GAP BODHI TARU
A GLOBAL JOURNAL OF HUMANITIES
(ISSN – 2581-5857)
Impact Factor: SJIF - 5.551, IIFS - 5.125
Globally peer-reviewed and open access journal.

INNOVATION REVOLUTION WITH DESIGN THINKING

Romita R. Swarup

Research & Academic Head, Explorra School of Design & Technology, Ahmedabad, India.
romita@xdsindia.com, 9898281315

Abstract

*Acceptance of Design Thinking has **fuelled** the innovation revolution, redefining approaches to problem-solving in creative and collaborative manner. Design Thinking encompasses a mindset of empathy, creativity, and a solution-orientation. By prioritizing user-centricity problem-solving, and iterative ideation, it nurtures an environment where creativity flourishes.*

*Design Thinking, fosters a holistic understanding of **contextual** innovation spanning centuries. This paper highlights how Design Thinking propels businesses and industries toward ground breaking solutions. Examining the multifaceted facets of Design Thinking, this abstract delves deeper into its core stages - observation, understanding, empathy, articulation, ideation, prototyping, and testing—showcasing their pivotal role in fostering a **tool and technique-based method**, and an environment conducive to breakthrough innovation.*

*Design Thinking also cultivates a culture of **change**, creativity and adaptability within organizations. This culture encourages a shift from a **static - linear** problem-solving approach to a **more dynamic, collaborative, and human-centred** process that values a sequential way of **finding possibilities and challenges and then addressing the same creatively** leading towards innovation. The most sought out feature of the current times the world is going through **– radical innovation**.*

This paper shows the influence of Design Thinking on revolutionizing innovation across diverse sectors, driving change, and shaping a future defined by ingenuity. A future where ingenuity and user-centric approaches intertwine, driving transformative changes and shaping a landscape defined by innovative, iterative problem-solving methodologies.

*Design Thinking encourages an iterative approach where feedback from each stage shapes the next stages. By continually refining ideas based on user needs and feedback, it fosters **holistic and sustainable** innovation encouraging a mindset shift from **a quick fix solution to an in-depth step by step** problem-solution, fostering a culture where innovation is driven by understanding and meeting real user needs. This human-centred approach often leads to more relevant, usable, **radical**, impactful, and **sustainable** innovations.*

Keywords: *Collaborative, Design Thinking, Holistic, Human-cnetered, Innovation, Radical, Sustainable.*

1. INTRODUCTION

In a rapidly evolving global landscape, innovation has become the cornerstone of organizational growth and competitive advantage. The traditional approaches to problem-solving are often proving insufficient in addressing the complex challenges of the 21st century. In this context, the paradigm of "Design Thinking" has emerged as a transformative force, revolutionizing how organizations conceptualize, develop, & implement innovative solutions.

Design Thinking, with its emphasis on user-centric problem-solving and iterative processes, has gained attention across diverse industries. It transcends the conventional boundaries of disciplines, fostering a culture that values empathy, collaboration, and creativity. As organizations strive towards technological advancements, market dynamics, and societal shifts, the integration of Design Thinking into the innovation process has become more than a trend; it is a strategic imperative.

This research paper seeks to delve into the profound impact of Design Thinking on innovation, exploring its role as a catalyst for the same. As we embark on this exploration, it is essential to understand the essence of Design Thinking and its underlying principles. By placing the human experience at the core of problem-solving, Design Thinking not only redefines innovation but also reimagines the very nature of creativity and ideation within organizations. Also, there is a case study that is presented in the paper.

The paper unfolds the Design Thinking process, exploring its integration into organizational processes, its impact on product development, and its implications for fostering a culture of continuous innovation. The ultimate goal is to provide a comprehensive understanding of how Design Thinking is not just a methodology but a driving force behind the innovation revolution that is reshaping industries and shaping the future of problem-solving

1.1 Background Information On Innovation And The Role Of Design Thinking

In the ever-evolving landscape of business and technology, innovation stands essential for organizational success and adaptability. Traditionally viewed as a linear process driven by technological breakthroughs, innovation has undergone a paradigm shift with the emergence of Design Thinking. Design Thinking transcends the conventional models, emphasizing a human-centric approach to problem-solving that integrates empathy,

GAP BODHI TARU
A GLOBAL JOURNAL OF HUMANITIES
(ISSN – 2581-5857)
Impact Factor: SJIF - 5.551, IIFS - 5.125
Globally peer-reviewed and open access journal.

creativity, and iteration. It acknowledges that innovation isn't solely about technological advancement but is deeply intertwined with understanding and addressing human needs, desires, and behaviours. By placing the end-users at the forefront of the creative process, Design Thinking acknowledges the intricacies of real-world problems and seeks to craft solutions that resonate with the users.

