Improving Organisation Innovation Process through application of Design Thinking

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Abstract

In recent years, Design Thinking has gained widespread popularity as a method and framework to drive customer-focused innovation and develop superior products/ services. However, a mapping between the steps/ tools/ techniques and the philosophies and practices of Design Thinking with that of Innovation Process is strikingly missing in business literature. Thus, organizations attempting to leverage Design Thinking in the Innovation process usually struggle to integrate the tools, techniques as well as underlying concepts of Design Thinking, leading to suboptimal results.

The authors conducted the literature review of past research studies, case lets, articles and books to gain insight into Design Thinking as well as the Innovation process. They have studied the deployment of Design Thinking in a business organisation. An attempt has been made to develop a conceptual model and lay out an approach on how Design Thinking tools, techniques and principles should be integrated in the organisational innovation process.

Keywords: Innovation, Design Thinking, Prototyping, Innovation Matrix, Ethnographic Studies, interdisciplinary teams

Introduction

Innovation is the life blood of any modern business enterprise. In a globalised world with increasing competition from start-ups and companies from emerging economies and shrinking product life cycle and customer loyalty, every company must turn into a formidable innovation engine to survive and thrive. Studies after studies have confirmed the rapid acceleration of corporate mortality in the last two decades, both for large and small firms (Govindarajan, Vijay and Srivastava Anup, 2016) and have advocated strong innovation capability as the main defence of established organisation from the continuous onslaught from nimble newcomers.

However, building a robust innovation process in an organisation is easier said than done. The established organisations always end up focusing solely on current product and services (which are actually cash cows for them and generate immediate revenue). This inherent lethargy coupled with " not invented here" syndrome that plague successful managers in these organisation as well as the lack of structured process almost always results in maintaining the

organisational status quo . The results often are suicidal for the companies as have been proven again and again by the rapid demise of iconic brands such as Kodak , Black Berry or Nokia.

In recent years, Design Thinking has gained popularity among business organizations, as a method and a framework to drive customer-focused innovation and develop superior products/ services. Progressive companies across the globe, as well as government agencies, NGOs and even educational institutions have embraced Design Thinking as a novel approach to address a fundamental problem: how to innovate, come up with new products/ services, satisfy customers and stay relevant in a VUCA (Volatile, Uncertain, Complex, and Ambiguous) World characterised by rapid and disruptive changes.

Design Thinking : Overview and Methods

The term, Design Thinking was coined in 1987 by Peter Rowe, a Harvard University architecture professor as the title of the book which mainly deals with the theory of architectural design. Since then the concept of Design Thinking has evolved over the years.

At the outset, "Design Thinking" must be distinguished from "Design". As per Hyo Yeon (Mckinsey Podcast, December, 2018) , there are three core elements of design - the first is the craft, the doing of design , which is closer to artisanal, beautiful, creating artefacts, creating experience. The next is the end product, a product or service, or, in today's context, often, a digital experience. The third, which is called "Design Thinking" is the method by which teams of individuals tackle (wicked) problems (Buchanan Richard, 1992) or challenges and create innovative and novel product/ services. In a nutshell, Design Thinking is a collaborative and customer (user) centred approach to develop new products and services and solve customer's problem.

### Design Thinking – Different Models for application

The Design Thinking process has been divided into several stages to facilitate the planning of project tasks, collective and production activities, and timelines to come up with the final output (a new product/ service) within a specified time. The first references to a multiphase structure of the creative process in general, go back to Poincaré (1924), who through his reflections on his own creative thinking process in solving mathematical problems, gave the impulse to Wallas (1926) to divide the creative process into four phases: the preparation phase, the incubation, the illumination and the verification phase (Tschimmel Katja, 2012). This classification was the starting point of the research movements into design creativity, which looked for new models to describe the phases of a creative problem-solving process.

Over time, several Design practitioners, academicians and business managers developed various methods and models on how to apply Design Thinking in practice. More popular and widely used three approaches are briefly discussed below.

Tim Brown's approach to Design Thinking (2008):

Brown, one of the founders of IDEO, the boutique Design consultancy firm, introduced the fundamental concept of "Design Thinking" in his seminal article of Harvard Business Review(June, 2008) . As stated in the article, Design Thinking follows three distinct phases in sequence as depicted in Fig 1 and briefly described below.

Fig 1: Ideo's Procedure Model (Tim Brown, 2008)
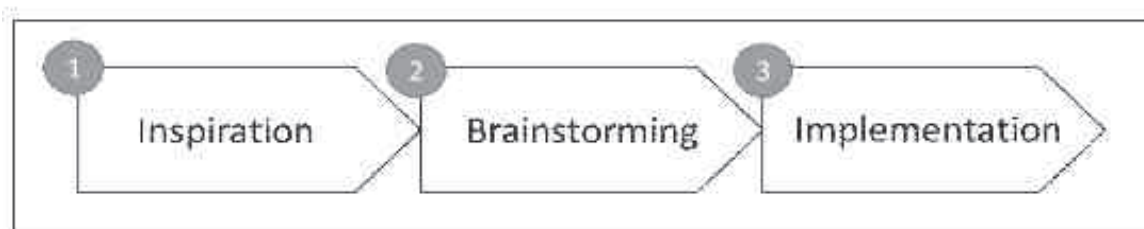
Inspiration: This phase focuses on understanding the current problems/ challenges the customer is facing and identify opportunities for new products/ solutions. This is largely done through observation of the users while they are using the current product and services as against customer surveys or focussed group discussion with select customers.
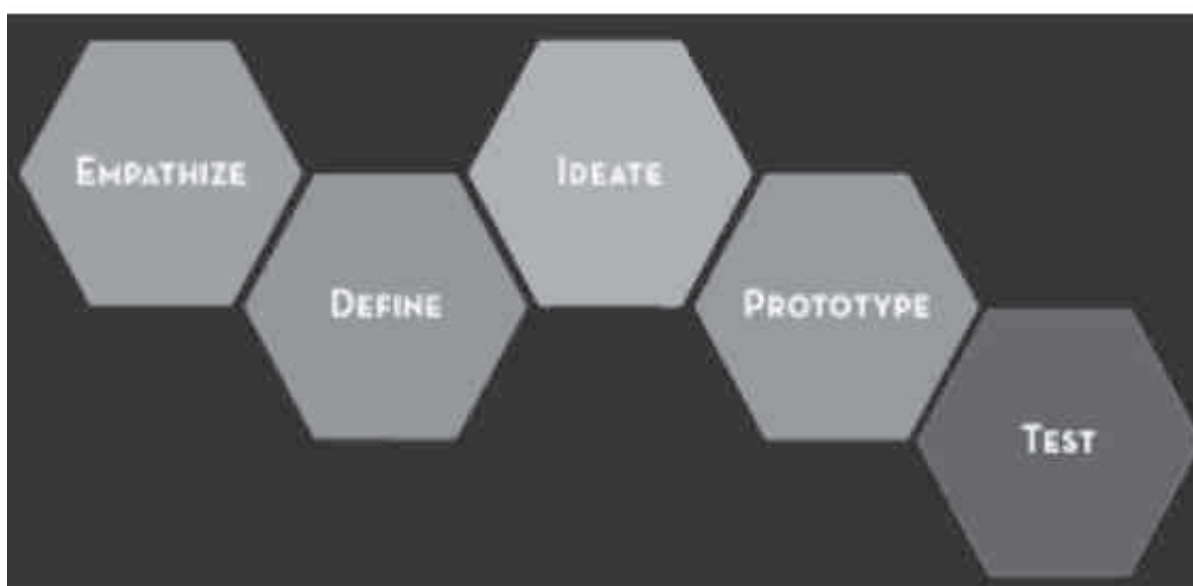
Brainstorming: This phase is related to acquisition,

