

Why: undefined parameter (user)

They *like to wear matching jewellery* for clothes and occasions. It was decided *to design silver and glass jewellery in which different coloured glass can be replaced as per occasion.*

Activity: user study

Dew drop was *used as a metaphor* because of its transparency and delicate look *which is similar to glass*. An idea for a jewellery range was developed with the form derived on dew drops. Different colored glass could be replaced both in pendants and ear rings.

Product Idea
How: associating (user aspiration with product feature)
New product segment
Following opportunity area (product)

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During this time, CDGI has no linkages with silver craftsmen. The replaceability of coloured glass beads was found to be interesting but the joinery mechanism was not worked out and the idea was rejected.

How: associating (visual with product feature)

It was suggested by design expert that silver may be substituted with brass from Moradabad cluster. *Linking with Moradabad brass cluster* and designing a product range combining brass and glass would be an interesting opportunity area.

How: Connecting (with other cluster)

It was found to be a good opportunity area since *not only jewellery but a lot of other products can be designed combining the expertise of brass and glass clusters*

Opportunity area: Production system

Opportunity area: extension Envisaging product families following same opportunity areas (production system)
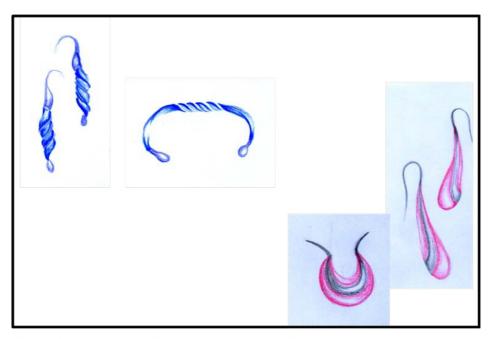
Figure 5.7: Case study 07-Product idea renderings

5.3.8 Case study 8: Educational robots for Robots Alive

Robots Alive is a venture involved in the design and
development of robotic systems. Robots Alive had an
existing range which catered to a niche market: robots
which would help in production for small and medium
enterprise which was a low volume, high price segment.

Organisational vision: single

They wanted to *diversify into a product range* which
would be low price but high volume segment and
considered *educational robots* to be one such possibility
for product diversification.

Product segment not specified
Organisational need: aspiration
(product diversification)

The information collection consisted of *studying about
robotics*, and *discussing with the organizational team.*

As part of field study, a *visit to retail outlets, user study* as
well as attending robotics workshops in schools/colleges
was carried out. It was analysed that remote controlled cars
and planes are easily available and people are ready to pay
highly for the same. Children are also interested to play
with the same.

Activity: understanding subject
area, discussing with key
personnel, field study

Activity: user study, market
study

During a Robofest, the characteristics of robotics was
studied in more detail. The attributes included
multisensory elements, interactivity, involvement,
entertainment etc.

Activity: understanding subject
area

Most of the existing education robotic kits are meant for
science and technology education. There is *a lack of
education in other areas through robots.* " Robots were
thought to be serious and only meant for kids who like
science and technology. I found that the *entertainment
aspect of the robot could be highlighted so that more*

How: Identifying gap (market)

Opportunity area:
product

number of children will be attracted to it and more number of product can get sold" the designer thought.

Brainstorming was done about all the activities done by children and how robots can be used for the same.

- *Different types of multi sensory robot and fun Robot* for personal computers that student can learn in home.
- *Transform able robot for multi-purpose task. Help in Learning mechanism* and construction through experience for age 12-16
- *Mobility Robot for home alone kids* so that they can explore space and learn in a playful manner games such as hide-and-seek for age 8-12
- *Creative and multiple use robot for kids* so that they can use them in painting and other creativity skill development for age12-16
- *Relaxation robot* that can change expression and synchronization of movement with music. This can also be used as application in personal computer.

Product Ideas
Following opportunity (product)
How: Associating (robot with user activities)

How: envisaging scenario (usage)
Why: Aspiration (user)

Opportunity area:
Product, Market

Taking the initial opportunity forward, robots for creative activities were explored. Creative and multi use robots which can be used for those activities which can not be easily done by human hands accurately and for which user requires a computer like *uniform pattern making* and other geometric imagery development. *Creation of texture, pattern or painting by the position and movement of robot without the use of computers* will be a good learning tool mainly for those students who are more oriented towards arts and crafts.

Product Idea

The opportunity was accepted to be developed further.

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However it was felt that it would be *easier to sell the idea to institutions rather than individuals* and therefore adding educational component such as the robot making technical drawing, teaching geometry etc. would be good.

Opportunity area : extension Envisaging product families following same opportunity areas (product) for other markets

Figure 5.8: Case study 08-Product idea mock up models and renderings

5.3.9 Case study 9 : Sanitary ware (Children's commode) for Weldecor

Morbi has one of the largest ceramic industry cluster in India. Weldecor, a ceramic industry located at Morbi caters to a large national market. The industry produced 90 % sanitary ware and 10% bathroom accessories. *It had good infrastructure facilities and was equipped with kilns from leading manufacturers*. It was a family owned business and has partnerships with other accessory suppliers. They produced bathroom sanitary ware products.

Activity: understanding industry

After an initial growth phase, *business at Weldecor was stagnating – they wanted to look at new opportunities* which would help them develop further.

Organisational need: Concern (Stagnation. Need to grow)

A study of ceramic production processes and raw material was carried out. Morbi ceramic cluster and the infrastructure was studied.

Product-user segment not specified

A meeting was held at Weldecor. *The design students met the owner , production manager and marketing manager* and had discussions with them. They also visited the production set up and observed the raw material process and production setup.

Activity: Visit to industry, meeting personnel

Identifying gap (existing product range)

Their current product range was also displayed. It was found that among the wide range of sanitaryware products displayed at the center, there were no commodes for children. " I decided to make commodes for children because I found that *there were no children commode in the Indian market* although they do exist abroad."the design student thought.

Designer's aspiration/liking

Activity: studying existing product range

Opportunity area:

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There are *no children commode in school, hospitals, flats, malls, hotels* etc. In school they were modified crudely according to the children's height. Major problem was found to be for the age group- 3 years to 6 years. Problems include that of height, length, upper diameter, inside depth, flushing system etc.

Even in shopping malls and hotels they have many facilities but lack sanitaryware for children. I*n residences, children often need parents help.* While discussing with the people in these areas- they want sanitaryware for them (children with age group 3 to 6 years) according to their requirement.

A study was carried out at schools as well as residences. It was found that although there was a need for commode for children in both *scenarios, it was more practical to have them in schools.*

The children' commode idea was not found to be feasible. The industry felt that unlike big companies who have the distribution network and salespersons to go and *sell the children's commode idea in public places like schools, they do not have the resources to do the same. The distribution network needs to be developed. It was suggested that a large company with a well established network such as Parryware may be more opne to this opportunity.*

Product

How: Identifying gap (market)
Building on strength

Activity : market study

Following trend (of sale)
Activity : user study in public places and residences

Opportunity area: user

Activity: market study

Opportunity area:
Market –product segment

Following opportunity (market, product, user)

Opportunity area:
Extension (distribution network)

Figure 5.9: Case study 09-Product idea testing photographs

5.3.10 Case study 10 : Sanitary ware (Washbasin) for Weldecor

A study of ceramic production processes and raw material was carried out.

A study of Morbi ceramic cluster and the infrastructure was studied. A meeting was held at Weldecor. *Meeting was organized with the proprietor, production manager and marketing manager for discussions*.

Activity: Visit to industry, meeting personnel

Product-user segment not specified

During a discussion about their competitors, it was found that Parryware and Hindware have a similar range of products but because of better quality their products are sold at higher prices.Weldecor does not cater to the upper segment. Mostly Parryware and Hindware supply to the upper segment in India

However, Weldecor has a good business catering to lower

market segments because their products are comparatively less expensive. It was *analyzed that the strength of the company was the ability to cater to lower end markets in huge quantities*. They also visited the production set up and observed the raw material process and production setup. Their *current product range was also studied.*

A visit to retailer was made. It was found that they *prefer selling their products in large quantities* to builders/architects rather than individual buyers. This *trend was mainly seen in large cities*.In large cities like Mumbai, where space was at a premium, people often wanted their wash basins to be of smaller size.
Accordingly, opportunity area was identified to have *washbasins which could fit into corners and which would be multipurpose*. i.e. bathroom accessories could get integrated with the washbasin. This range could be sold in large quantities to builders/architects.

The opportunity was liked since within the existing system, they could make the product and sell the same in high volumes. They felt that with *less investment they could easily sell in huge quantity and make more profit.*

Weldecor caters mainly to the residential bathroom ware segment. Being a comparatively *smaller company they could produce in small batches/customize their production.* A trend of heritage hotels being built in Gujarat was found after interaction with architects/builders.
Why not *design bathroom sanitary ware for hotels*? There are a lot of heritage hotels coming up in Gujarat. It is much cheaper for sanitary ware to be transported/ supplied locally.

Activity: analyzing organization's strength, studying existing product range

Designer's aspiration/liking
How: increasing impact

How: identifying trend
Why:Retailer's aspiration

Product idea
Following opportunity (market, product,feature)

Opportunity area: product (improvised), market

How: building on strength (technology)

How: following trend (market)

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However this opportunity was not taken forward since the
company felt that they would require specialized   Opportunity area:
salespersons to go for explaining and selling the idea to   New market
heritage hotels.
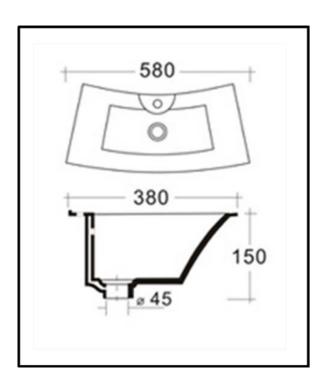
Figure 5.10: Case study 10-Product idea images

5.4 Categorization of codes

This process of initial coding was followed by categorization. Initial coding enabled the
organization and grouping of similarly coded data into categories or families because they
share some characteristic (Saldana, 2009). Further elaborating on ways to categorise, Saldana
reiterates the use of classification reasoning as well as tacit and intuitive sense to determine
which data 'looks alike' and 'feels alike' when grouping them together (Saldana, 2009).

The project context, factors which led to opportunity areas and the opportunity areas
generated were considered. Further categories emerged through organization of similarly
coded data.

The number denotes the case study number and has been used to refer to the same.

Based on the same, categorization was done as follows:

5.4.1 Project parameters

	Undefined parameters in the projects:	Case study Number
1.	Product-user segment not specified	CS01
2.	Product-user segment not specified	CS02
3.	Market segment not specified	CS03
4.	Market not specified	CS03
5.	Product not specified	CS04
6.	Market not specified	CS04
7.	Marketing and promotion not specified	CS04
8.	Marketing and promotion not specified	CS05
9.	Manufacturing method not specified	CS05
10.	Manufacturing method not specified	CS05
11.	Material not specified	CS05
12.	Market not specified	CS06
13.	Product not specified	CS06
14.	User segment not specified	CS07
15.	Product segment not specified	CS08
16.	Product-user segment not specified	CS09

Table 5.2: List of undefined project parameters in the Case studies

	Questioning status quo	Case study Number
1.	Questioning status quo	CS01
2.	Questioning status quo	CS03

Table 5.3: List of project parameters questioned in the Case studies

5.4.2 Rationale for identifying opportunities

	Concern	Case study Number
1.	Designer's Concern (social)	CS01.
2.	Concern (for safety)	CS01.
3.	Designer's Concern (social)	CS03.
4.	Organisation's Concern (for revival of craft)	CS03.
5.	Organisational concern (technical improvement)	CS03.
6.	User's Concern (about material)	CS04.
7.	Designer's Concern (for environment)	CS06.

Table 5.4: List of rationale related to 'Concerns' in Case studies

	Vision	Case study Number
1.	Organisational purpose/aspiration	CS01.
2.	Vision (to change meaning)	CS01.
3.	Designer's interest	CS02.
4.	Designer's vision/aspiration	CS03.
5.	Organisation's aspiration	CS06.
6.	Designer's aspiration/liking	CS07.
7.	Designer's aspiration/liking	CS09.
8.	Retailer's aspiration	CS10.
9.	Designer's aspiration/liking	CS10.

Table 5.5: List of rationale related to 'Vision' in Case studies

5.4.3 Factors related to opportunity identification:

	Identifying gap	Case study Number
1.	Identifying gap (product feature)	CS01.
2.	Identifying gap (product)	CS02.
3.	Identifying gap (market)	CS02.
4.	Identifying gap (market segment)	CS04.
5.	Identifying gap (market)	CS06.
6.	Identifying gap (product)	CS07.
7.	Identifying gap (market)	CS08.
8.	Identifying gap (existing product range)	CS09.
9.	Identifying gap (market)	CS09.

Table 5.6: List of 'identifying gap' factor in Case studies

	Building on strength	Case study Number
1.	Building on strength (exploring and Identifying skill)	CS03.
2.	Building on strength (process)	CS06.
3.	Building on strength (technology)	CS10.

Table 5.7: List of 'building on strength' factor in Case studies

	Making connections	Case study Number
1.	Connecting with existing company (production and distribution)	CS05.
2.	Connecting with existing companies (production and distribution)	CS05.
3.	Connecting (with other cluster)	CS07.

Table 5.8: List of 'making connections' factor in Case studies

	Following/questioning trend	Case study Number
1.	Following trend (product and user segment)	CS01.
2.	Questioning trend (material meaning)	CS03.
3.	Following trend (product)	CS04.
4.	Following trend (market)	CS04.
5.	Following trend (sales)	CS04.
6.	Following trend (user activity)	CS04.
7.	Following trend (marketing and promotion)	CS05.
8.	Following trend (new material)	CS05.
9.	Following trend (of sale)	CS09.
10.	Following trend (market)	CS10.

Table 5.9: List of 'following trend' factor in Case studies

	Following vision/envisaging	Case study Number
1.	Following vision (to change meaning)	CS01.
2.	Envisaging(production scenario)	CS01.
3.	Envisaging a scenario(Changing material meaning)	CS03.

Table 5.10: List of 'following vision/envisaging' factor in Case studies

	Resolving concern	Case study Number
1.	Resolving concern (Exploring new process)	CS01.
2.	Resolving concern (technical)	CS03.
3.	Resolving concern (Changing material perception)	CS04.
4.	Resolving concern (Exploring new process)	CS06.

Table 5.11: List of 'resolving concern' factor in Case studies

	Changing meaning	Case study Number
1.	Changing meaning (product)	CS01.
2.	Changing material meaning	CS03.
3.	Changing material meaning	CS04.

Table 5.12: List of 'changing meaning' factor in Case studies

5.4.4 Opportunity areas

	Opportunity areas	Case study Number
1.	New Production system	CS01.
2.	New Product –user segment	CS01.
3.	New product range	CS01.
4.	New process	CS01.
5.	New product ranges	CS01.
6.	New product-user segment	CS02.
7.	New product ranges	CS02.
8.	New market	CS03.
9.	New process	CS03.
10.	New production system	CS03.
11.	New market segment	CS04.
12.	New material	CS04.
13.	New product. New/old market	CS04.
14.	New Marketing and promotion system	CS04.
15.	New production system	CS04.
16.	New product	CS05.
17.	New mfg. and distribution system	CS05.
18.	New Production system	CS06.
19.	New Market and Process	CS06.
20.	New Product segment	CS07.

21.	New production system	CS07.
22.	New product	CS08.
23.	New Market-product segment	CS09.
24.	New User segment	CS09.
25.	New market	CS10.
26.	New product	CS10.

Table 5.13: List of opportunity areas across all case studies

5.4.5 Opportunity areas and product ideas

	Opportunity areas and product ideas	Case study Number
1.	Combining opportunities (production, process, user, product feature)	CS01.
2.	Following opportunity (product)	CS02.
3.	Following opportunity (market)	CS03.
4.	Combining opportunity areas (market, process, production)	CS03.
5.	Following opportunity (product)	CS04.
6.	Following opportunity (product)	CS05.
7.	Following opportunity area (production) and following trend (sales)	CS05.
8.	Following opportunity area (market, process) and user experience	CS06.
9.	Following opportunity area (product)	CS07.
10.	Following opportunity (product)	CS08.
11.	Following opportunity (market, product, user)	CS09.
12.	Following opportunity (market, product,feature)	CS10.

Table 5.14: List of opportunity identification to product ideas in Case studies

5.4.6 Opportunity extension

	Opportunity extension	Case study Number
1.	Envisaging product families following same opportunity areas	CS01.
2.	Envisaging product families following same opportunity areas (market segment)	CS02.
3.	Envisaging product families following same opportunity areas (market)	CS04.
4.	Envisaging product families following same opportunity areas (production system)	CS07.
5.	Envisaging product families following same opportunity areas (product) for other markets	CS08.

Table 5.15: List of 'opportunity extension' factor in Case studies

5.5 Concluding remarks

Initial coding for research questions helped in providing indications regarding opportunity identification. Initial coding included coding for project context, opportunity areas, product ideas and factors which led them to opportunity area/ideas. This step in the initial phase of research study was crucial to understand main factors pertaining to opportunity identification in the case studies and to further structure them in broad categories. The categorization process further helped in arriving at new categories pertaining to factors related to opportunity identification.

Some of the recommended ways to further analyze structural codes include within case and cross case displays propounded by Gibbs; Miles and Huberman (Saldana, 2009). The next level of analysis was done using within case i.e. single case study analysis and multiple case study analysis which included cross case analysis.

Chapter 6

Single case study analysis

6.1 Introduction

After the initial coding and categorization of the data, it was decided to study the phenomena in detail through single case study analysis. Here the rationale for conducting a single case study analysis was that of a representative case wherein lessons learned from this case was assumed to be informative about the phenomena to be studied (Yin, 2009).

6.2 Single case study analysis

6.2.1 Case study 1: (Educational) bamboo toys for INBAR
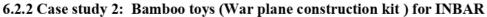
Figure 6.1: Product image pertaining to Case study 1

Opportunity area/ idea	How was the opportunity/idea arrived at?	Why was the opportunity/ idea thought of?
Production system (*Rural people were trained to work with simple bamboo hand tools*)	Questioning status quo Envisaging production scenario	Designer's concern for villagers not getting work Organisational objective/aspiration
Product –user segment (*Educational Toys for 3-5 year old children*)	Identifying product-user segment	Product-user segment not specified Reduce risk Maximise sale possibility
New product range (Role playing *toys inspired by Indian folk tales*)	Associating role play with Indian stories	Bring uniqueness
Opportunity Technical (*Non toxic coloring technique developed for the toys*)	Exploring new technique	Concern (of safety)
Opportunity extension	Applying new production system and safe colouring technique for other products.	Maximize the opportunity

Table 6.1: Single case study analysis pertaining to Case study 1

- Opportunities identified were in the areas of new production system, new user segment, new process and new product range
- Purpose of the project was questioned and multiple perspectives brought in multiple objectives to the project.
- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges
- Approach to opportunity identification was both push and pull. Factors such as vision helped in pulling the innovation towards the future scenario whereas concern and technique exploration resulted in pushing the innovation.

- Connecting the various opportunities helped in developing the product ideas. Instead of being a linear process, the product idea grew alongwith the opportunity identification process.
- There were a lot of defined parameters. However, questioning the defined parameters, resulted in identifying new opportunity areas.

6.2.2 Case study 2: Bamboo toys (War plane construction kit) for INBAR
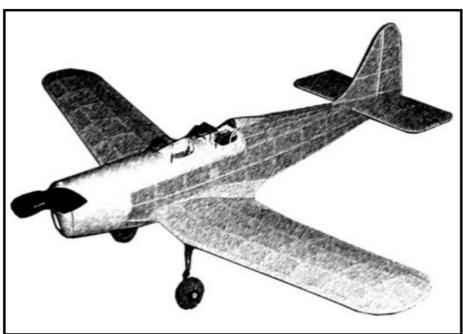
Figure 6.2: Product image pertaining to Case study 2

Opportunity/ idea	How was the opportunity/idea arrived at?	How was the opportunity/idea arrived at?
Idea (*model planes*)	Self experience	Designer's interest
Opportunity Product-user segment (*bamboo war planes using craft techniques for 8-12 year old boys*)	Identifying product-user segment Identifying market gap	Product-user segment not specified

Idea (*bamboo war planes construction kit*)	Fulfilling user aspiration	Following opportunity
Opportunity extension	An entire range of similar products could be designed for the market	Maximize the opportunity

Table 6.2: Single case study analysis pertaining to Case study 2

- Opportunities identified were in the areas of new market, new user segment, new product range
- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges
- The product idea was first developed based on designer's own experience. Identifying market gap helped in opportunity identification based on the product idea.
- Since it was a new venture, there were more undefined parameters. The user segment was not specified.
- Opportunity elaboration based on the product idea was critical.

6.2.3 Case study 3: Terracotta office accessories for Bankura cluster

Figure 6.3: Product image pertaining to Case study 3

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Opportunity/ idea	How was the opportunity/ idea arrived at?	Why was the opportunity/ idea thought of?
Opportunity: New market Material perception	Questioning the status quo Changing (material) perception/meaning	Market not specified Designer's aspiration
Ideas (office accessories)	Associating User preference with existing products	Following opportunity
Opportunity Technical (new process)/social	Identifying skill Exploring new process Questioning the status quo	Designer's Concern for income for tribal artisans Organisation's Concern for revival of craft
Opportunity Technical (improvement)	Identifying skill exploring new process Questioning the status quo	Designer's Concern for income for women Organisation's Concern for revival of craft
Opportunity Technical (improvement)	Solving problem	Organisational objective
ideas	synthesis	Following opportunity

Table 6.3: Single case study analysis pertaining to Case study 3

- Opportunities identified were in the areas of new market, new user segment, new product range, new technical process
- The purpose of the project was discussed and multiple perspectives brought in multiple objectives to the project.
- Elaboration of opportunity helped in extending opportunity to ideate similar product ranges
- Approach to opportunity identification was both push and pull. Factors such as changing meaning of product range helped in pulling the innovation towards the future scenario whereas concern and technique exploration resulted in pushing the innovation.
- Connecting various opportunities helped in developing the product ideas. Instead of being a linear process, product ideas grew along with the opportunity identification process.

- Since it was a new venture, there were more undefined parameters. The user segment was not specified. Due to nature of project it was possible to question status quo and propose a new vision.
- The evolution of product (idea) features along with opportunity area identification was found during the project.

6.2.4 Case study 4 : Glass products for Borosil
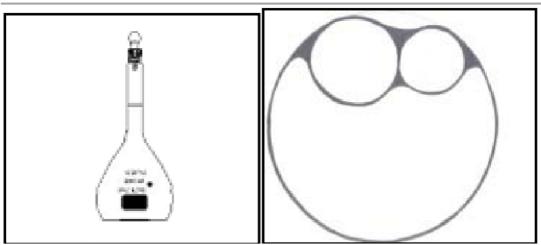
Figure 6.4: Product image pertaining to Case study 4

Opportunity/idea	How was the opportunity/idea arrived at?	Why was the opportunity/idea thought of?
Opportunity New market segment	Identifying user segment	Market not specified
Idea:	Envisaging ideal usage scenario	To solve user problem
Opportunity New material	Changing perception of material	User's Concern about material
Opportunity New product. New/old market	Identifying trend (lifestyle) Associating material property with existing product	Product not specified
Opportunity Marketing and promotion	Identifying trend (market) Associating with existing method of market and	Marketing and promotion not specified

	promotion	
Opportunity/idea	Identifying trend (sales) Associating material property with existing product	Product not specified
Opportunity New product. New/old market	Identifying trend (lifestyle) Associating user activity with existing product function	Reduce risk Product not specified
Opportunity extension: new production system	Applying opportunity to other similar products	Maximize the opportunity

Table 6.4: Single case study analysis pertaining to Case study 4

- Opportunities identified were in the areas of new production system, new market segment, new marketing and promotion system,
- The connection between the two opportunities was a spontaneous process during the field study.
- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges
- Approach to opportunity identification was both push and pull. Factors such as identifying various trends helped in pulling the innovation towards the scenario whereas identifying and building on strength of the company resulted in pushing the innovation.
- Connecting opportunities helped in developing the product ideas. A synthesis of the two opportunities resulted in the product idea.
- Since it was an established venture, there was less degree of freedom. Understanding the existing strength and weakness of the venture was critical.
- New product opportunity due to association between existing product function with user trend.

6.2.5 Case study 5 : Merchandising products for Famous studio
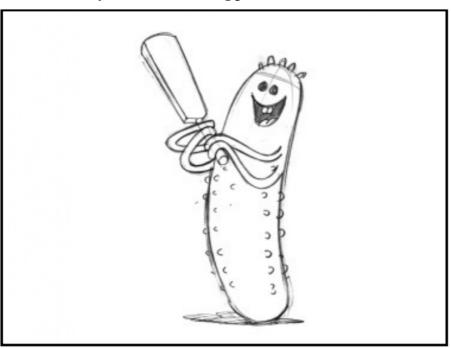
Figure 6.5: Product image pertaining to Case study 5

Opportunity/ idea	How was opportunity/idea arrived at?	Why was opportunity/idea thought of?
Opportunity New product	Associating with existing method of marketing and promotion	Marketing and promotion not specified
Idea:	Selecting material and process Associating with user activity Synthesis	Following opportunity
Opportunity New mfg and distribution	Associating with existing company (production and distribution)	Manufacturing method not specified
Opportunity/idea	Associating with existing product	Following trend (sales)
Opportunity New mfg and distribution	Associating characters with water based products and brainstorming Linking with existing water based companies	Manufacturing method not specified

Opportunity/idea	Associating character with product and new material	Material not specified

Table 6.5: Single case study analysis pertaining to Case study 5

- Opportunities identified were in the areas of new production system, new distribution system, and new product

- Approach to opportunity identification was both push and pull. Factors such as identifying trends, and associating with existing systems helped in pulling the innovation whereas building on the uniqueness/strength of the project resulted in pushing the innovation.

- Connecting the various opportunities helped in developing the product ideas. A synthesis helped in developing product ideas.

- Since it was a new venture, there were more undefined parameters and most of the systems were not specified. This resulted in new opportunity areas and ideation of product based on the same.

6.2.6 Case study 6 : Glass products for Ferozabad cluster
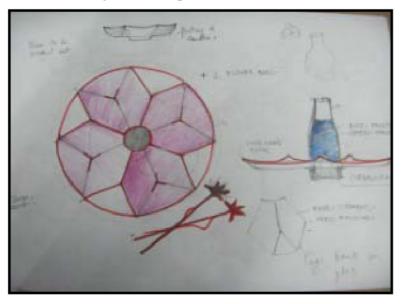
Figure 6.6: Product images pertaining to Case study 6

Opportunity/ idea	How was opportunity/idea arrived at?	Why was opportunity/idea thought of?
Opportunity Production system	Exploring new process	Designer's Concern for environment

Opportunity Market and Process	Identifying market and process	Reduce risk Organization's aspiration
Idea (features)	Associating user experience with product features Synthesis of features	Following opportunity

Table 6.6: Single case study analysis pertaining to Case study 6

- Opportunities identified were in the areas of new production system and new market
- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges
- Approach to opportunity identification was both push and pull. Factors such as identifying market helped in pulling the innovation towards the scenario whereas identifying technique resulted in pushing the innovation.
- Following the opportunity led to the development of product ideas.
- Since it was an unorganized sector, there were more undefined parameters. The user segment was not specified. Inspite of the same only a few opportunity areas were explored.

6.2.7 Case study 7 : Glass products (Jewellery) for Ferozabad cluster
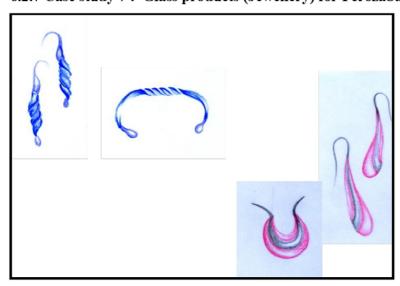
Figure 6.7: Product images pertaining to Case study 7

Opportunity/idea	How was opportunity/idea arrived at?	Why was opportunity/idea thought of?
Opportunity	Identifying market gap	Designer's aspiration/liking

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Production segment		
Opportunity User segment	Identifying user segment	User segment not specified
Idea	Fulfilling user aspiration Using visual metaphor	Following opportunity
Opportunity technical	Solving Problem (of process) Associating with cluster (for production)	
Opportunity extension	Using new production system for other products	Maximize the opportunity

Table 6.7: Single case study analysis pertaining to Case study 7

- Opportunities identified were in the areas of new product segment, new user segment, new process
- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges
- Approach to opportunity identification was spontaneous. Factors such as identifying market gap and user segment and associating with cluster helped in opportunity identification based on the product idea.
- The product idea was first developed based on designer's own experience and later elaborated to arrive at opportunity area. Opportunity elaboration led to further identification of process opportunity.
- Since it was an unorganized sector, there were more undefined parameters. The user segment was not specified.

6.2.8 Case study 8 : Educational robots for Robots Alive
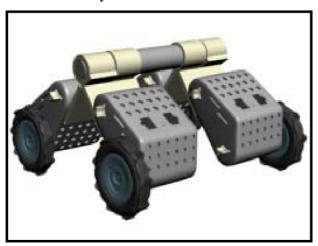
Figure 6.8: Product image pertaining to Case study 8

Opportunity/ idea	How was the opportunity/ idea arrived at?	Why was the opportunity/ idea thought of?
Opportunity New product category	Identifying market gap	Product segment not specified
Ideas	Brainstorming Associating robot features with user activities	Following Ideas opportunity
Opportunity Extension –new market	Modifying the ideas and applying to other market segments	Easier to sell

Table 6.8: Single case study analysis pertaining to Case study 8

- Opportunities identified were in areas of new product segment and new user segment
- Elaboration of opportunity helped in extending opportunity to ideate similar product ranges
- Factors such as identifying market gap and user segment helped in opportunity identification based on the product idea.
- The product idea was first developed based on following the brief and later elaborated to arrive at opportunity area. Opportunity elaboration led to further identification of opportunity.
- Since it was an established venture, there were fewer undefined parameters.