1.2 Design Thinking Overview

Definition: Design Thinking is a human-centered, iterative problem-solving approach that places empathy for end-users at its core.

It goes beyond traditional problem-solving methods to address the complex challenges and generate innovative solutions. Originating from design practices, Design Thinking has evolved into a versatile methodology applicable across various disciplines, including business, education, healthcare, and technology. Design Thinking involves a structured process that typically includes five key stages: empathize, define, ideate, prototype, and test. During the empathize stage, designers seek to understand the needs, feelings, and experiences of the users they are designing for. The define stage involves synthesizing the gathered insights to clearly articulate the problem or challenge at hand. Ideation encourages the generation of diverse and creative solutions, followed by prototyping, where tangible representations of ideas are created for testing. The final stage, testing, involves obtaining feedback from users to refine and improve the proposed solutions.

Design Thinking's strength lies in its emphasis on iteration and collaboration. It encourages multidisciplinary teams to work together. This methodology is characterized by its adaptability, promoting a mindset that views failures as opportunities to learn and iterate. The principles of Design Thinking extend beyond tangible product design to encompass a broader spectrum of challenges, including process improvement, service design, and organizational change. By fostering a deep understanding of user needs, encouraging creative problem-solving, and promoting collaboration, Design Thinking has become a powerful tool for driving innovation and addressing the dynamic demands of the rapidly changing world.

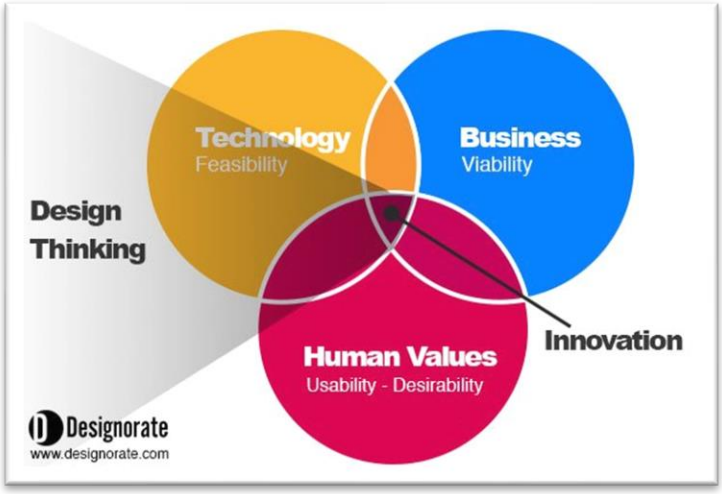


Figure 1 The relation between Design Thinking and innovation [1]

User Desirability: The product should satisfy the consumer's needs by solving everyday problems through a user-centered process.

Market Viability: Successful products require an integrated marketing strategy that identifies the target segment and builds the product brand in accordance with this target segment.

Technology Feasibility: Technology provides state-of-art tools for designers to innovate and build products that meet today's needs. And this technology must be implementable.

2. LITERATURE REVIEW

2.1 Defining Design Thinking

The term "Design Thinking" gained prominence notably in Peter Rowe's book of the same title (1987), where, upon closer inspection, its usage primarily pertained to architectural design, failing to encapsulate its current connotation in the business environment.