development, and also testing of ideas of new product/ services that are generated to address the problems(s) facing the users as identified in the inspiration phase . During this phase, it is ensured that the focus remains on the users and that prototypes are constantly tested and further developed through multiple iterations. Users are also involved in these tests.

Implementation: In this final phase, the definitive prototype is implemented. For this purpose, a communication strategy is defined, and a business case is created.

It may be noted that the phases shown above are linear but at the same time iterative and interconnected.

Stanford Design School's approach to Design Thinking (2010)

The Stanford D School has popularized a five-phase model as depicted in the figure 3 below. The five phases i.e. Empathize, Define, Ideate, Prototype and Test has clearly defined activities and outcome although these phases are iterative in nature. The brief objective of the phases are described in Figure 2. As per Stanford D School, a team executing a Design Thinking Project is likely to come up with superior and innovative product/service or solution if they rigorously follow these five steps.

Fig 2: Stanford D School Model (2010)

Stage 1: Empathize—Research Your Users' Needs

The first stage of the Design Thinking process allows the team to gain an empathetic understanding of the problem they are trying to solve, typically through user research. Empathy is crucial to a human-cantered design process like Design Thinking because it allows the team to set aside their own assumptions about the world and gain real insight into users and their needs.

Stage 2: Define—State Your Users' Needs and Problems

In the Define stage, the team accumulate the information they created and gathered during the Empathize stage. They analyse their observations and synthesize them to define the core problems identified so far.

Stage 3: Ideate—Challenge Assumptions and Create Ideas

Designers are ready to generate ideas as they reach the third stage of Design Thinking. The solid background of knowledge from the first two phases means that they can start to "think outside the box", look for alternative ways to view the problem and identify innovative solutions to the problem statement.

Stage 4: Prototype—Start to Create Solutions

This is an experimental phase, and the aim is to identify the best possible solution for each of the problems identified during the first three stages. Design teams will produce a number of inexpensive, scaled-down versions of the

product (or specific features found within the product) to investigate the problem solutions generated in the previous stage.

Stage 5: Test—Try Your Solutions Out

Designers or evaluators rigorously test the complete product using the best solutions identified in the Prototype phase. This is the final phase of the model but, in an iterative process such as Design Thinking, the results generated are often used to redefine one or more further problems. Designers can then choose to return to previous stages in the process to make further iterations, alterations and refinements to rule out alternative solutions.

Liedtka & Ogilvie's Approach (2011)

Two professors, Jeanne Liedtka and Ogilvie, based on their experience of teaching and developed an approach consisting of four phases.

These four phases are: What is?: **Analysis of the Current Situation**

In this phase, the current situation and problems of users are analyzed in detail. The objective of this phase is to unravel what frustrates users and what disturbs them in their current situation.

What if? : Shaping the future

In the second phase, new possibilities and trends are taken into account in order to come out with a solution which addresses pain points captured in the preceding phase. Brainstorming is used to generate ideas. Ideas are then grouped and described in the form of concepts.

What wows? : Making of Decisions

In this phase, the concepts described are tested with assumptions in order to identify the most promising concepts. Prototypes are created for the promising concepts, which are then tested with users and partners.

What works? : Marketing the final product/service/ solution

The last phase serves to work on the prototypes and to develop them further so that the product /service can be commercialized.

In this four-phase model, the divergent and convergent thinking is used alternatively. In the first two phases of the procedure model, a broad field of vision is opened up (divergent) in order to detach oneself from existing solution approaches. In the last two phases of the procedure model, the focus is then placed on the promising options (convergent). A pictorial description of the phase and the key activities in each phase is given in the Figure 3.0

Figure 3 Liedtka & Ogilvie's Procedure model (based on Liedtka & Ogilvie, 2011
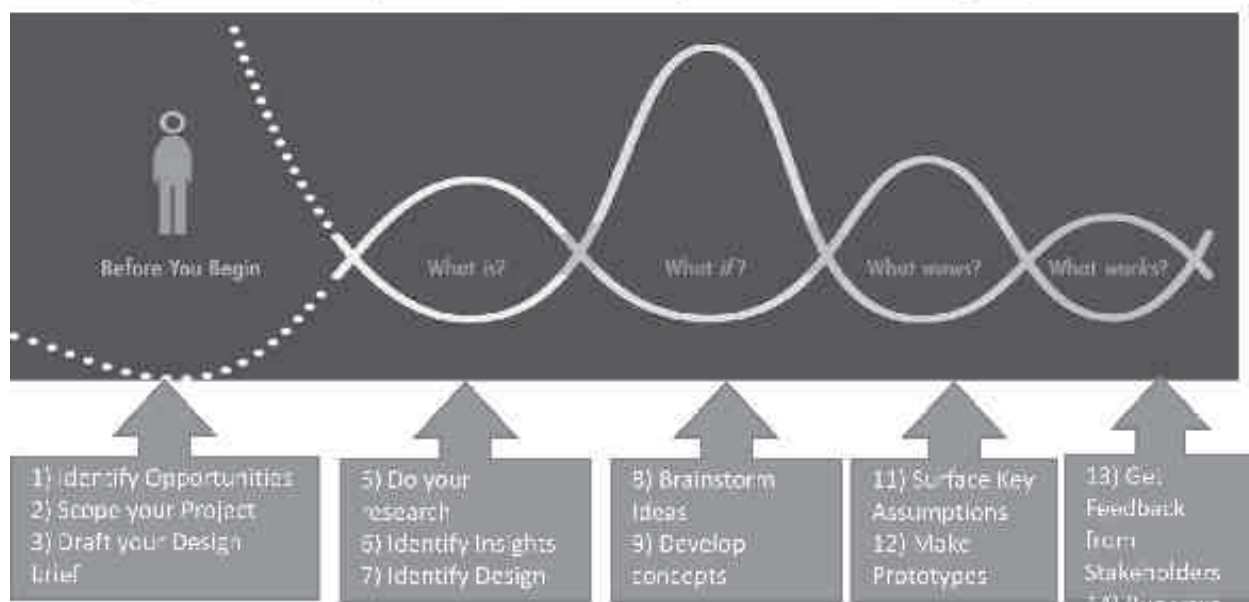
All the models / methods used in Design Thinking to come up with new products or services to meet the clients stated and implied needs can be largely summarised into the following four basic steps.