6.2.9 Case study 9: Sanitaryware (Children's commode) for Weldecor
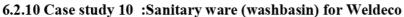
Figure 6.9: Product image pertaining to Case study 9

Opportunity/idea	How was the opportunity/idea arrived at?	Why was the opportunity/idea thought of?
Opportunity New product category	Spontaneous Identifying market gap	Aspiration/liking of designer
Opportunity: Market-product segment User segment	Identifying product-user segment	Product-user segment not specified
Idea	Fulfilling user aspiration Solve problem	Following opportunity
Opportunity problem		Problem with market linkage and distribution

Table 6.9: Single case study analysis pertaining to Case study 9

- Opportunities identified were in the areas of new product segment, new user segment, new market segment

- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges

- Approach to opportunity identification was spontaneous. Factors such as identifying market gap helped in opportunity identification based on the product idea.

- The product idea was first developed based on designer's own experience and later elaborated to arrive at opportunity area. Opportunity elaboration led to further identification of process opportunity.

- Since it was an established venture, there were fewer undefined parameters.

6.2.10 Case study 10 :Sanitary ware (washbasin) for Weldeco

Figure 6.10: Product image pertaining to Case study 10

Opportunity/ idea	How was the opportunity/ idea arrived at?	Why was the opportunity/ idea thought of?
Opportunity New market, improved product	Identifying trend (of sale)	Retailer's aspiration
Idea:	Fulfill user aspiration Associate user activities with product improvisation	Follow opportunity
Opportunity New market, new	Identifying trend in market	Designer's aspiration

product		
Problem with opportunity		Problem with selling (in specialized market)

Table 6.10: Single case study analysis pertaining to Case study 10

- Opportunities identified were in the areas of new product segment, new user segment, new market segment

- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges

- Approach to opportunity identification was both push and pull. Factors such as identifying various trends helped in pulling the innovation towards the scenario whereas identifying and building on strength of the company resulted in pushing the innovation.

- Following of opportunities helped in developing the product ideas.

- Since it was an established venture, there was less degree of freedom.

6.2.11 Consolidated Single case study analysis

Case study	Learnings from each case study
Case study 1 : (Educational) bamboo toys for INBAR	Concern for existing context and envisaging future scenario becomes the most critical factor in opportunity identification. Questioning existing production system in which tribal people had to travel from their villages to work in an industry set-up and envisaging a production system based on hand made tools made it possible for tribals to stay near their homes and earn.
Case study 2: Bamboo toys (War plane construction kit) for INBAR	Elaborating the product idea – war planes, which was based on identifying the gap of there being less toys in the craft sector targeting boys became the basis for developing other toy ranges for boys.
Case study 3: Terracotta office accessories for Bankura cluster	It was found during the study that terracotta products are associated more with domestic use and decorative articles. The desire to change the meaning led to identifying opportunity for using terracotta in corporate sector. Consideration of multiple perspective such as social perspective of helping women artisans earn led to identification of technical-

	process opportunity of coiling to make products.
Case study 4: Glass products for Borosil	Since Borosil was a industry having well established production system, marketing system etc., there were less undefined parameters. Building on strength of Borosil which was the property of borosil material and creatively associating this property with user trends and requirements led to opportunities.
Case study 5: Merchandising products for Famous studio	Since it was a new venture, there were many undefined parameters – the material, process and market were not fixed. Opportunities were identified to connect with Raincoat making companies, Asian paints, Bournvita etc. and product ideas such as Freebies, children's raincoat etc, were arrived at to promote characters mae by Famous studio.
Case study 6: Glass products for Ferozabad cluster	Building on strength of Ferozabad cluster both in terms of process-glass blowing and potential to market in Gulf led to opportunity area. But this also narrowed down the possibilities and diverse opportunity areas were not explored.
Case study 7: Glass products (Jewellery) for Ferozabad cluster	Product idea of jewellery led to the process opportunity of combining glass with brass by making a connection with a nearby brass cluster made it possible to elaborate the opportunity to think of mant other product possibilities apart from jewellery.
Case study 8: Educational robots for Robots Alive	Opportunity elaboration to increase the impact led to developing a range of educational robots. A product family can increase the impact of opportunity
Case study 9: Sanitaryware (Children's commode) for Weldecor	Identifying market gap of lack of children's commode in Indian market helped in opportunity identification. However considering the gap with respect to Weldecor was lacking.
Case study 10: Sanitaryware (Washbasin) for Weldecor	Considering multiple points of view of people involved including retailers led to identifying opportunity of designing washbasin for builders-architects purchasing in bulk.

Table 6.11: Consolidated single case study analysis

6.4 Concluding remarks

Single case study analysis helped in the study of unique aspects pertaining to opportunity identification in each of the case studies.

There seemed to be more undefined parameters in projects related to start-ups and unorganized/semi-organised sector. This often led to identification of opportunities in various areas. In the case of organized sector, questioning the defined parameters led to identification of new opportunity areas. Thus, undefined parameters in a project context and acceptability of questioning the status quo varies based on the type of organization and project context and became one of the critical factors for opportunity identification.

Opportunities identified were in areas of new product segment, new user segment, new market segment, new process/technique, new production system, new marketing and retail system. An opportunity related to a process or system would subsequently also result in product opportunities based on the same.

Another significant finding was that factors related to opportunity identification were operationalised using both push and pull. Just as the study of the existing context could result in opportunity identification, similarly considering broad patterns and trends as well as the future scenario also resulted in opportunity identification. Factors such as vision, changing meaning, associating with trends helped in pulling the innovation towards the future scenario whereas identifying and building on strength of the company, technical exploration resulted in pushing the innovation from the existing context. Thus, aspirations/vision for the future and concerns for the present played an important role in identifying opportunities,
The other significant findings were related to approach towards opportunity identification.
It was found that multiple perspectives played an important role during the process in terms of multiple purpose in the project resulting in multiple objectives; multiple stakeholders resulted in multiple points of view and multiple perspectives in terms of social, technical, marketing etc. resulting in multiple considerations

Further, opportunity identification and product ideation phase was found to be a non- linear phase. Instead of being a linear process, product idea gets developed along with the identification of opportunity areas defining each feature of a product idea. Product ideas could

be arrived at based on opportunity areas. Similarly, a product idea feature could also be elaborated to arrive at an opportunity area.

The process of opportunity identification was also found to be creative in nature since it involved questioning status quo of defined parameters, envisaging scenarios, exploring, making creative connections and elaborating an idea to increase its impact.

These findings helped in undertaking of cross case analysis to probe and study some of the patterns more in depth and to further strengthen findings through replication logic.

Chapter 7

Multiple case study analysis

7.1 Introduction

Multiple case study analysis method was used since evidence from multiple cases was often considered more compelling, and overall study was therefore regarded as being more robust. (Yin, 2012) Multiple case study was similar to conducting multiple experiments rather than sampling. In fact, it is considered that replication logic was analogous to that used in multiple experiments (Yin,2012). Cases may not predict similar results and may predict contrasting resulted but for anticipatable reasons.

7.2 Cross case analysis

Cross case analysis was used to further probe into factors pertaining to opportunity identification across two separate case studies having same project context.

7.2.1 Project : Bamboo toys for Inbar

Case 1 and Case 2

Analysis:

- Opportunities identified were multiple in case study 1 whereas in case study 2 the focus was only on new product range opportunity.

- Elaboration of opportunity helped in extending the opportunity in multiple ways in case study 1 whereas it can be extended only in terms of the product range in case study 2.
- Approach to opportunity identification was both push and pull in CS01. Factors such as vision helped in pulling the innovation towards the scenario whereas concern and technique exploration resulted in pushing the innovation whereas in CS02 Factors such as identifying market gap and user segment helped in opportunity identification based on product ideas.
- Opportunity areas led to development of product idea in CS01 whereas the product idea was first developed and later elaborated to arrive at opportunity area.
- Project context remained the same. However in CS01, defined parameters were questioned to arrive at opportunity areas whereas in CS02 defined parameters were not questioned and approach was linear.

Learning : Questioning status quo of existing defined parameters was important in order to arrive at new opportunity areas. Ability to approach with broader concerns and aspirations resulted in diverse opportunity areas compared to identifying product/market gap.

7.2.2 Project : Glass products for Ferozabad cluster

Case 6 and Case 7

Analysis:

- Opportunities identified were multiple in case study 6 whereas in case study 7, focus was only on new product range opportunity.
- Elaboration of opportunity helped in extending the possibility of developing product range for same market in CS06 and for same production system in CS07.
- Approach to opportunity identification was both push and pull in CS06. Factors such as identification of positive gap helped in pulling the innovation towards the scenario whereas concern resulted in pushing the innovation. In CS07, factors such as identifying possibilities in the product idea parameters led to opportunity identification.
- The project context remained the same. However in CS06 opportunity identification from diverse aspects led to product ideas whereas in CS07 identifying possibilities in various product idea parameters led to opportunity areas.

Learning : Opportunity ideas may lead to product ideas and vice versa. Different approaches to identifying opportunities and identifying possibilities in different product idea parameters may lead to opportunity identification

7.2.3 Project :Sanitaryware products for Weldecor

Case 09 and Case 10

Analysis:

- The opportunities identified were in the areas of new product segment, new user segment, new market segment in CS09 and new user and market segment in CS10.
- There was elaboration of opportunity in terms of new markets in CS09 and in terms of similar product ranges in CS10
- Approach to opportunity identification was mainly to fill the product gap in CS09 and was both push and pull in CS10. Factors such as identifying various trends helped in pulling the innovation towards the scenario whereas identifying and building on strength of the company resulted in pushing the innovation.
- The opportunity areas led to developing product ideas.

Learning: Since it was an established venture, there was less degree of freedom. Understanding the existing strength and weakness of the venture was critical

The analysis from the cross case study analysis brought forth the learning that questioning status quo was critical in the initial stage. Concerns and vision/aspirations resulted in diverse opportunity areas compared to identification of gap.

This was followed by a multiple case study analysis wherein replication logic was considered to strengthen the findings. Initial findings put forth in the preceding chapter included project context, approach to opportunity identification through design, factors corresponding to opportunity identification, opportunity extension, rationale behind opportunity identification; factors pertaining to opportunity identification leading to product ideas and vice versa. Considering the same, all corresponding instances of phenomena studied were written within case study number in brackets. This brings forth many instances of occurrences of these phenomena to further strengthen findings and also gives some indication to nature of these phenomena.

Case studies	Learnings from comparing case studies having same project context
CS01 : (Educational) bamboo toys for INBAR Vs CS02: Bamboo toys (War plane construction kit) for INBAR	Although project context was the same, questioning of existing defined parameters such as production system based on hand tools, combining Indian stories with toys and application of water based color on bamboo in CS01 led to diverse range of opportunities whereas in CS02 led to only opportunity in terms of a product range.
CS06: Glass products for Ferozabad cluster Vs CS07: Glass products (Jewellery) for Ferozabad cluster	Building on strength of Ferozabad cluster both in terms of process- glass blowing and potential to market in Gulf led to opportunity area which then resulted in product idea in case of CS06 whereas in CS07 the product idea –jewellery led to process opportunity combining glass and silver.
CS09: Sanitaryware (Children's commode) for Weldecor Vs CS10: Sanitaryware (Washbasin) for Weldecor	Consideration of multiple points of view including retailing led to developing product-washbasin targeted to builders-architects in CS10 whereas only identifying market gap of lack of children's commode and not considering multiple point-of-views including distribution system led the opportunity not being currently appropriate for Weldecor in case of CS09.

Table 7.1: Consolidated cross case study analysis

7.3. Replication across case studies

a)Project context:

Project brief for a new design opportunity often arose out of aspirations of existing industry or starting of a new/subsidiary industry or venture. Project context included both defined as well as undefined parameters. Understanding undefined parameters was critical since considering the same may result in identification of opportunity in those areas. For example, design opportunities for unorganised/small-scale industry set ups may often result in opportunities for new opportunity areas including new production systems and new marketing systems whereas for larger industries design opportunities often came forth as new product opportunities since the production system and marketing system may already be very well defined. Opportunity identification also occurs on questioning defined parameters and considering them to be undefined.

	Undefined parameters in the projects:	Case study Number
1.	User segment not specified	CS01, CS02,CS07
2.	Market not specified	CS03,CS04,CS06
3.	Product not specified	CS04
4.	Marketing and promotion not specified	CS04,CS05
5.	Manufacturing method not specified	CS05
6.	Material not specified	CS05,CS06
7.	Product not specified	CS06
	Defined parameters	
1.	Product, production system, market specified	CS01, CS02
2.	Material, process, production system specified	CS03, CS04
3.	Product category specified	CS05, CS08
4.	Material, process, production system specified	CS03, CS04, CS06, CS07, CS09, CS10

Table 7.2: List of 'undefined and defined parameters' factor in Case studies

Instances of questioning the status quo of defined parameters corresponding to case studies were as follows:

	Questioning the status quo of defined parameters	Case study Number
1.	Questioning status quo -production system	CS01
2.	Questioning the status quo -process	CS03
3.	Questioning the status quo –meaning	CS03

Table 7.3: List of 'questioning status quo' factor in Case studies

b)Opportunity areas:

As discussed in literature review, opportunity areas were mainly derived from technical research and development and marketing departments. Opportunity areas were often based on technological invention that helped in pushing new product ideas based on the same into the market and new markets that helped in pulling the product idea based on it. In the case studies we find a non-linear approach. Even when there were instances of technical/process opportunity areas, they may have been derived due to social concern (as in case study 1) or environmental concern (as in case study 6).

Instances of opportunity areas corresponding to the case studies were as follows:

	Opportunity areas	Case study Number
1.	New product	CS04,CS05,CS08,CS10
2.	New User segment	CS09
3.	New Product –user segment	CS01,CS02
4.	New product range	CS01,CS02
5.	New Product segment	CS07,CS09
6.	New process	CS01,CS03,CS06
7.	New production system	CS01,CS03,CS04,CS06,CS07
8.	New material	CS04
9.	New market	CS03,CS04,CS06,CS09,CS10
10.	New Marketing and promotion system	CS04
11.	New mfg. and distribution system	CS05

Table 7.4: List of 'defined parameters' factor in Case studies

c)Rationale for arriving at opportunity areas

One of the objectives of the research study was the rationale or the reason 'why' a particular opportunity area had been thought of. It was found that vision/aspiration of different team members associated with the project played a very important role. Another factor was 'concern' regarding a parameter in the existing context which then demanded to be changed/modified.

Instances of 'concerns' corresponding to case studies were as follows:

	Rationale related to concerns	Case study Number
1.	Designer's Concern –social	CS01, CS03
2.	Concern – legal	CS01
3.	Organisation's Concern -cultural	CS03
4.	Organisational concern - technical	CS03
5.	User's Concern – material	CS04
6.	Designer's Concern (for environment)	CS06

Table 7.5: List of 'project concerns' factor in Case studies

Instances of 'vision' corresponding to case studies were as follows:

	Rationale related to vision	Case study Number
1.	Organisational purpose/aspiration	CS01, CS06
2.	Designers vision	CS01, CS03

3.	Designer's aspiration/liking	CS02, CS07, CS09, CS01
4.	Retailer's aspiration	CS10

Table 7.6: List of 'vision/aspirations' factor in Case studies

Concern and aspiration from different stakeholders (organization, designer, user, retailer etc.) with different perspectives (social, economic, environmental, technical etc.) was critical to considering different parameters while arriving at opportunity areas.

d)Design approach in opportunity identification:

During the investigation, it was possible to observe patterns across case studies which corresponded with a design approach towards opportunity identification. The use of design approach in using the factors has been critical to opportunity identification. The major factors related to design approaches were outlined and have been discussed here.

- Multiple perspective

The perspectives can be generic or from the point of view of various stakeholders within the given context/ eco-system. 'Multiple perspectives' indicates the presence of more than one point of view: social, technological, environmental, economical etc. in the approach towards conceptualizing opportunities in design. It may also include the perspective from various team members/actors who were a part of the project. Multiple perspectives was found to help in coming up with diverse opportunities based on different perspectives. It also seemed to help in arriving at opportunities with a more holistic nature.

Multiple perspective can manifest itself as :

- Association of various perspectives in an organic manner (one leading to another)
- Synthesis of various perspectives (studied separately)
- Merging of contrasting perspectives (studying one perspective from another perspective)
- Permutation and combination (done in an intentional manner to come up with different opportunities)

'Why' was multiple perspective used?

- to arrive at design opportunities which were contextually appropriate
- to broaden the scope of context in arriving at product opportunities
- to come up with a range of opportunities

- to come up with a creative approach : seeing a known thing from a different perspective
- to arrive at a new context/eco-system for a product opportunity

Making connections and associations

Creative associations and making connections were found to occur often in the project. This can be to resolve a specific concern or identify an opportunity area based on building on the existing strength of the organization. Moreover it was found that in new ventures with less infrastructure, it became imperative to outsource and from connections.

Instances of 'connections and associations' corresponding to the case studies were as follows:

	Design approach- creative connections	Case study Number
1.	Connecting with existing company -production and distribution	CS05
2.	Connecting with other cluster- material and process	CS07
3.	Associating material property with existing product	CS0
4.	Associating with existing method of market and promotion	CS04, CS05
5.	Associating user activity with existing product function	CS04
6.	Associating thematically with product and new material	CS05

Table 7.7: List of 'connections and associations' factor in Case studies

Non linear approach :Opportunity area and product idea and vice versa

Process of identifying opportunity area and product idea was not always linear. Below were listed all case studies with a sequence of development of new opportunity areas and product idea features. Often the opportunity area and product idea development happen concurrently. Both combining opportunity areas and following one opportunity area were found to occur.

Instances of 'opportunity area to product development' corresponding to the case studies were as follows:

	Opportunity area to product development	Case study Number
1.	Opportunity area (new production system) – idea feature –	CS01
2.	Opportunity area (new product-user segment) – idea feature-	CS01
3.	Opportunity area (new product feature) -	CS01
4.	Opportunity area (new process) – product idea.	CS01
5.	Product idea – opportunity area (new market segment)	CS02
6.	Opportunity area (new market) – idea feature –	CS03
7.	Opportunity area (new production system)-– idea feature-	CS03

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8.	Opportunity area (technical) - – product idea.	CS03
9.	Opportunity area (new market segment) – product idea	CS04
10.	Opportunity area (new material) – product idea	CS04
11.	Opportunity area (new product, new market) – product idea	CS04
12.	Opportunity area (new product, new market) – product idea	CS04
13.	Opportunity area (new product feature) – product idea	CS05
14.	Opportunity area (new manufacturing and distribution system) – product idea	CS05
15.	Opportunity area (new material) – product idea	CS05
16.	Opportunity area (new production system) – product idea	CS06
17.	Opportunity area (new market and process) – product idea	CS06
18.	Opportunity area (new product segment) – product idea	CS07
19.	Opportunity area (new production system) – product idea	CS07
20.	Product idea - Opportunity area (new product category) –	CS08
21.	Opportunity area (new market, product segment) – product idea	CS09
22.	Product idea - Opportunity area (new market, product feature)	CS10

Table 7.8: List of 'opportunity area to product idea' factor in Case studies

e)Factors which contributed to arriving at opportunity areas:

The main focus of the investigation was to study the factors which contribute to opportunity area identification i.e. 'how' the opportunity areas were identified. This study has led to a consolidation of such major factors which lead to identifying opportunity areas.

- Identifying gap

Analysis of gap includes analysis of positive or negative gap. Negative gap implies coming up with an approach based on the limitations of current context. Positive gap implies coming up with an approach based on new possibilities.

Instances of 'identifying gap' corresponding to the case studies were as follows:

	identifying gap	Case study Number
1.	Identifying gap -product feature	CS01
2.	Identifying gap –product	CS02, CS07, CS09
3.	Identifying gap –market	CS02, CS07, CS09
4.	Identifying gap - market segment	CS04

Table 7.9: List of 'identifying gap' factor in Case studies

-Building on strength

This phenomena was found especially in established industries. This approach helped in exploiting strength of the organization and envisaging opportunity area based on the same.

Instances of 'building on strength' corresponding to the case studies were as follows:

	Building on strength	Case study Number
1.	Building on strength - exploring and Identifying skill	CS03
2.	Building on strength – process	CS06
3.	Building on strength – product and market	CS10

Table 7.10: List of 'building on strength' factor in Case studies

Building on strength can manifest itself as building on the existing strength of organization.

- Following/questioning trend

Trend can be from point of view of various perspectives within given context/ eco-system. Trend indicates presence of trend study in terms of: social, market, technological trends etc. in design opportunity conceptualization both in terms of acceptance as well as questioning of current trends. A study of trends in terms of material trends, market trends, lifestyle trends etc. can lead to opportunities. It was also found that both accepting as well as questioning current trends can lead to new opportunities.

Trend can manifest itself as :

- Following a trend
- Questioning a trend
- Reversing/changing the trend
- Connecting with trend within/outside the context

'Why' was trend used?

- to build opportunity on strength of existing trend within context
- to make connection with existing successful trends outside the context
- to change trend because of concern/vision

Instances of 'following/questioning trend ' corresponding to the case studies were as follows:

	Following/questioning trend	Case study Number
1.	Following trend - product and user segment	CS01
2.	Following trend - material	CS05
3.	Questioning trend - meaning	CS01, CS03
4.	Following trend –product	CS04
5.	Following trend -market	CS04, CS10
6.	Following trend –sales	CS04, CS05, CS09
7.	Following trend - user activity	CS04
8.	Following trend - marketing and promotion	CS05

Table 7.11: List of 'following trend' factor in Case studies

-Envisaging scenario

Vision can be the designer's /client's vision/ideal and can also be associated with visualisation/imagination of the ideal vision. 'Vision' indicates a sense of personal/collective/contextual vision or an aspiration to be fulfilled through design. Questioning of existing project context would often lead to a vision for a new system. It can also relate to aspirations of people associated with the project.

Vision can manifest itself as :

- Envisaging scenario
- Following an ideal/vision
- Visualizing a new system /context

'Why' was vision used?

- To realise an 'ideology' in terms of design opportunity
- to arrive at a product idea based on opportunity area
- to arrive at an opportunity area based on product idea

Instances of 'envisaging scenario' corresponding to the case studies were as follows:

	Envisaging scenario	Case study Number
1.	Envisaging - product form meaning	CS01
2.	Envisaging-production scenario	CS01
3.	Envisaging a scenario of use	CS03

Table 7.12: List of 'envisaging scenario' factor in Case studies

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-Resolving concern

Resolving concern can be based on larger issues or empathy/concern and a motivation to attend to the concern effectively through design solutions. A study of project context often raises many issues-concerns. Concerns often come from a strong sense of empathy. This concern can lead to envisaging a new system/process/product. Making creative associations or building on strengths, follow/question trend to address the concern effectively.

Issue concern can manifest itself as :

- Issue/concern as a driving force i.e. as a rationale for arriving at opportunity area
- Dealing with concerns within the context / broader context

'Why' was issue-concern used?

- to address a 'concern' in terms of design opportunity
- to arrive at a product -system opportunity based on solving concerns

Instances of 'resolving concern' corresponding to the case studies were as follows:

	Resolving concern	Case study Number
1.	Resolving concern -Exploring new process	CS01, CS06
2.	Resolving concern –technical	CS03
3.	Resolving concern -Changing material perception	CS04
4.	Resolving concern -social issues	CS01, CS03

Table 7.13: List of 'resolving concern' factor in Case studies

-Changing Meaning

Changing Meaning can be based on larger issues or empathy/concern. Changing the Meaning implies questioning the meaning of design context and coming up with an alternate meaning for design opportunity conceptualization. Questioning meaning of existing project topic and coming up with an alternate meaning can also lead to a new design approach.

Meaning can manifest itself as :

- Following the existing meaning
- using metaphor
- challenging the existing meaning

'Why' was meaning used?

- to convey/communicate the 'meaning' held by the designer/context of use
- to use contrasting meaning to arrive at unforeseen opportunity.

Instances of 'changing meaning' corresponding to the case studies were as follows:

	Changing meaning	Case study Number
1.	Changing meaning – product	CS01
2.	Changing material meaning	CS03, CS04

Table 7.14: List of 'changing meaning' factor in Case studies

e) Opportunity areas and product ideas

As discussed, opportunity areas led to product ideas through following a dominant opportunity area or through association and combination of two or more new opportunity areas. It was also found that product idea can lead to opportunity area. Identifying possibilities to exploit various product idea features/parameters can lead to a new opportunity area. Instances of 'opportunity areas leading to product ideas' corresponding to the case studies were as follows:

	Opportunity areas leading to product ideas	Case study Number
1.	Combining opportunities -production, process, user, product feature	CS01
2.	Following opportunity area–product	CS02, CS04, CS05, CS07
3.	Following opportunity area-market	CS03
4.	Combining opportunity areas -market, process, production	CS03
5.	Following opportunity area - production	CS05
6.	Following opportunity area -market, process	CS06
7.	Following opportunity -market, product, user	CS09

Table 7.15: List of 'opportunity areas leading to product ideas' factor in Case studies

Instances of 'product ideas corresponding to opportunity areas' corresponding to the case studies were as follows:

	Product ideas corresponding to opportunity areas	Case study Number
1.	Identifying possibilities in various product idea parameters – market	CS02

	segment led to opportunity areas	
2.	Identifying possibilities in various product idea parameters - process led to opportunity areas	CS07, CS10

Table 7.16: List of 'product ideas to opportunity areas' factor in Case studies

f)Opportunity extension

Opportunity extension or elaboration was a feature of opportunity identification. Exploitation of new opportunity areas was required. One of the approaches was opportunity extension through a product platform i.e. using a common process, production system, marketing system etc, to ideate many product ideas and develop a range or family of products. This helped in gain and increases the impact of opportunity area. Elaboration includes process based product diversification, considering diversification of product for new user scenarios etc. for opportunity in terms of product extension.

Instances of 'opportunity elaboration or extension' corresponding to the case studies were as follows:

	Opportunity elaboration or extension	Case study Number
1.	Envisaging product families following opportunity areas – process	CS01
2.	Envisaging product families following same opportunity areas - market segment	CS02
3.	Envisaging product families following same opportunity areas – market	CS04
4.	Envisaging product families following same opportunity areas - production system	CS01, CS07
5.	Envisaging product families following same opportunity areas - product	CS01, CS08

Table 7.17: List of 'opportunity elaboration/extension' factor in Case studies

7.4 Concluding remarks

In this chapter cross case analysis of case studies sharing the same project context resulted in an interesting comparative study. It was possible to conduct this study since opportunity identification was done independently by more than a team for the same project brief and

context shared by the industry/organization. Apart from understanding importance of certain factors, this also brought forth importance of designer's stance and approach towards identifying opportunity areas which needs to be considered.

The study enabled a more indepth study of each of the opportunity identification factors identified previously. Multiple perspectives often led to design opportunities resulting out of a synthesis from various perspectives. Thus multiple perspectives may result in divergent design opportunities from various perspectives as well as design opportunities which cover multiple concerns and aspirations. Similarly, opportunities from trend study were often identified while accepting as well as rejecting the trend. Following trends in terms of new materials, processes etc. often resulted in more creative opportunities whereas following dominant market-consumer trends often resulted in more appropriate design opportunities.

Product ideation were often arrived at in industries where many of the parameters were already defined. Opportunity elaboration often becomes very important to elaborate the idea to arrive at opportunity areas. Elaboration of the opportunity seemed to play a very important role both in terms of making the opportunity feasible and also in terms of enlarging the scope of the opportunity. Design opportunity in terms of a new process and system often led to a range of new products and long terms implications. Product opportunities became only examples of 'what was possible' while system/process opportunity may lead to design and development of several products based on the same.

All phenomena studied based on initial research queries resulted in initial findings in the preceding chapter. As per Yin, two or more instances of recurrence of the event /phenomena considerably strengthen the findings. Multiple case study enabled replication logic of phenomena across all case studies to further strengthen the findings.

Chapter 8

Findings and recommendations

8.1 Introduction

Multiple case study analysis further strengthened findings initially put forth through single case study analysis. Findings were based on specific research queries being investigated through research study and indicate a conceptual framework for opportunity identification in product innovation through design. Study also brings forth some differences of identifying opportunities from a design perspective. Consequently, study proposes this model to be of use to industries/organizations who would like to explore the possibility of opportunity identification for product innovation from a design perspective as per an open innovation model.

8.2 Findings from single case study analysis

8.2.1 Project context

- In order to come up with opportunity areas, it was important to question the status quo or have undefined parameters in the project. Undefined parameters can become the basis to develop opportunity areas.

- Degree of freedom in terms of having undefined parameters and acceptability of questioning the status quo varied based on type of organization and project context.

8.2.2 Factors related to opportunity identification

- Approach to opportunity identification was both push and pull. Factors such as vision, changing meaning, associating with trends helped in pulling towards an innovation whereas identifying and building on strength of the company, technical exploration resulted in pushing towards an innovation.

- Elaboration of opportunity helped in extending the opportunity to ideate similar product ranges

- Questioning status quo, selecting, envisaging, exploring, associating, connecting and elaborating play an important role in opportunity identification.

a.Resolving concern

A study of the project context often raises many issues-concerns.

Concerns often come from a strong sense of empathy and an aspiration to attend to the concern effectively through design solutions. This concern can lead to envisaging a new system/process/product to address the concern effectively.

b.Envisaging a scenario

Questioning of existing project context would often lead to a vision for a new system. This vision can arise from the self or can be an expression of an understanding of the collective vision. Vision often leads to the envisaging of a new system /process/product.

c. Following/questioning trends

A study of trends in terms of material trends, market trends, lifestyle trends etc. can lead to opportunities. It was also found that both accepting as well as questioning current trends can lead to new opportunities.

d.Changing meaning

Questioning the meaning of the existing project topic and coming up with an alternate meaning can also lead to a new design approach.

e. Identifying gap

Analysis of gap can include analysis of positive or negative gap. Negative gap implies coming up with an approach based on the limitations of the current context. Positive gap implies coming up with an approach based on new possibilities.

f. Building on strength

This phenomena was found especially in established industries. This approach helped in exploiting the strength of the organization and envisaging opportunity area based on the same.

g. Opportunity elaboration

Opportunity extension or elaboration was a feature of opportunity identification. Exploitation of new opportunity areas was required to gain from the same. One of the approach was through opportunity extension through a product platform i.e. using a common process, production system, marketing system etc, to ideate many product ideas and develop a range or family of products. This maximizes the gain and increases the impact of an opportunity area.