In its contemporary application as a thought process, the nomenclature is more aptly associated with the innovation consulting firm IDEO and its key figures, founder David Kelley (Kelley and Littman, 2005), and more recently, current CEO Tim Brown (Brown, 2009). IDEO's strategic evolution mirrors that of Design Thinking itself: originally concentrated on product development, it has broadened its scope to encompass the design of services, strategies, and even educational and other social systems. Brown defines Design Thinking as "bringing designers' principles, approaches, methods, and tools to problem-solving." Offering a more comprehensive definition, Thomas Lockwood, former president of the Design Management Institute, describes Design Thinking

GAP BODHI TARU
A GLOBAL JOURNAL OF HUMANITIES
(ISSN – 2581-5857)
Impact Factor: SJIF - 5.551, IIFS - 5.125
Globally peer-reviewed and open access journal.

as "a human-centered innovation process that emphasizes observation, collaboration, fast learning, visualization of ideas, rapid concept prototyping, and concurrent business analysis" (Lockwood, 2009) [2].

2.2 Overview Of Key Concepts In Design Thinking.

Numerous scholars (Bruce & Bessant, 2002; Von Stamm, 2003, 2004; Perks, Cooper, & Jones, 2005; Borja de Mozota, 2010) have underscored the innovation potential inherent in design. Despite this recognition, there has been a noticeable gap in innovation research concerning the centrality of design as a critical activity (Hobday, Boddington, & Grantham, 2011; Noble, 2011). Exceptions to this trend exist within the product development literature (Gemser & Leenders, 2001; Perks et al., 2005; Veryzer, 2005; Luchs & Swan, 2011; Micheli et al., 2012). Recent research initiatives signal a growing interest among scholars in exploring the intersection between design and innovation. Noteworthy examples include discussions around design-driven innovation, which delves into how design facilitates innovative transformations in product meanings (Verganti, 2008), as well as the exploration of design as meaning-making (Jahnke, 2013) and Concept-Knowledge (C-K) theory (Hatchuel & Weil, 2009). There is a rising appreciation for design as a strategic resource in managerial discourse, with the emergence of 'Design Thinking' (DT) as a human-centered approach to innovation based on the cognitive processes of designers (Brown, 2008, 2009; Martin, 2009). Previous research underscores the significance of professionally trained designers (Kimbell, 2011; Jahnke, 2012) and their impact on innovation. In contrast, advocates of DT, such as IDEO (Brown, 2008, 2009) and the Rotman School of Management (Martin, 2009), emphasize that the principles of Design Thinking can be applied by any discipline to enhance problem-solving, innovation efforts, strategy, new product development (NPD), or organizational renewal [3].

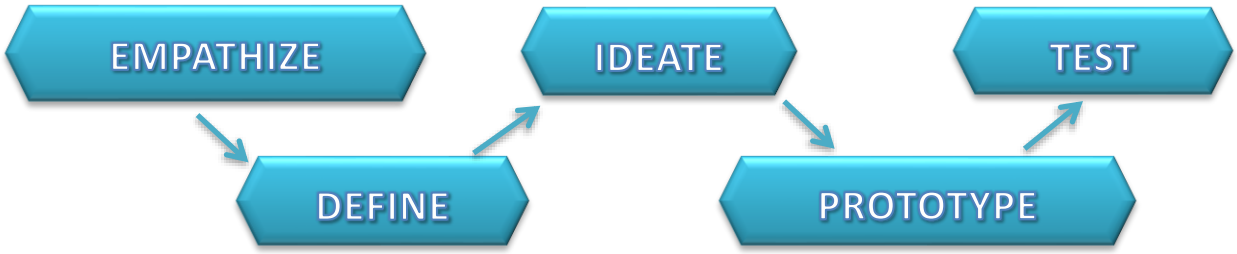
2.3 Review Of Existing Research On The Relationship Between Design Thinking And Innovation

In 2005, the Hasso-Plattner-Institute of Design at Stanford University in California initiated the teaching of Design Thinking to engineering students, driven by the conviction that engineers and scientists could cultivate the skills to become innovators. Plattner's vision, recognized by Meinel and Leifer (2010), suggests that exceptional innovators and leaders must possess strong Design Thinking capabilities. Their research emphasizes that impactful teams operate at the convergence of technology, business, and human values. Collaborative communities formed at this intersection, they argue, are fertile grounds for the emergence of breakthrough ideas, products, and companies. According to them, Design Thinking acts as a catalyst for innovation, playing a pivotal role in bringing new concepts into existence (Meinel, Leifer, and Plattner, 2011) [4].

