

Design Thinking and Innovation Management

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Abstract

As an approach to creative problem solving, design thinking has received much attention in the professional IT industry. It appears to be especially well-suited to the challenges facing the IT sector. Regardless of the rising interest in this technique, the genuine viability of Design Thinking is negligible. Most normal results situated proportions of imaginativeness (e.g., number of new product presentations or number of new Services) used to show the effect of Design Thinking don't catch the apparent advantages of utilizing Design Thinking. The review of existing points to the need for a more nuanced exploration of the mechanisms behind Design Thinking's effectiveness for innovation and performance by identifying the intermediate outcomes. The research discussed in this paper contributes to Design Thinking by identifying and assessing Design Thinking practices and intermediate outcomes and assessing the relationship between them in a diverse sample of IT practitioners. The discoveries show that Design Thinking rehearses are related with a rich and differed cluster of positive halfway results — for those being designed for as well as for the innovators utilizing its innovations, their teams and IT organizations, and even the larger systems in which they operate to gain the competitive advantages from IT market.

Keywords: Design Thinking, Innovation Management, Innovation, Creativity, Competitive Advantages

Chapter 1: INTRODUCTION

1.1 Research Background

The current analysis using Design thinking, organizational creativity, and creativeness in pursuing management decisions, principally connected with the items and the market changes, is motivated. By Design thinking as an interdisciplinary methodology, the necessities of partners (clients, customers, representatives, colleagues, and so forth) and the normal outcomes are distinguished. The adequacy of the model is legitimate by the way that fruitful innovations emerge in joining business targets and necessities (assurance of suitability) with innovation (assurance of acknowledgment of potential choices) and individuals' needs (ensure for seriousness).

New edge technologies are changing the digital footprints of organizations in the process of doing business, staying competitive, giving the best services to customers, and winning the market share. The justification for why organizations take a stab at innovation is to be more adaptable and versatile to the dynamic and changing business climate and the business sectors, where new versatile instruments are expected to start groundbreaking thoughts. This open door is given by design thinking as a key and a key device working with the mix of inward cycles in an organization and taking them to another level by zeroing in on the client and its necessities. Practice shows that when leaders see the system of design thinking as a methodology in each movement and such of their organizations (new items, administrations and encounters, advertising, services, HR, innovation, and so on), the outcome is arriving at positive market arrangements with an additional incentive for the client, secure acknowledgment, and benefit for the organization.

The implications are that Design thinking isn't as distant from business as it appears, yet entirely a remarkable inverse. It is a fundamental instrument to work on the connections between the various areas of organizational movement and its outcomes. It helps to grow innovative management practices to stay competitive.

The present organizations and their leaders continually search for better approaches to produce thoughts and new business potential open doors that add esteem and make a character for their organizations. This goal is likewise determined by the should be more adaptable and versatile to the dynamic and changing business climate, which brings about the direction towards new versatile apparatuses to start innovative thoughts. These patterns are essential lately for the development of much extra writing connected with the making of innovations - a vital component for the endurance of organizations in the present market, particularly for the people who are delicate to the creation and burden of new items and management. In such a manner, as a technique for starting imagination and innovation, the consideration of the business's local area is centered around a generally new strategy called Design Thinking. It has additionally excited impressive interest in established researchers throughout recent years, both as far as well-known administration books and course readings and in significant distributions by business specialists, for example, *Kato* The Economist, Harvard Business Review, Business Week, The Wall Street Journal and The New York Times.

The distributions express the extraordinary potential and value of Design thinking as a way to deal with work on organizational outcomes in different areas of business.

1.2 Research Aim and Objectives

Aim:

The main objective of this research study is to examine whether organizations can be steered by adopting Design Thinking which will create an Innovative Management culture and result in competitive benefits.

Against this background, the research study aims to examine the adoption and usage level of Design Thinking and Innovation management. At the same time, the research aims to discover new ways of working that can help organizational performance and growth using Design Thinking and Innovation management.

Objectives:

- To examine the Design Thinking and Innovation Management adoption level in global IT organizations.
- To determine how Design Thinking can trigger Innovation Management culture in global IT organizations.
- To explore how the growth of the organizations can be steered through new ways of working in the adoption of Design Thinking and Innovation Management.