i. Understanding the Customer requirement

ii. Develop potential solutions to address the requirements

iii. Test and refine solutions through rapid prototyping

iv. Commercialize the best-fit solution

Each of the above phases have clear set of activities and deliverables. In addition, step 2 and 3 are iterative in nature and sometimes, a team may have to go back to step 1 while executing the Design Thinking project.

While there are multiple methods of application of Design Thinking in an organization (three of which are stated above) – the end goal of these methods remains the same. The end goal is to come up with products and services which are breakthrough in nature, and which meets the stated as well as implied needs of the intended users.

Innovation: Definition and importance in creating new products and services

Innovation, simply put, is the successful commercialization of a new idea. The idea could result is a new product / service or it could be about how to produce / market / distribute the product / service faster, cheaper or better. Thus, broadly the Innovation can be of two types:

(a) Product / service Innovation – this brings new product / service in the marketplace for consumption. Examples of this type of Innovation are Apple's iPod /Sony's Walkman (both are brilliant product Innovations) or 'No frill low cost Airline services' by Southwest Airlines (a service Innovation). Automated Teller Machines (ATM) is a good example of Innovative solution, which embodies perfect amalgamation of product and service innovation.

Fig 4.0 : Porter's Value Chain (Michael Porter, 1985)

(b) Value Chain Innovation – this improves the value chain efficiency by modifying and improving the components of value chain architecture. A value chain is a chain of activities that a firm, operating in a specific industry, performs in order to deliver a or service to the market. The concept was popularized by in his 1985 best-seller, Competitive Advantage: Creating and Sustaining Superior Performance.

A Value chain consist of a set of primary activities (Inbound logistics, Operation, Outbound Logistics, Marketing & Sales, Service) and four support activities viz. Infrastructure , Human Resource Management , Technology and Procurement. All these activities together enable a firm to produce and market goods and services and thus innovations in any of these activities will improve the productivity of producing and marketing the goods and services.

Examples of value chain Innovation are using robots to improve productivity of automobile car assembly or using offshore low-cost location delivery model for delivery of Application Development & Maintenance in software services industry.

Another school of thought is to classify the types of innovation in terms of the nature of change and impact. The advocates of this approach talk about two types of innovation – (a) incremental (b) radical or strategic. As per them, adding a feature or two in an existing product (e.g., touch screen facility on mobile phone) or making minor improvements in a production process (say introducing

cellular cell concept instead of arranging the machines in a straight line) are examples of incremental innovation.

On the other hand, radical innovations means disruptive change leading to very high impact such as introduction of iPhone by Apple (an example of product innovation) or invention of Assembly line production process by Ford Motor Company (an example of process innovation).

Why do Organizations need to focus on Innovation for product and service development

A study conducted by reputed French Business School Insead way back 2004 revealed that in a year, only 14% of the product launches include innovation but they account for 56% of revenue and 86% of the profit. Clearly, innovation is the only silver bullet for organizations looking for profitable growth.

Today, the customers have a plethora of choices in terms of product and services. Thus, we witness very high customer churn, drop in customer loyalty and shrinking product life cycles. In this environment, companies need to rapidly come out with new products and services to protect their market share. Otherwise, today's market leader can go belly up within a span of few years. Bankruptcy of iconic cell phone brands like Blackberry or Nokia or well established companies like Kodak in absence of product innovation are living testimony of this fait accompli.

Besides from macroeconomic point of view, the 'for–profit' organisations can add value to society in two ways (Govindarajan V, Trimble C, 2005) and both of these involve innovations:

1. The companies can improve productivity of existing work processes and thus enable production of more good and services using less and less resources (both human effort and other natural resources). This will lead to sustainability, a very important consideration in today's world.

2. The companies invent and popularise new products and services that meet previously unfulfilled needs. Thus, product innovations from railroads to aircrafts, from telephone to cellular phones or coronary bypass surgery to non-invasive laparoscopic treatments help to revolutionize human lifestyles.

Thus, organizations need to focus on innovation both from benevolent and selfish point of view. The former is needed for improving the living standards of the society as well as address sustainability issues while the latter is needed just for their survival.

In spite of this, there are handful of organisations which are truly innovative. There are hundreds of computer hardware and software companies for every Apple and there are hundreds of consumer product companies for every P&G.

Research Gap

Reluctance of many organizations to pursue the path of Innovation & Approach of Design Thinking (DT) in Innovation

Few years back, a leading consultancy firm commissioned a survey to find answer to the general apathy of corporations to aggressively pursue the innovation agenda and covered 500+ senior and middle managers in large US companies to identify the biggest barrier to innovation. Most of the response were "short term focus of the management" and "lack of time and resources for the company" (Charles De Monchy, 2013).

In this view, innovation is highly dependent on investment and senior management's presumed obsession with near term earnings limits a company's innovation productivity. Thus, most organization do not go for producing breakthrough products and service.

Design Thinking can be useful in giving a structure to the innovation efforts in a company and help to get high return on investment (ROI) from their investment in Innovation activities. Application of Design Thinking principles, tools and techniques can prove immensely powerful to create product and services that catches the imagination of intended customers/ users and offer a competitive edge to the company.

However, while there are multiple methods of application of Design Thinking in an organization (three of which are stated above) – a mapping between the steps of Design Thinking with that of Innovation Process is absent. So the organizations attempting to use Design Thinking approach in Innovation fails to successfully integrate the tools, techniques as well as underlying concepts on Design Thinking in their Innovation journey

Research Objectives

Based on the above gap - an attempt has been made in the present study to develop a model for the integration of Design Thinking with the typical innovation life cycle in a business organisation. The authors had studied the steps of Innovation and identified the tools / techniques and underlying concepts of Design Thinking which, when applied will fortify the innovation process. However, the integration attempt is not limited to only tools and techniques but also extends to the Design Thinking best practices and philosophies that need to be integrated to the Innovation process to achieve best results. In the end, the authors have attempted to build a conceptual model to

identify the components of Design Thinking approach, which when applied in the Innovation Process will produce superior outcome.