Innovation driven by design is grounded in the concept that each product carries a distinct meaning for consumers. For instance, Swatch redefined watches from time instruments to fashion accessories, while Nintendo Wii transformed the meaning of playing with a game console into a social and active experience. Pioneering companies like Swatch, Nintendo, and Apple adopt a holistic perspective, stepping back from users to explore broader contexts (Verganti, 2010). They examine how the evolving context of consumer purchases, coupled with advancements in technologies, products, and services, influences these meanings. This underscores the importance of social-cultural observation in their approach. Incubators and their support for emerging businesses can achieve impactful, radical innovations in meanings by actively engaging in the practices of listening, interpreting, and addressing (Verganti, 2010) [5].

2.4 Exploration Of Relevant Theories, Models, And Frameworks

There are several processes that we can find across the globe, of Design Thinking.



Stages	Empathize	Define	Ideate	Prototype	Test
Description	Understand the users and care about their lives, know their needs, how they think and what is meaningful to them	Framing the right problem	Generate ideas/solutions/range of possibilities to solves people's needs/problems	Build to think and test to learn. Convert ideas into prototypes	Test with the stakeholders t learn about the solution

Figure 1 Design Thinking Process Proposed By Stanford Which Is More Human Centric [6]

GAP BODHI TARU
A GLOBAL JOURNAL OF HUMANITIES
(ISSN – 2581-5857)
Impact Factor: SJIF - 5.551, IIFS - 5.125
Globally peer-reviewed and open access journal.

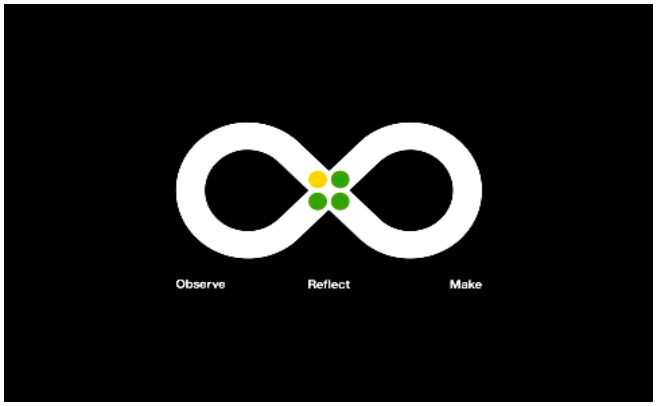


Figure 2 Design Thinking Process Proposed By IBM [7]

Table 2.1 - *A comparison of the models of design thinking along common phases of discover, create, and build.*

	DISCOVER			CREATE			BUILD		
Simon	Intelligence			Design		Choice			
Doblin	Analysis			Genesis		Synthesis			
Brown	Inspiration			Ideation		Implementaion			
IBM	Understand	Observe		Conceptualize		Validate	Implement		
Vogel	Identify	Research	Opportunity	Define Criteria	Achieve Criteria	Go/No Go	Produce		
Patton	Understand			Identify Solutions	Refine/Validate	Produce			
d.School	Empathize	Define		Ideate		Prototype	Test	Produce	
IDEO/Educators	Empathize	Interpret		Design		Experiment	Evolution		
LWC	Identify	Research		Ideate	Refine & Test		Aftermath		
	Define Problem	Research/ Empathy	Frame Constraints	Divergent Ideation	Convergent Ideation	Integrative Ideation	Prototype Ideas	Validate & Evaluate	Deploy & Learn

Figure 3 Models Of Design Thinking [8]

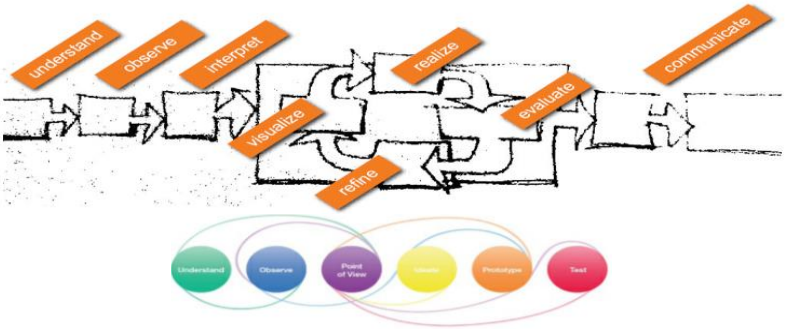


Figure 4 Design Thinking Process Proposed By IDEO [9]