8.2.3 Opportunity identification and product ideas

- Analyzing the various parameters of a product idea and identifying a parameter based on its likely impact can lead to an opportunity area. New product range opportunities can also be derived based on a product idea through opportunity extension and through considering the possibility of exploiting the product idea features/parameters for new opportunity areas.

- Rather than invention of a new technology or identification of new markets, aspirations/vision and concerns played an important role in identifying opportunities.

- Opportunities identified were in areas of new product segment, new user segment, new market segment, new process/technique, new production system, new marketing and retail system

8.2.4 Design approach in opportunity identification phase

Role of design in the opportunity identification phase was also studied. It was found that certain characteristics were prevalent throughout the study. It included perspective from multiple sources and of multiple concerns/aspirations; ability to make connections and associations and the development of new product alongwith identification of new opportunity areas.

a.Multiple perspective

Multiple perspectives involved the study of various perspectives: social, technological, environmental etc. Multiple perspectives was found to help in coming up with diverse opportunities based on different perspectives from different actors. It also seemed to help in arriving at opportunities with a more holistic nature.

b.Connections and associations

Creative associations and making connections were found to occur often in the project. Making connection and creative associations were found at various levels : connections at a physical level – between organizations, associations at a thematic level or at an abstract level.

c.Non linear approach : Opportunity identification to new product development

The process of identifying opportunity area and product development was not always linear. The study of a sequence of development of new opportunity areas and product idea features in case studies led to the finding that it happens both ways : an opportunity area leading to a product idea and vice versa. Often the opportunity area and product idea development so happen concurrently. Both combining opportunity areas and following one opportunity area were found to occur.

The phenomena of deriving product idea based on new opportunity areas and vice versa was also studied. Opportunity areas lead to product ideas through following a dominant opportunity area or through association and combination of two or more new opportunity areas. It was also found that product idea can lead to opportunity area. Identifying possibilities to exploit various product idea features/parameters can lead to a new opportunity area.

8.3 Proposed Conceptual framework for opportunity identification

Based on the understanding derived related to project context, factors for opportunity identification, rationale for opportunity identification, role of design and design thinking in identifying opportunities, the relation between developing new opportunity area and product ideas as well as the phenomena of opportunity extension; a conceptual framework was developed.
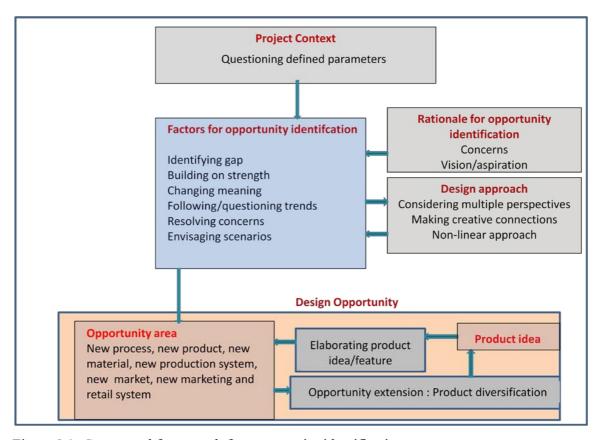
Figure 8.1: Conceptual framework for opportunity identification

a. Project context

- Project brief for a new design opportunity often arose out of aspirations of existing industry or starting of a new/subsidiary industry.

- Design opportunities for unorganised/small-scale industry set ups may result in opportunities for new systems whereas for larger industries the design opportunities often came forth as product opportunities.

- Questioning of existing context often resulted in envisaging a new system opportunity with long term implications

b. Rationale for opportunity identification

- Rationale or 'why' identifying opportunity occurs was found to happen due to phenomena of vision/aspiration or concerns related to the existing project context

- Aspirations may result due to organizations objective/purpose, designer's stance or may be due to the aspirations of any of the actors /stakeholders who was a part of a project context.

- Concerns again may result due to organizational concern, designer's stance or may be due to the aspirations of any of the actors /stakeholders who were a part of the project context.

c. Factors for opportunity identification

- Opportunity identification was associated with both push and pull phenomena. Traditionally new technology opportunities push innovation and new markets pull innovation. Factors such as resolving concerns, changing the meaning, identifying the gap, building on strength were concerned with the existing context and the understanding related to the same. These factors push the identification of new opportunities from the existing context.

- However factors such as following/questioning trends, and envisaging scenarios were concerned with the outside context and the ability to connect with the same. These factors seem to pull the identification of new opportunities to the new desired/envisaged context.

d. Design approach for opportunity identification

- Multiple perspectives often led to design opportunities resulting out of a synthesis from various perspectives. Thus multiple perspectives may result in divergent design opportunities from various perspectives as well as 'holistic' design opportunities. They also enable in bringing in aspirations/concerns of all key actors/ stakeholders of the project.

- Making connection and linking with other organizations/industries/clusters as well as building creative associations to resolve concerns indicate the designerly approach of making creative connections and associations.

- It was found that product ideation based on opportunity identification may not be a linear process. Concurrent thinking of new opportunity areas while developing tangible product ideas emphasizes the ability of designers to collate abstract and tangible phenomena and emphasise the non-linear approach taken for the same.
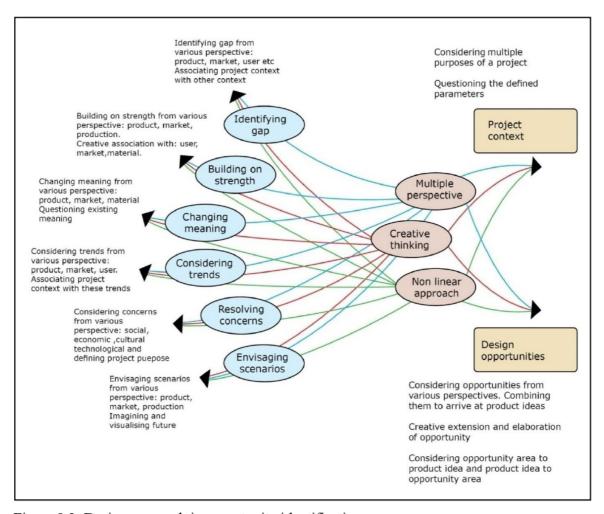
Figure 8.2: Design approach in opportunity identification

e. Opportunity areas and product ideas for design innovation

-   Combining opportunities or following singular opportunity areas leads to product ideas. It was also found that considering possibilities of possible exploitation of parameters related to product ideas leads to the development of new opportunity areas in terms of process/systems (production/marketing/retailing)

-   Elaboration of the opportunity seemed to play a very important role both in terms of increasing the impact of the opportunity feasible and also in terms of enlarging the scope of the opportunity by associating it with product families and product platforms.
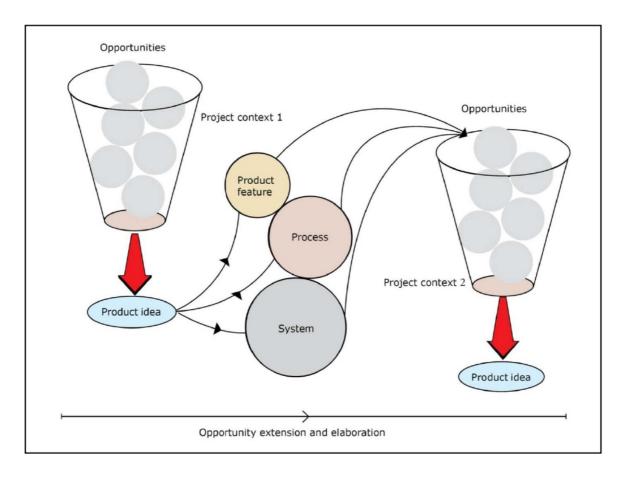
Figure 8.3: Design opportunities- ideas and elaboration

- Design opportunity in terms of a new process and system often led to a range of new products and long terms implications. Product opportunities became only examples of 'what was possible' but the system/process opportunity areas became more significant.
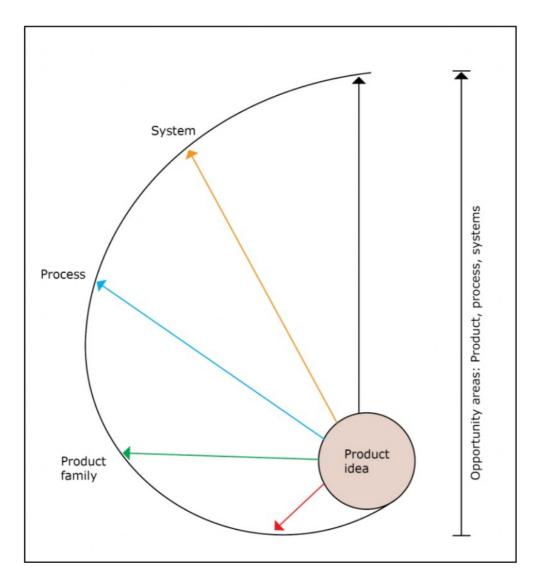
Figure 8.4.: Design opportunities- product, process, system levels

8.4 Key findings based on the proposed conceptual framework

- These findings are specifically meant for industries/organizations looking for new opportunities areas and design directions for innovation.
- Opportunity areas included new process/product/market as well as new production system/marketing-retail system.
- Opportunity areas led to product ideas while opportunity elaboration of product ideas also resulted in opportunity areas.
- Six factors have been identified to be playing an important role in opportunity identification. Factors such as questioning undefined parameters helped in broadening the scope of opportunity identification. Factors such as building on strength, resolving

concerns and identifying gaps helped to identify opportunities based on existing project context whereas considering larger patterns and trends, changing meanings and envisaging future scenarios helped to identify opportunities based on building a future.

- Project contexts entailing entrepreneurship and business diversification involving undefined parameters often resulted in usage of pull factors such as envisaging scenarios and changing meaning whereas project contexts entailing established industries with defined parameters often resulted in usage of push factors such as building on strength and following trends.

- Design approach played an important role towards using the six identified factors mentioned earlier. Consideration of design thinking parameters such as multiple perspectives, making creative associations and opportunity elaboration/extension while considering the six factors were found to play a significant role for opportunity identification.

- The rationale for opportunity identification is to resolve concerns and meet aspirations to the utmost by increasing the impact and arriving at a viable scenario.

8.5 Concluding remarks

This conceptual framework consolidates the learning from single case study analysis and multiple case study analysis to put together parameters evolved through this study in a framework. It was expected that industries practicing open innovation would collaborate with design academia to get fresh approaches and diverse opportunity areas through use of this conceptual framework. Benefits of implementing this model will be for both the industry as well as design institution. Industry will get different opportunity areas as well as an understanding on creative design thinking aspect as well as product ideas based on this framework and design students will get exposed to arriving at opportunity areas and product ideas based on the same.

The most salient feature of the study is the nature of design opportunities and design approach towards identifying opportunities. Design opportunities may be a product, process or a system opportunity. The two approaches could be building on the existing project context and identify opportunities to push it towards a future scenario or envisage a future scenario and identify opportunities while pulling/relating it back to the existing context. Making creative connections and elaborations, considering multiple perspectives and a non linear approach can be found throughout the opportunity identification phase.

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Chapter 9

Conclusion

Although, the approach to opportunity identification stage in product innovation has been considered creative, it may not involve designers or a design approach. Instead, there seems to be a focus on research in technology and marketing in identifying opportunities. This has perhaps resulted in not tapping the creative potential of designers and design thinking for identifying new opportunity areas. This research study argues that design plays an important role in the creative opportunity identification phase of innovation and has sought to understand the nuances of the same.

With an increasing awareness of open innovation, it is becoming possible for industries and organizations to approach designers and academic design institutions to collaborate in this area in order to identify opportunities. This throws open a lot of challenges and possibilities. Further, project based nature of design education makes it conducive to collaborate between design academia and industries in order to identify opportunity areas. The objective of the collaboration was to broaden the perspective and come up with diverse opportunity areas. This was expected to help industries/organizations identify creative opportunity areas which could then be discussed, analysed, further evaluated and developed before implementation.

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Aim of the current investigation was to understand how design and design approach can play a role in opportunity identification for product innovation and to arrive at a conceptual framework for opportunity identification in product innovation in an open innovation collaborative framework. Considering the objectives of this research study, a research model based on multiple case study analysis was proposed.

Accordingly the first phase of this study consists of preparing original case studies based on specified research parameters in order to write the case studies for further analysis. The second phase consisted of initial coding of these case studies based on research queries and a broad categorization of the same. The third phase of this research study included multiple case study analysis which consisted of cross case analysis as well as analysis of identified factors across case studies to further strengthen the findings through replication logic. Findings from both within case study analysis and multiple case study analysis were consolidated in order to arrive at a conceptual framework for opportunity identification for product innovation through design.

This chapter has included findings and the major recommendations in implementation, the scope of this research study as well as future work possibilities.

9.1 Summary of the findings

Following are the main research contributions. Based on these findings, the role of design and design approach in the opportunity identification phase was reiterated. Factors which contribute to identifying opportunities and factors in the project context which relate to opportunity identification were elaborated. The process of product ideation based on identification of new opportunity areas and vice versa was further elaborated.

9.1.1 Project context and opportunity identification

Firstly it was important to understand the reason why industries/organizations look for opportunities. Reasons can vary from facing difficulties and problems of survival or stagnation due to competition, changing socio-economic environment etc. to a need to start an entrepreneurship/ diversification for growth. A few examples to reiterate the same can be given based on the analysis of the case studies. The terracotta craft in the Bankura cluster was

dying and opportunities to revive the same were required (CS03). Identification of multiple opportunity areas including new process opportunity of using coiling as a method to enable women to design for a new corporate sector market helped in revival of the craft cluster. Robots Alive wanted to diversify into a different sector with opportunities required to be identified for diversification and growth (CS08). Opportunity areas in terms of new market in the educational sector with modular product features helped in diversification. Famous studio was considering merchandising products as a new entrepreneurial venture with opportunities needed for the same (CS05). Some of the opportunity areas identified included identifying new production system using organic materials, collaborating with partners supplying raincoats, water bottles etc , new distribution system of selling products alongwith children's food items etc. The degree of freedom in this entreprenual venture helped in arriving at many directions of growth for this entrepreneurship.

Factors within the project context which seem to have an impact on opportunity identification include the degree of freedom given to the designer that is determined by undefined parameters in the project context. It was found that the degree of freedom was usually more in start-ups and companies which want to diversify into completely new areas such as Famous studio which was looking for merchandising products as a new venture (CS05) versus established companies such as Weldecor (CS09,CS10) which already had a well established sanitary ware industry.

Project context also included consideration of the purpose of the project,which included a singular purpose such as profit making in the case of an industry such as Borosil (CS04) versus multiple often contradictory objectives such as having social objective of income generation alongwith profit making for Bankura terracotta craft cluster (CS03). The project context had a major implication on the identification of opportunities.

9.1.2 Design opportunities

Design opportunities identified included opportunities in the area of product, process, service or system design. Process opportunity areas such as the technique of using handmade coiling technique in Bankura terracotta craft cluster (CS03) and system opportunity areas such as establishing a production system based on the use of handmade tools in case of INBAR(CS01) became the basis for product ideas.

Approaches to 'Opportunity identification to product ideas' and 'product ideas to opportunity identification'and factors which contribute significantly to them were elucidated. Opportunity identification of new market-user group and their requirements led to product ideas for glass products for Ferozabad cluster (CS06) whereas the idea for a glass jewelry combining glass and brass led to envisaging an opportunity area connecting the capabilities of two craft clusters (CS07). Permutation and combination of diverse opportunity areas also became a basis for idea generation. This was especially found in new ventures with many undefined parameters. The combination of opportunity in production system, marketing, promotion etc. led to product ideas such as in the case of merchandising products for Famous studios (CS05). Selecting a specific opportunity area and defining the design brief based on them such as new user-product group such as Children's commode for Weldecor (CS09) also resulted in idea generation.

It was found that sometimes (product) ideas lead to new opportunity areas. This phenomena was found when ideas were elaborated keeping in mind the project/organization purpose or considering possibilities of making product families to increase the impact. The product idea for War plane construction kit for INBAR led to opportunity area for toys targeting boys in the craft sector (CS02). Product ideas may also lead to opportunity areas by considering possibilities of exploiting product features or process/material/system associated with it to achieve maximum impact and gain. In case of Bamboo toys for INBAR, elaboration and extension of the opportunity areas led to the possibility of having product families based on the new production system, or new process of coloring bamboo with non-toxic colors (CS01).

9.1.3 Factors which contribute to the identifying opportunities
Factors which contribute to identification of opportunities included both push and pull factors. Building on the strength of existing parameters related to organizations such as building on the strength of Borosil company which was the unique property of Borosil material. The identification of this strength led to identification of product opportunity areas substituting materials in existing products with borosilicate material (CS04).

Similarly changing the meaning in the existing context also resulted in new opportunities. Changing the meaning of the product/product feature/material/process/system such as changing the meaning associated with terracotta craft of being used more for decorative and

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functional use at home to that of having a corporate feel helped in arriving at opportunities which led to designing of office tabletop accessories in case of Bankura craft cluster (CS03).

Determining the issues, concerns related to existing project context and resolving the same could also result in identifying opportunity areas. The issues related to Bankura craft cluster pertaining to problems of breakage and transportation led to opportunity areas to make small products and modify the furnace (CS03).

Identifying a gap in terms of a product/product feature/material/process/system can also result in opportunity identification. For example, the negative gap in the market which was the lack of toys targeting boys in the bamboo craft cluster led to identifying an opportunity area in this sector for INBAR (CS02).

Apart from understanding existing project context, understanding of related macro trends is also critical. Following/questioning trends in various areas such as product/product feature/material/process/system and considering broad patterns of trends could help in identifying opportunities. New trends in materials helped in arriving at opportunity area for merchandising toys for Famous studios (CS05).

Envisaging future scenarios based on aspirations from various perspectives e.g. marketing, technical, social, cultural etc. could contribute to opportunity identification. For example, a production system based on handmade tools was envisaged for INBAR to fulfill the social-cultural objective to help tribal community living near forests to work from their homes (CS01).

9.1.4 Role of design in identifying opportunities

Design approach was observed to play a significant role in opportunity identification phase of innovation. It was observed that opportunity identification through design included the possibility of creative combinations for arriving at opportunity areas. This approach enabled arriving at opportunity areas other than through technical invention and new market development. Thinking of a creative idea connecting clusters producing brass and glass articles resulted in envisaging opportunity areas based on the creative idea in case of glass jewelry project for Ferozabad (CS07). Similarly identifying health trends in society and connecting it with existing labware produced by Borosil resulted in a new opportunity area (CS04).

Design approach helped in identifying opportunities from multiple perspectives. Redefining the purpose of the project may enable organizations to consider not only business opportunities but also social, ecological, cultural opportunities. This was observed in case of designing bamboo toys for INBAR (CS01). The vision of INBAR and consideration to various perspectives during the project resulted in opportunity areas which considered benefit for tribal communities, low cost eco friendly techniques, aspects of storytelling in Indian culture apart from the economic aspect of profit making.

Opportunity identification through design also involved developing connections between opportunity identification and new product. Although this phenomena was observed in all projects, the non-linear approach to the same was noteworthy. The product idea of modifying Borosil labware and converting the same into oil containers for health conscious users happened alongwith the consideration of modification of existing products of Borosil for new use as an opportunity area (CS04).

The opportunity areas identified were further elaborated through envisaging scenarios and through arriving at ideas for product platforms to increase the impact. The impact of the opportunity areas was sought to be increased through elaboration. Elaboration of the opportunity area in INBAR led to the opportunity of using non-toxic coloring technique on bamboo to be used on other products as well as using the new production system for other type of products (CS01). The modules developed in educational robots for Robots Alive became the basis for developing more products based on the same module (CS08).

Designerly attributes which were observed and which were found to contribute to opportunity identification process included the ability to have a vision and visualize scenarios, ability to improvise, modify, think 'what can be' and make creative combinations/associations. Opportunities were often modified and developed rather than rejected.For example, glass jewelry combining glass and silver was rejected but further creative thinking of considering brass and collaborating with brass craft cluster instead of silver helped in arriving at the opportunity area (CS07).

The findings are also pertinent to design education since use of the conceptual framework will enable design students to arrive at diverse opportunities for real life contexts.

9.2 Research contribution

A conceptual framework for finding design opportunities has helped to develop a better understanding of the project context, design opportunities as well as factors and approaches to identifying design opportunities.

Use of the proposed conceptual framework and discussions on role of design and design approach towards identifying opportunities has also helped in understanding and establishing the need for a greater role of design and design thinking in opportunity identification phase of innovation.

9.3 Future scope

This research study was generic in nature and explains broad terms related to opportunity identification. A research study based on the proposed conceptual framework for a specific industry/project context may lead to more concrete guidelines.

Each of the factors put forth in the conceptual framework may be further studied and elaborated. Studies towards understanding the project context involving empathetic means of collecting information from various perspectives as well as studies to arrive at future scenarios can be carried out in-depth and methods arrived at for the same. The use of such methods in relation to the conceptual framework established for opportunity identification will help in its further understanding and implementation.

It is established that design approach such as thinking from multiple perspectives, making creative connections and associations as well as elaboration helps in arriving at opportunities. A further study in this area can be carried out to understand how the nature of opportunities may be affected due to the same and implications of the same in the larger context. These abilities may be studied more in-depth with the objective of developing methods to enable the same.

Based on findings of this study, it has been established that there has been a strong non-linear link between opportunity identification and product idea generation. A further research study on seamless integration between opportunity identification and new product development by including designers and design thinking in the entire process is proposed. This can have a significant bearing in not only reducing time but also help the organisation to work more synergistically.

Actual implementation parameters of proposed conceptual framework can be further consolidated. A further research study to define collaborating partners, teams and specific guidelines on the nature of interaction between various team members may help in easing the implementation process for industries and design academia.

The research study has established major factors affecting opportunity identification for innovation and has also put forth salient features and designerly approaches towards the same. As such, the conceptual framework is expected to help in gaining a better understanding of opportunity identification for design innovation and help towards arriving at a range of diverse opportunity areas from various perspectives. An understanding of various factors contributing to discussions on design approach towards opportunity identification will help by providing an exploratory, creative approach rather than a linear predictable one towards innovation.This research study has also led to future work possibilities to go further in-depth into critical areas with the objective of bringing design closer to the initial phase i.e. the opportunity identification phase of innovation.

Appendices

The raw data for the case studies was collected throughout the project duration including meeting collaborating partners for conducting origincal case studies to field study visits, periodic project presentations, discussion and interaction sessions as well as discussions and deliberations on the final outcome.

The observation points and interaction points were noted down in the form of observation notes and interview notes. The data was too rich and detailed and therefore was edited to cover the objectives of this research study. Wherever required detailed interviews were also conducted and were subsequently transcribed.

Some of this raw data has been given in the appendices as follows:
Appendix A: Project presentation slides
Appendic B: Case study notes consisting of observation notes and interview notes
Appendix C: Sample interview transctription
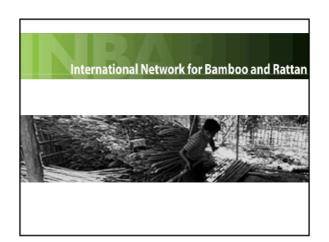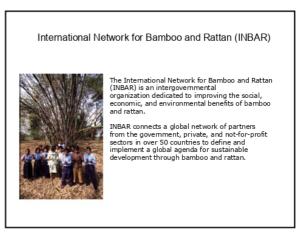
Project presentation
Case study 1: Educational bamboo toys for INBAR

System design Project
Bamboo toys

System design Project
Bamboo toys

Initial design brief

To design a range of bamboo toys for INBAR for the National/ international market.

International Network for Bamboo and Rattan

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• short rotation 3-5 years
• increases biomass to 30% a year compare to 2-3% for wood
• biomass production of 40-100 tons/ha
• more cellulose then average wood
• abundant resources
• tolerant, adaptable and not demanding
• environmentally friendly
• produces more oxygen then an average tree
• sequesters more carbon dioxide
• enhances and fertilizes soil, reduces soil compaction and hardening
• conserves and regulates water
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1. An expanded, highly effective network of committed stakeholders

2. Better ways and means of livelihood development, in particular in rural areas

3. Increased and more effective conservation of the environment and of biodiversity

4. A better and more innovative market environment, providing fair global-to-local and local-to-global trading systems for income generation

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MAHARASHTRA-KONKAN
GUJARAT----AHMEDABAD
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NORTH EAST-AGARTALA
MANIPUR
ASSAM
MIZORAM

OTHER AREA'S

ARUNACHAL PRADESH
WEST BANGAL
BIHAR
ANDHRA PRADESH
KERALA
UTTER PRADESH
UTTRANCHAL

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mapping

Konkan visit for system study

INFRASTRUCTURE
BAMBOO LEARNING CENTRE

INFRASTRUCTURE

BAMBOO LEARNING CENTRE

Raw material procurement

Local people get bamboo to center. They are given Rs. 30 to 50/-
per piece based on the diameter, length and straightness of bamboo

Mainly four types of bamboo are there

- Manga bamboo
- Borbit bamboo
- chiva bamboo
- Kanak bamboo

EXHIBITION AREA OF BAMBOO PRODUCTS
This is the office where the finished products displays and send to different places
from where the order gets.

Weaving

About 20- 30 women are weaving.
Many of them work from home in village

They are paid about 50 Rs per sq. feet
of woven mat.

THEASE ARE SOME PRODUCTS WHICH IS DONE BY LOCAL ARTISAN IN LEARNING CENTRE

This is the place where local artisans come and work. They will approximately 30-40 products per day.

KONKAN BAMBOO & CANE DEVLOPMENT CENTRE

CENTRE FOR INDIAN BAMBOO RESOURSE & TECHNOLOGY

Tools and Machines

1 External node remover machine

2. Gross cutting machine

3. Hydraulic splitter

4. Sizer machine

5. Cutter machine

Bamboo preservation

Treatment process

CCB chemical is injected at pressure in the machine.

350- 400 bamboos can be kept inside and treated at the same time

It takes about 4-5 hours to complete the treatment process for one batch of bamboo

8 days stage on rack is required before bamboo can be used

BAMBOO TREATMENT PLANT

This is the bamboo treating machine. This machine can treat 300-350 pieces at a time and it will take 6 to 7 hours to complete the process. The bamboo will drill at its nodes before treatment. after the treatment the bamboo can sustain for 40 to 50

This is the machine which is using to sliver the bigger Size bamboos.

1.This is the machine which is using to make smaller Weaving pieces of bamboo from previously cut sliver.

This the machine which use to remove the node from The surface of bamboo.

MECHINES FOR BAMBOO CUTTING

These are 2 machines use to cut the bamboo into pieces.

THIS IS THE MECHINE USED FOR DRILLING HOLES IN BAMBOO

THESE ARE MACHINES USE TO MAKE FINISHED SLIVERS. THE FIRST MACHINE USE TO SLICE THE BAMBOO AND THE SECOND ONE FOR FINISHING THE SLIVER. BOTH ARE HAND OPERATED MACHINES.

BAMBOO FIBER TECHNIQUE

THIS IS NEWLY EQUIPED WORSHOP TO PRODUCE "BAMBOO FIBRES".

HERE THE PROCESS STARTS. THIS MACHINE WILL PRIDUCE THE FINE BAMBOO FIBRES. AFTER PUTTING THE WAIST PIECES THA MACHINE WILL WORK FOR 6-7 HOURS AND CREATE A PULP KIND FORM.

THIS IS ANOTHER MACHINE TO REFINE THE PULP INTO MORE FINE.

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THIS IS THE MACHINE WHICH WILL PRODUCE THE FINEST BAMBOO FIBRE BY ITS FINE COMBS.

THE SECOND AND THE THIRD MACHINES ARE USING TO PRESERV THE FIBRE THEN IT GOES TO THE THIRD WHICH USE TO COMPRESS IT INTO ITS PERFECT SHAPE.

THESE ARE THE PRODUST WHICH ARE MAKING FOR JOHNSON AND JOHNSON. BABY NAPKINS FROM THE PRESERVED BAMBOO FIBRES.

THIS IS THE MACHINE WHICH USE TO FUSE THE EDGES OF THE FILLED NAPKINS.

PRESERVE THE BAMBOO

Manufacturing unit

Bamboo product range

They make a lot of furniture like bed, different type of chairs, storage racks etc.

They make accessories, lamps, gift articles etc.

They also make large scale architectural structures, spaces and interiors for tourist market.

Marketing

They have linkage with Goa handicraft and goa drv.

Most of their products are sold in the local market, Goa, Kolapur and Bombay.

They sell both for residential purpose as well as resorts, hotels etc, for tourism

INBAR is also planning to start online marketing service

User study

Children between the age group of 3 to 7 play a lot with toys.

- They like to do role play, story telling and have good imagination
- They develop fine motor coordination, balance etc.
- They are possessive
- They learn language skills
- Memory and basic educational skills also get developed

Opportunities

User related:

Role playing
Children like to roleplay. They like doing roleplay of family, cooking, becoming a doctor, driving vehicles etc. at this age. It helps in their social development

Balance/ construction play
Children like to balance. It helps to develop their fine motor coordination. Also they like to construct things

Aim and shoot
Children above 5 years like to aim and shoot. It makes them feel in control Also they like to see the action – reaction happening.

Educational play
Parents are secondary users/ buyers. They like to give education related Toys to children

Opportunities

Market related:
- Gift items during birthdays/occasions. Education related toys are many times preferred as gifts.
- There is good market for eco-friendly products.
- Festival and vacation time related toys could have a good market.

Material and process related:
- Combination of material like textile
- Surface decoration like screen printing, using of water based colour pigments etc. to give colourful look to Bamboo
- Using elastic property and cylindrical form of Bamboo
- Turning of solid bamboo
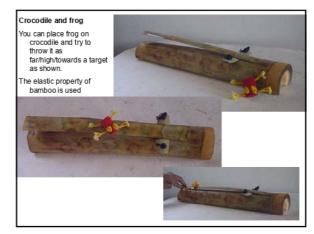
Design brief

To design a range of role playing/ construction/ education related non-toxic, eco-friendly toys for children between 3-7 years for middle and upper middle class user segments using a combination of Bamboo and colourful rope.

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products

Turtle play

You can balance and place tutrles in different positions. If you look backside there are numbers 0 to 9. You can play memory game, and simple maths game with it

Crocodile and frog

You can place frog on crocodile and try to throw it as far/high/towards a target as shown.

The elastic property of bamboo is used

Role play

A family of dolls with different face expression on two sides and different dresses. You can turn them, change expression, do role play etc.