Research Methodology

In this research, we largely used literature review and case study research methods. Case study research (Benbasat et al., 1987; EisenharDesign Thinking, 1989; Yin, 2013; Stake, 1995) analyses relevant cases, describes them and develops empirically grounded concepts (Kromrey, 2009). We conducted the literature review of past research studies, caselets , magazine articles and books to gain insight into Design Thinking as well as the Innovation process . Based on this, an attempt has been made to develop   a theoretical model to identify the components of Design Thinking that can be applied to strengthen the organisation's typical Innovation process to produce superior outcomes.

Findings of the Study: How to successfully integrate Design Thinking with the innovation Program?

Phases of Innovation Cycle and application of Design Thinking:

Typically, an end to end Innovation cycle includes the following phases:

i.   Decide strategic areas to focus the innovation effort

ii.   Idea Generation

iii. Idea Assessment and Prioritization

iv.   Feasibility test and Concept Development

v.   Launch and Commercialization

We will discuss each of these phases in some detail and explore how the Design Thinking principles, tool and techniques will result in superior outcome.

Deciding strategic areas to focus on the innovation effort

In many organizations, the Innovation process starts with an idea collection drive. The management thinks that the first step of the process is to collect ideas from individual employees. The implicit assumption is that in an idea collection exercise, the more the merrier and creativity of the employees is the recipe for innovation. Unfortunately, these assumptions are wrong and often results in dissipated effort. It is important to have a strategic vision on how to channelize the innovation effort aligned to organisational priorities.

Secondly, Design Thinking advocates that organisation's innovation effort should not be limited to few functions (R & D), focus on few lines of business or pursue only high impact areas. In fact, rather than putting all bets in a single large scale innovation to create a blockbuster product, the companies should muster Design Thinking to manage an "innovation portfolio" as suggested by Tim Brown in his seminal book " Change By Design" (2010).

Fig. 5: Innovation Portfolio (Source : Brown T, Change By Design)
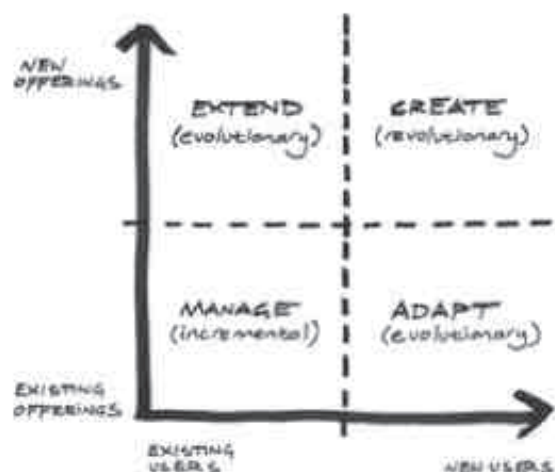
The organisation needs to consider the innovation exercise from the perspective of a new or existing user faced with new or existing offerings. The organisation can "adapt" current products for novices or bring fresh offerings to experienced users. Additionally, the company can focus on creating offerings to new users in a "revolutionary" approach. The creation of new product and services generally happen in this "revolutionary"/ "create" quadrant (please refer to Fig 5) but it also entails significant investment and risk. That does not mean that an organisation should ignore the other quadrants of Fig 5 – rather it is important to recognize that different types of innovations require different management strategies, investments, and carry different levels of risk and tailor the approach accordingly for innovation projects lying in each of these four quadrants.

While Design Thinking advocates that an organisation should use different types of innovation projects (as described above) , it is important to understand that which type of Innovation will be more amenable to Design driven approach and can thus benefit from the Design Thinking tools and techniques.

For this, we can refer to the innovation matrix proposed by Verganti (2009). Carefully collecting and analysing the firms that successfully use design to innovate, Verganti concluded that design-driven innovation does not necessarily result from cutting-edge technology. Instead, he observed that it is often driven by assigning new meanings to existing products or services. Accordingly, he classified radical innovation strategies into three groups—technology push, design-driven, and technology epiphany— depending on the level of technology and meaning involved (please refer to Figure 6). At the strategic level, the organizations must understand the various types of innovation pathways and apply Design Thinking principles accordingly. To get the most value from Innovation effort, organisations need to consciously drive towards the state of "Technology epiphany" as shown in the Figure 6.

Fig 6: Innovation Matrix, Verganti (2009)
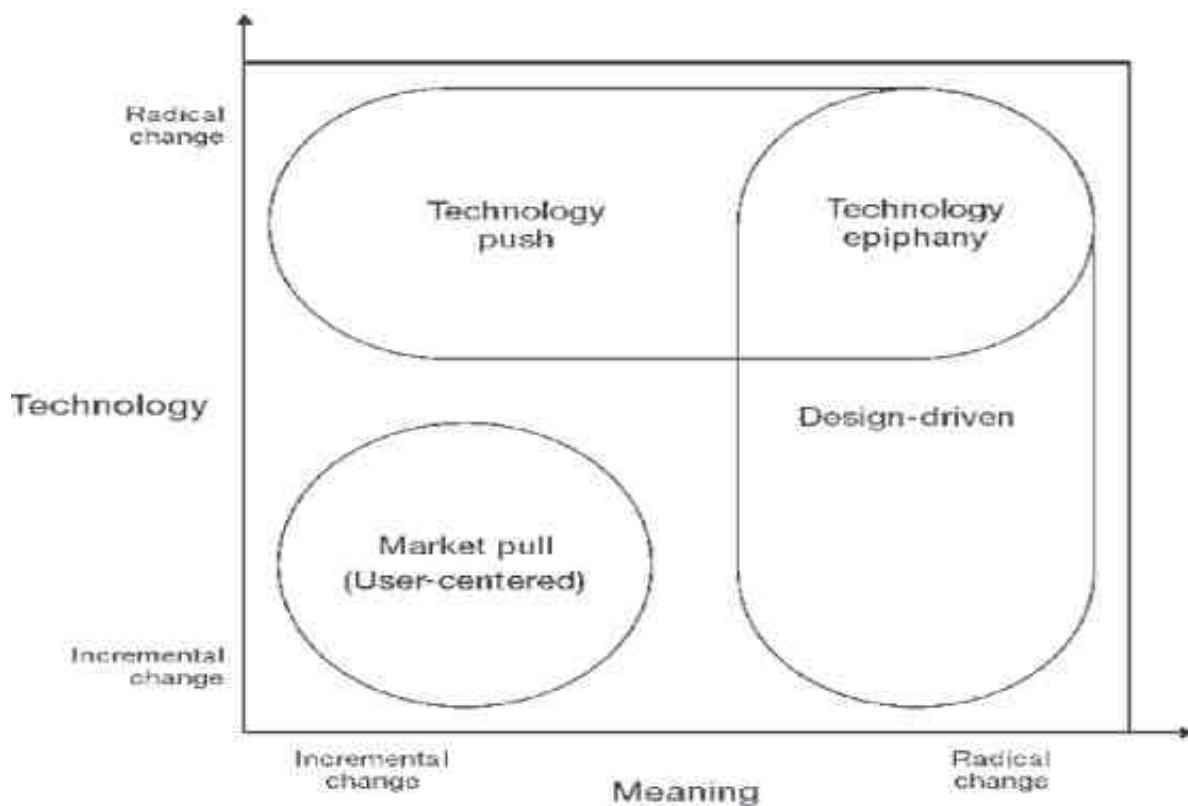
Ethnographic studies: To identify the right directions to pursue product/ service innovation, the organisations need to execute ethnographic studies of their potential/ market and customers. Ethnography is a qualitative research method extensively used in Design Thinking to observe the users/ customers as they use the product/ service. Ethnography takes three forms: observation, immersion and engagement. With observation we get the most "realistic" data as by observing what people are doing, not what they say they would do. Immersion puts the Design Thinking team into the experience so that they can become part of what they are interacting with and collect data accordingly. And finally, engagement allows the team to interact with people, typically interviewing them and have a conversation to get more insights. The ethnographic study results in creation of a "personas" - imaginary (but cloning real world) characters, created based on ethnographic research in order to represent the different user types that might use the intended service or product. While It is a generally fictional character, in includes real world qualities such as desires, delights goals, frustrations and other relevant characteristics. The detailed analysis of persons helps in identifying opportunities for new product and service innovation.