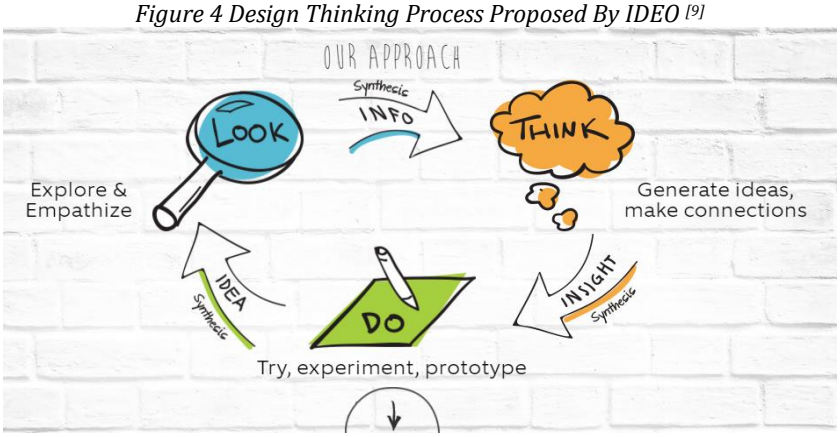


Figure 5 Design Thinking Used At SAP [10]

2.5 Creative Thinking & Innovation

GAP BODHI TARU
A GLOBAL JOURNAL OF HUMANITIES
(ISSN – 2581-5857)
Impact Factor: SJIF - 5.551, IIFS - 5.125
Globally peer-reviewed and open access journal.

In order to produce innovation creativity, is a must. And for the same creative thinking comes into picture. Creativity, defined as "the generation of novel and valuable ideas by an individual or a small group of individuals collaborating," and innovation, characterized as "the successful implementation of creative ideas within an organization" (Amabile 1988, p. 126), stand out as fundamental attributes & outcomes of Design Thinking. This observation is consistently echoed both in the literature and the insights shared by expert practitioners. For instance, A. G. Lafley, the former CEO of P&G, acknowledged for promoting a design-focused approach at the company, remarked that "Design Thinking is a mindset that nurtures creativity and innovation in products and services, as well as innovative approaches to business and organization" (Lafley, Norman, Brown, and Martin, 2013, p. 5). More specifically, certain features of Design Thinking, including prototyping, the trial-and-error methodology, and the application of abductive logic, are recognized as pivotal mechanisms for generating original ideas and fostering innovation (Deserti and Rizzo, 2014; Martin, 2009) [11].

The innovation process can be likened to a narrative of storytelling and retelling. Innovation process follows a storyline. In the observation phase, inputs or information from the field are noted. Progressing to framing, search for novelty, extracting vital insights from observational data. Identify gaps in use, usability, and meaning—what's absent—leading to the discovery of new opportunities and subsequently generating tangible solutions. During the analytical phases, decipher the current state of the story. In the synthesis phases, craft and narrate a fresh story envisioning how the innovation will enhance the experiences of its users [12].

3. EXPLORATORY QUALITATIVE STUDY

Explorra Consulting based in Ahmedabad, India, conducted a series of workshop at a multinational automobile company based in India. It is India's leading two-wheeler company with over 100 million two-wheelers sold till date. With innovation at the core of its philosophy, the New Delhi (India)-headquartered two-wheeler manufacturing giant has been at the forefront of designing and developing technology. With a focus on innovation and an expanding ecosystem, the company is set to redefine electric mobility with its new brand. Committed to Sustainability and Diversity & Inclusion, the company aims to create a greener, safer, and more equitable future, embodying the principle defined by its actions.

Case-Study by Explorra Consulting

3.1 Qualitative Findings

The starting point: How can Design Thinking and its implementation, support innovation processes in the automobile industry?