User study

Children liked 'crocodile and frog' very much. It was rigid even during rough play by children.

Turtle play was liked by younger children

Role play dolls were liked but needs to be left with children so that they can play on their own

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Design Project
Bamboo toys

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Some information about the market

Why I am selecting this age group

· The design would be targeted for the age group 5-7 years. This is for the reason that this particular age group will be aware of what to expect and experience from this material.

· Also this material wont be suited for children of lower age. And this particular age group is the most susceptible to grasp the principles on which the design has to be based.

· Also this group has better attraction towards toys than any other group.

Psychology of the child this age group

· This is the rapid growth age.

· They enjoys vigorous running, jumping, climbing and throwing kind of things

· They also want fun with problem solving and sorting activities like stacking, puzzles etc.

· They talk lot experimental and finds extremely funny enthusiastic and inquisitive activities about surroundings

· They reminds every day event very much.

WHAT THEY LIKE
MULTIPLE ACTIVITIES   DYNAMIC
CHANCE   IMAGINATION
TECHNOLOGY   COOPERATIVE
PLANNING
COMPETITIVE   CHALLENGING   ORGANIZING THINGS
DISCOVERY   GROUP PLAY   STORY TELLING
TYPES OF PLAY ACCORDING TO USER
PHYSICAL IMPACT   AGGRESSIVE   RELATIONAL
DESTRUCTIVE
EXPERIENCE
ROLE PLAY   EMOTIONAL
MAGICAL   ENVIRONMENTAL   DISMANTLE TYPE
MECHANISM   FIGHTING TYPES   STRATEGY

There are no existing bamboo fighter planes.

There are very few toys for boys in the craft sector.

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DESIGN PROJECT FOR TERRACOTTA ARTISIAN FROM

PANCHMURA VILLAGE,
DIST:- BANKURA (WEST BENGAL)

History Behind Bishnupur

Characteristics

Location : Bishnupur
History : > 1000 yrs.

Noukabihar of Lord Krishna

Lord Krishna in playing Mood

Mythological Horse

(Folk Nature, Aesthetic Appeal, originality)

Statistical data of Khatra Division

Total Block Area : 349,7 sq.km.

No of Moujas : 145
No of Villages : 321

Cultivable Land : 15,538 hectars

FIRING PROCESS

Single Hole Furnace

EXISTING PRODUCT

Market - BISHNUPUR

FURNANCE

Single mouth

Three mouth furnace

LOADING AND FIRING PROCESS

Design project for Borosil

User study and opportunities

---

working women culture

➤ Working women
➤ 4 to 5 family members
➤ Middle higher income group
➤ Gym as a daily routine.
➤ Busy life still cook food for whole family before leaving for office.
➤ Fond of different cuisines.
➤ Goes for shopping at weekends (for personal & households)
➤ Twice a week goes out for dinner.
➤ Whenever she goes out at night she cook food for her family in advance.
➤ Friend circle keep coming
➤ Husband is too fond of food.
➤ To make her life easy for cooking she prepares garlic, ginger and tomatoes paste in advance and preserve it for few days.

Heat and eat

• Working women prepare food and store it in small containers for her family before leaving for office.
• Family member heat each container separately in microwave for lunch which is time consuming.
• So to avoid it one can think about something where user can put all what he wants to eat in a one platter, heat it in microwave
   and eat in that only.
• Looking at daily diet, coming up with a concept which can fit in everyone's life.

Heat and eat
• office as an opportunity area, tea or coffee intake is more because of working load.
• Keeping in mind space factor, looking towards
• Cup with a heating mechanism, which can be directly plugged in.
• Electric plate can be fit at the bottom.

Heat and eat
• people are fond of different cuisines, for that they cook at home and goes out for dinner (twice a week).
• As Italian food lovers are increasing day by day that also specifically for sizzlers , thought can be given for sizzler plates .
• That can be used in restaurants as well as at home.

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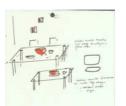
People avoid keeping hot stuff directly on glass table top.
- Something which can provide matting to the surface can be looked as a opportunity area.
- Costars can be introduced for it with
- Different sizes and shapes

Market oriented

Branding through other brands

- As other brands are producing for their cooperative customers, Borosil can also look toward this area.
- As in if Borosil produce cup for Nescafe, so in return Borosil will get profit through Nescafe advertisement and user will understand properties of Borosil in better way.

Surveying the demand
- Market survey shows that drinking glasses are more in demand (regular)

- Range for hot drinks can be introduced in market.
- Why hot drinks?
  Proper justice to the material properties.

Technology, material & process

Changing the function of existing range

- Beakers and other bottles can be transformed into oil jars for kitchen.
- Conscious about health, use particular amount of oil in food, where product range of lab ware can be easily fit into users daily life.
- Similar way set of Chinese sauce can be introduced
- Which can be cater to hotels for serving on table as well as One can use it at home, because of changing trend. More of western influence can be seen.

Issues & concerns

Strengthen the material

- As glass is a delicate material, people avoid using it in daily busy life.
  So to change that behavior.
- other material can be integrate in glass which will reduce the breakage.

Awareness through packaging
- Customers are complains about carafe breakage, customer itself not aware about material quality.

- Proper instruction on the packaging about how to use this particular product
  Demonstration can be given to retailers & users.
- Tray or some fixture can be provided with the carafe itself.

Taking further

- Heat & eat
- Changing the function of existing range

User survey at hotels for oil & sauces containers

- In hotels like curriers, sheeba, new Yorkers, US pizza, mostly ceramic and steel are more in use for serving Chinese sauce. In other hotels they keep bottle directly on the dinner tables.
- They pour from the bottle to these containers.
- About oil, they transfer first from the main tin, than put into some other container according to their daily requirement. Material they are using to keep oil are: plastic, steel containers with spout.

Market survey for containers

- For keep oil and other sauce, different containers are available in the market.
- Steel, plastic are the two main material available in the market at price of Rs 80 to 180/-
- Set of three Borosil test tubes in combination with steel was available for keeping oil in kitchen at the price of 1070 Rs.
- For Chinese sauce ceramic in combination with wood and steel, glass with plastic are available at the price from 180 to 500/- Rs
- Chinese sauce available in they market comes in a packaging of 200 ml to 300 ml.
- Huge variety of sauces are available in market.
- For oil from big oil tin to small packets are available.

User survey

- people keep oil in steel jars with serving spoon .
- With the trend people start keeping cooking oil in plastic and glass jars which has spout for easy pouring.
- for different sauce they keep in packaging bottles or transfer in some other bottle and store it in refrigerator.
- For cooking :
  Caster oil
  And olive oil
  are also is in use because of different cuisines. These are oil which use very less in different cuisines. Proper measurement need to put in particular dish.

User survey

- Daily meal
One curry or dry dish
Boiled rice
Roti.

space for only one bowl in plate.

Store in small plastic container for other members.
In microwave they keep plate and bowl.

Market survey for heat and eat range

- Range for heat and eat in market is at good level.
- Places like, can mart, Westside, @ home and star bazaar serving ceramic (stoneware) platters pricing from 280 to 450 each.

Opportunity areas for Borosil

Heat and eat

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- Family member heat each container separately in microwave for lunch which is time consuming.
- So to avoid it one can think about something where user can put all what he wants to eat in a one platter, heat it in microwave
  and eat in that only.
- Looking at daily diet, coming up with a concept which can fit in everyone's life.

User centric

Feedback
They were agreed to the statements made by user.
For this concept they said they can take it further to Baruch plant
They have all the links to take this product to market.
It can be worked in borosilicate material very well.

Heat and eat

- office as an opportunity area, tea or coffee intake is more because of working load.
- Keeping in mind space factor, looking towards
- Cup with a heating mechanism, which can be directly plugged in.
- Electric plate can be fit at the bottom.

User centric

Feedback
They were not able to understand the concept.
Tests were required to see how much its feasible.
To Source the heat plate they will require new links.

Heat and eat

- people are fond of different cuisines, for that they cook at home and goes out for dinner (twice a week).
- As Italian food lovers are increasing day by day that also specifically for sizzlers , thought can be given for sizzler plates.
- That can be used in restaurants as well as at home.

Feedback
Aesthetically it will be a good change.
And it will be hygienic too.
Links are not a problem.

User centric

Changing the function of existing range

- Beakers and other bottles can be transformed into oil jars for kitchen.
- Conscious about health, use particular amount of oil in food, where product range of lab ware can be easily fit into users daily life.
- Similar way set of Chinese sauce can be introduced
- Which can be cater to hotels for serving on table as well as One can use it at home, because of changing trend. More of western influence can be seen.

Feedback
This can be worked with present infrastructure only.
Have all the links to take it to the market.
They like the idea of taking lab ware to kitchen for new experience as well as for new range.
They are ready for brand extension.

Technology material process

DESIGN PROJECT FOR

FAMOUS STUDIOS

Famous Studios

Started in : 1998

Location : Mumbai
(India)

Started with 2D Animation in 1998. Now also work on 3D Animation, Claymation, Stop Motion and also Mixed Materials.

Does Production as well as Post Production.

Well equipped with equipments and spaces. Also give on rent
-Shoot floors
-Film cameras
-Preview theater
-High definition cameras (with high definition Recorder).

Main Focus is
-Impactful and good concept
-With strong story and screenplay
-Good quality of work

Has particular style of working.

Famous Studios

Major people involved

Famous Productions : Mr. Vijay Parimoo

House Of Animation : Mr. E. Suresh

Cine Fx Production : Mr. Nasir

Digital Restoration : Rajiv Singh and Shamsher Singh

Rentals : M. Ramachandran

Famous Studios

Famous Studios

Clients

AND MANY MORE…..

Famous Studios

Some projects they have worked on

B4U Movie promo

Brooke Bond Tea

Bindu Remix

Annapurna salt

Karam movie

Daikin

Female Foetus

Simpu singh

Awards

Award: Asia image: - DTC
Client: JWT - Mumbai / DTC
Film: DTC
JWT required a film for their client DTC. (the diamond trade Corporation), that told the story of the legendary Kohinoor Diamond.

Award: 50th international Advertising Festival - Cannes (finalist)
Film: Foetus
Client: Illusion films
It promotes - the movement against female infanticide.

Awards:
 Hiroshima Wildlife Festival
 INSEAA
JIJIC Festival Internacional de cine
 Indian Documentary Producers Association
MIFF
Film: Freedom Song

Award:
INSEA SEAGATE Promax BDA

Film: Poga (TV channel promotion series)
Client: MTV India

ABBY - Amaron Batteries
Client: O&M Mumbai
Selling a Car Battery using clay animation? The film is considered a landmark in Animated TV commercials in this country.

Award: FICCI
Film: Poga (TV channel promotion series)
Client: Terry fox foundation
Production house: Virtual reality
It's objective was to help young children fighting cancer to overcome their fear of hospital equipment that they encounter during chemotherapy and so on.

MERCHANDISING PRODUCTS

This is an interesting idea which can become a good pre-school kids slot program. The series is tentatively called 'Sea Squabbles'. It has sea creatures as 'kids' as potential 'crowd pullers' and every episode deals with the way they interpret any object, that is alien to their water world. The sea creature kids squabble about what that object is and demonstrate the utility of that object according to their judgment/discretion and make a mess, till the old man Octopus come sin to reveal the utility of the 'alien'!!

BRIEF

DEVELOP CONCEPTS/PROTOTYPES FOR MERCHANDISING AND TOYS USING THE CHARACTER DESIGN EXPERTISE OF FAMOUS STUDIOS FOR A FLEXIBLE AGE GROUP AIMING PRIMARILY AT PRESCHOOLERS FOR WHOM THE TV SHOW IS MADE

SYSTEM DESIGN RESEARCH

Popular Merchandising for Preschoolers

Popular Merchandising

Daily use products
(need)

-Bathroom products like brush, soap, shampoo, mat, etc.(material—plastic and rubber majorly)

-Furniture like table, chair, stool, bed of characters shape.(tough plastic majorly or wood.)

-School accessories like water bottle, lunch box, pencil box, eraser, etc.(plastic and eraser)

- alarm clock(plastic).

-Wearable – T-shirts, earrings, hand bands, hair clip.(fabric, plastic and rubber).

Accessories

-Notebook stickers, tattoo,
car stickers, caricature, posters,
Etc.(paper)

-Drawing book, scrapbook,
Color sets, compass box, pens,
Playing cards, Etc. (paper and
plastic)

-Packaging of perfume bottle,
Watches, etc.

-Sharpener, erasers, scales,
key rings, rings, bracelets, earrings,
Cap, etc.(plastic and rubber)

-Headphones, speakers, clip-on,
Hangers, hooks, pencil stand, hair pin,
head bands, mouse pad, etc.(plastic and wood)

USER STUDY

METHODOLOGY

REGARDING SHOWS

- which show they normally watch
- which show they stopped watching but still they prefer to watch
- what merchandising products do they buy
- what aspect of the show do they like
- which character do they like
- how did they know about the characters, source : shows products TV comics etc.

OTHER ACTIVITIES

- daily activities
- games they play
- products they use
- How do their rooms look
- what things they like to personalise and how
- venues they like to visit and why

REGARDING TV SHOWS

- what kind of shows do children watch
- what do they like best in them
- what tantrums do they throw for watching the show
- do they have any merchandising products, if yes then why
- do you encourage buying of merchandising products, reasons
- do they (PARENTS) still remember certain characters, why

OTHER ACTIVITIES

- which venues do they prefer the children to visit
- which market they buy most of their children products from

OBSERVATIONS

MOVIES TO BE SHOWN AND OBSERVATIONS

- top shows
- indian as well as foreign
- ones with dialog and ones without dialog
- only preschooler characters and shows to be shown
- at what instant do the viewers get excited
- questions soon after the show : what did they like in it and what they remembered incase its a show they are w atching for the first time

VENUES FOR USER STUDY

- schools
- playschools
- homes on weekends
- playgrounds

MARKET STUDY

Looked into the market for Existing Merchandising.
Concentrated more on products for preschoolers

Products that were new to us....GIFT STORE ,TOY SHOPS, MALL

Calculator
(Plastic)

Magazine shelf
(fabric & wood)

Bubbles with liquid soap
(Liq. soap and plastic)

While operating mouse this product is used in order to avoid Wrist pain. (gel kind of material inside and plastic outside)

Mouse pad
(cotton fabric)

A kit having
mirror and comb.

OTHER PRODUCTS

FEAR OF SEPARATION FROM PARENTS AND OTHER IMPORTANT PEOPLE

FEAR OF NEW PLACES   3 – 6 YR OLDS   FEAR OF NEW EXPERIENCES

REQUIRE CLEAR AND SIMPLE RULES TO KNOW BOUNDARIES OF ACCEPTABLE BEHAVIOR

MAKING DEVELOPMENTAL STRIDES INTO THE WORLD AND
EXPRESSING AN INTEREST IN THE WORLD AROUND

BUSY DEVELOPING SKILLS USING LANGUAGE AND STRUGGLING TO GAIN INNER CONTROL

MIGHT HAVE TROUBLE GETTING ALONG WITH OTHER CHILDREN   LEARN BY EXPERIENCING AND DOING

PRESCHOOLERS

FIND IT DIFFICULT TO SHARE   LEARN FROM PLAY   LIKE DRAWING PAINTING BUILDING

SPEND A LOT OF TIME PRETENDING

DIFFICULTY IN DIFFERENTIATING BETWEEN FANTASY AND REALITY

TIME WHEN FEARS DEVELOP   CAN EXPRESS THEIR NEEDS AS COMPARED TO TODDLERS

ARE ENERGETIC AND ACTIVE   ESTABLISH THEMSELVES AS DIFFERENT FROM PARENTS

NEED LARGE BALLS TO THROW, WAGONS TO PULL AND TRICYCLES TO RIDE

WANT TO TOUCH, TASTE, SMELL, HEAR AND TASTE THINGS FOR THEMSELVES

IMAGINARY FRIENDS

EFFECTS OF WATER ETC.   ERGONOMICS   SMOKE

FALLING ON THE PRODUCT   FURNITURE AND FURNISHINGS   SHARP EDGES

ELECTRICALLY OPERATED TOYS   USE OF DMF (DIMETHYLFUMERATE)   SUPERVISION   VISUAL CONTENT
SHOOTING TOYS AND GAMES   prevents moulds that may deteriorate
CHEMISTRY SETS   PROPELLED OBJECTS   leather furniture or footware during storage
(AVOID EYE INJURY)   or transport in humid climate cases painful
LEAD PAINT   skin contact

LONG TERM USE   PIECES OF BALLOONS   PROTECTIVE GEAR

WHEELED CONVEYENCES   PLACING TINY TOYS IN NOSES AND EARS
EATABLES   LIKE TO CLIMB   HOT SURFACES ON METAL   SHARP CORNERS
GUMS   SHELVES TO STORE TOYS
STMIGHT HAVE TROUBLE GETTING ALONG WITH OTHER CHILDREN ICKY OBJECTS   DETACHABLE PARTS
SMALL PARTS
HELMETS   SMOOTH SURFACE (SANDED)

CHILD SAFETY

COLOURS   BIG TOYS WITH SMALL PARTS
ERGONOMICS   BUNK BEDS
WEATHER   COSMETICS   THINGS KEPT ON SHELF AT SAFE HEIGHT
LOUD NOISE
SWALLOWING SMALL PARTS   DRESSES   NON TOXIC   UNINFLATED BALLOONS AND DISCARDED
MAGNETIC TOYS   SWIMMING POOLS   RESTRICTED ENVIRONMENT
FALLS ARE FREQUENT ACCIDENTS   WEATHER AND AIR QUALITY MEASURES
INJURY BY PROJECTILES   EXPLODING GAS POWERED TOYS   PRODUCT SHOULD BE ACCORDING TO AGE,
INTEREST AND ABILITY OF THE CHILD
ENTANGLING IN HAIR   HOLDING HANDS
TDOOR SAFETY   CARBON DIOXIDE/ MONOXIDE
EXCESSIVE EXPOSURE TO SUN   PLAYGROUNDS (EQUIPMENTS)
CUTS BY SHARP EDGES   size should be less than 1.5 m not taller
than that of an average woman
FALLING OF LIDS ON CHILDS HANDS   STRANGULATION

When went children's home

SPARSH (6yrs)   Kashish (6 yrs)   MAAHI (7 yrs)   Haard (5 yrs)

KARM (2 ½ yrs)

Which character they like most…….???

-Barbie (because she wears nice clothes, long hair, beautiful, they even have
 nail paint and Barbie set).

-Remote Car (because he can fight very well).

-Doremon

-Par man

-Shin Chan

-Chota Bheem (all of them are fond of this character)
They know all characters of the series.
They like this character because
"wo laddo khata hai aur bada ho jata hai"

Posters on wall

Entrance to the room

As soon as his mother switched on the cartoon channel, he asked his mom to put Chota Bheem. He is not able to speak properly but was able sing the title song of the hota Bheem. All the Children went close to T.V .They were very excited and were shouting his name. Karm shouted at every one asked them to stop. All were repeating his dialogue "ye kalia ne kia tha". After some time they told me that they are watching same episode for the 5th or 6th time.

HAARD
(6 yrs)

Shows he likes : CID, doremon, shinchan, superman, power rangers

He likes CID because its got **fighting**, (daya a character in CID) he beats up everyone Sometimes he also **acts out as the ACP**

Already **aware about so many things**

Channels he watches : Cartoon Network, Pogo, Hungama

Likes to show his toys a lot

Most of his games and activities including the shows being watched on TV was **Regulated by his mom** who is a teacher
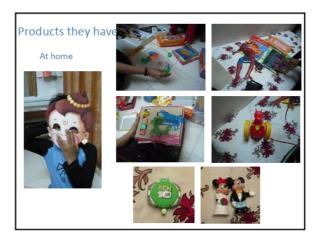
Mom hardly knew about educational shows.

According to her the **parent teaches first**

Has **heard about MAD** but did not mention it herself

PRODUCTS AT HOME

Less of SOFT toys and more of PLASTIC toys

Products they have

At home

Products they have

At home

TOP PRESCHOOLER SHOWS

Pinky Dinky Doo (NOGGIN)

Pinky Dinky Doo may be a little girl, but she has big ideas and an even bigger imagination. The show is animated using a blend of flash animation over photo collage backgrounds. In each episode, little brother Tyler comes to Pinky with a big problem, and he uses a big word to describe it. Pinky takes Tyler to the story box, where she tells a story that will surely lift Tyler's spirits and help him solve the dilemma. Tyler's big word is used several times in the story, so viewing kids can gain an understanding of the new vocabulary. Each episode features two eight-minute stories, each followed by interactive games to help viewing kids with literary skills such as recall and order of events.

Dora the Explorer (Nick Jr.)

A pioneer show in the realm of interactive cartoons for preschoolers, Dora the Explorer characters enlist the help of viewing kids, as Dora and her friends complete educational adventures. Kids learn about colors, numbers, shapes and more as they help Dora solve riddles and puzzles along her way. Dora, a seven-year-old Latina heroine, also throws in Spanish words, and kids are asked to repeat them or sing along with songs incorporating the words. The show has been a hit for over 8 years, and in 2008 Dora was updated with a new voice and some new curriculum points were added. This landmark children's series will continue to be in the top most loved learning shows for preschoolers for who knows how many years to come.

Blue's Clues (Nick Jr.)

Since its premiere in 1996, Blue's Clues has continued to stand out as one of the top preschool series on TV. With its interactive, educational focus, Blue's Clues was also a pioneer in a new model of preschoolers' television. The show's educational focus covers skills from colors and shapes to numbers and letters, but the greatest focus is on helping kids learn problem solving skills. In each episode, clues left by Blue must be found and put together to come up with an answer or idea. Through this process, kids are able to practice relating information and drawing conclusions. Kids are also able to observe as Joe (or Steve on older episodes) guides children through the day's adventure finding and relating Blue's clues.

Sesame Street (PBS KIDS)

Any list of top shows for preschoolers is obviously going to feature the main staple of kids' TV -- Sesame Street. The show has been on the air for decades (since 1969), and the characters are known by almost every kid alive. Still, there are things about the show that I didn't realize when I watched as a kid. For example, each new season of Sesame Street brings a new area of educational focus along with funny parodies (note the photo of "Pre-School Musical" -- Ha Ha!) and exciting characters. Sesame is continually assessing and refining the show to meet the educational needs of preschoolers, and there is also a wealth of online Sesame Street resources to help kids continue learning.

The Backyardigans (Nick Jr.)

The Backyardigans are five adorable friends who put their imaginations together to turn their backyards into fantastical settings as they sing and dance their way through epic adventures. Created by Janice Burgess, each CGI animated show features original music, and the dance steps are performed by real dancers whose movements are recreated in animation. The show is incredibly entertaining -- so much so that there are numerous parent blogs devoted to it -- and it exposes kids to all kinds of music from South African Township Jive to rock opera. The show presents clever, and unique music, plots and settings in each episode.

Imagination Movers (Disney)

Scott, Rich, Dave, and "Smitty" are in a rockin' band from New Orleans nation Movers uses upbeat music, comedy, and behavior modeling to entertain kids and teach them to think things through. The show also appeals to kids' sense of wonder and imagination through whimsical storylines and settings. The focus on thinking empowers kids to solve their own problems and tackle challenges with a positive attitude.

Between the Lions (PBS KIDS)

Between the Lions features a family of lions - Mom and Dad, named Cleo and Theo, and their children, Lionel and Leona - who run a library that is filled with the magic of books. The series combines puppetry, animation, live action and music to develop a literacy curriculum geared to beginning readers aged four to seven; however, younger preschoolers still enjoy the show and can get a lot out of it. Characters from books come alive, letters sing and dance, and words play in the world between the lions. Also, every episode addresses the five key areas of reading instruction: phonemic awareness, phonics, fluency, vocabulary and text comprehension. As far as TV shows go, educational content does not get any better than Between the Lions.

Super Why (PBS KIDS)

Super Why follows four friends -- Alpha Pig with Alphabet Power, Wonder Red with Word Power, Princess Presto with Spelling Power, Super Why with the Power to Read -- who use fairy tales to solve problems in their every day lives. The Super . Kids follow along as the Readers read a story, talk with the characters, play word games, and relate the story's lesson to the problem they are trying to solve. The brightly colored characters make letters, spelling, and reading fun for preschoolers. Kids adore them, and fans of Super Why can be found searching for "super letters" in grocery stores, on signs, or wherever the now familiar symbols might pop out.

The Little Einsteins (Disney)

The Little Einsteins series was created for preschoolers and incorporates classical music, art, and real world images to entertain and educate. Combining animation with the real life images, the Little Einsteins take kids on adventures that teach them about actual places and things. Sometimes, the setting of the adventure is actually an animated version of a famous work of art. Also essential to each themed show is the musical score, and the Little Einsteins incorporate musical terminology and concepts into each adventure. The show provides a great introduction to music and art, and kids may also learn about real things and places through the different adventures.

Sid the Science Kid (PBS KIDS)

Always wondering "why?" or "how?," Sid's inquisitive nature and zeal for learning are contagious to kids. Each episode finds Sid with a scientific conundrum. His mom helps him explore the topic online, and at school his friends and teacher give him additional insight into the question. By the time he gets back home, Sid has a good handle on his new found knowledge, and he is ready to share it with his family and put it into practice. The animation is not the prettiest, in my opinion, but kids relate very well to the show and to Sid, and it teaches them to be excited about science and problem solving. Parents can also glean some good ideas from the show about ways they can incorporate science into kids' every day life.

THE BACKYARDIGANS (NICK JR.)
TOYS • PARTY SUPPLIES AND DECORATIONS • HOME AND DECOR • CLOTHING • ACCESSORIES • BOOKS CDS DVDS

DORA THE EXPLORER (NICK JR.)
TOYS • PARTY SUPPLIES AND DECORATIONS • ACCESSORIES • HOME AND DECOR • BOOKS CDS DVDS • CLOTHING

COMMONLY USED
DIFFERENT MATERIALS

Soft Materials

---

felt
sheep   mild   dissolved   rubber
ribbon   Gentle   harmless   soft colors   weak
pleasing   layering   kids
Blankets   safe   Hand gloves
Winter clothes   playful   fabric
Soft Materials
manipulative   Fluffy
Lacking strength
subtle   towel   cushioning   Pillow
cotton   threads
Bed cover   fur
bedding   bags   delicate
Soft toys
Not sharply drawn   gloves
Affectionate   Smooth
fragile   Flower petals   pleasant to hold
rabbit

Soft Materials

Fabric

-Clothes
-Curtains
-Pillow
-Bag
-Soft toys
-Bed spreads
-Blankets
-Bean bag

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Paper

- Paper craft
- Stickers
- Posters
- Paper toys
- Glitters
- Books
- Hand puppets
- Paper bag
- Night lamps
- Birthday caps
- Decoration items
- Paper plates
- Cards
- Drawing copies
- Hang outs
- Dairy
- Kite
- Stamps
- Calendar
- Comics
- Magazines
- Masks

Foam

- Bedding
- Filling
- Bean bag
- Soft toys
- Sponge
- Sofas

Cotton

- Banded
- Socks
- Hair band
- Cushions
- Napkins
- Ear buds
- Soft toy
- Diaper
- Pillow
- Bedding
- Cotton shoes

Rubber

- Rubber bands
- Ball
- Eraser
- Rubber shoes
- Rubber mats
- Cap of the products used by children
- Head bands
- Key rings
- Belt of watch
- Hand bands

Leather

Hard Material

Useable products
Stationary items
Decorative/gift items
Games & toys

PLASTIC — textured, rigid, breakable, tough
rough, Heavy, Non sticky
glass
tough, mould able
friction, modular, strong
durable
bending

WOOD — Furniture, toys, stationary

Piggy bank
Mug
Wash basins — CERAMIC
marble — stiff
solid, dependable
Long lasting, magnet, strength, resistant
unbreakable, concrete
ductile — METAL

Al foil box
Toy cars
stationeries — aluminum

steel — utensils, Ruler scale

iron — rides, swings, For support, joineries

Plastic

-Toilet accessories like toilet seats, shelf, etc.
-Crockery
-Modular furniture
-Cradle
-Toys
-Games
-Slides
-Gifts
-School stationary like compass box
-Wearable accessories

Wood

-Furniture like table, chair,
 stool, book shelf, wardrobe,
Door, etc.

-Toys – wooden toys, puppets,
Building blocks like jenga, learning sets.

- Games

-Wooden frame, compass box, pencils,
Sharpener, hangers, folder, key rings,
Bamboo toys.

Metal

-Aluminum foil, hot wheel cars,
Compass box, etc.

-Steel basically used for utensil purpose,
Stationary items like ruler scale, mess furniture of
some schools.

- Iron basically used in the structure of big rides
like Tora-Tora, Columbus, etc in places like water
kingdom ; or in the joinery of kids furniture to
give support; used in the parks for sea-saw, slide,
etc. ; bicycle, skates, children train etc.

HASBRO

INDUSTRIES

HASBRO

HASBRO (NYSE: HAS) IS A U.S.-BASED, MULTINATIONAL TOY AND BOARDGAME COMPANY.
IT IS ONE OF THE LARGEST TOY MAKERS IN THE WORLD. THE CORPORATE HEADQUARTERS IS
LOCATED IN PAWTUKET, RHODE ISLAND, UNITED STATES. THE MAJORITY OF ITS PRODUCTS ARE
MANUFACTURED OVERSEAS

MOST OF HASBRO'S PRODUCTS ARE MANUFACTURED FROM BASIC
RAW MATERIALS SUCH AS PLASTIC, PAPER, AND CARDBOARD.

