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A Study on Implementation of Design Thinking and Innovation – Contribution Towards Atmanirbhar Bharat

Saumi Roy*, Dr. Sheelan Misra**
*Assistant Professor, **Professor & HOD
New Horizon College of Engineering, Bangalore, Karnataka, India

ABSTRACT

This paper is an attempt to identify and discuss about implementation of design thinking in order to create and innovate product to solve various livelihood problems catering to the pyramid of the society in a developing countries like India. Design thinking a five stage problem solving methodology to cater and assist innovation and the process of adaption of innovation in the life of people to influence the livelihood. Design Thinking process is reiterative, adaptable and centered on coalition between inventor and users, with an emphasis on bringing ideas to life based on how real useer think, feel behave and adopt.

Keywords : Design Thinking , Innovation, Problem solving, creativity, Atmanirbhar Bharat

I. INTRODUCTION

Design Thinking is human centric, nonlinear, iterative process where the ideas generate either from present need or from futuristic requirements. it leads to collaboration of Technology and economics. According to Tim Brown(2008) Design thinking comprises of 3 step process which includes – Inspiration, Ideation and Implementation . Inspiration can be opportunity, Problem that can be identified through close observation. Ideation stage a brainstorming stage to collect relevant information sketch and produce creative formwork. Design thinking has transformational abilities by developing products and services apt to benefit the customer and create more value to the business. Design thinking starts with understanding users, challenge assumptions, redefine problems and create innovative solutions to prototype and test. The five step design thinking process proposed by the Hasso-Plattner Institute of Design at Stanford. Design thinking can be explained Involving five Stages Empathize, Define, Ideate, Prototype and Test it is most useful to solve problems that are poorly defined and unknown by understanding the human needs involved, in brainstorming sessions, and by adopting a hands-on approach in prototyping and testing. Commiserate the first step in design thinking process it includes gaining an empathic understanding of the problem. consulting experts to find out more about the area of concern through observing, engaging and empathizing with people to understand their experiences and motivations, immersing in the physical environment to gain a deeper personal understanding of the issues involved. Empathy is crucial to a human- centred design process and allows design thinkers to set aside their own assumptions about the world in order to gain insight into users and their needs. substantial amount of information is gathered to use during the next stage to develop the

best possible understanding of the users, their needs, and the problems that underlie the development of that particular product. The second stage is Define stage, it put together the information created and gathered during the Empathise stage analysis of the observation and synthesise them in order to define the core problems identified . The problem is defined as a problem statement in a human-centred manner. The Define stage will help to gather great ideas to establish features, functions, and any other elements that will allow them to solve the problems or, at the very least, allow users to resolve issues themselves with the minimum of difficulty.

In the Define stage will lead to the third stage, Ideate, A stage for idea generation of solution . There are many methods available for Ideation such as Brainstorm, Brain write, Worst Possible Idea, and SCAMPER. The ideation stage leads to selecting most feasible solution and developing a working model including all features to it called as prototype . The last

Understanding these five stages of Design Thinking will empower anyone to apply the Design Thinking methods in order to solve complex problems that occur around us — in our companies, in our countries, and even on the scale of our planet. There are various phases in around the spheres of life where design thinking can be applied to solve the problems. This paper is an attempt to identify implementation of design thinking leading to innovation and then diffusion of the innovation by adapting it to solve the problems of life".

II. LITERATURE REVIEW

Innovation means something new, not done before, for any innovation need to incorporate the phases of design thinking process. Design Thinking is a five-step sequential process that initiates with empathise or understanding about pain of any person. the first step in identifying the problem. and hence observation becomes a crucial tool in understanding the same.

Define the problem which refers to demographic profiling of the problem. Develop Idea in and around the problem and look for the innovative solutions to solve . Develop a prototype and check for the feasibility and adaptability of the same. This design thinking approach accordring to Brown consists of three main steps: the motivation, idea generation, and application phase. Brown, T. (2008).