Objective of Case Study And Research

The Workshops and resulting study's goal is to investigate how innovation-led Design Thinking can be fostered and supported in new business models, product / service development, lowering automobile production costs, reducing risks of unintended consequences and partial approaches, and assisting in the delivery of more complete and resilient solutions.

Design Clinic Were Conducted

Two workshops were carried throughout this research. The stages of Design Thinking process were applied:

Stage I – Observation

During this phase, participants observed and engaged with real users and stakeholder i.e. service partners, OEM partners, Employees of different department who represented the target audience from different perspectives.

Stage 2- Empathy

In this stage, participants indulged in getting to know the end users, service partners, OEM partners, Employees and understanding their needs, wants, and objectives.

Stage 3- Problem Articulation

In this stage, participants were told to outline the problem from the information gathered in the observation and empathy stages. A seven-step problem articulation process was done from identifying the problem through root cause analysis and data analysis & synthesis.

Stage 4- Ideation

Here, participants were encouraged to come up with fresh ideas by thinking outside the box, challenging assumptions and exploring new territories. Through range of lateral and divergent thinking techniques.

Stage 5- Prototyping

The focus of this stage was to turn ideas into something tangible solutions that can be checked for feasibility and viability.

Stage 6- Testing

The final stage was all about testing the information and solutions with the stakeholders and while the solution was in action and mapping the final outcome of it.

GAP BODHI TARU
A GLOBAL JOURNAL OF HUMANITIES
(ISSN – 2581-5857)
Impact Factor: SJIF - 5.551, IIFS - 5.125
Globally peer-reviewed and open access journal.

CONCLUSION

Three level interventions were proposed, and then implemented at Company,

1) Future Leader Program: Training the team to be innovation – cultivating a mindset and temperament for innovation and creative thinking
2) Clinic – where new products and services could be introduced i.e. a New Product every 6 months, launch of spare part business, enhancing the current automobile and its parts
3) Internal Accelerator – whereby the company could compete with startups and disruptions in automobile sector by themselves nurturing startups from within their employees. Resulted into,

a) Electric Vehicles
b) Shared Mobility
c) Convertible 2-Wheeler to 3-Wheeler for Rural India

3.2 How Design Thinking Leads To Innovation

Design Thinking is a holistic and iterative problem-solving approach that brings in innovation by fostering a deep understanding of user needs, encouraging creativity, and promoting collaboration. The process typically involves several key stages, and each contributes to the generation of innovative solutions:

1. **Empathy and Understanding:** Design Thinking starts by empathizing with the end-users, gaining insights into their experiences, needs, and challenges. This empathic understanding forms the foundation for meaningful problem definition, ensuring that the innovation process is grounded in a real-world context.
2. **Problem Definition:** Design Thinking emphasizes the identification and framing of problems based on user experiences, keeping in mind all stakeholders. This helps in defining challenges in a way that resonates with the people who will benefit from the eventual solutions.
3. **Ideation and Creativity:** The ideation phase encourages a free-flowing exchange of ideas. By promoting a non-judgmental environment, Design Thinking stimulates creative thinking, encouraging participants to explore a wide range of possibilities without judgement.
4. **Prototyping:** Rapid prototyping is a pivotal element of Design Thinking. It involves creating tangible representations of ideas, allowing teams to visualize and test concepts fast. This iterative process not only helps refine solutions but also provides valuable insights that may lead to unexpected innovations.
5. **Testing and Iteration:** Design Thinking emphasizes continuous testing and refinement. Prototypes and ideas are tested with end-users, and feedback is incorporated into further iterations. This iterative loop ensures that the final solution is not only innovative but also closely aligned with user needs and expectations.
6. **Cross-functional Collaboration:** One of the strengths of Design Thinking is its ability to bring together individuals from diverse disciplines and backgrounds. Cross-functional collaboration facilitates a blend of perspectives, skills, and expertise, enriching the innovation process with a variety of insights and approaches.
7. **User-Centric Focus:** At its core, Design Thinking places the end-user at the center of the innovation process. By continuously seeking to understand and address user needs and preferences, Design Thinking ensures that the resulting innovations are not only novel but also resonate with the target audience.
8. **Adaptability and Flexibility:** Design Thinking recognizes that the path to innovation is seldom linear. The process is adaptable and allows for flexibility, acknowledging that unexpected insights or changes in the external environment may necessitate adjustments to the initial problem definition or solution.