Persona creation is a very effective Design Thinking tool that can reveal the areas in which an organisation needs to focus their innovation effort to satisfy their customers. Personas typically represent a synthesis of characters of the organisation's target customers and thus provide the "voice of customers" and help to determine the areas where innovation will be meaningful to address customer's stated and implied needs.

Idea Generation

In this phase, the organization must decide who all to include in the Idea Generation exercise. While traditionally, only the employees of the company were typically employed in idea generation, companies are increasingly realising the value of including a larger ecosystem in the idea generation exercise. Almost two decades back, the visionary CEO of P&G, Alan Lafley , an staunch supporter of Design Thinking who appointed Claudia Kotchka, P&G's first vice president for Design Strategy & Innovation (David Dunne, 2018), insisted that 50% of P & G's new product ideas must come from outsiders.

The best ideas related to new product / services come from the interdisciplinary team formed as part of Design Thinking projects with inputs from the "outsiders" to the company – typically users of the product or service . This Design Thinking project team consist of members from various functions of the organization as well as from different personas of users for the product/service. While random ideas are hardly useful – the ideas emerging from deep brainstorming by the Design Thinking teams following the "What If" phase (as per Liedtka & Ogilvie's) normally result in fresh and practical solutions . Some of the Design Thinking tools that can be used in this phase of generating useful ideas include "Journey Mapping", " Empathy Maps", " Value Chain Analysis", "2X2 Matrix" , "Brain Storming" etc.

For example, when Shimano, a Japanese manufacturer of bicycle components launched a project to design a high end casual bike targeted at " Baby- boomers" in the United States (Tim Brown, 2009) , they not only involved the user groups but also engaged OEMs (Trek, Raleigh and Giant) , local government and cycling organizations in the US . The result is the development of "coasting bikes", built for more pleasure than for sport, and a creation of an unique brand identity for coasting ("Chill , Explore, Dwadle , Lollygag").

Idea Assessment and Prioritization

Often, in an unstructured Innovation Process, the organisation choose ideas at best by likely ROI and at worst by some vague criteria not clear either to the management or to the employees. There is often some randomness involved in the prioritisation of the ideas – this invariably results that the potential winners are nipped in the bud while mediocre project are sponsored for execution.

When Design Thinking approach is embedded in the innovation process , each idea is prioritised using the structured Design Thinking process by assembling an interdisciplinary team which evaluates it with the findings of the previous phase of the project (i.e Inspiration as per Brown, Empathise as per Stanford D School and " what is" as per Liedtka & Ogilvie's). In this phase, some of the Design Thinking tools that are relevant include Affinity Diagram , Concept Development , Assumption Testing , Quality Function Deployment (QFD), Body Storming etc (please refer to Annexure 4 for brief description). Any idea which is not aligned to the finding of the previous phase should not be pursued, however attractive it might appear on the surface.

For instance, when IDEO (a boutique Design Consultancy firm) was hired by Amtrak to explore the customer experience for their high-speed Acela trains – the railway engineers were hell bent to spend money on improving the seat quality and ergonomics (Brown Tim, 2008) . This ideas was viewed as common sense, but ethnographic research revealed that majority of the interaction took place before

the passengers even got on the train: getting to the station, buying the tickets, finding the platform and thus the ideas to improve customer experience must address these "moments of truth".

Concept Development and Feasibility test

If the organisation jumps direct to implementation, it will result in wasted efforts and money. Here the rapid prototyping concept of the Design Thinking approach will help in determining the right solutions to be implemented. As per the philosophy of rapid prototyping – the teams need to create "quick and dirty " replicas of their solutions from the very early stages of the project, share those with the potential users and take feedback early and often. This "fail fast" approach will lead to a more robust solution as the project progresses.

For example, when the designers of IDEO was once working with a group of surgeons to develop a new device for sinus surgery. As the Surgeons described the ideal physical characteristics of the equipment, a designer grabbed a white-board marker, a film canister, and a clothespin and taped them together. With this raw and rudimentary prototype, the surgeons could more precisely articulate how the final design should ideally be (Brown Tim, 2008).

Launch and Commercialization

Only a handful of projects for developing a new product/service will go to the final phase of launch and commercialization. The launch phases for an innovative product/service is very important as many otherwise brilliant products may fail due to insufficient planning and inept handling of the launch process.

Here again, the concepts of assembling an interdisciplinary team as part of Design Thinking projects comes in very handy. The team with representatives from all relevant functions will help to drive the launch and commercialisation of the new product/service in the right way by constantly focusing on the need of the end users .