BRAND

BABY ALIVE (41)		BATTLESHIP (12)
CANDY LAND (9)		CLOVERFIELD (1)
CLUE (9)		CONNECT 4 (16)
CRANIUM (20)		DISNEY (56)
DORA THE EXPLORER (17)		DUNGEONS 4 DRAGONS (7)
EASY-BAKE (22)		FURREAL FRIENDS (63)
G.I. JOE (165)		GO DIEGO GO! (14)
HASBRO GAMES (410)		I-DOG (54)
INCREDIBLE HULK (6)		INDIANA JONES (2)
IRON MAN (63)		JURASSIC PARK (13)
LAZER TAG (1)		LITE-BRITE (29)
LITTLEST PET SHOP (433)		MAGIC: THE GATHERING (20)
MAPLESTORY (6)		MARTIAN MATTER (7)
MARVEL (328)		MIGHTY MUGGS (77)
MONOPOLY (39)		MR POTATO HEAD (53)
MY LITTLE PONY (197)		NERF (213)
PLAY-DOH (112)		PLAYSKOOL (325)
POW-R-FUEL BATTERIES (4)		RISK (3)
ROOM TECH (3)		SCRABBLE (32)
SESAME STREET (4)		SPIDER-MAN (118)
SPIROGRAPH (2)		SPONGEBOB SQUAREPANTS (11)
STAR WARS (310)		STRAWBERRY SHORTCAKE (36)
THE BACKYARDIGANS (4)		THE EYE OF JUDGEMENT (12)
TINKERTOY (5)		TITANIUM SERIES (5)
TONKA (107)		TOOTH TUNES (46)
TRANSFORMERS (324)		TRIVIAL PURSUIT (18)
VIDEONOW (1)		WIZARDS OF THE COAST (54)
WOLVERINE (174)		ZAMBI (1)

PRODUCT CATEGORY
ACTION FIGURES 4 COLLECTIBLES (1206)
APPAREL (74)
ARTS 4 CRAFTS (50)
BOOKS 4 MOVIES (108)
CREATIVE 4 PRETEND PLAY (449)
DOLLS 4 PLUSH TOYS (417)
ELECTRONIC TOYS 4 GAMES (104)
GAMES 4 PUZZLES (442)
HEALTH 4 BEAUTY (48)
INFANT 4 PRESCHOOL TOYS (532)
KIDS' DÉCOR (14)
PARTS 4 REFILLS (99)
PARTY SUPPLIES (61)
SPORTS 4 OUTDOOR PLAY (229)
VEHICLES (127)
VIDEO GAMES 4 ACCESSORIES (76)

DO I NEED MORE OF THESE FOR THE NUMBER AND AGES OF CHILDREN AT HOME

USEFUL I THE EYES OF PARENTS (maybe as a daily use product)

QUALITY OF THE SHOW SHOULD BE MAINTAINED (reason for there not being any for calvin and hobbes – did not take any chance)

CAN IT BE USED IN A VARIETY OF WAYS IF IT'S A TOY   BETTER TO BUY A NEW RATHER THAN A SECOND HAND ONE

PEOPLE ARE ABLE TO PREDICT CHANGES IN THE SHOW BASED ON MERCHANDISE PRODUCTS

CAN IT MADE FOR A CHEAPER PRICE: MAYBE AT HOME

CAN ANOTHER PRODUCT BE BOUGHT FOR THE SAME PRICE WHICH WOULD BE MORE USEFUL

SOMETIMES ALTERNATE DESIGNS ARE MORE POPULAR WITH KIDS   IS IT EASY TO CLEAN   LINKED WITH ADS

USABILITY

EXPECTATION FROM THE MERCHANDISE

AVAILABILITY OF MATERIAL

PLAYFUL   REPARABILITY

HOW LONG IT WILL LAST   SAFETY

USE OF FAMILY OF PRODUCTS   SHOWS GET CANCELLED IF TOYS DON'T SELL

IT SHOULD BE ASSOCIATED WITH THE MAIN PRODUCT

IF TOYS GAIN MORE POPULARITY THEN SHOWS WOULD BE DEPENDENT ON THEM EVENTUALLY BECOMING A MERCHANDISING DRIVEN SHOWS   INCREASING POPULARITY OF THE EXISTING MAIN PRODUCT

WHAT SHOULD IT ENCOURAGE: COOPERATION AGGRESSION VIOLENCE

WILL CHILDREN OF DIFFERENT AGES ENJOY IT

MERCHANDISE DRIVEN SHOW – TOY MANUFACTURER WILL HAVE SOME DEGREE OF CREATIVE CONTROL (characters can be added to the show according to the toys, new characters be such that they can be converted to toys)   DURABILITY

GETTING THE PARENTS INVOLVED IN THE USABILITY

IF A CHARACTER DOESN'T HAVE A TOY MADE THEN THERE IS MORE DEMAND FOR THE TOY

OPPORTUNITY AREAS

FINAL CONCEPTS
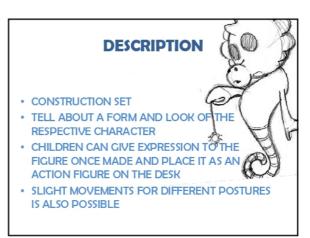
FREEBIES WITH POPULAR EATABLES
(EG: BISCUIT, CHIPS, CHOCOLATE)

FREEBIES

DESCRIPTION

- SMALL TOYS
- TELL ABOUT A SPECIFIC ATTRIBUTE OF THE RESPECTIVE CHARACTER
- THE ATTRIBUTE WILL BE DEPICTED THROUGH THE USE OF THE TOY

MATERIAL USED

- PAPER
- PLASTIC
- WOOD
- RUBBER

PRODUCTION

- ACCORDING TO THE SELECTION OF MATERIAL THE PRODUCT COULD BE MADE AT A CERTAIN PLACE
- SINCE THE PRODUCTS ARE BEING MADE FROM CHEAP MATERIAL THEY SHOULD BE PRODUCED AT LOW COST INDUSTRIES

RETAILING

- WOULD BE GIVEN AS A FREE ITEM WITH A POPULAR EATABLE

WHY
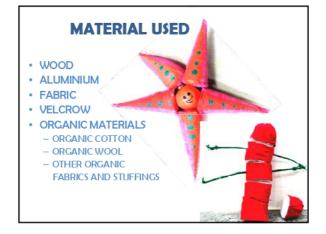
- A POPULAR EATABLE WOULD BE BOUGHT BY MANY CHILDREN OF DIFFERENT AGE GROUPS
- THESE SMALL TOYS WOULD PROMOTE THE SHOW : INFORMATION ABOUT THE SHOW TIMINGS CAN BE GIVEN ALONG WITH THE TOY
- AFTER PLAYING WITH IT THE KIDS WOULD BE ABLE TO RELATE TO THE CHARACTER ONCE THEY START WATCHING IT ON TV

ORGANIC TOYS : CONSTRUCTION SET

MATERIAL

DESCRIPTION

- CONSTRUCTION SET
- TELL ABOUT A FORM AND LOOK OF THE RESPECTIVE CHARACTER
- CHILDREN CAN GIVE EXPRESSION TO THE FIGURE ONCE MADE AND PLACE IT AS AN ACTION FIGURE ON THE DESK
- SLIGHT MOVEMENTS FOR DIFFERENT POSTURES IS ALSO POSSIBLE

MATERIAL USED

- WOOD
- ALUMINIUM
- FABRIC
- VELCROW
- ORGANIC MATERIALS
  – ORGANIC COTTON
  – ORGANIC WOOL
  – OTHER ORGANIC FABRICS AND STUFFINGS
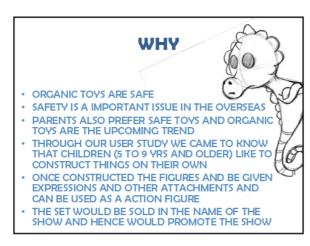
PRODUCTION

- THERE ARE PLACES WHICH FARM ORGANIC MATERIAL AND ALSO PRODUCE TOYS MADE FROM THOSE MATERIALS
- EG: TAMILNADU (PADMAVATY) : THIS PERSON GETS ORDERS FROM US TOYS COMPANIES FOR ORGANIC SOFT TOYS

RETAILING

- THESE TOYS COULD BE MADE FOR TOY COMPANIES WHO HAVE POPULAR BRAND VALUE
- WE CAN APPROACH COMPANIES WHO HAVE THEIR OWN RETAILING SECTION
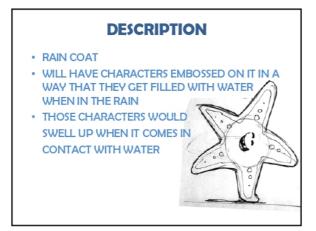
OTHER CONCEPTS

- ACTION FIGURES IN JELLY MATERIAL
- THERE ARE EXISTING MATERIALS THAT HAVE A WOBBLY FEEL TO THEM – jelly rubber

WHY

- ORGANIC TOYS ARE SAFE
- SAFETY IS A IMPORTANT ISSUE IN THE OVERSEAS
- PARENTS ALSO PREFER SAFE TOYS AND ORGANIC TOYS ARE THE UPCOMING TREND
- THROUGH OUR USER STUDY WE CAME TO KNOW THAT CHILDREN (5 TO 9 YRS AND OLDER) LIKE TO CONSTRUCT THINGS ON THEIR OWN
- ONCE CONSTRUCTED THE FIGURES AND BE GIVEN EXPRESSIONS AND OTHER ATTACHMENTS AND CAN BE USED AS A ACTION FIGURE
- THE SET WOULD BE SOLD IN THE NAME OF THE SHOW AND HENCE WOULD PROMOTE THE SHOW

SEASONAL ISSUES : CLIMATE (ACCESSORIES)

MERCHANDISING

DESCRIPTION

- RAIN COAT
- WILL HAVE CHARACTERS EMBOSSED ON IT IN A WAY THAT THEY GET FILLED WITH WATER WHEN IN THE RAIN
- THOSE CHARACTERS WOULD SWELL UP WHEN IT COMES IN CONTACT WITH WATER

MATERIAL USED

- FORM CHANGING MATERIAL
- TRANSPARENT RAINCOAT MATERIAL
- COLORFUL RAINCOAT MATERIAL OR FABRIC FOR THE CHARACTERS
- PLASTIC FOR SMALL SOUND MAKING HORNS

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PRODUCTION

- COULD BE MADE BY THE COMPANIES WHICH MAKE CHILDREN'S RAINCOATS
- THE SMALL HORNS WOULD BE EXTRA ATTACHMENTS WHICH COULD BE FITTED INTO SLOTS
- THESE SMALL HORNS ARE WIDELY USED IN TOYS AND ARE EASILY AVAILABLE

RETAILING

- WOULD BE SOLD AT POPULAR KIDS CLOTHES SHOPS WHICH SELL RAINCOATS ALSO DURING THE RAINY SEASON

WHY

- RAINCOATS ARE A NEED FOR THE CHILDREN WHICH USUALLY PARENTS WOULD BUY FOR THEM
- THESE CAN BE WORN TO SCHOOLS OR SIMPLY FOR PLAYING IN THE RAIN
- THE CHARACTERS ARE AN ADDED VALUE TO AN ALREADY EXISTING PRODUCT

UTILITY ITEMS : AQUARIUM ACCESORY

MEDIUMS

DESCRIPTION

- AQUARIUM ACCESSORY
- MADE FROM RUBBER OR PLASTICS
- ACT AS THE NOZZLE FROM WHICH THE BUBBLES ARE RELEASED

MATERIAL USED

- RUBBER
- PLASTIC

PRODUCTION

- WILL BE MADE BY THE AQUARIUM ACCESSORY MANUFACTURERS

RETAILING
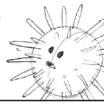
- THE AQUARIUM ACCESORY MANUFACTURERS CAN ALSO RETAIL IT TO THE AQUARIUM MANUFACTURERS
- ITS PRESENCE IN THE CHILDRENS FISH TANKS WOULD PROMOTE THE SHOW

OTHER CONCEPTS

- TABLE LAMPS THAT WOULD ALSO DOUBLE UP AS COLOURFUL NIGHT LIGHTS

WHY
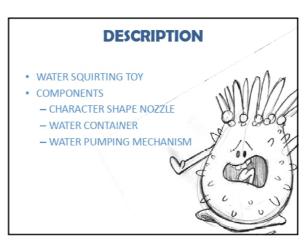
- THE CHARACTERS ARE OF VERY BRIGHT COLORS AND HAVE A SHINY AND GLOWING VISUAL APPEARANCE TO THEM
- LIGHTING ACCESSORIES IS A NEED IN MANY HOUSES
- CHILDREN ARE ATTRACTED TO AQUARIUMS A LOT

DAILY ACTIVITIES

PLAYING WITH WATER

DESCRIPTION

- WATER SQUIRTING TOY
- COMPONENTS
  - CHARACTER SHAPE NOZZLE
  - WATER CONTAINER
  - WATER PUMPING MECHANISM

MATERIAL USED

- PLASTIC
- RUBBER

PRODUCTION

- WATER TOY MANUFACTURERS WITH A STRONG RETAIL CHAIN OR SECTION CAN BE APPROACHED WITH THE CONCEPT

RETAILING

- WOULD BE DONE BY THE TOY MANUFACTURERS THEM SELVES

OTHER CONCEPTS

- CHILDRENS SWIM WEARS THAT WOULD BE IN THE FORM OF THE CHARACTERS WITH CERTAIN ATTRIBUTES THAT WOULD REMIND THE CHILDREN ABOUT THE CHARACTERS –
- Eg :

WHY

- CHILDREN LIKE PLAYING WITH WATER IN THE SUMMERS
- NORMAL SQUEEZE TOYS DON'T HAVE MUCH CAPACITY FOR HOLDING WATER
- A WATER TOY WOULD PROMOTE THE CONTEXT OF THE SHOW WHICH IS BASED UNDERWATER

Collaboration with Asian paints for Decorating Children's Room (Indian market)

Why?

-Decorating children's room is getting more attention these days.(in India as well as Abroad)

-Number of children in a family are two or less, have their personal rooms and has aspiration to live in an imaginary world of their own.

-People like to customize their rooms for themselves. Houses are generally smaller and with fewer rooms. So, money can be spend for making each room look good.

Major Competition- Nerolac Paints

Nerolac Disney solutions- The launch of their latest range of products for kids, 'Nerolac Disney'. The product pack will contain Wall designs which consists of a 'Paint for the wall' and 'Custom made Stencils' to capture the designs on the wall.

Opportunity 1

How is it different then???

Till now the wall are either painted or textured or given a pattern.
For kids, stencils of the characters are just painted on the wall.

BUT CHILD'S ROOM CAN BE MORE **INTERESTING AND INTERACTIVE BY ADDING VALUE TO IT**. CHARACTERS WONT BE JUST PAINTED ON THE WALL INSTEAD, THEY WILL IN ACTUALL **3D FORM** ON THE WALL. ALSO THEY WOULD BE PAINTED WITH ASIAN GLOW PAINT AND ASIAN CHALKBOARD PAINT. WITH ASIAN GLOW PAINT, **CHARACTERS WILL SHINE IN NIGHT**. AND WITH CHALKBOARD PAINT, **CHILD CAN DRAW AND WRITE** WATEVER HE LIKES IN SHOW AFTER WACHING EACH EPISODE (SEA SQUABBLES) . THIS WILL MAKE CHILD MORE CREATIVE.
OTHER THAN THIS EVEN BASIC FURNITURE IN THE ROOM ACCORDING TO THEME IS GOING TO BE TAKEN CARE OF.
ALSO ONE INTERSTING THING CAN BE IMPLEMENTED.**CASTLE** OF THESE CHARACTERS CAN BE MADE ON **THE WALL NEXT TO THE BED**.THE PLACE **WHERE CHARACTERS HANG OUT CAN BE MADE ON THE WALL NEXT TO PLAYING AREA OF CHILD**.THIS CAN HELP TO RELATE THESE CHARACTERS IN THE REAL WORLD.

What are glow paint (introduced by Asian paints)

Asian Paints Glow Paint are 100% water based products that absorb light and then glow in the dark.
Has Four vibrant shades of Fluorescent paints which when added to the ,Glow-in-the-dark gives the magical effect.

Day   Night

Details of the Product Range

Different themes/layouts of sea squabbles is going to be introduced to the customer.
And according to his/her choice he can select one.
Price can be either according to layout of the theme or Per sq. feet.
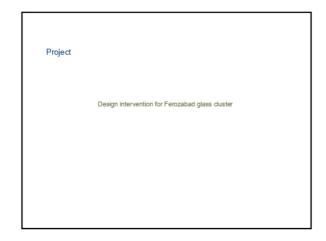
How will it Benefit both???
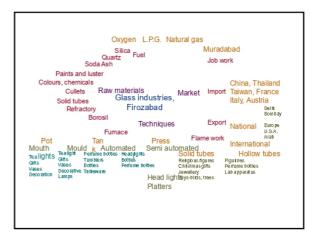
Both the parties will have equal benefit. Asian paints will get more customers and therefore more profit. Eksauras will get more publicity, more TRP and certain amount of share from the profit of Asian paints.

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Project presentation
Case study 6. Glass products for Ferozabad cluster

Project

Design intervention for Ferozabad glass cluster

Gatherings

Other opportunity area using ideation process

Themes –
CELEBRATION :

FLOATING

MOONLIGHT

EXOTIC/ ROYAL

Motives and patterns

Moonlight +floating

— as the moonlight theme is leading to more of elite and occasional products , its an deliberate attempt to make a product that would have more demand and fits in the ferozabad system better.

Floating forms

Exisiting products in the market

Glass tray and glass bowls

Final product

brass stand for dry-fruits and lamp

Slide 1:

Project

Design intervention for Ferozabad glass cluster

Slide 2:

Oxygen   L.P.G.   Natural gas

Silica   Fuel   Muradabad

Quartz

Soda Ash   Job work

Paints and luster

Colours, chemicals

Cullets   Raw materials   Market   Import   China, Thailand
                                                           Taiwan, France
Solid tubes   Glass industries,   Italy, Austria

Refractory   Firozabad   Delhi
                                                           Bombay
Borosil   Export   National

                        Techniques   International Europe
                                                                      U.S.A.
Furnace   Flame work   Arab

Pot   Tank   Press

Mouth   Mould   Automated   Semi automated   Solid tubes   Hollow tubes

Tea lights   Tea light Perfume bottles Head lights Religious figures Figurines
Gifts   Gifts   Tumblers   Bottles   Christmas gifts   Perfume bottles
Vases   Vases   Bottles   Perfume bottles Jewellery   Lab apparatus
Decoration   Decorative Tableware   Toys-birds, trees
             Lamps

                                          Head lights
                                          Platters

Slide 3:

Design Approach

After the analysis the following work areas were looked into:

Tableware: Office accessories:
Dinner sets   Pen stands
Tumblers   Pen holders
Serving plates   Visiting card holders
Salt and pepper cellars   Mobile holder
Pickle bottles   Section containing posteds, paper
Coasters   A personalized space
Napkin holders
Spoon holders
Stackable containers

Decorative articles: Fashion accessories:
Tea-lights   Belts
A range of products for gifting Hair accessories
Lighting system   Neck pieces
Candle stands   Earrings
Vases   Bracelets
                                Anklets
                                Rings
                                Glasses
                                Footwear

Slide 4:

Initial design brief:

a range of fashion accessories in glass combined with silver or brass for the
development of the Firozabad glass cluster and export, catering to the youngsters
between the age group of 18 to 25, belonging to the higher middle class or the
upper income strata.

Slide 5:

user study was done to understand the user psyche, space, behavioral patterns etc...

Slide 6:

For this purpose, photographs were taken, visuals were collected and questions were asked.

Exisiting products in the market

Glass tray and glass bowls

Final product

brass stand for dry-fruits and lamp

The questions were pertaining to their tastes, how often they purchase accessories, how often they do other shopping, who accompanies the user while shopping etc… also some visuals were shown to the user so they could have an idea of what kind of designs were being thought of …

Going into depth of various kinds of different user persona, adjectives and adverbs were used to define the user so the understanding was better.

common
gauche
familiar
comfort

shy   ordinary   timid   dependant   feminine

vibrant
dissimilar
conventional

unforgettable
distinguished
neat
enduring

dynamic

Audacious
Gallant
Distinct
Irreplaceable
Confident
Daring

The visuals that were shown to the user to understand their preferences.

After showing some samples of accessories to the user, a few images were also shown to some of them so it would re-confirm their preferences

Images liked the most…

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Images disliked…

- The spending power of the user on accessories with silver ranges from Rs. 300 to Rs. 1000 and above.

- The accessories were meant for casual parties amongst the age group up to 35-40 years of age though only the ones between 18 to 25 years would also wear fashion accessories for formal functions like a wedding.

- The settings ought to be comfortable in terms of putting them on and removing them so that too much time is not consumed.

- Due to the occasions being casual parties the colors were bright blues, greens, pinks and purples and red. Black was an all time favorite.

- Their decisions are influenced by peer groups and work mates.

- The most important decisions are concerning their careers and relationships.

- Spending power ranges between Rs. 28000 to Rs. 40000 on food, clothing, entertainment and consumer durables.

Silver articles available in the market

Silver as a material

- Atomic Number :47

- Symbol : Ag

- Atomic weight : 107.868

- Discovery: Known since prehistoric time. Man learned to separate silver from lead as early as 3000 B.C. Electron Configuration) Kd|2s14d10Word

- Origin: Anglo-Saxon *Seolfor* or *siolfur*, meaning 'silver', and Latin *argentum*.

- Properties: The melting point of silver is 961.93°C,
  boiling point is 2212°C,
  specific gravity is 10.50 (20°C), with a valence of 1 or 2.
  Pure silver has a brilliant white metallic luster. Silver is slightly harder than gold. It is very ductile and malleable, exceeded in these properties by gold and palladium. Pure silver has the highest electrical and thermal conductivity of all metals. Silver possesses the lowest contact resistance of all metals. Silver is stable in pure air and water, although it tarnishes upon exposure to ozone, hydrogen sulfide, or air containing sulfur

- Uses: The alloys of silver have many commercial uses. Sterling silver (92.5% silver, with copper or other metals) is used for silverware and jewelry. Silver is used in photography, dental compounds, solder, brazing, electrical contacts, batteries, mirrors, and printed circuits. Freshly deposited silver is the best known reflector of visible light, but it rapidly tarnishes and loses its reflectance. Silver fulminate (Ag2C2N2O2) is a powerful explosive. Silver iodide is used in cloud seeding to produce rain. Silver chloride can be made transparent and is also used as a cement for glass. Silver nitrate, or lunar caustic, is used extensively in photography. Although silver itself is not considered toxic, most of its salts are poisonous, due to the anions involved. Exposure to silver (metal and soluble compounds) should not exceed 0.01 mg/M3 (8 hour time-weighted average for a 40 hour week). Silver compounds can be absorbed into the circulatory system, with deposition of reduced silver in body tissues. This may result in argyria, which is characterized by a greyish pigmentation of the skin and mucous membranes. Silver is germicidal and may be used to kill many lower organisms without harm to higher organisms. Silver is used as coinage in many countries.

Uses: The alloys of silver have many commercial uses.

Sterling silver (92.5% silver, with copper or other metals) is used for silverware and jewelry. Silver is used in photography, dental compounds, solder, brazing, electrical contacts, batteries, mirrors, and printed circuits. Freshly deposited silver is is the best known reflector of visible light, but it rapidly tarnishes and loses its reflectance. Silver fulminate (Ag2C2N2O2) is a powerful explosive. Silver iodide is used in cloud seeding to produce rain. Silver chloride can be made transparent and is also used as a cement for glass. Silver nitrate, or lunar caustic, is used extensively in photography. Although silver itself is not considered toxic, most of its salts are poisonous, due to the anions involved. Exposure to silver (metal and soluble compounds) should not exceed 0.01 mg/M3 (8 hour time-weighted average for a 40 hour week). Silver compounds can be absorbed into the circulatory system, with deposition of reduced silver in body tissues. This may result in argyria, which is characterized by a greyish pigmentation of the skin and mucous membranes. Silver is germicidal and may be used to kill many lower organisms without harm to higher organisms. Silver is used as coinage in many countries.

- Sources: Silver occurs native and in ores including argentite (Ag2S) and horn silver (AgCl). Lead, lead-zinc, copper, copper-nickel, and gold ores are other principal sources of silver. Commercial fine silver is at least 99.9% pure.

- Commercial purities of 99.999+% are available.

Combining glass and silver
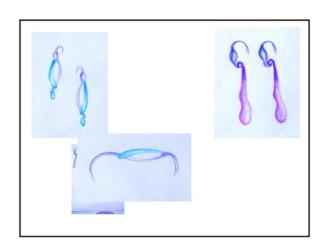
- A cluster in a village named Dokalli, which is about 45 minutes drive from Firozabad, has been doing flame work and all their work is being exported.

- The exporters place their orders either on their own or through middle men.

- These products like glass trees, birds, pendants, earrings, idols etc are all being exported. Only the birds and the idols can be seen in the local markets. All the fashion accessories are straight away exported and the Indian market is not even aware of the existence of such accessories.

- The possibilities in this technique are suitable for accessories and forms that are either not possible in precious and semi precious or would be too expensive and laborious to do the same.

- The glass accessories available in the market are just beads tied together to form a neck piece, belts, earrings etc and the slots are usually in gunmetal, brass or steel.

- The usage of silver would be ideal as a lot of users are allergic to gun metal and other metals when they sweat and rashes are developed. With silver such reactions normally take place.

- Combining glass with silver such that the designs have not been introduced to the Indian market thus creating a new concept.

- Also, since the melting point of glass and silver is relatively close, one can easily look at combining them even in their hot stage.
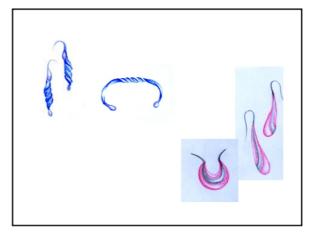
From the observations through the study the redefined brief was as follows

A collection of accessories combining glass and silver for young women between the age group of 24 to late 30s which can be worn to casual parties and functions and the spending capacity on each accessory ranges from Rs. 500 to Rs. 1000 and above

Concept building

- The product range can be extremely wide including the following:
  Earrings
  Pendants
  Bracelets
  Anklets
  Mobile strings
  Buttons
  Bag slings
  Belts etc...

- Since the product is aimed at party goers an element of interest can be added to the product like an LED with a battery or a small piece or radium encased so that when the light falls on it, the piece glitters or shines.

- The products could also be designed in a way such that the silver casing remains the same and the glass can be changed such that one can wear what ever colour of the glass that they like.

- The designs of the products would be based on corals or drops as they justify the adjective – ELEGANT.

Attributes, Adjectives, Inspirations...

Stylish	Immortal	Active
Graceful	Traditional	Substantial
Neat	Lavish	Discreet
Chic	Dynamic	Superior
Classic	Sophisticated	Unusual
Enduring	Splendid	Corals
Lively	Luxurious	Drops
Impressive	Exceptional	Water
Unique	Distinct	Spring
Confident	Striking	Circles
Familiar	Vivacious	Swirls
	Plush	Delicate
	Classy	Exotic

Final concepts

Two main concepts are to be used for this range of products

- The silver will have a finding such that the front is a continuous piece to the hook

- The designs will be inspired from the form of a drop

- In a few designs the casing will be done in a way that radium can be incorporated such that it will shine in dim light.
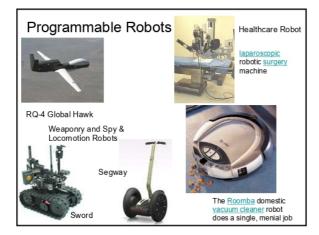
Systems Design Project
ROBOTS ALIVE

Robot

- a machine capable of carrying out a complex series of actions automatically, esp. one programmable by a computer.(Oxford Dictionary)
- A **robot** is a virtual or mechanical artificial agent. In practice, it is usually an electro-mechanical system which, by its appearance or movements, conveys a sense that it has intent or agency of its own.(Wikipedia.org)

Programmable Robots

Healthcare Robot

laparoscopic robotic surgery machine

RQ-4 Global Hawk

Weaponry and Spy & Locomotion Robots

Segway

Sword

The Roomba domestic vacuum cleaner robot does a single, menial job

Educational Robots

Mindstorm is a programmable educational robot

A few robot kits which to assemble before play

Play & Learning (Learning through Play)

- **Learning** The acquisition of knowledge or skills through experience, practice, or study, or by being taught
  but according to the stereotype concept of schools, learning is only been taught. So this learning is not lasting. In our education system we failed giving quality education though more practical and more exploratory way.
- **Play** engage in activity for enjoyment and recreation rather than a serious or practical purpose
  play is very important part of our life, coz it recreates our mind and gives relaxation. So anything that is taught through a play method,increases understanding and it lasts long.
  In that case Learning or Educating through this method is beneficial. Play way method is an informal way of teaching/learning/educating.

Market Survey

Remotely operated robots like remote controlled cars and air planes are widely available in toy stores.

Educational robots are not available in market but some engineering institutes are making their own robots but they are mostly line following and hurdle sensing.

Recently IIT Kanpur and IIT Pawai are working on educational robots.

Asia Pacific Union (ABU), Doordarshan, Maharashtra Institute of Technology (MIT) holds an event named ROBOCON every year to promote robotics in institutes.

Dr Vijay Sevak

Lecturer Educationist V.T.Choksi College, Surat

Values a toy should have

Should get feeling of play

Physical, Mental, Aesthetic development of a child

Child should enjoy play

Shouldn't be so costly

Educational Robot

It goes well with the time(today's requirement)

Should have amazement

Cognitive development

Learning through robots

Should provide experience

How much can you spend over an educational Robot

If its actually that useful and gives boost to creativity and learning

He can spend INR 5000 - 20000

Case study Parent

Sita Patel

Mother, Teacher

Values a toy should have

Should have surprise element

Should be innovative

Should have fun and should be pleasurable

Child shouldn't get bored

Educational Robot

Should have amazement

Cognitive development

How much can you spend over an educational Robot

She wants high utility from an edu bot then price is negotiable

She can spend INR 2000 - 5000 for her child.

A few things that come to light

- Kids are exposed to electronic and electrical things
- They want to build and wire them before playing
- They like things that perform different actions
- They all have remote controlled cars and all like to play with that
- They were helping each other when somebody wasn't understanding questions and were also explaining them things
- They are very much aware about computers
- They are smart enough to find and play online games

- Recent cartoon characters are their favorite

User Study

What do they think about robots?

Just a machine useful for humans

Combination of technology

Entertainment

Animated robot in cartoon channel

Use in different things

Have advantage and disadvantage

Industrial purpose

More personal

Associate with human

Audio and video

Electronics stuff

Should have propose and utility

Automatic device

What do they think about educational robots?

"Educational robot?????????" Don't have any idea.

What do they want in educational robots?