Herbert Simon was the first one to coin the term design thinking as a way of thinking in his major book The Sciences of the Artificial, 1969. Later in 1973 and in 1993, respectively, Robert McKim and Rolf Faste elaborated the term, defining, and commercializing the idea of design thinking and its original benefits on creation. Peter Rowe's 1986 systematic approach in his book Design Thinking became one of the primary literatures on design that explained the design thinking term with problem solving procedures in urban planning and architecture. In these past years, design thinking has been a highly discussed term in the realm of design and also in the realm of business (Davy, 2012). the structure of design thinking creates a natural flow from research to rollout. Immersion in the customer experience produces data, which is transformed into insights, which help teams agree on design criteria they use to brainstorm solutions. Assumptions about what's critical to the success of those solutions are examined and then tested with rough prototypes that help teams further develop innovations and prepare them for real-world experiments. (Jeanne Liedka,2018). Having good design thinking skills can help in solving really complex and ill defined problems as well as adjusting to unexpected changes. The design process involves in-depth cognitive processes—which will,help to build critical thinking skills (e. g. , reasoning and analysis) involving

personality and dispositional traits such as persistence and creativity. (Razzouk,2012). Design Thinking is used to identify the problems and provide solutions . Some examples quoted from rural Indian innovations focuses on the concept of design thinking for inventions & Innovations. Anjan Mukherjee, a former marine chief engineer, has developed the Taraltec Disinfection Reactor, a 'fit and forget' device, which converts contaminated water from borewell andpumps at the source to clean water, by killing 99% of the microbes. From the remote village of Madhya Pradesh born in the family of marginal farmer s, Jitendra mechanical engineer by profession has built Shuddham, a low-cost water filter that can filter 90,000 litres of water in six months and uses no electricity and works on the principle of gravity . Per day, it has the capacity of repurposing 500 litres of dirty water for everything except drinking and cooking. Lack of storage facility and food processing units leads to a loss of post harvest. Three ex-students of IIT- Kharagpur have come up with a product through which farmers can now increase the shelf life of their produce and operate in a wider market. Through their start-up Eco zen, Devendra Gupta, Prateek Singhal, and Vivek Pandey developed Eco frost, a solar-powered cold storage unit. This can be used to preserve produce that tends to spoil quickly, such as spinach, tomatoes, or capsicum, and be stored for up to 21 days. Farmers can control the temperature from their phone by selecting the produce that they want to store. The storage unit then automatically regulates the optimum temperature. On days when there is no sun, the facility is equipped with chemical batteries that maintain temperatures up to 30 hours . Charu Monga, a researcher at the Department of Design, Indian Institute of Technology, Guwahati, announced the development of Jugnu solar bags, that have solar panels integrated into them. During the day, the bag stores enough power for an LED light. For students living in unelectrified parts of India, especially mountains it's a great innovation. There are many grassroots innovators Who took inspiration from everyday circumstances and shortcomings to invent time-saving, energy-efficient devices. Bommai N (41) has always had an eye for innovation. rural innovator from Bukkasandra village in Karnataka has comes a long way. Irked by the manual effort it takes for rural women, to dole out large number of rotis, Bommai decided to innovate a simple machine that makes the whole process easier. Costing Rs 15,000, Bommai's portable, easy-to-operate machine weighs just 6 kg and is the size of a regular induction stove. Forty- seven-year-old V Jayaprakash went door to door, selling clay stoves with his mother in the villages near Koyilandy, Kerala.

Seeing how these biomass stoves emitted huge amounts of smoke, Jayaprakash's inquiring mind thought of various ideas that could mitigate this problem and help women who choked in the kitchen while cooking. This then led him to improvise the portable stove to make it more efficient and energy saving. Made of stainless less and cast iron, Jayaprakash's unique design involves a two-tier system of burning that ensures both the biomass fuel and the smoke created from it are completely burnt creating less pollution. At a time when traditional handlooms are dying a slow death, people like Dipak Bharali refuse bow down to the dictates of modern weaving. Compelled by the everyday challenges involved in weaving Assam's much acclaimed muga silk, this serial innovator has invented a device that has simplified the laborious task of many silk weavers. Hailing from a small village in Gujarat's Junagadh district, Bhanjibhai Mathukiya has been credited with innovating more than many useful agricultural equipment- ranging from low- cost tractors to an airborne agricultural sprayer. Born into an agricultural family, the multi-talented tinkerer has also developed a mechanism to store grains at low cost. Born to a carpenter's family in Rajasthan's Sikar, Madanlal Kumawat had to quit school after fourth grade owing to health issues and an added financial burden. This led him to build a thresher, a machine

used to separate grain from stalks and husks. Though efficient, the initial model was not suitable for multi-grains.

However, further improvisations and persistence paid off and, soon, Madanlal was able to design different models of the thresher that come in different sizes and consume different levels of power. Having simplified a labour-intensive task of threshing that mostly depended on right winds, Madanlal's thresher has helped many farmers obtain cleaner grains without much. Having grown up amidst the rubber plantations surrounding Kottayam, Mathews K Mathews was well acquainted about the mosquito menace that prevailed in Kerala, the state that houses the greatest number of breeds. Soon after his graduation, Mathews started developing a cost-effective device that traps and kills mosquitoes through many trials and errors. Unlike other mosquito catchers and repellents that make use of toxic chemicals, Mathew's eco-friendly version (called Hawker) depends on the smell from septic tanks to attract mosquitos. Eventually, the trapped mosquitos are killed due to the heat built up inside the device because of direct sunlight. Remya Jose, a young teenager from Kerala who was tired of washing dirty clothes with her hands decided to do get solution of the problem . She went ahead and created a washing machine that resembles the exercising cycle in gym. 3-4 minutes of pedalling will help to clean the clothes completely and also to dry by 80%.