The "Learning Launch tool" popularized by Jeanne Liedtka , Professor of Darden Business School in the University of Virginia, is very useful in this phase. The concept includes creating an affordable experiment that lets customer experience the new solution over an extended period of time, to test key assumption with data collected from the market.

The table below (Fig 7) provides a snapshot of the possible Design Thinking tools that can be leveraged for the various phases of the Innovation process. For a short description of these tools , please refer to Annexure 1.

Fig.7 : Design Thinking tools aligned to the phases of the innovation process

	1. Understand Customer needs	2. Develop potential products through idea generation	3. Refine Solutions through feasibility testing	4. Implement and Commercialize
Tools/techniques	i. Persona Creation	i. Brain storming	i. Assumption testing	i. Story boarding
	ii. Empathy Maps	ii. Mind mapping	ii. Control-Impact Matrix	II. Learning Launch
	iii. Journey Maps	iii. Forced Connection	iii. Rapid prototyping	
	iv. Job to be done	iv. Six Thinking Hats™	iv. Bring-Build-Buy Map	
	v. Ethnographic interviews	v. Quality Function Deployment		
	vi. Kano Model	vi. FMEA		
	vii. Focus Group Interviews			

Design Thinking principles that aid in the Innovation Process:

The success of Innovation is not only depended on the application of the right tools and techniques or on the R & D budget of the organisation. There are some time-tested principals, philosophies and best practises that the organisation must endorse and practise for their innovation efforts to be successful. Most of these principles are embedded in the Design Thinking approach and can be copied directly by the organisations in their innovation exercise; some other may need some tailoring before implementation. We discuss below these Design Thinking principles and best practise in some detail.

The Importance of separate team to drive innovation project

Many a time, companies make the common mistake to let the existing BAU (Business As usual) team to own the innovation project. They expect that the existing operations manager spend as much time perfecting the production process of the new product as they spend in producing the current cash cow or the current sales force will spend as much energy to sell the new product as they spend in promoting existing product. This approach is a sure shot recipe for failure.

The operation manager is expected to focus more on the current product which is the main source of revenue and will only spend time on the new product only after the needs of existing product is adequately addressed. Similarly, the salespeople will naturally spend more time in promoting existing products, as those are easier to sell. Therefore, the only option is to form a separate team to look into the project of converting the new idea to a successful commercial product or service. However, this team needs to have a good working relationship with the existing BAU team so that it can leverage the assets, customer relationships and core competencies from the BAU team (Govindarajan V, Trimble C, 2005).
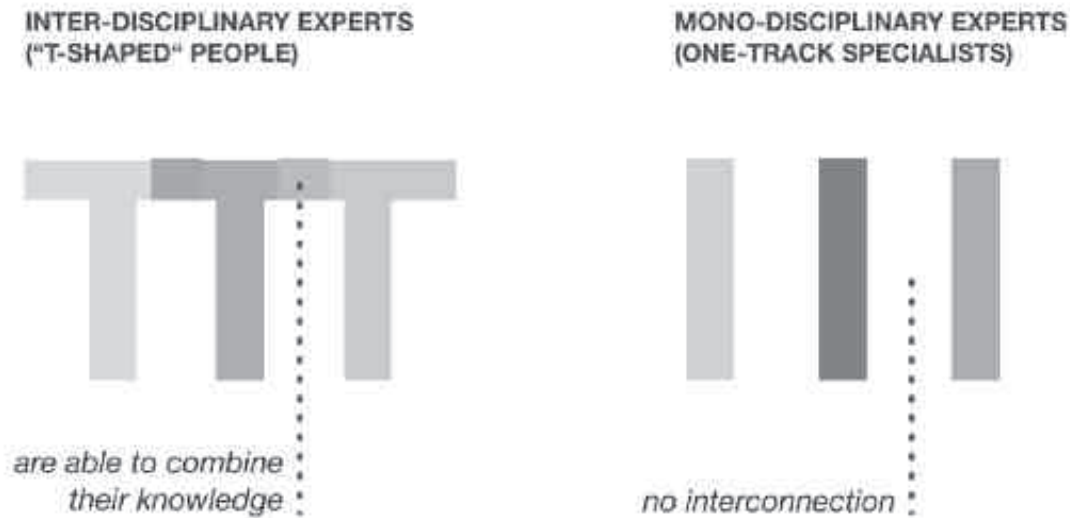
The Design Thinking approach actually emphasises of creating an interdisciplinary team at the beginning of the project which may get dismantled once the project is over. During the project , the team member will not have any responsibility for their day to day operations and should solely focus on the "project in hand".

A Design Thinking team should ideally be a cross/multi-disciplinary team consisting of a mix of specialisations, including specialists associated with problem areas contributing but not dominating the journey. While specialists may have vast knowledge on a technical level, they are working towards solutions targeted towards non-specialists in many cases and require outside-in perspectives, in addition to what they already know.

Taking a cross section of an organisation, one will soon realize that individuals within specific departments with specialist skills in specific business functions tend to approach problem solving on their own level of experience, using the skill set they feel most comfortable with. Sales, marketing, IT, product development, customer service and HR departments all view challenges they face through the prism of their departmental functions. Bringing together teams that provide a wider view of things is important, but even more so is to encourage them to look outside their own spheres of influence to allow more holistically framed problems to be uncovered.

A common complaint in business organisation regarding the specialists is that they normally tend to approach problem solving on their own level of experience, using the skill set they feel most comfortable with. This usually if not invariably, results in suboptimal solutions or "me-too" product that fails to delight customers. For example , each department functions such as Sales, marketing, IT, product development, customer service and HR departments, working in their respective silos , view challenges they face through their own lenes.What works in product innovation is to create a cross functional team with seamless communication where every team member can look outside their own spheres of influence to allow more holistically framed problems to be uncovered. While choosing the members of a Design Thinking team, the organisation should look for need T-shaped people. T-shaped people have a depth of knowledge and experience in their own fields, but they can also reach out and connect with others horizontally and create meaningful collaborations, as shown in Fig 8 (Dam R. F, Teo Y S, 2019).