Should make presentation

Keep records

Access to internet

Should predict future in relative terms

Not for school children but for college students

Memory

Motivating factor

Visually appealing

Communication and technology

Humanoid

Mathematics

Play Role of a teacher

Fun, humor, interactive and friendly

Problem solving

Should increase attend class

Mind Mapping Phase 1

Attributes and other related words to robotics

Related words & Attributes

A few attribute and words

- Multi device
- Trendy
- Different operations
- Activity based
- Remotely operated
- Easy, Simple, Handy
- Easy to carry
- Informal education
- Multi tasking
- Durable
- Interchangeable
- Boost creativity
- Affordable
- Flexible
- Hi tech
- Growth

- Light weight
- Customizable
- Updatable
- Network able
- Motivating
- Permutation-combination based
- Self study
- Exploratory
- Initiative
- Communicable
- Structured
- Modular
- Selective
- Contextual
- Entertaining
- Moods

Psychological point of views

Physical point of views

Socioeconomic point of views

Opportunity Mapping

SOCIAL AND LIFE STYLE POINT OF VIEWS
- Table bots and stress busting bots for children, students and also for professionals who works on table. **Age 15 +**
- Stationary bots- bots that fits into compass boxes and pockets coz they have a fascination of buying different & unique accessories. **Age 11 - 15**
- Bots that behaves according to the moods of the child. **Age 7 - 10**
- Bots that communicate with each other this will also encourage children to meet other children. **Age 7 - 10**

TECHNOLOGY POINT OF VIEWS
- All ready programmed parts that work on permutation and combination, where in the bots can be customized with existing things and other parts. **Age 12 +**
- A kit of a robot that performs a task, then an interval of time we come up with updates that user have to do with using a computer through net or could be through a disc where we have software. **Age 12 +**
- Bots that change its shape on users touch or on voice command. **Age 7 - 10**
- Modular bots-independent and separate bots performing different tasks and have different characteristics, but when they come together they join with each other and perform a unified action, based on permutation-combination. **Age 10 +**
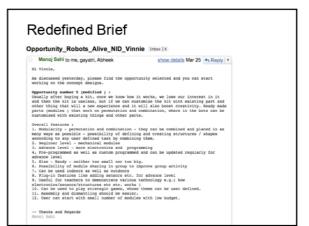
MARKETING POINT OF VIEWS
- Actual bots and their demo bots- these demo bots wont perform every thing but the price of them would be less, that increases the chances of sell in other then higher income group, because of the aspiration value.
- To enter into the market and create demand, initially make small and simple kits then launch advance and complex bots.
- Initially launch mechanical stuff and then the extension of it could be electrical and electronic devices, coz people like to buy mechanical things for their durability.
- Specially designed bots on course syllabus of school are sold in textbook stores and other stationary store along with the books.
- Modular bots that are independent and separate which joins and make a different robot- independent robots could be less in price so people would buy it and then also they have an option to add on with the other robots to the one they have.

EDUCATION POINT OF VIEW
- Bots for subjects like geometry and physics for school children and advance bots for big children and college student.
- Introducing subject robotics at a very basic and primary level in schools for children of class 6 that will be advancing every year in schools. This will also be helpful to make a new discipline in colleges. This will create an awareness in children for subjects like mechanical, electrical, electronics and also robotics as a whole.
- From now we can start creating awareness in children through workshops on robotics in schools.
- The robotic kits are distributed in the schools which has different parts and things that work on permutation-combination. These are programmable kits. For this teachers are been taught. Even this has an opportunity for engineering students to become teachers, which usually they don't prefer.
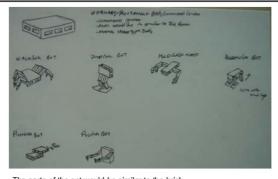
- Bots for learning mathematics - trigonometry and geometry- child assemble the robot and see and test it in outdoor to encourage them to do physical work also. **Age 12 - 15**
- Bots to learn language- bots help as a dictionary and could also communicate in regional languages. **Age 5 +**

Redefined Brief

Opportunity_Robots_Alive_NID_Vinnie Inbox | X

Manoj Sahi to me, gayatri, Abheek   show details Mar 25   ↩ Reply ▾

Hi Vinnie,

As discussed yesterday, please find the opportunity selected and you can start working on the concept designs.

Opportunity number 5 (modified) :
Usually after buying a kit, once we know how it works, we lose our interest in it and then the kit is useless, but if we can customize the kit with existing part and other thing that will a new experience and it will also boost creativity. Ready made parts (modules) that work on permutation and combination, where in the bots can be customized with existing things and other parts.

Overall features :
1. Modularity - permutation and combination - they can be combined and placed in as many ways as possible - possibility of defining and creating structures / shapes according to any user defined task by combining them.
2. Beginner level - mechanical modules
3. Advance level - more electronics and programming
4. Pre-programmed as well as custom programmed and can be updated regularly for advance level
5. Size - Handy - neither too small nor too big.
6. Possibility of module sharing in group to improve group activity
7. Can be used indoors as well as outdoors
8. Plug-in features like adding sensors etc. for advance level
9. Useful for teachers to demonstrate various technology e.g.(how electronics/sensors/structures etc etc. works)
10. Can be used to play strategic games, whose theme can be user defined.
11. Assembly and dismantling should be easier.
12. User can start with small number of modules with low budget.

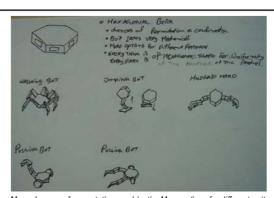-- Thanks and Regards
Manoj Sahi

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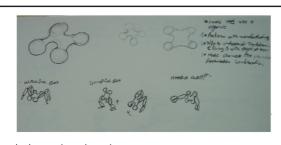

Concepts

-The parts of the set would be similar to the brick
-Looks very stereo type
-Manufacturing cost is less

-More chances of permutation combination -More options for different patterns
-Looks very mechanical   -Easy to Manufacture
-All parts will be hexagonal
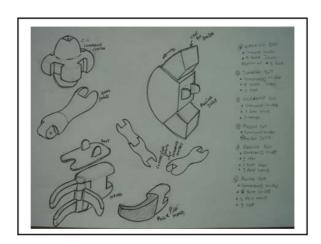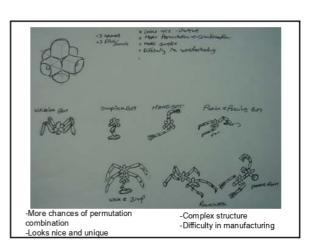
-Looks very nice and organic
-Chances for permutation combination
-Nice and playful form
-Manufacturing is complex
-Joineries and accessory will be complex

-More chances of permutation combination
-Looks nice and unique

-Complex structure
-Difficulty in manufacturing
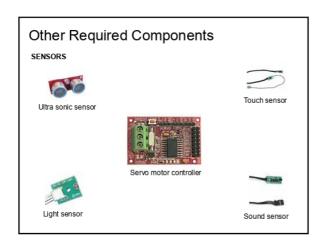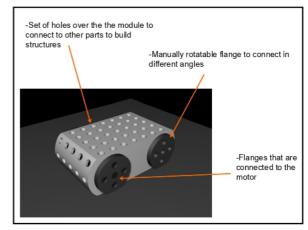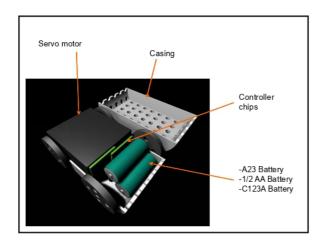
-Started working on capsule shaped robot Where both the parts of the capsule rotates, and it also has some holes to fix one module to another.
- One part of the capsule will have a motor and another will have battery and a controller chip

-The problem occurred when motor wasn't single excel, rather it was double excel.
-So the form was changed into a three sided.
-At the end its been changed to this

Components

THE MOST IMPORTANT OF ALL
MOTOR- **Hitec HSR-8498HB Digital Servo**

Stall Torque (6.0V): 102 oz/in. (7.4kg.cm)

Dimensions: 1.57" x .78"x 1.45" (40 x 20 x 37mm)

Weight: 1.94 oz.. (55g)

Other Required Components

SENSORS

Ultra sonic sensor

Touch sensor

Servo motor controller

Light sensor

Sound sensor

-Set of holes over the the module to connect to other parts to build structures

-Manually rotatable flange to connect in different angles

-Flanges that are connected to the motor

Servo motor

Casing

Controller chips

-A23 Battery
-1/2 AA Battery
-C123A Battery

Parts

A few possible shapes and forms

The Modules will be programmed though the computer.
The connection will be made using LAN cord or 4 wire phone wires.

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Project presentation:
Case study 9. Sanitary ware (Children's commode) for Weldecor

System project -
Understanding **MORVI INDUSTRIES** in relation to sanitary ware

Ashok M., Japneet K, Nista D

Sanitary ware in INDIA and MORVI

- **In INDIA** For the last 6-7 years, the sanitary ware industry in India has shown dramatic growth with major players doubling their production capacity

- This industry has been growing by about eight per cent per annum during the last two years.

- With increasing **urbanization** and **impetus** from the **Government to improve hygiene and sanitation,**

- This industry is expected to witness a growth of about 11 per cent in the future.

- **The sanitary ware industry in India is prominently divided into two sectors–. organized and unorganized**
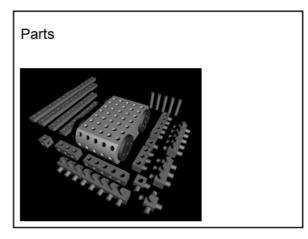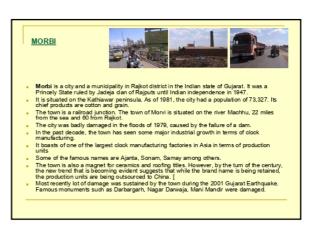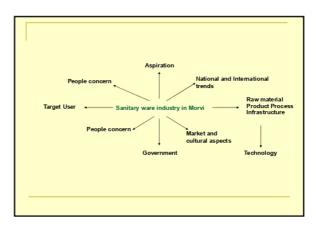
- The organised sector, comprising of eight units, has a production level of 95,000 metric TPA against total capacity of 1,03,300 metric TPA.

- There are 250 units in the unorganised sector producing about 1,26,000 metric TPA against a total capacity of 1,40,000 metric TPA.

- However, the major threat of this industry is from the unorganised sector, which continues to flourish by compromising on quality and selling cheap products at throw away prices.

MORBI

- **Morbi** is a city and a municipality in Rajkot district in the Indian state of Gujarat. It was a Princely State ruled by Jadeja clan of Rajputs until Indian independence in 1947.

- It is situated on the Kathiawar peninsula. As of 1981, the city had a population of 73,327. Its chief products are cotton and grain.

- The town is a railroad junction. The town of Morvi is situated on the river Machhu, 22 miles from the sea and 60 from Rajkot.

- The city was badly damaged in the floods of 1979, caused by the failure of a dam.

- In the past decade, the town has seen some major industrial growth in terms of clock manufacturing.

- It boasts of one of the largest clock manufacturing factories in Asia in terms of production units

- Some of the famous names are Ajanta, Sonam, Samay among others.

- The town is also a magnet for ceramics and roofing titles. However, by the turn of the century, the new trend that is becoming evident suggests that while the brand name is being retained, the production units are being outsourced to China. [

- Most recently lot of damage was sustained by the town during the 2001 Gujarat Earthquake. Famous monuments such as Darbargarh, Nagar Darwaja, Mani Mandir were damaged.

Market of Morvi Industry

Exported to
SRI LANKA
UGANDA
POLAND
ZIMBABWE
SOUTH AFRICA
UAE
FRANCE
ISRAEIL
SAUDI ARABIA
NEPAL
CAMEROON
SUDAN
BAHREIN
KUWAIT
KENYA
MAURITIUS
first grade products

Indian markets :
- Low percentage of upper middle class
- Middle class
- High percentage of mass production – Building Construction
- Rural sector & Slum dwellers

Aspiration

People concern

National and International trends

Target User ← **Sanitary ware industry in Morvi** → Raw material Product Process Infrastructure

People concern

Market and cultural aspects

Government

Technology

Process of production followed in an industry

Modeling → Mother mould → Block making → Mould making → Slip preparation → Casting → Drying → Glazing → Firing → Testing → Transportation → Finishing
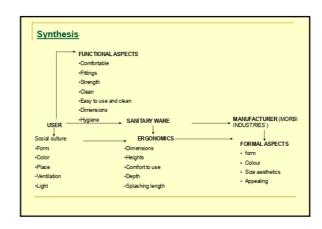
Feedback from dealers

- Showrooms cater to a large segment of people . In relation to sanitary ware , both Indian and international brands like cera parryware , Toto . And also local morbi made products .

- Consumer needs and preferences matter a lot

- Consumer wants not only quality but also form, function, aesthetics and complete bathroom solutions , which provides a look and match with ones interiors .

- In relation to morbi products with the dealer , the quality and the after purchase benefits mattered .

- Morbi products cater to bulk installations as in cinemas , malls , societies , and urban areas .

Feed back from architects

- Nowadays people are very cautious about their lifestyles ,that includes living spaces interior designs and also health

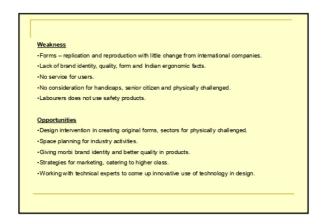- For them interiors is also about identity .

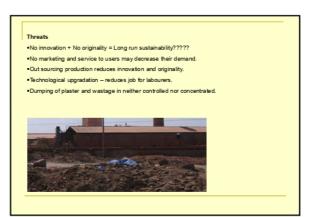- Their concerns are –hygiene , ergonomics ,and good sense of aesthetics .

- Spacing and good ventilation is also an issue .

Synthesis

FUNCTIONAL ASPECTS
- Comfortable
- Fittings
- Strength
- Clean
- Easy to use and clean
- Dimensions
- Hygiene

USER
Social culture
- Form
- Color
- Place
- Ventilation
- Light

SANITARY WARE → MANUFACTURER (MORBI INDUSTRIES)

ERGONOMICS
- Dimensions
- Heights
- Comfort to use
- Depth
- Splashing length

FORMAL ASPECTS
- form
- Colour
- Size aesthetics
- Appealing

SWOT Analysis

Strength

Raw Material
- easy availability
- low cost fuel
- fuel productivity
- space availability.

Production and technical
- Market need and demand
- 2nd hand equipment
- Available manpower in skill labour and technicians
- Testing laboratories – physical, chemical and colour range.
- Varied choice for user
- New technical development in present design
- Supplying to international and nation wide market.
- Recycle use of the rejection

Government benefits
- Keen interest in motivating and upgrading industries.
- Fuel, land, raw material
- Training workshops by CGCRI.

Weakness
- Forms – replication and reproduction with little change from international companies.
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Opportunities
- Design intervention in creating original forms, sectors for physically challenged.
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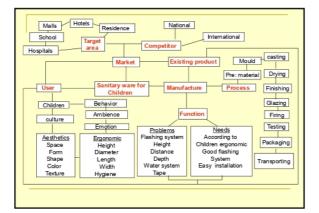

Threats

▪No innovation + No originality = Long run sustainability?????

▪No marketing and service to users may decrease their demand.

▪Out sourcing production reduces innovation and originality.

▪Technological upgradation – reduces job for labourers.

▪Dumping of plaster and wastage in neither controlled nor concentrated.
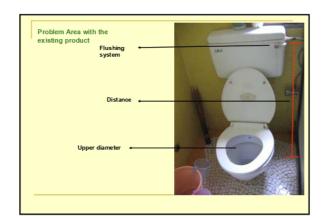

Design brief:

What has been seen in industry and retail sector of sanitary ware, the lack of sensitivity towards children as users, find it interesting to work these line in order to add in the development of Morvi Ceramic Industry- which would cater upper middle class.

Feed back from architects

▪ Nowadays people are very cautious about their lifestyles ,that includes living spaces interior designs and also health
▪ For them interiors is also about identity .
▪ Their concerns are –hygiene , ergonomics ,and good sense of aesthetics .
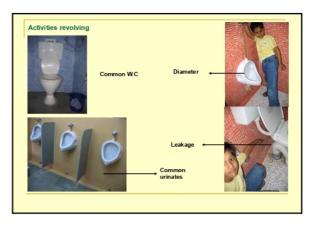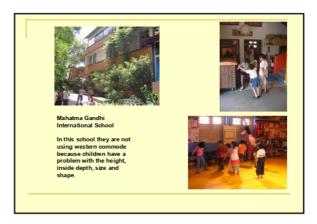▪ Spacing and good ventilation is also an issue .

User survey

Children School

Total student strength- 210
Age group is started from- 4 years
Class timing is – 8:15 a.m to 3 p.m

Up to 8years each classes have 24 students and they have a attached bathroom.
Above 8 years they have a separate and common bathroom.
During class, normally children are using bathroom 4 to 5 times.

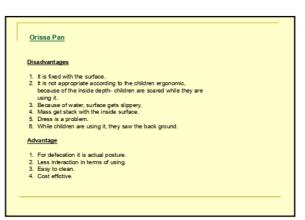Problem Area with the existing product

- Flushing system
- Distance
- Upper diameter

Water splashing

Not enough space

Activities revolving

- Cleaning hands
- Washing face
- Vomiting
- Washing feet
- Cleaning
- Urinate
- Defecate

Height, inside depth

Activities revolving

Common W.C

Diameter

Leakage

Common urinates

No space

Bigger size

Length

Euro kids school.

Age group: 2.5 years to 4 years
Student strength: 50
Time: 9:30 to 11:30 a.m
All the time there is care-takers to take care of all the children.
What ever bathroom they have that is for adults.

All the time they need someone

Delhi Public School

Student strength: 4000
Class: 1 t0 12[h]

They are using indian pane, because
it paced in surface.
Urinals are fixed in such a way that
children can use easily.
They have problem with the height,
length, splashing system,

Indian pane

They fixed it according to
the children height

**Mahatma Gandhi
International School**

In this school they are not
using western commode
because children have a
problem with the height,
inside depth, size and
shape.

Children hospital

There is no product for children. They are
using the normal wc, wash basin and urinal
which is available for everyone. So that
while they are using it they have problem
with the height, upper diameter, inside
depth.

Shopping Malls and Hotels

There is no sanitaryware for children,
All the time they are depended on their parents while they are using
bathroom.

Residence

In flats, children are totally
depend on their parents.
Because the existing
products are not comfortable
for them, in terms of- form,
color, size, ergonomically,
space, hygiene.

Opportunity area

1. There is no products for children sanitaryware in school, hospitals, flats,
   malls, hotels.
2. Whatever product have in their bathroom, those for adults.
3. In school they fixed it according to the children's height.
4. Major problem of this age group- 3 years to 6 years. Because of height,
   length, upper diameter, inside depth, flashing system.
5. In school all the time they are depended.
6. Even in shopping malls and hotels they have all the facilities like game,
   dress, food, etc but apart from sanitaryware.
7. In flats all the time children needs parents help.
8. While discussing with the people is those places- they want sanitaryware
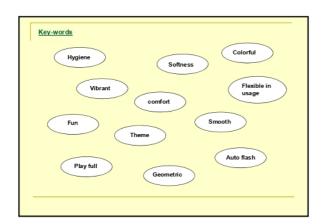   for them (age group 3 to 6 years) according to their requirement.

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Children Preference color and form

Color	Form
Yellow	Delicate
Red	Organic
Orange	curves
green	Round
Blue	Filleted edges
White	
Pink	

SWOT Analysis of user survey

STRENGTHS :	WEEKNESSES :
1. It comfortable for adults. 2. Easy installation. 3. Because of white color, it is easy to clean and hygiene.	1. It is available only for adult 2. Difficult to installation for children. 3. Ergonomically bad for children according to their height, length, depth, diameter, size and shape.
OPPURTUNITIES :	**THREATS :**
1. A huge market for children sanitaryware. 2.This product can be use in school, hospitals, hotels, malls, flats. 3. A new product range (brand identity, popularity in the market.	

Western commode

Disadvantages

1. It is not hygiene.
2. It is not fit according to the children ergonomic. (like- height, length, inside diameter, flashing system)
3. Cost is high.
4. More interaction with the product while children are using it.
5. Not easy to clean in outer surface.
6. More space require in terms of installation.
7. Difficult to wash after defecation.

Advantage

1. Comfortable while children are using it.
2. Dress are not wet.
3. Easy to clean inside part.

Orissa Pan

Disadvantages

1. It is fixed with the surface.
2. It is not appropriate according to the children ergonomic, because of the inside depth- children are scared while they are using it.
3. Because of water, surface gets slippery.
4. Mass get stack with the inside surface.
5. Dress is a problem.
6. While children are using it, they saw the back ground.

Advantage

1. For defecation it is actual posture.
2. Less interaction in terms of using.
3. Easy to clean.
4. Cost effictive.

Why Orissa pan- why not Western Commode

1. Orissa pan is more hygiene rather then western commode.
2. For defecation "orissa pan" is a appropriate posture.
3. Less interaction.
4. Easy to clean.
5. It is to production.
6. If it is orissa pan then there is a huge market where it can be use (maximum people can buy it).
7. Compare to western commode orissa pan is cost effective.
8. For installation orissa pan require less space.

Redefine brief:

A sanitaryware product for children is required which ensure hygiene and comfortable usage. Enhancing the psychological and ergonomic parts.

User group is from 3 years to 6 years.

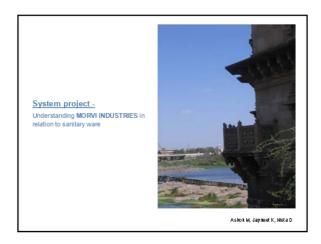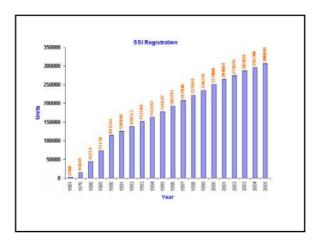Location: School, hospital, malls, house, hotels etc.

Key-words

Hygiene

Colorful

Softness

Vibrant

Flexible in usage

comfort

Fun

Smooth

Theme

Auto flash

Play full

Geometric

Existing Product in the international Market

TOILET AUTOmatic FLUSH

Whatever product exist in the international market are according to the children requirement , the form, height, shape, size, color.

Existing Product in the international Market

In terms form and color- the products which is exist in the international market, white color because of hygiene and cleanliness.

Concept Building

Physical

Defecation

Comfortable

Ergonomically

Activity

Product

Urinate

Psychology

Natural feeling

Form

Distance

Carefree

Slope

Colorful

Water flowing

Hole

Ergonomic Study

Lower abdomen   Between the feet   Total distance from toe to seat

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System project -
Understanding **MORVI INDUSTRIES** in relation to sanitary ware

Ashok M, Japneet K, Nista D

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- The city was badly damaged in the floods of 1979, caused by the failure of a dam.
- In the past decade, the town has seen some major industrial growth in terms of clock manufacturing.
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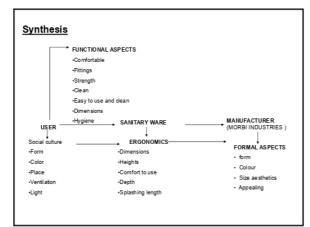- Rural sector & Slum dwellers

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SANITARY WARE

ERGONOMICS
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- Heights
- Comfort to use
- Depth
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MANUFACTURER
(MORBI INDUSTRIES)

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▪Out sourcing production reduces innovation and originality.

▪Technological upgradation – reduces job for labourers.

▪Dumping of plaster and wastage in neither controlled nor concentrated.

Morvi's market and Target user

• Morvi caters largely to the **middle class** and **rural areas** too.

• Morvi also cater to a few percentage of people consisting of upper middle class.

• One sees a large extended market in UMC with their

OPPORTUNITY

Present market

• Presently morbi has products that come into different range e.g. Simple, decorative, with pedastal,etc.

▪These products are supplied to Indian, European and UAE market according to their taste.

▪Morbi basins though in India approximately range from 800 rupees to 3000 rupees.

International Market

• Morvi has a big **opportunity in expanding** its market from the extending one and create a brand of its own in National market.

• This market is taken right now by a **few companies** nationally like Cera, Hindware, Parryware,etc. and internationally by various big name as Villery and Bosch, Hnasgrohe, etc.

• These brands have made it big due to **disciplined check on the quality** of products and that's what made them brands.

Competitions ……………..

with other designs in form and material diversification

Activities revolving around Basin

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Brushing Washing face Washing hands

Shaving

Items used while using a basin

Regular usage

What's important

- Form of the basin
- Depth
- Broadness
- Affects due to flow of water
- Installation at what height
- Keeping is mind various user

580

380

150

x 45

Observations

- While people use basins for various activities, they have a general tendency of **reacting to the product** according to the environment around it.

- People using basins like to have related products like soap, tooth paste, tooth brush, shaving items, towel area near in the space where the product is placed.

Trends and consumers need ?

- Multi purpose
- Multi utility
- Variety and choice
- Affordable
- Hi end look
- Exotic
- Vibrant / soothing
- Technical innovation
- Something that feels custom made

Something that looks different........................

Appendix B : Case study notes

Case study 1. Bamboo toys for INBAR

Observation notes

Collaborating organisation approached the institute for project briefing

The students made a visit to one of their centers KONBAC in Maharashtra. The type of bamboo, raw material procurement, bamboo preservation methods, tools and machines, hand weaving techniques, marketing linkages etc. were studied. The product range made at KONBAC consisting of furniture, accessories etc. was also studied.

The student was talking to artisan and asking them about their daily schedule, travel time and their life in their villages.
The student was discussing the details of the machines, especially the machine used to treat the bamboo.

In order to understand the properties of bamboo, the student did material exploration. This consisted of cutting, drilling, experimenting with half slits, etc. The elastic property of the traditional bow was replicated on bamboo by making a half slit.

Alongwith material exploration in the workshop, the student was also doing Internet survey on bamboo toys available in the market. A survey of other popular toys in the market made from wood, plastic etc. was done.

While doing the study, the student also met an occupational therapist (who was referred by his friend who was also working on a design project for children).

An user study was carried out for children aged between 3 to 7 years by the student.
The student made models and prototype in the workshop.

The opportunity areas and ideas were discussed with collaborating organization.

Interview notes

Collaborating organization representative :

The International Network for Bamboo and Rattan (INBAR) connects a global network of partners from the government, private, and not-for-profit sectors in over 50 countries to define and implement a global agenda for sustainable development through bamboo and rattan. The Centre for Indian Bamboo Resource and Development (CIBART) has been facilitated by INBAR as a dedicated agency for bamboo development in India. CIBART's main area of focus is to achieve livelihood development, ecological security and economic development through the sustainable use of bamboo and rattan. Its primary focus is on benefiting poor rural communities. CIBART has four major centers in India : Kudal, Maharashtra, Tripura, Himachal Pradesh and Assam. We also plan to start bamboo centers in other parts of India for income generation in rural areas.

The ideas are good. We have tried colouring bamboo and it is not easy. Also children like colour. The process of combining bamboo with colored rope is good. We can even use this process for other ranges of toys/products .

Student Designer:

I visited KONBAC center and studied the set up. It made me think: Why should the bamboo toy production model be an industry model? Why can't the production be taken to semi skilled rural craftsmen so that they can get employment? The KONBAC model is high investment oriented and not providing much help to the artisans as promised in the organizational objective

It made me visualize an ideal scenario in which rural people living near forest areas were trained to work with simple bamboo hand tools to make toys. There could be a production system in which workshops could be conducted in rural areas – they could be trained to produce bamboo toys using simple hand tools – the toys they produce can be collected and marketed by INBAR through their online portal. This production system can be an opportunity for income generation for many rural artisans.

The main objective in doing material exploration was to understand how simple hand tools can be used to create playful elements and to make production easy.

The traditional bow used by tribals made me realize that the elastic property of the traditional bow can be explored.

Majority of toys were found to be for the age group 0-7 year old. I also studied safety regulations. It was found that safety rules for 0-3 year old are quite stringent. I selected the age group of 3-5 years since this group buys a lot of toys and safety regulation is less strict. One of the major focus for the 3-5 year age group was education since this a pre-school group. After doing the study I found that there was a good market for toys which are related with development/education. Parents want some sort of education/development factor in the toys.

The occupational therapist elaborated and emphasized the importance of social-emotional development of child including role playing, story telling etc. during that particular age group.

From the user study, I came up with the finding that children like story telling with toys. I thought India also has a lot of folk stories and that could become the inspiration for such toys. From my market study, I saw that there were not toys like this in the market.. so if I make toys like this they will be unique.

I decided to make toys based on folk stories and give sample stories along with the toys. The material explorations were combined with characters (for story telling) to come up with a range of toys

When I observed children I found that children stack spoons, clothes etc. one on top of another. This made me think of an idea of a row of turtles which can be stacked (inspired by folk tale and learning numbers).

I had kept all my material explorations with me. When I was observing them I could relate the form of the crocodile with the half slit bamboo exploration. This made me think of making a crocodile. Then I thought about a folk story with crocodile and finally made the toy. I also decided to take simple cylindrical form of bamboo to make characters and made a family – since I had seen children role play about a family.

I wanted to make bamboo toys colourful since children like colour. Safety was a major concern and I was trying to find ways of giving natural colour to bamboo. It was difficult to prepare natural colour but when I went to market I found that natural dye is very commonly used in textile and fibre. So I thought of combining bamboo with coloured rope. All the time I was also thinking to make the process simple for artisan.

Case study 2: Bamboo toys (War plane construction kit) for INBAR

Observation notes

Collaborating organisation approached the institute for project briefing

The students made a visit to one of their centers KONBAC in Maharashtra. The type of bamboo, raw material procurement, bamboo preservation methods, tools and machines, hand weaving techniques, marketing linkages etc. were studied. The product range made at KONBAC consisting of furniture, accessories etc. was also studied.

The student went to do a market study in the city and was also searching for craft toys online. Information in the form of visuals was collected from the internet on various types of modeling planes.

The students starting working on form to make two of the planes simple to be made from bamboo.

Bamboo was handcrafted to make similar war plane. Bamboo joinery was made so that all the parts could fit with each other.

The opportunity areas and ideas were discussed with collaborating organization.