1.3 Research Questions

The research questions developed for this research study are presented below:

RQ1: What is the adoption level of Design Thinking in global IT organizations?

RQ2: How does Design Thinking help in creating Innovation Management which helps IT organizations to gain competitive advantages during this VUCA world?

Based on this research idea, the following hypotheses are proposed:

1. Design thinking has a significant and positive impact on product innovation
2. Design thinking has a positive and significant impact on process innovation
3. Design thinking has a positive and significant impact on organizational innovation

1.4 Organization of Research

This research paper is constructed in the flow of Chapter 1 Introduction, Chapter 2 Literature Review, Chapter 3 Research Methodology, Chapter 4 Result & Findings, Chapter 5 Discussion, Chapter 6 Conclusion, and References.

Chapter 2: Literature Review

2.1 Theoretical Concept of Design Thinking

Design thinking has a lot more extensive importance than the, for the most part, acknowledged idea of modern design. It is disconnected from the simply stylish appearance of the things that decide the last period of the improvement of the new item. Even though choices about what it will resemble are fundamental to its acknowledgment in the item market, the outside design alone is, as of now, adequately not. With regards to design, we mean the whole course of item acknowledgment, recognizing who else will purchase a specific item, why and for what purposes, as well as in what circumstances or conditions it will be consumed or utilized. Design Thinking covers the whole client's endless experience with the item.

As an interdisciplinary way of thinking, Design Thinking incorporates a few devices and structures deeply grounded in the field of design, yet currently in the business setting. Examples of overcoming adversity of market giants like Microsoft, Amazon, P&G, IBM, Apple, SAP, Google, and Toyota, who value this approach, demonstrate its convenience and viability.

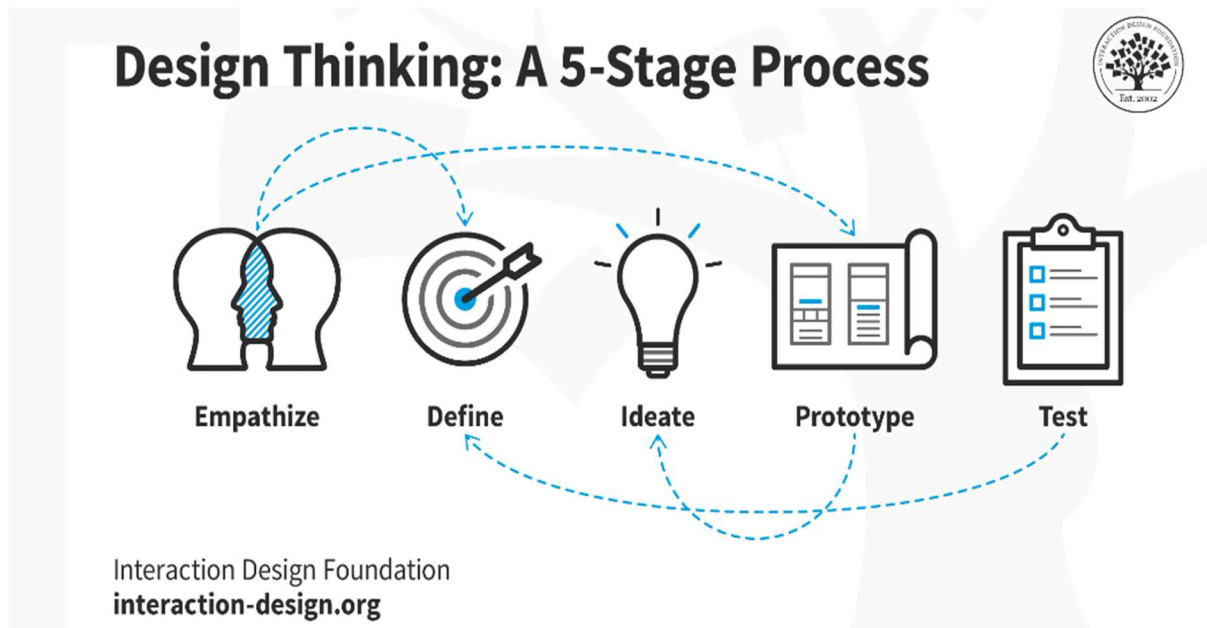
As per Tim Brown, CEO of IDEO, Design thinking is *“Put simply, design thinking is a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity.”* This definition not just grasps effective arrangements that address individuals' issues yet additionally zeros in consideration on three regions: business necessities (assurance of suitability), innovation (assurance of acknowledgment of potential choices), and individuals' requirements (assurance of seriousness) (The Design Thinking Process. (n.d.). IDEO U).