Fig. 8: T-Shaped People vs. One-Track Experts (Thoring and Müller, 2011)

INTER-DISCIPLINARY EXPERTS
("T-SHAPED" PEOPLE)

MONO-DISCIPLINARY EXPERTS
(ONE-TRACK SPECIALISTS)

are able to combine
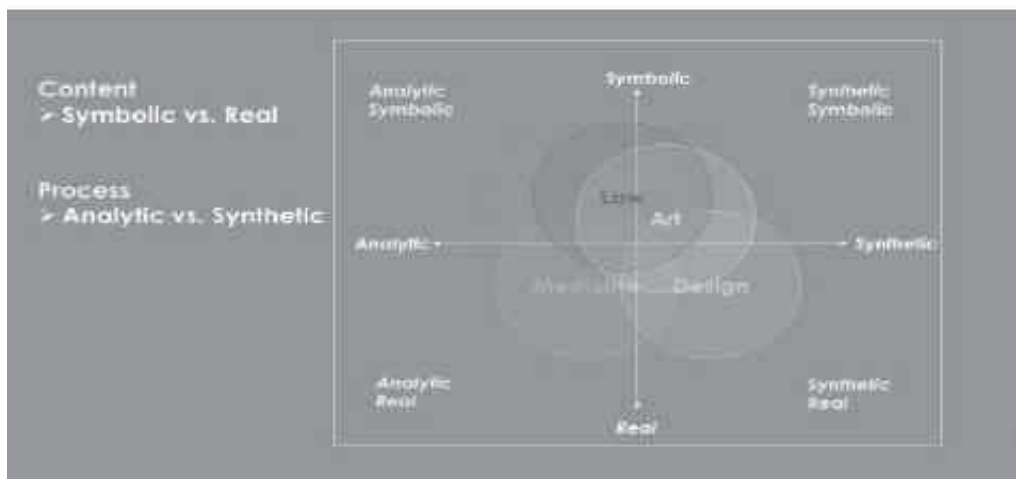their knowledge

no interconnection

Double Diamond Approach in Design Thinking Process

The philosophy and approach of Design Thinking is fundamentally different from the ways the business managers are trained to think. This was first elaborated by Owen (2007) when he had contrasted Design Thinking with "scientific thinking." Where scientific thinking is concerned with sifting facts to discover patterns and insights, designers invent new patterns and concepts. Owen classifies different fields according to the way they work—Analytic versus Synthetic—and their domain of activity—Symbolic versus Real, as shown in Fig. 9

Fig 9: Types of Thinking across domains ; Owen (2007)

Content
➤ Symbolic vs. Real

Process
➤ Analytic vs. Synthetic

Symbolic

Analytic
Symbolic

Synthetic
Symbolic

Analytic

Art

Synthetic

Design

Analytic
Real

Synthetic
Real

Real

Business managers, typically think convergently and rely on analytical decision tools to come to a solution. This type of thinking and decision making definitely saves time and effort but seldom results in "out-of-the-box" innovative solution that creates out of the ordinary product / services. To create novel solutions and innovative product/ services, the team needs to deal with the subject in a divergent and convergent mode (Dunne and Martin, 2006). Divergent and convergent thinking are elementary cognitive factors to solve problems (Guilford, 1967).

Divergent thinking is the ability to find multiple alternatives or solutions to a given problem. Divergent

thinking results in a changed point of view and generation of larger number ideas that ultimately lead to creativity (Guilford, 1950). Convergent thinking, on the other hand, utilizes elements and outputs of divergent thinking, bringing them together in a meaningful way, using methods, clusters, patterns, concepts or frameworks.(Lindberg et al., 2010).

Fig. 10 : Alternation of generating and selecting in the Design Thinking process (Thoring and Müller, 2011)
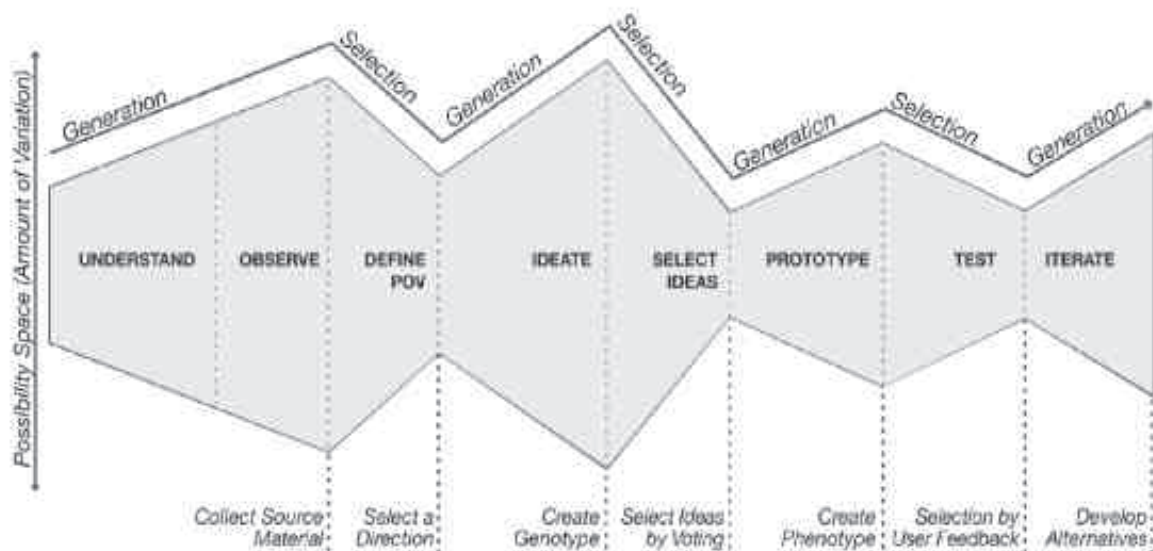
The Design Thinking method as depicted in Fig 9 provides the team with opportunity to apply divergent and convergent thinking in a consecutive manner and thus presents with much higher chance of creating innovative product/ service than what could be otherwise be possible. What actually transpires on the ground , when the teams adopts double diamond approach is pictorially shown in Fig No. 11. As can be clearly see in this diagram, the divergence and convergence approach neatly aligns with the phases of Design Thinking project , creating a superior outcome