Interview notes

Collaborating organization representative :

The International Network for Bamboo and Rattan (INBAR) connects a global network of partners from the government, private, and not-for-profit sectors in over 50 countries to define and implement a global agenda for sustainable development through bamboo and rattan. The Centre for Indian Bamboo Resource and Development (CIBART) has been facilitated by INBAR as a dedicated agency for bamboo development in India. CIBART's main area of focus is to achieve livelihood development, ecological security and economic development through the sustainable use of bamboo and rattan. Its primary focus is on benefiting poor rural communities. CIBART has four major centers in India : Kudal,

Maharashtra, Tripura, Himachal Pradesh and Assam. We also plan to start bamboo centers in other parts of India for income generation in rural areas."

We manufacture bamboo and rattan furniture and are now planning to diversify into the area of toys. Currently we are selling our   products online and wanted to explore new design opportunities in the area of bamboo toys for their existing market.

We find the concept of model plane interesting since there are not many such toys, especially for boys in the craft segment. However there are issues of feasibility with the actual concept. The project does not connect with the context. Each part is hand crafted and can be very time consuming and lead to a lot of wastage. Also there is no product graphics on the war plane models which might make it less attractive in the market. However a new range of toys such as war planes as a segment of toys for boys can be a good market segment opportunity.

Student:

During the market survey I found that there were no craft toys which would be typically liked by boys such as planes, cars etc. I also liked model planes in childhood, and felt the same may be liked by children today and can be made in Bamboo. It would be something new in Bamboo'. I also thought versatile medium and toys made from other materials can be easily replicated in bamboo. So I came up with the idea of making war planes in bamboo.

I selected World war 2 planes for their strong form and comparative ease in making the same from Bamboo.
Suggestion was given by design expert to make a construction kit so that children can enjoy playing with it. A kit made with bamboo joinery and body parts which could be assembled by the child to make the plane was derived

Case study 3: Terracotta office accessories for Bankura cluster

Observation notes

Collaborating organisation approached the institute for project briefing

An initial study was carried out by the students before going to the cluster. The study included market study of terracotta articles and study of users.

After the initial study, a team of students and design expert visited the cluster located in a village called Panchmura, in Bankura District .

The models and prototypes were made.

Interview notes

Collaborating organization representative :

Cottage and small Scale Industries, West Bengal works for the overall development and growth of the sector. We are looking for Design intervention in the terracotta cluster located in Panchmura village in the district of Bankura. Our objective is to develop the sector through design and technical intervention. Bankura craft is dying and needs to be revived.

Student: During the user study at homes, I found that terracotta is mainly used as decorative. Why cannot terracotta be perceived as a modern material in offices? This made me think that a range of terracotta products could be designed for corporate offices to change the perception of terracotta by placing terracotta products in a corporate environment.This led me to the study of the office scenario and observing user activities in the office space.

After the initial study and observation of spaces, I observed that the office staff like to personalise their space by keeping photographs and also prefer to have some product to keep their things in an orderly way.

This resulted in initial ideation of designing tabletop accessories like photo frames.

During the visit I talked to the artisans and found that over the period the markets for this cluster is gradually reducing. The reasons are several such as non availability of new designs, quality standards of the product etc. the design expert also said that strength of the material to sustain the transportation from one place to the other etc. is a problem.

I found that terracotta is very important historically in that region. Terracotta products from Panchmura (Bankura District) hold a very strong identity of its own. I felt it was important to retain this identity of the craft.

I observed that slowly the joint family as a unit is breaking up into nuclear families resulting into lesser number of hands to share the work load, while the production processes remain the same. The men folk have been moving away from wheelwork to work as labourers or to contribute to their own farms, the women worked only as a supporting factor. The women were good at coiling and slabwork. This made me think that if products are designed so that the women can make them only using coilwork and slabwork then they would be able to earn income independently.

I also observed that the younger generation was better at coil and slab work rather than wheelwork. We were concerned about the revival of the craft and if we explore new designs using only coil and slabwork, then youth and women will be easily able to make them and earn from the same.

Terracotta being a highly brittle material, breakage was one of the critical issues to be dealt with. This was also suggested by the design expert. Breakage occurs at many stages, while drying, firing and most importantly while transporting. Therefore after experimentation with the raw material, technical changes were made in the kiln to achieve higher temperature so that all the new designs can achieve better surface finish and will not break during transportation.

A range of office accessories including photoframes, paper weight etc. were designed for corporate offices. They were designed in such a way that visual identity of the craft was retained, they were made using coiling and slabwork and were small and easy to transport for selling in exhibitions or directly to offices.

Case study 4: Glass products for Borosil

Observation notes

Collaborating organisation was approached.

The students made a visit to Borosil company and studied the production process. They also met representatives from production and marketing team.

The student visited the market outlets in the city.

The students browsed the internet for glass products.

The student made visit to homes and restaurants in the city.

The student visited the Borosil again to show the opportunity areas and discuss the same.

The opportunity areas and ideas were discussed with collaborating organization.

Interview notes

Collaborating organization representative :

Borosil is a well known glass industry making a range of tableware and lab equipment in glass. Due to its technical expertise in making high temperature resistant glassware, we had a monopoly in this sector. However with increasing competition in this sector, we are finding it more and more difficult to sustain ourselves in this position. We would mainly want to explore new opportunity areas especially for our tableware range of products which is our main product segment.

The opportunity areas were more than expected. Oil container idea is interesting and also unusual. It could be made with present infrastructure and sold with existing market links. We need to evaluate other opportunity areas and ideas for feasibility before investing.

Student:

During the meeting with Borosil, I felt that the company was averse to taking risks but were open to new ideas and opportunities. They had expectations from us.

Then a study of market competition and existing glass products was done. I wanted to explore different scenarios of use of the glass products and studied the home and office scenario .

I observed that in office, tea or coffee intake is more because of working load. There was a problem of storage space in office so I thought of a cup with a heating mechanism which can be directly plugged in. The idea will need technical detailing and new links will have to be sourced for the heat plate

I observed that people avoid keeping hot stuff directly on glass table top. When I asked them, they said that the problem is that glass feels fragile and they feel it will break if hot stuff is put on it. This made me think of providing matting to the surface in order to change the perception of glass to make it look strong.

I observed that nowadays people are opening up to different cuisines, for that they cook at home and also go out for dinner, approximately twice a week.Sizzlers are becoming popular. Since sizzlers are supposed to be served hot, I thought that sizzler plates can be made from borosilicate glass since borosilicate glass can withstand high temperature.
The glass sizzler plates can be used in restaurants as well as at homes and can be a new opportunity area.

During market study I found that a lot of products are being sold alongwith other brands For example mugs are sold along with Rasna drinks. Borosil can enter into the market through other brand so that they can introduce their range to customers loyal to other brands. So if Borosil produces a cup for Nescafe, in return Borosil will get profit through Nescafe advertisement and user will understand properties of Borosil in better way. So, marketing and promotion through other brands could be an opportunity area.

During market study I also found that drinking glasses are more in regular demand and sell in large quantity. I had a discussion with design experts about how it is important to increase impact of opportunity so I thought it will be a good area to explore. A range of drinking

glasses for hot drinks can be introduced in market which will also do proper justice to the material properties of borosilicate. This can be a good opportunity area to ensure high volume sale

I observed during home visits that people are more conscious about health and measure oil when using it in the kitchen. Borosil has been famous for labware and I remembered seeing the same during my visit to Borosil. The existing labware range of borosil is also used for measuring purpose so they can be modified as oil containers.

The opportunity of designing oil containers modified from borosilicate labware will not require much investment and there will be low risk. The containers will have a minimalist look and feel and can be used to both store and measure oil. In a similar way a set for Chinese sauces can also be introduced.

Case study 5: Merchandising products for Famous studio

Observation notes

Collaborating organisation was approached and got back with a detailed briefing

The students made a visit to the company to study the whole setup. They also met the whole team in the studio.

The student visited homes and schools in the city.

The students browsed the internet for information and made a lot of charts to put together and consolidate all the information.

The collaborating organisation visited the institute to discuss the opportunity areas.

Interview notes

Collaborating organization representative :

Famous studio is an animation company which started with 2D Animation in 1998. Currently they also work on 3D Animation, clay motion, stop motion and also mixed materials. We do production as well as post production. Our main focus is on good concept with strong story, screenplay and good quality of animation work. We have started making our own animation films for children and are interested to explore the connection between merchandising products and animation films through the start-up. We found that TV channels are more likely to telecast our films if we also have a range of merchandising products. We would like to develop a range of merchandising productsbased on TV show 'Sea squabbles' meant for pre school children for both promoting the show and for selling them.

Student:

We Visited the company and met the people involved in making the animation series. This gave a better idea about the development of the characters and the storyline.
Since materials and process and marketing channel was not decided by them we did a brainstorming on the various possibilities pertaining to the same.

We then did user study and market study in order to understand the scenario.

We found that one of the trends in marketing is to give a toy alongwith a children's product for e.g. bournvita, happy meals by macdonalds etc. So I thought of a product opportunity based on current trend in marketing channel/distribution. They can be given as a free item with a popular eatable since popular eatables will be bought by many children of different age groups. These small toys would promote the show and information about the show timings can be given alongwith the toy. After playing with it the kids would be able to relate to the character once they start watching it on TV.

These could be small toys which tell about a specific visual attribute of the respective character. The attribute will be depicted through the use of the toy.
According to the selection of material, the product could be made at a certain place. Since the products are being made from cheap material they could be produced at low cost industries.

Then I thought about the main objective of the company and felt that it will be recall value of characters. So it was important that the children remember and recollect the form and look of the character. Also it was observed that children like dynamic interactive toys. With this objective, I tried to relate children's interest with manufacturing and marketing possibilities.

It was observed during user study that children like to construct and collect characters. The set can tell about a form and look of the respective character. Children can give expression to the figure once made and place it as an action figure on the desk.Slight movements for different postures is also possible. It will be like a collectible. It can be made using wood, organic fabric, stuffing, velcro etc. I also found that one trend is to sell things made in organic material since parents are becoming conscious. There are places which farm organic material and also produce toys made from those materials like Padmavati, Tamilnadu. Organic material will be safe and eco-friendly and can be selected for making the toys. Toy companies who have their own retailing section can also be approached for linking with them.

One interesting trend I observed in terms of new materials is that have a wobbly feel to them like jelly rubber. Children aged 5 to 9 years also like to construct things on their own. Once

constructed the figures can be given expressions and other attachments. The set would be sold in the name of the show and hence would promote the show.

Since the characters of the story live in a water world, a brainstorming was done based on the same so that the children can also relate with the water world.

Since the company does not have a production or distribution system it was thought to make linkages with existing producers and distributers with whom they could collaborate to make the products. Since the characters were living in a water world, it was decided to approach companies with a product range associated with water

One idea was that of children's raincoat. Raincoat can have characters embossed on it in a way that they get filled with water when in the rain. These characters would swell up when it comes in contact with water because of form changing material placed in the pockets and because of the new material, the raincoat will also become unique and interesting. Transparent raincoat with such small horns could be made by companies which make children's raincoats. The small horns would be extra attachments which could be fitted into slots. These small horns are widely used in toys and are easily available. It would be sold at popular kids garment shops which sell raincoats during the rainy seasonRain coats are a need for children which usually parents buy for them. These can be worn to schools or simply for playing in the rain. The characters are an added value to an already existing product.

Similarly another product which fascinates children is aquarium. Aquarium accessory can be given form of characters and can be made from rubber or plastic. It can act as a nozzle from which bubbles are released. It can be made and sold by the aquarium accessory manufacturers. The aquarium accessory manufacturers can also retail it. Its presence in the children's fish tank would promote the show.

Water squirting toy could have a character shaped nozzle, a water container and a water pumping mechanism. Water toy manufacturers with a good retail chain or section can be approached with this concept. It can also be easily made by local toy manufacturers. Children like playing with water in the summers.

Similarly, children swim wears that would be in the form of the characters and would remind them about the characters. Children can play in these costumes while in the pool or in the rain. It can be easily made and sold by swim wear manufacturers.

Then I thought about how can we make the merchandising a part of child's surroundings so that he remembers it. I remembered table lamps on children's study table. Table lamps can be designed in the form of characters. The lamp could also double up as colourful night lights. The characters have bright colours and a shiny and glowing visual appearance. The lamp manufacturers can produce and can also retail it.

I then made all the mock up models and working prototypes for all the concepts so that it would be easy to discuss the same while discussing opportunity areas.

Case study 6: Glass products for Ferozabad cluster

Observation notes

Collaborating organisation approached the institute

The students made a visit to the glass industries to study the whole setup and scenario and met with the people involved. A meeting was held between the CDGI, marketing people, master craftsmen and skilled blowers/craftsmen working under the supervision of the master craftsmen and the design team at Ferozabad.

During the visit, various infrastructural facilities, processes etc. were observed.

The student visited homes in the city.

The student visited the market outlets in both Delhi and Ahmedabad

The students browsed the internet for information.

The collaborating organization was presented opportunity areas and they were discussed.

Interview notes

Collaborating organization representative :

Center for development of glass industries CDGI was set up by the Govt. of India for the overall technical and economic development of the glass sector in India. A number of glass industries are located at Ferozabad. This cluster was first established in the 16th century and mainly produced chandeliers and phials for scents, cosmetic products etc. which were in great demand during those times. Since 1989 it started production of artistic glassware in different colors and shades used in chandeliers and other items.About 480 glass industries are registered in Firozabad and currently they are making a variety of glass products. 50 % productions of these units are exported to different countries.

Ferozabad is facing a lot of competition from Chinese glass products and not doing well in the Indian market and therefore we are interested to explore what design can do for us.

The idea is good but we need a range of similar products for being able to market it to the market segment.

Student :

During the visit I felt that there was a lot of energy consumption. Also there is wastage of glass. This made me think of a range of products by heat fusing waste glass. This was thought of since glass consumes a lot of energy when melted to recycle-this opportunity will be very environmental friendly . However, I also felt that the ferozabad industry may not accept the same and did not take it further.

When I visited market and retail outlets dealing with glass products at both Delhi and Ahmedabad , I observed an influence of Islamic culture on the glass products .

While visiting the ferozabad units, many owners pointed out that they were facing stiff competition from Chinese glassware products in India and they wanted to sell their products abroad to get a better price for the same.

 I thought if I design glass products catering to Islamic culture, then I would be able to sell them both in India and the Gulf countries. So the risk will be less and they will get better income through export.

I wanted to use the unique strength of Ferozabad. The strong point of Ferozabad was the ability to make hand crafted glass products made by blowing technique so it was selected. It was decided to design products using blow moulding technique inspired by Islamic culture

Next I did a user study to understand aspects of Islamic culture. The observations regarding user behaviour and activities were noted down and insights were derived from the same. Patterns of socialisation and customs-traditions was given importance. I took a lot of visual references and tried to understand the visual language. I then also looked at unique activities pertaining to the user group. Some of the activities were the use of itar for sprinkling during gatherings, the regular use of saunf, dry fruits etc., the custom of eating meals together from one huge plate, family gatherings till late nights often take place.

Based on these observations, the idea of a product with features to create an experience of aroma, lighting and serving dry fruits was developed

I then thought of a modular blow moulded glass product which could create a multisensory experience – it could be lit up and spread aroma from the center and which would be surrounded by platters to serve dry fruits. The amount of light could be controlled by controlling the light outlet which was in the form of moon.The product is easy to produce with the help of blow moulding. The modularity of the product would help in its packaging and transportation. The concept was found to be marketable and accepted.

Case study 7: Glass products (Jewellery) for Ferozabad cluster

Observation notes

Collaborating organisation approached the institute

The students made a visit to the glass industries to study the whole setup and scenario and met with the people involved. A meeting was held between the CDGI, marketing people, master craftsmen and skilled blowers/craftsmen working under the supervision of the master craftsmen and the design team at Ferozabad.

During the visit, various infrastructural facilities, processes etc. were observed. The student visited homes in the city.

The student visited the market outlets in Delhi and Ahmedabad.

The students browsed the internet for information.

The collaborating organization was presented opportunity areas and they were discussed.

Interview notes

Collaborating organization representative :

Center for development of glass industries CDGI was set up by the Govt. of India for the overall technical and economic development of the glass sector in India. A number of glass industries are located at Ferozabad. This cluster was first established in the 16th century and mainly produced chandeliers and phials for scents, cosmetic products etc. which were in great demand during those times. Since 1989 it started production of artistic glassware in different colors and shades used in chandeliers and other items.About 480 glass industries are registered in Firozabad and currently they are making a variety of glass products. 50 % productions of these units are exported to different countries.

During the discussion, CDGI said they had no linkages with silver craftsmen. The replace-ability of coloured glass beads was found to be interesting but the joinery mechanism was not worked out and the idea was rejected.

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It was suggested by design expert that silver may be substituted with brass from Moradabad cluster. Linking with Moradabad brass cluster and designing a product range combining brass and glass would be an interesting opportunity area.

We also found potential in the area since not only jewellery but a lot of other products can be designed combining the expertise of brass and glass clusters

Student:

When I visited the market and retail outlets dealing with glass products at both Delhi and Ahmedabad, I did not find any silver and glass jewellery. I was interested in designing jewellery and thought since they don't have it, it will be a new range for them. The area was taken as the design project

I then selected flamework as the technique for production because it can be used to make glass jewellery. Teenagers were targeted as the primary user because of their liking towards jewellery and willingness to experiment. I then did a user study at different homes to observe the range of jewellery currently owned by this user group and asked about their aspirations. It was observed from their existing jewellery and clothes that they like funky style.

They like to wear matching jewellery for clothes and occasions. It was decided to design silver and glass jewellery in which different coloured glass can be replaced as per occasion.

Dew drop was used as a metaphor because of its transparency and delicate look which is similar to glass. An idea for a jewellery range was developed with the form derived on dew drops. Different colored glass could be replaced both in pendants and ear rings.

Case study 8 : Educational robots for Robots Alive

Observation notes

Collaborating organisation approached the institute

The students made a visit to the set up and had a meeting with the team

During the visit, various infrastructural facilities, and existing products were observed

The student attended robotic workshops and got hands on experience.

The student visited the retail outlets in Ahmedabad.

The students browsed the internet for information.

The collaborating organization was presented opportunity areas and they were discussed.

Interview notes

Collaborating organization representative :

Robot's Alive is a venture involved in the design and development of robotic systems. Robots' Alive had an existing range which catered to a niche market: robots which would help in production for small and medium enterprise which was a low volume, high price segment.

We wanted to diversify into a product range which would be low cost but high volume and considered educational robots to be one such possibility for product diversification.

The opportunity was accepted to be developed further. However it was felt that it would be easier to sell the idea to institutions rather than individuals and therefore adding educational component such as the robot making technical drawing, teaching geometry etc. would be good.

Students:

We started with information collection through studying about robotics and discussing same with their team

As part of field study, visit to retail outlets, user study as well as attending robotics workshops in schools/colleges was carried out. It was analysed that remote controlled cars and planes are easily available and people are ready to pay highly for the same.We also observed during workshops that children are interested to play with the same.

During the robofest, we studied the characteristics of robotics was studied in more detail and analysed thathe attributes included multisensory elements, interactivity, involvement, entertainment etc.

While doing market study of robotic products, we found that most of the existing education robotic kits are meant for science and technology education. There is a lack of education in other areas through robots. While talking to parents and children I also found that they thought of Robots to be serious and only meant for kids who like science and technology. I found that the entertainment aspect of the robot could be highlighted so that more number of children will be attracted to it and more number of product can get sold.

I then decided to do brainstorming about all the activities done by children and how robots can be used for the same. This included the following
   • Different types of multi sensory robot and fun Robot for personal computers that student can learn in home.
   • Transform able robot for multi-purpose task which can help in Learning mechanism and construction through experience. (age-12-16)
   • Mobility Robot for home alone kids that child can explore space and learn in playful manner like hide-and-seek play. (age-8-12)
   • Creative and multiple use robot for kids that they can use in painting and other creativity skill development. (age-12-16)
   • Relaxation robot that can change expression and synchronization movement with music which can be used alongwith personal computer.

Taking the initial opportunity forward, robots for creative activities were explored. Creative and multi use robots which can be used for those activities which can not be easily done by

human hands accurately and for which user requires a computer like uniform pattern making and other geometric imagery development. Creation of texture, pattern or painting by the position and movement of robot without the use of computers will be a good learning tool mainly for those students who are more oriented towards arts and crafts.

Case study 9 : Sanitaryware (Children's commode) for Weldecor

Observation notes

Collaborating organisation was approached.

The students made a visit to the set up and had a meeting with the team

During the visit, various infrastructural facilities, production unit and existing products were observed.A meeting was held at Weldecor. The students met the owner , production manager and marketing manager and had discussions with the same.

Their current product range which was displayed was also observed.

The student visited schools, homes, malls and hotels in Ahmedabad.

The students browsed the internet for information.

The collaborating organization was presented opportunity areas and they were discussed.

Interview notes

Collaborating organization representative :

Morbi has one of the largest ceramic industry cluster in India. Weldecor, a ceramic industry located at Morbi caters to a large national market. The industry produces 90 % sanitary ware and 10% bathroom accessories. It has good infrastructure facilities and is equipped with kilns from leading manufacturers. It is a family owned business and has partnerships with other accessory suppliers. Currently we produce bathroom sanitaryware products.

After an initial growth phase, our business is stagnating. We are not going down but we are also not growing as much as we would like to – we want design ideas which will help us grow.

The children' commode idea cannot be accepted. Unlike big companies who have the distribution network and salespersons to go and sell the children's commode idea in public

places like schools, we do not have the resources to do the same. Maybe a big company like Parryware with wide distribution network may take the idea forward.

Student:

A study of ceramic production processes and raw material was carried out. Morbi ceramic cluster and the infrastructure was studied.

It was found that among the wide range of sanitaryware products displayed at the center, there were no commodes for children. I decided to make commodes for children because I found that there were no children commode in the Indian market although they do exist abroad.

I first decided to visit schools.When I visited schools, I found that in some of the schools, they were modified crudely according to the children's height. Major problem is for the age group- 3 years to 6 years. Problems include that of height, length, upper diameter, inside depth, flushing system etc.

Then I decided to visit public places where many children come. I observed that even in public places such as shopping malls and hotels they have all the facilities like game, dress, food, etc but lack sanitaryware for children.When I visited homes, I found that all the time children needs parents help. While discussing with the people in these areas- they do want sanitaryware for them (age group 3 to 6 years) according to their requirement.

I found that although there was a need in all these places, schools will be most open to buy them since at home they do not want to change commode in a few years time.

I started studying the ergonomics of the commode and analysed the pros and cons of both western and Indian commode. Once I had decided the posture and dimensions, I made rough mock up for testing and then made final mock up.

Case study 10 : Sanitaryware (Washbasin) for Weldecor

Observation notes

Collaborating organisation was approached.

The students made a visit to the set up and had a meeting with the team

During the visit, various infrastructural facilities, production unit and existing products were observed.A meeting was held at Weldecor. The students met the owner , production manager and marketing manager and had discussions with the same.

Their current product range which was displayed was also observed.

The student visited retailers and homes in Ahmedabad.

The student also visited heritage hotels and architect/builder offices

The students browsed the internet for information.

The collaborating organization was presented opportunity areas and they were discussed.

Interview notes

Collaborating organization representative :

Morbi has one of the largest ceramic industry cluster in India. Weldecor, a ceramic industry located at Morbi caters to a large national market. The industry produces 90 % sanitary ware and 10% bathroom accessories. It has good infrastructure facilities and is equipped with kilns from leading manufacturers. It is a family owned business and has partnerships with other accessory suppliers. Currently we produce bathroom sanitaryware products.

After an initial growth phase, our business is stagnating. We are not going down but we are also not growing as much as we would like to – we want design ideas which will help us grow.

We liked the ideas of modified wash basin. It can be worked out within the existing system, We can make the product and sell the same in big quantity. We could not accept other idea because the number of heritage hotels is too small and it is a niche market. We also felt that they would require specialized salespersons to go for explaining and selling the idea to heritage hotels.

Student:

I discussed with the marketing team of the company and found that Parryware and Hindware have a similar range of products but because of better quality their products but their products are sold at higher prices. Weldecor does not cater to the upper segment but has a good business catering to lower market segments because their products are comparatively less expensive. I wanted to find what their strength is and found that the company was ability to cater to lower end markets in huge quantities.

I then visited the retailers to understand marketing aspect. It was found that they prefer selling their products in large quantities to builders/architects rather than individual buyers. This trend was mainly seen in large cities. In large cities like Mumbai, space was at a premium and they wanted their wash basins to be of smaller size. Also the trend is that now there are more flats being built for this segment of people and they are not making their own homes.

Based on the same, I thought it will be a good opportunity to have washbasins which could fit into corners and which would be multipurpose. i.e. bathroom accessories could get integrated with the washbasin. This range could be sold in large quantities to builders/architects.

I also found a trend of heritage hotels being built in Gujarat after interacting with architects/builders. I thought that being a comparatively smaller company they could produce in small batches/customize their production. Why not design bathroom sanitary ware for hotels? There are a lot of heritage hotels coming up in Gujarat. It is much cheaper for sanitary ware to be transported/ supplied locally.

Appendix C: Sample interview transcripts

Case study 05: Merchandising products for Famous Studio

Interview1

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So, there was this firm called Famous Studios, they were planning to launch a children's piece, children's show, which was basically meant for pre-schoolers and what they had in mind was to come out with merchandising products before the show was launched, that was their marketing strategy. So, they approached us and said, told us that you should work on the merchandising products' aspect of that thing, for marketing purpose and they gave us a brief idea of what the show is about and what they plan to achieve through it, about characters involved and about different scenarios that could be there existing in the show. So, now we started off on this project by first studying what the company is about, what are their contacts, what work they do and what work they can do, like, the materials they have and all that. Then, we just had a brief understanding of what merchandising is, because that is the basic theme of what we are supposed to do. After that, we decided since it is about merchandising products, we should go into the market and see what products are existing there.

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So, after doing a survey, we understood what is the range of products in the Indian market. So, we did market survey and we got a slight idea about what range of products are there existing in the Indian market and we also got an idea of what are the other areas in which there is a possibility of merchandising that could be done. And, basically we realised there are a lot of accessories there in the market – keychains and small soft toys – these are the things which are basically being used. Then, after the market study, we decided to come up with a… we decided to interact with the children and their parents, because both of them are very much involved at this stage, which leads to what products they are buying. So, we made a separate questionnaire, as in, we just made an outline of what things we are supposed to ask the children as well as the parents. So, we went to children and we started asking

them what shows they watch, what they like about it, what are the activities they perform and why do they do it and what they like about it. Basically, their likes and dislikes regarding this area. And, we decided to... the same questions, it was asked to the parents also, what they prefer their children to watch, where would they like their children to go, and what activities they like them to perform. So, we made these two sets and we decided to conduct it in different scenarios, as in, at homes, at playgrounds, at schools; because children are in a different mood at each stage and they might have a different perception about the things that we are asking. And then, another thing we also did, while we went to the homes and schools and all – what products are they carrying with themselves, like, are there any merchandising products with them, on them at that time, at homes, at schools and while they are playing. And, we got some inferences from it about likes and dislikes, we made a list of the shows they watch and other things that we felt was important for the *parent (1:31). And, then we went into the secondary research, where we made a list of the talk shows – why were they, what are the USPs of those shows, what made them so interesting and what products are already there of these shows that are existing in the market, in the foreign market and in the Indian market. Then, after that, we decided to look into a few industries which are popular in this field of making merchandising products. So, what brands do they work upon and what range of products do they work upon. Then, now, we had an ample collection of data regarding what products are there, what range of products and then, through our user study, we had a slight idea of what children like and what parents might like their children to have in this range of products. After that, it was time for us to... user research, market study, secondary research we did... Then, it was time for us to understand about pre-schoolers. This was our understanding about merchandising products, now our users. Then, in this section what I mean by understanding is then is the different development that happened in them in terms of social development, intellectual development, physical development, which happens at different age levels. So, this information we got from the net from different reports and from different studies and findings that have been done by experts in this field. From that also, we got a lot of information, the different activites that the parents prefer their children to do, these kind of activities to improve their development in these specific fields. So, that was also another information that we added onto our research. Then, after that, after collecting all this information, we decided to analyse it and come up with opportunity

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areas. So, we decided to categorise all this information in terms of the products, since we have to make merchandising products. The first category we made was different materials that are used for making a product, it could be a soft material, which has a lot of categories – fabric, rubber, leather, this and that and a lot of things firm – foam etc. Then, there were hard materials like plastic, metal and which ones are popular and where, in which sections there is a possibility of something to happen. Then, the different mediums for which merchandising products are being made, is it just through advertisements or toys or accessories. So, like that, we got a huge set. Then, the different scenarios in which these merchandising products are being used, is it just in the shops, is it just for playing, or is it an installation and the different mediums through which it can be done. So, again, we got an idea, so this also added on to our understanding of merchandising products – their material, their mediums and their scenarios and why they are being made for pre-schoolers in terms of safety, in terms of their development. So, we were basically being able to make a connection now between the different…

You are understanding the client, was that a part of it?

Client… during the intial stage, all they told us was to come up with the merchandising products for this show, their main idea was to try it on new marketing strategy and it is meant for these children, which is not only for the Indian market, but for the foreign market also, for abroad. And, that is all the information they told us and the rest they totally left it on us.

How did you try to understand the scenario also from the client's perspective?

Scenario from the client's perspective, since their idea was to market their show, so when we were studying about the other show that children like, we made sure to understand what they liked, what element they liked in the show, so whether it is possible to replicate that element in the products that we are making, to give them that experience, so whenever they are with the toy, playing with it or whatever it is – does it remind them of the show? So, that's how we tried to, as in, associate the brief, which our client had given us with the work we were doing right now. Then, after this, we started, we decided to come with some opportunity areas, which we felt would be situable, favourable for our company and in that, we made a very huge list. For example, we started of with if its, if materials is taken as one opportunity area, in

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that there is a huge scope, as in, if it is plastics, what is the scope, as in, the number of industries that are there, what all competition do they have. Then, the same for soft materials, then a new sector could be organic materials, where work done is not very much, but its very popular and parents would obviously like for that to happen, because it is safe. So, safety was an important issue there. Then, like that materials was there. Then, the industries is it, if they are planning to aim at a particular area or a particular country, then you will have to look into what industries are there – based on that they could have different opportunity areas, selective products. Then, the medium that they would like to select, through which they want to, as in, market their show as well as come up with a merchandising product. It could be in a school, in a play school, or in a creche probably which is there for children. Basically, different places where pre-schoolers visit – at home, at school, at pre-school, playgrounds and workshops or whatever area. So, that was the scenario, there were mediums through which merchandising… then, the material. Then, there were, of course, merchandising product in terms of would they like it to be visual format or in a physical format or in a digital format or is it, as in, just an installation, you can interact with it also, you cannot interact with it also. So, I think these were the broad opportunity areas…

What helped you to come with opportunities, you mentioned scenarios, materials and all of this. So, what helped you in giving uniqueness to it?