Design Thinking ought to be considered as an iterative cycle in which the various stages blend and feed one another. The cycle dispatches the experimentation model, accordingly, creating and working with numerous thoughts immediately. The interaction disposes of the craving, which is shared by many organizations, to work with only one, the best arrangement, and to zero in on the execution of only one thought.

D.school (design institute) in Stanford and IDEO define the Design Thinking model in five stages which is an iterative and non-linear process that contains five phases: 1. Empathize, 2. Define, 3. Ideate, 4. Prototype, and 5. Test. (The 5 Stages in the Design Thinking Process, 2022)

The succession displayed in Figure 1 shows the fundamental rationale behind uncovering the requirements and dormant necessities of the client, permitting different groupings to be permitted and, surprisingly, energized because of the organizational setting, the genuine encounter with the clients, and the current assets after some time.

Figure 1: Phases of the Design Thinking Process



(Source of Figure 1: <https://www.interaction-design.org/literature/topics/design-thinking>) (The 5 Stages in the Design Thinking Process, 2022)

The authority of the stages shows that Design Thinking envelops both thinking and method of activity: gathering data and insightful tasks, trailed by periods of prototyping and testing, where thoughts become substantial items.

Giving Shape to the Innovator's Journey - Figure 2: *"What makes design thinking a social technology is its ability to counteract the biases of innovators and change the way they engage in the innovation process."* (HBD, Jeanne Liedtka, 2018)

Figure 2:

Problem	Design thinking	Improved outcome
Innovators are trapped in their own expertise and experience.	Design thinking provides immersion in the user's experience, shifting an innovator's mindset toward...	...a better understanding of those being designed for.
Innovators are overwhelmed by the volume and messiness of qualitative data.	Design thinking makes sense of data by organizing it into themes and patterns, pointing the innovator toward...	...new insights and possibilities.
Innovators are divided by differences in team members' perspectives.	Design thinking builds alignment as insights are translated into design criteria, moving an innovation team toward...	...convergence around what really matters to users.
Innovators are confronted by too many disparate but familiar ideas.	Design thinking encourages the emergence of fresh ideas through a focused inquiry, shifting team members toward...	...a limited but diverse set of potential new solutions.
Innovators are constrained by existing biases about what does or doesn't work.	Design thinking fosters articulation of the conditions necessary to each idea's success and transitions a team toward...	...clarity on make-or-break assumptions that enables the design of meaningful experiments.
Innovators are lacking a shared understanding of new ideas and often unable to get good feedback from users.	Design thinking offers pre-experiences to users through very rough prototypes that help innovators get...	...accurate feedback at low cost and an understanding of potential solutions' true value.
Innovators are afraid of change and ambiguity surrounding the new future.	Design thinking delivers learning in action as experiments engage staff and users, helping them build...	...a shared commitment and confidence in the new product or strategy.

HBR

(Source of Figure 2: <https://hbr.org/2018/09/why-design-thinking-works>)(Why Design Thinking Works, 2018)

Design Thinking capabilities with four primary inquiries that uncover parts of motivation, ideas, and their application. They include:

- What is? - investigates the ongoing reality, the truth.
- What if? - to foresee another future.
- What? - to decide and pursue explicit decisions.
- What works? - to be tried.

The rationale continues as before, albeit the stages have been supplanted by questions, making the interaction more powerful and extensive. Along these lines, unmistakable responses are found for explicit cases, giving clients and asset requirements, and leaders in the organization can more readily grasp its current circumstance, searching for new market potential open doors and ebb and flow shopper issues. The point is to concoct numerous potential choices, yet to acquaint with the market

what Sis picked, after the most common way of producing, creating, and testing the thoughts, and to try in another way what ends up being awesome.