Fig. 11 : Double Diamond Approach in practise
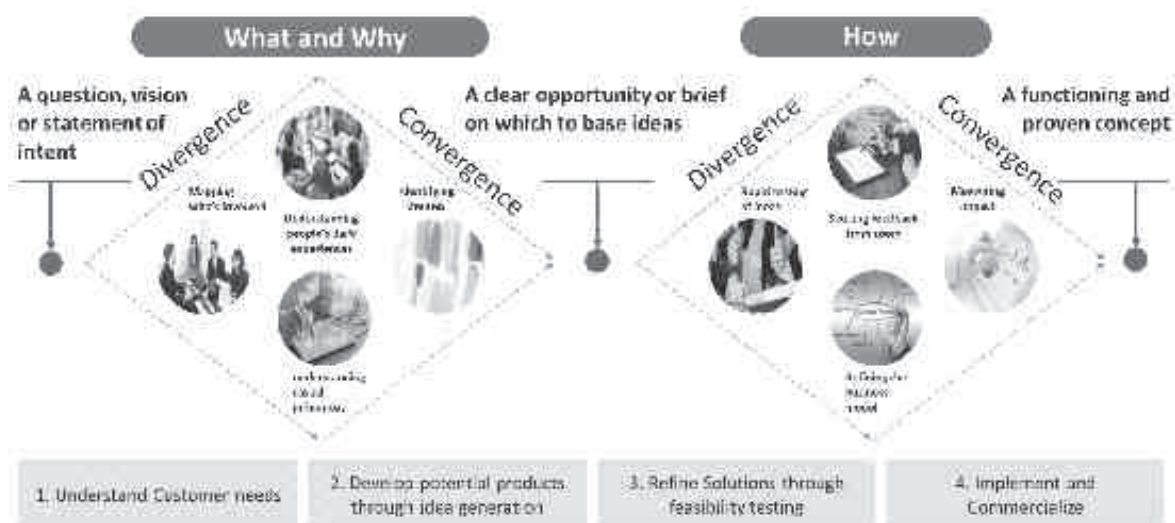
Tolerance for failure in the execution cycle

"Innovation is generally an untidy process," says Gary Pint, retired Sr. VP of 3M, worlds one of the most innovative companies. A majority of new ideas fail, but people shouldn't fear for their jobs when that happens. Design Thinking as a philosophy and as an approach has high failure tolerance in-built in the method. In the rapid prototyping phase, the teams are expected to build quick and dirty prototypes and test them in the real-life environment. Many of these experiments fail. Even the final product developed by the Design Thinking project team may not see the light of the day and be abandoned after a lot of effort and money have been spent on the project. But the learning that the teams get from these failed endeavours are invaluable and prove very important in the success of future innovation projects.

However, Gary P Pisano, Professor Harvard Business School , in a rather recent article (HBR, Jan- Feb, 2019) cautions that unbridled freedom for failure can quickly become count productive for an organisation unless it is counterbalanced by tougher behaviours such as rigorous discipline during execution , zero tolerance for sloppy work habits and a very high level of accountability of the people involved in the Innovation Project. This is ensured by the interdisciplinary teams of Design Thinking projects which serves as effective "checks and balances" for such poor performance ethics.

Putting it all together: integrating Design Thinking in the Innovation Process

Organizations pursued diverse goals through Design Thinking which include but not limited to innovation, customer orientation, and cultural change. However, in the managerial literature, innovation featured prominently as a central objective (Dunne D, 2018).

Some of the fundamental practise of Design Thinking contributes to more innovative products and solutions when applied in letter and spirit in the Innovation process . These as per Liedtka Jeeane (2018) are:

deep understanding of user needs through direct observation instead of depending on reams of market research data

II.   involving cross functional and interdisciplinary teams

III. dialogue based conversation during project execution

IV. multiple solutions winnowed through rapid prototyping

V.   creation of structured and facilitated process

The diagram 12 below at high level attempts to summarize the various tools, techniques and underlying principles of Design Thinking that can be integrated with the Innovation process in an organization to deliver superior results.

Fig 12 : Innovation Process and Design Thinking - conceived by the authors
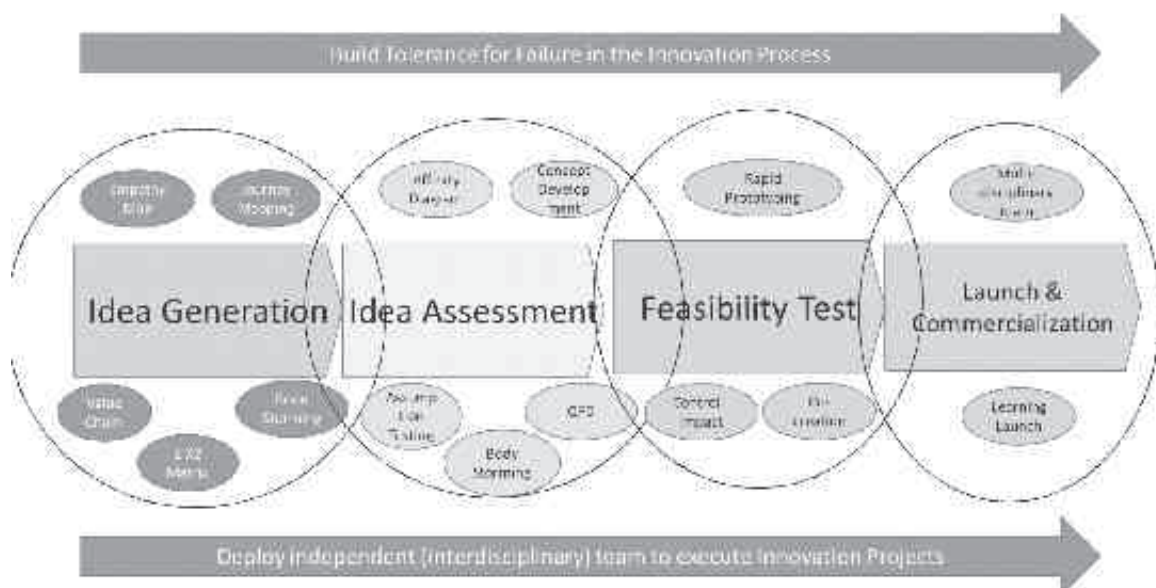
Conclusion and Next Steps

To make a company truly innovative, the company management must work on building the processes and propagating the values which foster innovation. Deploying a Design Thinking approach across the organisation is a very effective method through which organisations can maintain the momentum of innovation and come out with winning products/services and solve complex organisation problems. This article outlines some of the Design Thinking principles which when implemented in the proper way will aid in building the innovation engine in an organisation. The organisational practices which create the right environment to apply these principles need to be studied further and could be the topic for further research.

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Annexure 1: List of Design Thinking tools – brief Description

a)   Visualization : using imagery to envision possibilities and bring them to life

b)   Journey Mapping : assessing the existing experience through the customer's eyes

c)   Value Chain Analysis: assessing the current value chain that supports the customer's journey

d)   Mind Mapping: generating insights from exploration activities and using those to create design criteria

e)   Brainstorming: generating new possibilities and new alternative business models

f)   Concept Development: assembling innovative elements into a coherent alternative solution that can be explored and evaluated

g)   Assumption Testing : isolating and testing the key assumptions that will drive the success or failure of a concept

h)   Rapid Prototyping : expressing a new concept in a tangible form for exploration, testing, and refinement

i)   Customer Co-Creation: enrolling customers to participate in creating the solution that best meets their needs

j)   Learning Launch : that lets customers experience the creating an affordable experiment new solution over an extended period of time, to test key assumptions with market data