Uniqueness… since, our clients were very peculiar about the fact that they would like this show to be launched abroad. So, we felt that since here we know what are the popular material, what are the popular industry, so we thought depending on the industries they'll be able to contact there, they would have an idea what products would be easy for them to make, because they had also mentioned the point that they had proposed this idea to Hasbro and they were very much willing to work with them. Even Cartoon Network was very happy with it. So, if they already have tie-ups with certain industries, then obviously they will have to look into the kind of range of products they make and they will have to do something in that area. And, if they keep that in mind, that becomes an opportunity area, if they already have contacts with certain industries, so, that was one thing for industries. Then, since material is again, there are certain materials which have not been explored, but at the same time, there are products being made which have a lot of play value with materials and which have

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become popular, but merchandising products, those range of products have not entered into the merchandising sector. So, that was something new that they could try. So, in that way, that was unique, as in, materials itself could be a new area, which they could try out. Then, visuals and the existing merchandising, techniques was something that is popular, which would help them in the initial push for the merchandising product, so that also is something that we cannot not consider, it is there, it is one opportunity area. This new materials could be one opportunity area, then based on the context they already have that could be one opportunity area. Then…

So, you are also looking at trends?

Trends… then, another thing was…

Why is trends important?

Trends are important, because one point that they had mentioned to us was initially when they were coming up with different ideas for the show itself, by the time they reached there, gave the idea, the people said that this concept, this trend has now changed, it has come out to a new thing and with children, trends keep on changing depending upon the surrounding, or depending upon the new products that are coming in the market, so trend is something that is very important, that we have to keep in consideration for children, because their minds and their likes and dislikes cannot be constant, if they like something, they will totally shift onto it, they don't have that, as in, sticking onto a trend thing. Play value is what is important for them and that can keep on changing from product to product. So, if right now there is something, as in, if action figures are in the market, so, it will be there and you have to keep that in mind. It will be difficult to, as in, have something new… not difficult, but it will be more of a challenge.

Like, you looked at material trends…

New materials.

So, why was that important?

That was important, because in, like I said in the merchandising sector, those materials have not been tried out. But, otherwise, the products that are being made

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from those materials, those products are popular and it is recommended by parents, as in, it should be bought by them for the children. And, parents obviously at this stage, for a pre-schooler, they play a very important role in what they buy, what they watch and what they learn. So, that is also another thing, you should also aim at like what products are you making for parents, so keep them in mind also.

What are the difference between ideas and opportunities?

Like again, ideas and opportunities was… idea is like if you… an opportunity is a field where you can have a lot of ideas, as in, if you just take, if materials is taken as an opportunity, so there, it could be suppose organic material, which is something new. Then, metal, which is something not used too much for making toys for children, but if you manage to come up with a design, which is feasible, it could be something that is long lasting, it won't break and if you are able to keep it within the safety limits, it could be something very affordable and useful and long lasting for them. So, that ways you have a lot of options. So, it doesn't become an idea, it becomes an opportunity where you can explore more and come up with different range of products or different range of ideas, which can be used in different scenarios.

Is opportunity also connected with… because in your case, they didn't have an established system… so, how do you make it feasible? What was the important part of the project in terms of the…

After, like, thinking about the possible opportunity areas, we decided to, as in, individually, we decided to zoom onto five main themes. So, in that theme, when I have selected a theme, we have also talked about, how it would be possible for them to come up with a product, as in, how they would like to make it feasible. For example, one theme was to make toys from very cheap materials, which they could give as freebies with existing products, eatables or something else, which are very popular with children. So, now, what happens there is these, the material that is selected for making these products, those industries are already existing and they are in large numbers. So, now, they can contact them, they can get it made there, and if the packaging is also very simple and all. So, they can get it made from this industry, and they can ask the other people, who would like to market this thing, along with their product, which will be done for free, so marketing will happen. So, like that, on a very surface level, we have given them an idea about what are the possibilities of

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making the product feasible as well as to make the idea feasible, as in, how it would work out for them. Then, another idea or another concept was to come up with these accessories, now, since the show was about an underwater scenario, it is about underwater animals, and aquariums is something that attracts children a lot. So, now the opportunity that we used here was accessories, the accessories could be anything, it is something that is used by them, as in, it could be a bag, it could be a bottle, it is something that is used at home, so that is the opportunity. In this opportunity, we took one idea that aquariums is something that is there in most of the homes, and something that attracts children. In that, the nozzle that is used for giving oxygen into the aquarium that could be made into a character. So, and action figures is always something that is very easy for the child to associate with the show that they are watching. So, you have the face of the character, which is there inside, so it would obviously attract them and there could be other objects inside within the aquarium, which could be used to characterize the characters that are there in the show. So, again, that was again an opportunity in which we took out an idea and then, we have told them how it will work out for them and those materials. The material, which we would use for making it would be rubber. As in, at a very surface level, we have told them. So, they can approach an industry and they can get it made, because there are industries which do work in this area.

While doing the project, did you have any concerns, mis-directed your opportunity in some way?

Concern is directed, or which we found…

Either ways.

The concern was, they were very much interested in getting this idea, or getting this show marketed in the… not in the Indian market right now, but first, abroad, as in, in the foreign market. So, as far as the user research and the user study goes, we did that here and our secondary research was something that we got about children on a very wholistic level. So, I don't know to how much extent…

That would be a limitation. I am saying that in your approach, like sometimes you come up with an opportunity, because you have a concern for something.

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Ok. There I think, when I came to know about the use of organic material for making toys, I came to know about this place in Chennai, where this lady, she has a farm, where she is farming organic cotton and from that, she is making…

That was, through a website.

Yes, that was through a website. So, I just felt that first of all, safety is a very important issue here. So, concern, as in, it helped me in making that, as in, an opportunity…

Area?

…as a good idea. It would promote, not only promote other people in doing so and since, in foreign markets, safety regulations are very strict, so this would help in that, it would help promote the work that the lady is doing. And she would be more than willing in doing things, and I also came to know that all the products that she makes are for the foreign market, as in, they are made here and then, they are sold there. And if that thing can be done here in the Indian market also, then maybe it could be realised that safety is an important issue here also. And, unlike all the… some of the toys, which don't follow the safety regulations to all the extents are sold here at a very cheap price and many children are using it. That can also be brought to a… it can be checked, not brought to a stand-still, totally.

Do you think that looking at the area of merchandising or toys and accessories, do you look at it in an unconventional way, like, give it a new meaning? Or, did it go with the flow?

I think, it went with the flow, because we were more concerned about what the client wanted. But, well, in between, we used to have discussions where we used to think that, I don't know, if something else is possible. But, still I think, it went with the flow, because since, there was a client who was waiting for designs from our side, opportunity areas from our side, we never ventured into some unconventional things. Unconventional in terms of ideas, maybe, because…

In the way, just in the way, you looked at toys or you looked at accessories, or you looked at the area of merchandising…

I guess, this was the first project in which, I started experiencing the fact that it's more about coming up with the play value in a product, than to think of a toy or a game. So, it's not necessary that it always have to be something, it has to be a toy or a game, it can be a daily use product like a mug, which you can give a play value, or which can give you a nostaglic idea, emotion about some object.

Play experience.

So that experience or that effect that is happening on the user is something I realise, it is also very important, it is above…

Looking at the product as an experience, as a tangible.

…as an experience. That was one thing I realised in that project.

And did you have a… sort of a… vision that you sort of envisioned… that you see something when you are doing your user study, like, one approach is that you collect all the informations, sit and you come up with concepts. The other is when you go out and see, maybe that gives you a vision, saying why is it like this, why can't it be like this. Did that happen throughout the phase, like… where you are thinking of what could happen, not extrapolating from what is there, but in terms of…

In few of the final ideas that I came up with, maybe like the freebies thing. I have seen, like, during my childhood, I have seen lot of people playing with these free things and relating it with lot of things, so, I could, maybe, have the vision of how it would look in the scenario, if it actually works out and if it's actually in the market, and how people would actually play with it. If that was something existing that I saw, this I realised.

No, we have a vision for it, like, it is not extrapolation, you feel that, for example, you are working in the craft sector, then, you may have a vision saying that you want to improve their lives, why is it like this?

In that ways.

So, your opportunity is guided by your vision and not necessarily by your study.

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So, talking about the vision, as in, when we were thinking about , discussing about the opportunities – at that time, we never had a particular vision, because opportunities we felt was a very broad area. But, when we were ideating on certain concepts, that time, maybe for the… there was an idea were I was thinking about an interactive raincoat. At that time, I just felt that most of the products that they make, they never keep in mind that that product should be maybe long lasting, something that can be used year after year. It's just for that brief moment when that show is popular, it will be used and then, it will be thrown away. So, instead of that, I just felt like if its something that can be used for a long time. Suppose, even if the show doesn't work out, but the product they can keep with them, they can use, so, that way it doesn't go waste. That will be one vision I had.

So, envisionaging the scenario of use.

Scenario of use and the time for which it can be used. Then, again, regarding the organic materials we used, if that could be used on a more larger scale. Since, it is something that has been farmed here in India itself, it could be promoted and lot of things could be done with it also. That could be something that should be made very popular, I had… it took so much time for me to find that, find an article regarding this, it was not coming, it should pop out immediately when you are talking about materials, it should be something that is very popular, that's what I felt here in India.

And was there something during your study that you got some interesting different type of in-depth information, which helped you to come up with opportunity, or was it the connection between different things?

I guess, it was more of the connection we were trying to, like, we got one information, which was justified by the other informations, the other inferences we had, I guess that is what we were working on more.

And, if you look at inspiration in your, in the project. The inspiration part was more important or the elaboration that how it will be used and how it will be made and how it connects with the…

I think, the second part was more important for us in this project and how, if you are thinking about something, how it is justified by, how it's justified in different aspects, as in, feasibility, then, how it would act as a merchandising product, how it would act

as an attractive product for a child, even that is what was more important, instead of coming up with something new, or…

And overall learning?

Overall learning… one thing, like, which I told earlier the thinking that, initially we had that play is just about toys and games, it could be there in the product, it could be there in the experience. The other thing was that thinking about, again, different aspects and it's not just about coming up with an idea and coming up with a design, but there are so many things that happen after it – how it will be made, where it will be made, how it will be marketed and all that can render your design useless at the end. So, that is the main learning I got from this, which I have used later on in my diploma project also. You have to, as in, have a very good top side view about all the things that are involved, that are related in any way to what you are going to make and you have to keep all that in mind, when you are coming up with something. And, it's not about coming up with a small section of people, when you are making something for a large number of people, for a whole country, something you expect a lot of people to use; so, there is a lot of things you have to keep in mind. And, you have to be ready to, as in, compromise with your design for the need of other people, you might like something, but you have to keep in mind that it has to be used by other people. So, I guess.

Would opportunity mapping be relevant for any type of design projects or they would be relevant only for certain type of design projects? Like, you mentioned about how it helped you in your diploma, although, as such, they were not looking for it.

Yeah, they were not looking for it. Till now, like, till now, whatever experience I have, I guess, if it is something on a very initial level and things are very uncertain about what is going to happen, what is the future of the product and if there are many possibilities, if they are not sidelined, as in, this has to go in this particular direction; then, opportunity mapping can be very helpful, it can actually help you to lead the entire thing into a new direction and it could be a new aim keeping the same product. So, I guess, whenever it is something new, I guess, opportunity mapping is very helpful, if it is already decided that you are making a toy for a particular child, then, there also at a very small scale, opportunity mapping can happen. But, otherwise, if it is something new…

Or you question it, then it can happen, but then there maybe too many constraints.

Like here, the only thing that they told us is they wanted for pre-schoolers and they want a merchandising product, but nothing else, as in, what sort of product. When you have lot of questions, if there are lot of questions you have within yourself to ask your client, if you have lots of whats and whys, that means opportunity mapping, there is a scope for opportunity mapping.

That means things are not fixed and structured and therefore, you can. And, in real life, like, from your experience of diploma project also, you think it's not too time consuming or too… it doesn't waste too much time to do opportunities, whereas you can actually come up with ideas within those times.

I guess, as a designer, I don't find it as a waste of time, but for my clients, who are businessmen and who are just looking into products being made on time and…

Like, if you feel this should be done, how would you, sort of, convince or how would you explain that?

I guess, the initial step would be to show them results, that's, I think, one way of convincing them. Maybe, not just by showing it on paper, but maybe by trying it out and seeing how…

Like, for example, they wanted 100 designs, you can brainstorm and come up with 100 designs, that is one way of doing it, you don't even need to do any study for it. You can just brainstorm your own perceptions, put it together and do that in terms of ideation.

I think, like, the one most aspect of opportunity mapping is first you have to understand your client very well. So, now, in my case, I knew they are marketing people, they have done their MBAs and marketing is something that attracts them a lot, so if I am able to do the opportunity mapping and explain them the advantages it will have from a marketing point of view, I guess, then, maybe, it would be easier for them to relate with it. So, I guess, it all depends on how you convey your idea to them, you have to understand their language and maybe, convey it in that language to them. Because, since opportunity mapping is something that works on all fronts, it should work in that front also…

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And for yourself, you think that rather than brainstorming on 100 ideas, this works better?

This works better, because when you have to think about 100 ideas, you will go mad. One idea will come, you will start repeating your ideas. Instead of that, if you come up with an opportunity area, then you don't have to think about these things, it is there on paper. You take one idea, you take one opportunity area, you think about ideas, you will get 100 there, then you'll get 100 more here, then you'll get 100 more here, and you don't start overlapping or confusing one topic with another, I think it becomes easier for you to think, it makes it more clear, it's like brainstorming, you never know there are so many ideas in your mind, you just think randomly, you won't realise that you are repeating or you are missing out on something. Here, you have everything in front of you that main opportunity areas and you can actually come with more ideas than those 100 ideas. And, it is more clear, you will feel more confident about what you are coming out with, you can justify your idea, instead of just saying that I liked it, that's why I am doing it; instead of that, you can say, this is because, this is so and so, so and so, so and so will like it, so it can be marketed this way…

More wholistic?

More wholistic. You can argue out your idea with anyone on any front.

Anything else? Thanks.

Interview 2

090312_002

So, Purvi, you developed opportunities for merchandising toys, yes? So, can you tell what type of opportunities you came up with?

The major opportunities, which we came up with, were materials, introducing new, different materials like organic toys in the market, approaching different clients… like, the company, Famous Studios were not able to produce the product, so they were planning to approach *Hasbro (00:52), different maybe playschools or something, so that was again an opportunity. Then, different merchandising mediums like bags, accessories, earrings are already existing. So, introducing a new merchandising way to merchandise the product, as in, like TV serials, or maybe giving ads on TV, and approaching different industries, maybe like chip industries, potato chips with some merchandising product. These were the major opportunities' areas, which we came up with.

How did you think about these opportunities? What made you think about…

First, we did brainstorming about the major things like merchandising and pre-schoolers were the broad things, which were necessary to understand these things, so we did brainstorming on merchandising and pre-schoolers and the materials, which are used for pre-schoolers. So, this gave us a lot of information and the market survey was the most important thing, particularly for this project. Because, different types of material and different types of accessories and products are available for merchandising specifically, and for children also, not for adults.

Specifically, what helped you to think about the opportunity?

Market survey.

Can you give examples, like you went somewhere, you talked to someone… how did the opportunities strike you?

Market survey… we went to different toy shops, different gift galleries, we saw different products like there was a bean bag of a cartoon character, which we never saw before. There were mouse pad of 'Hello Kitty', there were bags, there were games of *Krissh*, so these were different things, which we saw in the market, which we never thought that these were also ways for merchandising. Even now, some

movies are, you know, the movies are also getting merchandised by games, digital games.

If you take one opportunity, what you have done and you say how did you arrive at it?

090312_003

Someone wants to come up with wall decoration in a 3D effect, so this came up in the children's survey, which we did. So, we went to children's houses and we saw their rooms. Nowadays, children have their own, independent rooms, they have decorative walls, they have their own bed, they have their own customised rooms. So, I came up with an idea that there would be walls painted with characters, which we have to merchandise and the whole setup of the room will be water based, because the series was also water based. And, the characters of the series have to be replicated on the walls with Asian Paints' colour, because now, they are coming up with different colours, which glow at night. So, this was a collaboration of Asian Paints and the company. The second opportunity was to come up with a playful blanket, for which I made a prototype also. This was also because of the same thing, children have their independent rooms, independent beds, they have their own accessories, they have their own beddings. So, they can play with the bedding, they can play with this quilt, and they can sleep with it also. So, it was a dual purpose thing.

And where did it come from… the idea?

There are printed bedsheets, they have cartoon characters printed on it, so I thought of making a more interactive and more playful, because they are just printed and they are just kept on the bed. You never play with it, you never talk with these characters, but using this, maybe you can talk to these characters, you can play with them, you will get to know other things about characters. There were pockets in the blankets, so you can also find something in the blanket.

So, what makes them opportunities, rather than ideas?

090312_004

Idea maybe a random idea, but opportunity is if something is missing, or if something is giving a negative impact, or something like that.

In your case, what is it?

I think, in mine, it was lesser than an opportunity, it was more than an idea, because it was a way of merchandising…

090312_005

Idea can be a random idea, but opportunity is that if something is missing, we can fill up that gap with an opportunity and with the idea.

And, in your case, what did you do?

In my case, I did a trend research, like what all is going on, what all is in the market and according to that trend, concepts were developed.

So, what trends did you look at?

Like, nowadays, parents can afford for their children, they want their children to lead a good life, they want to spend on their children, they don't mind spending on their children. Nowadays, children have their own independent rooms, they have their independent toys, they don't have to share their toys, most of the parents have single child, so, they are more pampered. So, these are the things…

Social trends… what are the other trends you looked at?

Different medium of toys and products are in the market, like the organic thing, which I said, and…

Material…

Different materials are there.

New products, as in, earlier, only bags, earrings were there; nowadays, things have shifted to like mouse pad, as I said. They have wallpapers on their computer, they have their own… soft toys are there. Nowadays, *Hanuman's* character is also in the market, *Shiva's* (01:33) character is also in the market. There was a movie on *Hanuman*, so after that movie, *Hanuman* characters were in the market and they had a huge market.

So, did you question the trend, or did you mainly followed the trend?

I followed the trend.

Why did you decide to follow the trend?

I followed the trend and came up with different concepts related to that trend. I didn't exactly copy, but I thought of running on the same track.

And because?

Because, the company was getting into the new market, they didn't want to take a risk, but, also wanted to introduce this.

What was your understanding about the company?

The company was basically an animation-film based company, so they know about animation, graphics, motions and everything, but they were new to materials, they were new to merchandising, they were new to the product thing, the industrial thing. So, they were good at that, and we were good at this. So, it was a good combination.

And, how did you understand the company's context as a designer?

We did company's research, we did their competitors' research, we researched about their style of working. So, that can be incorporated in the product also.

So, how did it help you to come up with the opportunities?

Like, the character they have made, it has to be replicated as it is, because, they wanted to merchandise these characters only. So, we researched about the company, we researched about the competitors, we researched about their clients.

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So, how did you understand the company industry context?

We researched about the company, we had a brief with the company, we met company people, so their brief stated that they were taking a risk, since they were launching a new series for international market, so it is a high budget market. But, they wanted a cheap product, which they could merchandise in India and abroad. Moreover, the research was done with Indians, but the launch had to be international as well, so, this was there. Plus, they wanted the characters to be replicated as it is,

because it was a new serial. So, they wanted the character to be exactly as it is, because even a small change in the character would be perceived as such by a child. So, they did not want that there should be even a slight change in the style, illustration, shape or the colour scheme of the characters, so it was important to take care of that as well. So, these were the things we found out after researching about the company and after talking to them.

So, how did this affect the way you thought about the opportunities?

Like, suppose, I am talking about the replication thing. There are only limited materials that can be used for exact replication. For example, there are soft materials, the characters can be replicated exactly on wood. There are some materials, which do not allow for the replications to happen exactly. For example, if there is a balloon toy, then it is possible that the toy will take a new shape after being filled with air. So, that criterion was very important that the toy had to be replicated exactly as it is. When we had concept meetings with them, they liked the concepts that already exist, for example I had an idea revolving around accessories, so they liked it because they felt that a majority of people will buy those. They wanted a large number of people to like that product, instead of an interesting or different concept. Because, they didn't want to take a risk at that initial point. And they said, after sometime when people get to know these characters, we can introduce a hi-fi or a different kind of product into the market, because by that time, people would be knowing about the product, people would be knowing about the characters and the series.

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So, what was interesting about the entire process?

The most interesting part was the market survey, because there were many things that we were not aware of, we had not seen, we did not know that merchandising could be done in that way. There were various kinds of mouse pads; there were a mouse pad with a character. There were bubble machines, where bubbles where coming out of a character's mouth. So, there were many different things, which we didn't know about earlier. We felt good when we came to know new things. Then, we observed the behaviour of children, it was new and interesting, it was good to see that. We were

approaching the whole thing in a new and interesting way, so that was a good experience.

What was the different approach?

The different approach was doing the systems study. We had never worked for a company earlier. Doing the company research, finding out about their competitors, their clients, they had given us a brief, they had limitations, and working within those limitations was a challenge. All this was very interesting.

When you had gone to do these studies, did the opportunities arise at that time, or did it happen after coming back, when you were putting things together?

When we put everything together, when we linked all the 3 – 4 parameters, which are the preschoolers, materials – linking these 3 – 4 parameters, the opportunities arose from these, things we didn't expect…

What all – user, material…

Yeah, one topic was material, one was preschooler, one was word. So, maybe linking wood as a material, preschoolers, so… character… so, different different… this might be a bad example, but something like that.

But, did you also come up with opportunities when you were in the scenario?

No, when we researched, when we mindmap…

No, while you were doing the research, you went to user and you felt that, yeah, actually why not have something like this for him…

Like the bubble one, I wanted to do something similar, like a fish or a character…

Or, if you went to a child's home, you felt that why can't a child's home be like this, did that also happen?

One concept… the wall thing… on his door, I saw a Mickey Mouse – Minnie Mouse poster, so I thought that Mickey Mouse – Minnie Mouse, which are flat paintings are so in the trend and have been there for ages… so, maybe they can be made interactive, they can be made interesting, maybe a 3D character could come in… this idea was in my mind and hence, it came to me during the concept development stage

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and I mentioned this concept. And to make this thing interesting, I researched about the glowing in the night factor of the Asian Paints. I came across it during my research, but, since something was in my mind, I researched about the existing things and the new things coming up.

So, what was there in the mind?

That I want to do something related to interiors… to make something different… it is always these big, flat paintings; there are fishes or Mickey Mouse or something similar… but, that is all flat, the same could be done with a 3D effect or with something interactive to give a 'magic' feeling… so, this magical feeling will make the characters 3D in the daytime and these same characters will glow in the night. So, it's like that.

What was the client's response?

The client, most of the times, liked all the concepts. The only thing with them was… there was a concept regarding solving puzzles, but they said that it could be used as a playstick as well, because it was made of acrylic sheet. So, from a material point of view, they said, regarding the child's health, that it could pinch the child, because the character had spikes, so that was one. Apart from this, they liked a blanket. Asian Paints had told them that if four children are going for that idea, then, all four should have different themes. Even if the theme is the same, like water, but for that, different illustrations and different paintings can be done on the same theme. That idea was also appreciated by them. Then, there was a 'board pin' idea, for which they said that it will be bought by a lot of people, then, the characters will gain a reputation through this product. So, that was also there. And, then, the accessories; for limited things, one can make bracelets, earrings, badge for bags – for these also they said that a lot of people could buy these and it is an interesting idea.

What was the critical feedback? Anything else… or in general, about the opportunity, how it could be taken further?

They wanted us to join the company for Diploma Project also, because they wanted to take this project forward. But…

But… even, otherwise…

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Even, otherwise, they like all the concepts, they were satisfied. They said that they had not thought that there would so much research behind all this. They liked the process, they gave us feedback that we had put in a lot of work. And, they were happy, they were satisfied with the project.

And, how do you find the usefulness about the process – opportunity mapping?

By opportunity mapping and research, you can come up with different ideas and you get to open up your mind, because if you think just like that, you will not become aware of so many ideas and things. But, by research, market survey, opportunity mapping, you get to know different things, different aspects of things, which one would not come across by thinking randomly.

Was it different from your earlier projects?

Yes, because it was a live project.

In what way?

It was a live project, one. There were limitations, there were budget limitation…

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Yeah, it was a different experience, because in this, firstly, there were certain limitations of the client. We had to think from the college's point of view as well, so things had to be balanced. In addition, we were made aware of new things, for example that the company needs to be studied. To get into the depth of the things, it becomes important to gather information regarding related things as well, because a lot of things are interdependent and they affect each other. The earlier projects, the classroom projects are limited to the classroom level. In this case, there was a possibility of collaborating with Hasbro, which would have added another dimension to the project.

But, there also you did study, you did research and study. In this also, you did study...

But, not in...

What was the difference between the two?

In a broader way... like, we did...

What do you mean by broader?

Like, we used to go for one or two days for our classroom projects, we would go and check things out. But, in this case, we did our work seriously, because it was a company.

No, what was the difference in terms of the study? Like, you did user study here, you did user study there... what was the difference in terms of your overall approach to studying the things?

I think, opportunity mapping and all that we did, but in this, we had a small course – systems thinking, which opened up our mind. Then, we did systems design, so there was a different approach.

What was the different approach?

It was a broad sector, everything had to be done deeply. Like, in our classroom projects, we worked on the inspiration – we took that from somewhere and worked on it. Like, we did not look for gaps and findings. So, in this particular project, it was very broad, everything was new – user testing, their feedback. Then, according to their feedback, looking at opportunities, where are the gaps. And the most important was the testing, what is the technology offered by the company, balancing all these elements. Looking at things from all angles – the consumer, satisfying the client, finding the right balance, looking at how to market things really well and also to look at what are the benefits for the consumer. And plus, whether you are following the design process properly or not, so looking at the whole thing as a student.

And what was the difference in the study?

In the study… the testing we did…

No, in the overall study? Like, in design process 2, you also did some testing, so in this case, what was the difference in terms of the overall approach to study?

In this case, the difference I felt was there was an extra element that was the company. Like, we had a project, we did the testing and everything, we did user study, but there was a company here that had to be researched – what all is there in terms of technology, who are the consumers and what all could they do. So, how to

balance all these things. It is easy to do the same in two things, like in we felt that the diploma project we were doing, there was a company involved. However, in the classroom project, there is a student involved along with the consumer – just the two of us are working together. But, in this case, now we are three, we are doing something for ourselves and trying to follow a process, then secondly there is a client whom we need to follow as well and thirdly, for whom we are making – the user needs to be satisfied. So, now there is a combination of three, and most importantly, opportunity mapping, making a new system, how to map things, everything, word – combining it all. In mapping, one doesn't come across one or two ideas, there is a huge combination. If I took interviews of people of different ages, so the involvement used to change – that this could be done with one, something else could be done with the second and so on. So, I felt 100 super ideas could have been thought of. So, all this was completely new in this case, all this was not there in the classroom project, which had a really small base. But, the basic thing was used here as well and the number of elements increased. This is how it was.

Plus, the client's feedback – that was a new thing. Because, earlier, you could get the children's user testing, you could get the user testing from your friends in college, but there the client's feedback is present. And, you gave them a formal presentation, you explained things to them. That was also very different in this projects as compared to the other classroom projects.

So, what it same as a diploma project?

No, it was not.

In the sense, both have to do with a client.

But, it was not.

Why not?

Because there are different type of clients.

Even, otherwise.

Even, otherwise… no, I don't think, because this was a systems project. You have to stay here and…

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No, was the main difference between a classroom project and this – that there is a client and there is no client. Diploma project also you had a client.

Yes, there was a client in the diploma project, but, we had to make things according to his requirements.

Yes, so what was the difference in the context? In both cases, there is a client, institute is there, you are there, guide is there – what was the difference in terms of the context. Context is different in both, so, what was the difference in the context?

In the context, first of all, we didn't do research. In the diploma project, simply, with the company that I was dealing with they didn't believe much in research. So, it was not for them. However, I needed it for my own understanding, because in my systems design, when I had researched about Nokia, I came across good opportunities, ideas. So, I felt that the same could be done here, it is not for the company, but it is for me – what is the feedback from the parents, the teachers. The trend is changing, the client, the company's head, he said I have experience. Ok, he had experience, but that was from earlier on, he didn't have the experience regarding the current trend, that was what I felt. So, I went and met everyone personally and found out what is the teachers' point of view regarding teaching, what sort of problems they are facing. Because, the company's head is not going to the school or the class and looking at the problems that are actually happening there and how the children are studying these days. New technology has come, people are using iPads, but that is in a particular generation, they have a class.

So, did you have a fixed brief or was it open? The brief was different for both?

They had a fixed brief, in the diploma – that this has to be done, within this, anything could be done…

Product brief was given. The frame was defined there; one couldn't go outside that frame. In systems, the brief was there, but anything could be done about it…It was an open brief.

It was an open brief. One could make a product, something very useful and if it could address a need. And one could have done what we did, using the existing technology that they had. We could also decide how to use that technology, whether to use the

latest technology or something basic, because they had a lot of applications, they are launching a lot of new things, so this was the benefit in this.

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Other recognition of work done in PhD thesis work

A workshop on 'Creativity, design strategy and opportunity mapping" was conducted for around a total of 60 industry participants from various industries including TCS, Crompton and Greeves, Ingersol Rand, Godrej etc., in 2013, 2014 and 2015 based on the findings of the research study and positive feedback was obtained from them. The researcher has also found the conceptual framework very useful in conducting the workshop and giving the inputs to industry participants in a structured manner.

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Approval Sheet

This thesis/dissertation/report entitled **A Conceptual Framework for Opportunity Identification for Product Design Innovation** by Gayatridevi G. Menon is approved for the degree of Doctor of Philosophy.

Examiners

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Date : __02 February 2016__

Place : __IDC; Indian Institute of Technology Bombay.__

– Declaration–

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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