3.3 Creative Thinking Leading To Innovation

Creative thinking is a precursor to innovation, serving as the driving force that generates novel ideas, solutions, and approaches to challenges. The relationship between creative thinking and innovation is dynamic and interconnected, and several key mechanisms illustrate how creative thinking leads to the production of innovation:

Connecting Ideas: Creative thinkers often excel at making connections between seemingly unrelated concepts. This ability to draw associations across different domains is crucial for innovation. By synthesizing diverse ideas, creative thinkers can develop unique and multidimensional solutions.

Risk-Taking and Experimentation: Innovation requires a willingness to take risks and experiment with new ideas. Creative thinkers are often more open to risk-taking, embracing uncertainty and seeing failures as opportunities for learning. This mindset fosters an environment conducive to innovation.

Out-of-the-Box Solutions: Creative thinking encourages individuals to think "outside the box" and consider unconventional approaches. This mindset disrupts traditional thought patterns and facilitates the generation of breakthrough ideas that can lead to innovative outcomes.

Iterative Process: Creative thinking and innovation often involve an iterative process. Ideas are generated, tested, refined, and retested. This cyclical approach allows for continuous improvement and adaptation, leading to more robust and innovative solutions over time.

User-Centric Design: Creative thinking, when applied to innovation, often emphasizes a user-centric approach. By understanding the needs, preferences, and experiences of end-users, creative thinkers can design solutions that truly resonate and provide value, fostering innovation with a human touch.

GAP BODHI TARU
A GLOBAL JOURNAL OF HUMANITIES
(ISSN – 2581-5857)
Impact Factor: SJIF - 5.551, IIFS - 5.125
Globally peer-reviewed and open access journal.

Cross-disciplinary Collaboration: Creative thinking thrives in collaborative environments that bring together individuals with diverse backgrounds and perspectives. Interdisciplinary collaboration promotes the exchange of ideas, leading to innovative solutions that draw on a broad spectrum of knowledge.

Creative thinking sets the stage for innovation by creating a mindset that values exploration, embraces uncertainty, and actively seeks new possibilities. As individuals engage in creative thinking processes, they generate the rough prototypes that, when refined and applied strategically, transforms into innovative solutions, products, or approaches.

3.4 Tools & Techniques Used To Produce Innovation Using The Design Thinking Process

The Ideation phase in Design Thinking serves as a platform to unleash creative abilities. Numerous tools & techniques are employed to foster idea generation, where ideas essentially manifest as one's unique thoughts. The distinction arises when these ideas transcend mere conception and evolve into true innovation. Let's explore a selection of tools utilized in the process of idea generation, paving the way for innovative outcomes.

SCAMPER is a creative thinking technique used to stimulate innovation and generate new ideas by encouraging individuals to think about existing products, processes, or ideas in new ways. The acronym SCAMPER stands for Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Reverse.

Substitute: Identify components, materials, or processes that can be replaced or substituted with alternatives. Consider how changing certain elements could lead to improvements or new possibilities.

Combine: Explore opportunities to combine different ideas, elements, or features. Consider how merging/integrating existing components could create synergies or innovative outcomes.

Adapt: Think about how existing ideas/solutions could be adapted or modified for different contexts, purposes, or target audiences. Consider how making adjustments might lead to improved outcomes.

Modify: Consider making modifications or changes to existing elements or processes. This could involve altering shapes, sizes, colors, or other attributes to enhance functionality or appeal.

Put to another use: Explore alternative applications/contexts for existing ideas, products, or processes. Consider how something designed for one purpose could be repurposed/applied in a different setting.

Eliminate: Identify elements, steps, or features that can be removed or eliminated without compromising the overall effectiveness. Streamlining and simplifying can often lead to innovative solutions.

Reverse: Challenge the conventional order/sequence of elements. Consider reversing roles, processes, or perspectives to explore how it might lead to unique insights or outcomes.