The machine washes clothes effectively, saves time and electricity. Daramveer Kamboj cost-effective machines to make the process of converting herbs into gel easily. Leaves and twigs can be easily converted into highly beneficial gel in rural areas for both production purposes as well as self-medication in many cases. M J Joseph ,Tree Climbing Machine. The machine consists of two loops and pedals for each foot, which one can easily use to climb a tree. Primarily used for coconut trees, it can be adjusted and used for various other trees as well. Safe, cheap and convenient, the machine has been a roaring success. Innovations are important as long as they influence and change life of people and make it better . And for all these innovation design thinking empathise understanding the problem from the perspective of people becomes important and solution become easy to escalate to diffusion and more importantly acceptable by the people to adapt the same .

III. RESULT AND DISCUSSION

Innovation, adaptability, and diffusion of innovation depends upon identification of problem and how much the problem is empathised by the innovator. For adaptability of innovation its very important that solution can be affordable by the people facing the problem . In all examples quoted from innovation from rural India it can be referred that design thinking is a key to innovation and creating the solution suitable and affordable makes the innovation popular and worth . In country like India which covers varied geographical regions with huge population it becomes especially important to inculcate the concept of design thinking among the youth as it will help systematise the problem-solving skills through innovation. Atmanirbhar self-dependent need to be started from grass root level identifying micro level problem proving apt solution that is affordable and achievable . The five step process of design thinking is a framework of innovation , where the process is carried out in a more flexible and non-linear fashion. Design Thinking should not be a concrete and inflexible approach to design. To gain the purest and most informative insights for any problem, these stages might be switched, conducted concurrently, and repeated several times for best possible solution .

IV. CONCLUSION

Atmanirbhar comes from identifying and solving problems at micro level with the resources or the capabilities available. Solving the problems ourselves without taking help from any other country. Design thinking is the guiding principle towards innovation we would like a suggest a preliminary step of observation to find the problem and provide suitable solution. Five-stage model can be concluded to seven step that will help in acquiring knowledge at the later stages can provide feedback to earlier stages. Information is continually used both to inform the understanding of the problem and solution spaces, and to redefine the problem(s). This creates a perpetual loop, in which the designers continue to gain new insights, develop new ways of viewing the product and its possible uses, and develop a far more profound understanding of the users and the problems they face. Design thinking a five step process is a framework for innovation and understanding of grassroot level problems and providing solution , and intermediate refining and gaining more insights to the problem and suitability of the solution . The innovation quoted in the paper are some of the examples of identifying problem and providing solution suitable for the people facing the same . Design thinking is a process that can be implemented anywhere and everywhere a mindset to solve problem and zeal to change and influence life of people is the motivation required. Atmanirbhar Bharath is achievable through all these small innovations. Development is not an overnight process but a revolution which can come through solving grass root level problems.

V. REFERENCES

[1]. A Design Thinking Approach in Startups, Bao Marianna Nguyen , UNIVERSITY OF OSLO

[2]. Brown, T. (2008). Design thinking. Harvard Business Review.

[3]. 5 stage in the Design Thinking Process, By Rikke Friis Dam And Teo Yu Siang, Interaction Design foundation.

[4]. Why Design thinking Works, Jeanne Liedtka, Harvard Business Review , Sept-Oct 2018

[5]. What Is Design Thinking and Why Is It Important? , Rim Razzok , Valerie J Shute , Review of Educational Research , Volume 82,Sept 2012

[6]. Design and Design Thinking in Business and Management Higher Education, Judy Matthews, Cara Wrigley, Queensland University of Technology, Journal of Learning Design,2017, Vol10

[7]. Capturing the Value of Design Thinking in Different Innovation Practices, Volume 4, Issue 9, November – December - 2019, International Journal of Design

Websites Referred

[8]. https://www.thebetterindia.com/18 0198/innovation-transform- villages-health-water-solar- farmers-rural-india/

[9]. https://yourstory.com/2018/02/soci al-innovators

[10]. https://homegrown.co.in/article/81 39/10-incredible-inventions-that- changed-rural-india