2.2 Relationship between Design Thinking, Innovation Management

Design Thinking is thinking and the way to deal with joint effort, learning, critical thinking, and innovation. The design cycle is an organized system for recognizing difficulties, gathering data, producing possible innovations, refining thoughts, and testing arrangements. Design Thinking appears to be a new and unsafe interaction for organizations and organizations, as they don't see the similitudes and associations between it and the laid-out logical technique.

"The scientific method is almost perfect for understanding the physical aspects of our lives. But it is a radically limited viewfinder in its inability to offer the values, morals, and meanings that are at the heart of our lives." (Martin, 2017)

Design Thinking is the logical strategy reached to incorporate the perception and discovery of the human way of behaving, the feelings behind that way of behaving, and the utilization of that information to make creative answers for complex business issues. It can work effectively as one with the logical technique. At the point when the logical strategy surpasses the comprehension of goal and quantitative information, design thinking offers a method for gathering and grasping emotional and subjective information as the need might arise, as well as private stories and encounters. These sorts of information are particularly valuable in the earliest phases of an undertaking when a considerable lot of them might be obscure, and it is in many cases not understood what issue should be settled. At this underlying stage, speculations are framed from the gathered information and client bits of knowledge (Behal C., Moore A., 2016)

The scientific method depends on testing hypotheses inside the boundaries of the issue that the group is attempting to settle, and Design Thinking assists the group with figuring out these boundaries. By reproducing the circumstances in the ideal setting, the hypothesis can be discredited or upheld, and new information about the issue can be made. The boundaries of the trial reenact the circumstances in reality, as perceived by Design Thinking, and make the consequences of the analysis more dependable. (Behal C., Moore A., 2016)

The present business depends a lot on examination, ignoring human open doors for innovativeness, prompting transitory credits to take care of rapidly upon the arrival of the utilization of items and management, yet with low unstable development and vulnerability about what is in store. The techniques for working and taking care of issues for 10 years are centered around a different methodology: the response is first demonstrated with information before it is tried. Design Thinking turns around the cycle, which opens the chance for innovation.

The issues of genuine business are not very much shaped by structures. They are not normally introduced as issues yet as "confused, uncertain situations" (Schön, 1987). Design Thinking offers an exit from these circumstances. Extraordinary learning experiences at the absolute starting point of creation cannot be recognized from poorly conceived notions, and there is no definite wellspring of information for them to show what their identity is. Just a client testing the model can respond to this inquiry. Subsequently, as indicated by the approach of Design Thinking, the client has the open

the door to pre-test the arrangement, item, or management, and this cycle unfurls new secret possibilities. Along these lines, every administrator can support creative, open doors, and upgrade the persistence of workers in their organization, pointing toward fulfilling all partners. By moving toward a perplexing issue or issue with this technique for synchronous design, thinking, and science, organizations can dependably and precisely serve their clients with the right creative items, administrations, and information.

The relationship between design thinking and innovation management is that design thinking is often used as a tool within innovation management to drive innovation. Design thinking provides a human-centered approach to innovation that complements the systematic approach of innovation management. By combining the two, companies can create a culture of innovation that is both systematic and user-centric.

Innovation management provides the structure and processes to manage the innovation process, while design thinking provides the creative problem-solving tools to generate innovative ideas. Together, they enable companies to develop new products, services, and processes that meet the needs of their customers and give them a competitive advantage.

Chapter 3: Research Methodology

3.1 Introduction

Quantitative research methodology and Qualitative research methodology are chosen in this research study in combination because the nature of the research study is quite investigative and requires data collection from a larger sample. Also, combining them should deliver significant benefits, enabling you to compare and contrast results and gain much deeper insights. Therefore, the quantitative data collection method turned out to be the most appropriate. (Choy, 2014). The selection of the quantitative methodology is made in light of the research philosophy of the deductive research approach (reasoning) and positivism (knowledge of facts). The research data collected using the survey method is analyzed in descriptive analysis form using the graphical data presentation method. Qualitative data gathers data that tries to portray a subject more than measure it. This kind of research estimates feelings, perspectives, and characteristics versus hard numbers that would be introduced in a diagram or a graph.