Lateral Thinking as one of the Creative Thinking Style Lateral thinking is a creative thinking approach that involves looking at a situation/problem from a unique and unconventional manner. Coined by Edward de Bono, lateral thinking encourages individuals to break away from traditional thought patterns and explore innovative solutions through indirect and non-linear reasoning. Unlike vertical/logical thinking, which follows a sequential and systematic approach, lateral thinking encourages the exploration of diverse ideas, often involving unexpected connections or "sideways" jumps in thinking. One such tool to implement lateral thinking is forced connection using random words.

4. CHALLENGES AND OPPORTUNITIES

The adoption of Design Thinking, while widely acknowledged for its potential to drive innovation and problem-solving, is not without its challenges. Identifying and analysing these challenges is crucial seeking to integrate Design Thinking into practices. Here are some common challenges faced in the adoption of Design Thinking:

Resource Constraints: Design Thinking often involves a multidisciplinary team, time, and resources for research, prototyping, and testing. Organizations with limited resources may find it challenging to allocate the necessary time and funds for the full implementation of the Design Thinking process.

Lack of Training and Skill Development: Design Thinking relies on specific skills such as empathy, ideation, and prototyping. The absence of training programs/skill development initiatives can hinder employees' ability to fully engage in the Design Thinking process.

Inconsistent Implementation: Inconsistent/partial implementation of Design Thinking across different departments/teams can lead to confusion and a lack of alignment. A cohesive and organization-wide approach is necessary for the successful adoption of Design Thinking principles.

Overemphasis on Tools: Focusing too heavily on the tools & techniques associated with Design Thinking, rather than embracing the underlying mindset & principles, can result in a superficial application that fails to produce meaningful innovation.

5. CONCLUSION

The widespread adoption of Design Thinking has ignited an innovation revolution, revolutionizing problem-solving with creativity. Design Thinking goes beyond current challenges, providing a holistic understanding of contextual innovation across centuries. Design Thinking stages of—empathy, articulation, ideation, prototyping, and testing—emphasize their pivotal role in driving breakthrough innovation through effective tools and

techniques. The future converges ingenuity and user-centric approaches, ushering transformative changes with innovative, iterative problem-solving methodologies. The iterative nature of Design Thinking, incorporating feedback from each stage, promotes holistic and sustainable innovation. This iterative approach cultivates a mindset shift from quick fixes to meticulous problem-solving, fostering a culture where innovation deeply addresses real user needs. Ultimately, Design Thinking's human-centered approach leads to more relevant, usable, radical, impactful, and sustainable innovations, shaping a future driven by creativity.

REFERENCES

[1] Author, Elmansy Rafiq. (2016). Design Thinking Case Study: Innovation at Apple. https://www.designorate.com/design-thinking-case-study-innovation-at-apple/
[2] Author Liedtka Jeanne. (Copyright 2014). Perspective: Linking Design Thinking with Innovation Outcomes through Cognitive Bias Reduction
[3] Author Carlgren Lisa, author Rauth Ingo, Author Elmquist Maria. (Copyright 2016). Framing Design Thinking: The Concept in Idea and Enactment
[4] Author Beausoleil Angele. (Copyright 2012). Design Thinking, Innovation and Business Incubators: A Literature Review
[5] Author Stanford d.school. (Copyright 2017). Project Report: 21st Century Employability Goals of Higher Education: Aligning Authentic Learning Goals of Courses and Self-Determination of Students
[6] Author, IBM. The Design Thinking process used by IBM.
[7] Author, Stinson Liz. (Copyright 2016). IBM's Got a Plan to Bring Design Thinking to Big Business. https://www.wired.com/2016/01/ibms-got-a-plan-to-bring-design-thinking-to-big-business/
[8] Author, IDEO. Design Thinking process proposed by IDEO
[9] Author, SAP. Design Thinking at SAP.
[10] Author Micheli Pietro Micheli, Author Wilner Sarah J. S., Author Bhatti Sabeen, Author Mura Matteo, Author Beverland Michael B. (Copyright 2019). Doing Design Thinking: Conceptual Review, Synthesis and Research Agenda
[11] Author Beckman L. Sara, Author Barry Michael. (Copyright 2007). Innovation as a Learning Process: Embedding Design Thinking