3.2 Research Philosophy

In the research studies, the research philosophy of positivism focuses on examining the different roles of professionals in IT organizations. The organization's new ways of working using Design Thinking. The positivism philosophy supports data collection in a quantitative form and an objective manner. Therefore, objective data must be collected using the survey method and considered the most appropriate approach in this research. The positivist philosophy tends to acquire factual knowledge based on realistic experiential data and is therefore selected as the fairest philosophy in this study (Kaushik and Walsh, 2019). Qualitative research techniques typically include direct perception, for example, meetings or center gatherings. It is statistical surveying ordinarily led in regular settings, implying that researchers concentrate on things as they are without control — there are no tests and control gatherings.

3.3 Research Approach

In quantitative research studies, the deductive research approach is considered a suitable approach to control the entire research process. The survey data collection method and the deductive research approach support human participation in the research process and are therefore considered appropriate. (Mallinson, Childs, and Herk, 2013). The deductive research approach helps to examine any existing research phenomenon in the form of a scientific inquiry. Since this study also requires some form of testing, the deductive method is used. (Melnikovas, 2018). Keith Punch defined Qualitative research as "empirical research where data are not in the form of numbers". Empirical means that data or research is based on something that is experienced or observed as opposed to being based on theory. Data could be in the form of interviews, videos, images, or artifacts. Qualitative research aims to study things in their natural setting to make sense of a phenomenon in terms of the meanings people bring to them. It doesn't involve any form of intervention or a method to manipulate the studied environment.

3.4 Research Design

As the nature of the research focuses on examining new ways of working and adopting Design Thinking, an exploratory research design is found appropriate. With the help of this design, the deep exploration of the research problem can be done by collecting experience-based data (Creswell and Creswell, 2018). This research design helps to investigate and study a research problem that has not been studied or explored before. The challenges of new ways of working in the post-pandemic period have not been adequately explored and can, therefore, be explored in a systematic and organized manner using this design. The flexibility of the exploratory research design also makes it applicable to most mainstream research studies that aim to collect real empirical data (Dannels, 2018). With the help of this design, data interpretations can be made considering personal knowledge.

3.5 Data Collection Method

For conducting the exploratory research design in this study, the primary data collection method has proven to be the most suitable as it encourages the collection of first-hand data based on the real-life experiences of the individuals. The primary data collection method used in this research is the survey method due to its multiple beneficial properties, including audiences of any size, cost savings in data collection, and time efficiency with accurate results. (Ofiazoglu, 2017). The survey was conducted in the form of an online survey where the collection and distribution of the questionnaire were done via a multiplatform of respondents. The questionnaire instrument is designed using the Likert scale, and the response was recorded on MS Excel. The questionnaire contains both personal questions and research-specific items. A suitable sample is required for each survey. In this study, the selected sample is mostly IT company professionals. Also, multiple interviews are conducted with IT professionals who practice Design thinking in their work.

3.6 Data Analysis Method

The data collected with the survey method is always objective and numerical in nature, and therefore a quantitative data analysis method is used to analyze this type of data. The method of quantitative data analysis helps get accurate and reliable data results using proper data analysis techniques. To analyze the collected data with the survey method, the graphical data representation is used for descriptive analysis. (Queries, Faria and Almeida, 2017). For the purpose of graphical data analysis, the graphs are developed in the form of pie charts, bar charts, etc. This method is effective because it allows for better presentation and comparison of the data, thereby understanding the purpose of the research audience. The research study has developed pie charts in MS Excel. The data is interpreted and analyzed by percentage, with the analysis of each suite item based on most responses. The insights generated from the survey data are discussed based on the insights from the literature data. Thus, a good basis was developed to arrive at the conclusions of the research study (Rahman, 2017). Interview outputs are recorded in Word documents and taken the critical outcomes from those discussions as key points.

3.7 Ethical Considerations

In academic research studies, obtaining ethical approval is the most important requirement, and therefore to obtain the ethical approval of the professionals, the research has ensured the incorporation of the defined ethical guidelines discussed here. Firstly, it has been ensured that all participants have given their voluntary consent to contribute and partake in the survey process and that there is no pressure on them to participate in this process. All participants were then assured that their personal data would not be passed on or misused at any time. (Clark-Kazak, 2017). The personal data is anonymized and kept confidential in a password-protected computer. This is to avoid the problem of unauthorized access to the data by other illegal parties. The research study has also ensured that the researcher is not involved in scientific misconduct such as plagiarism or copying of works to address the issue of copyright infringement (Tripathi, 2013). The research study also ensured that in the sample selected for the purpose of the survey, none of the participants belonged to a vulnerable group.

3.8 Summary

Overall, the research methodology chapter has shown that the data collection in this research was conducted with the help of the quantitative research methodology in which the survey method of primary data collection was used. The analysis of the research data was carried out using the quantitative data analysis method of graphical data representation. Also, used interview data collection using qualitative research methods. Several ethical considerations were reviewed in this research study to ensure that it is conducted validly and reliably. Research has ensured that none of the research results affect an individual's values.

Chapter 4: Result & Findings

4.1 Introduction

The data analysis phase of the research work is designated into a distinct research chapter comprising different sections for analysis of the survey data findings as well as discussion of the procured findings from the survey. This chapter holds importance in terms of showing the practical application of the incorporated method of data analysis. The data analysis chapter represents the graphical presentation of the survey outcomes of 93 IT professionals' responses to 13 survey questions. In the end, a summary of the important data findings is also provided in this chapter. Also, 9 interviews are taken with different professionals and design thinking practitioners who teach Design Thinking to organizations.

The study gives us insight into the knowledge, need, and application of Design Thinking. It also provokes several relations that provide guidelines for future research:

- Experience of the professionals with a degree of knowledge and application of Design Thinking.
- Field of work with a degree of knowledge, need, and way of application of Design Thinking.
- Organizations and their usage of Design Thinking or habit of Design Thinking
- Level of the board with a level of information, need, and method of utilization of Design Thinking.

4.2 Survey-Data Analysis

4.2.1 Gender Distribution

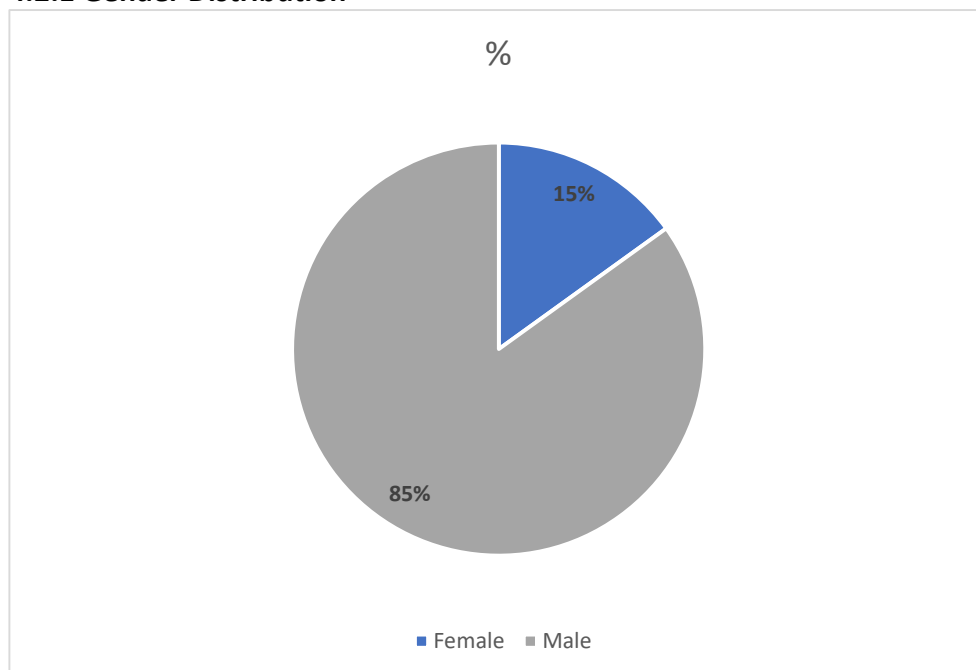


Chart 1

The results in Chart 1 show the total number of males and females who participated in this study. The survey data findings help in evaluating that about 85% of the males participated in this survey, and the remaining 15% of the participants of the survey process were females. Therefore, it is reasonable to infer that the male participants in the survey procedure are heavily larger than the females.

4.2.2 Work Experience Distribution

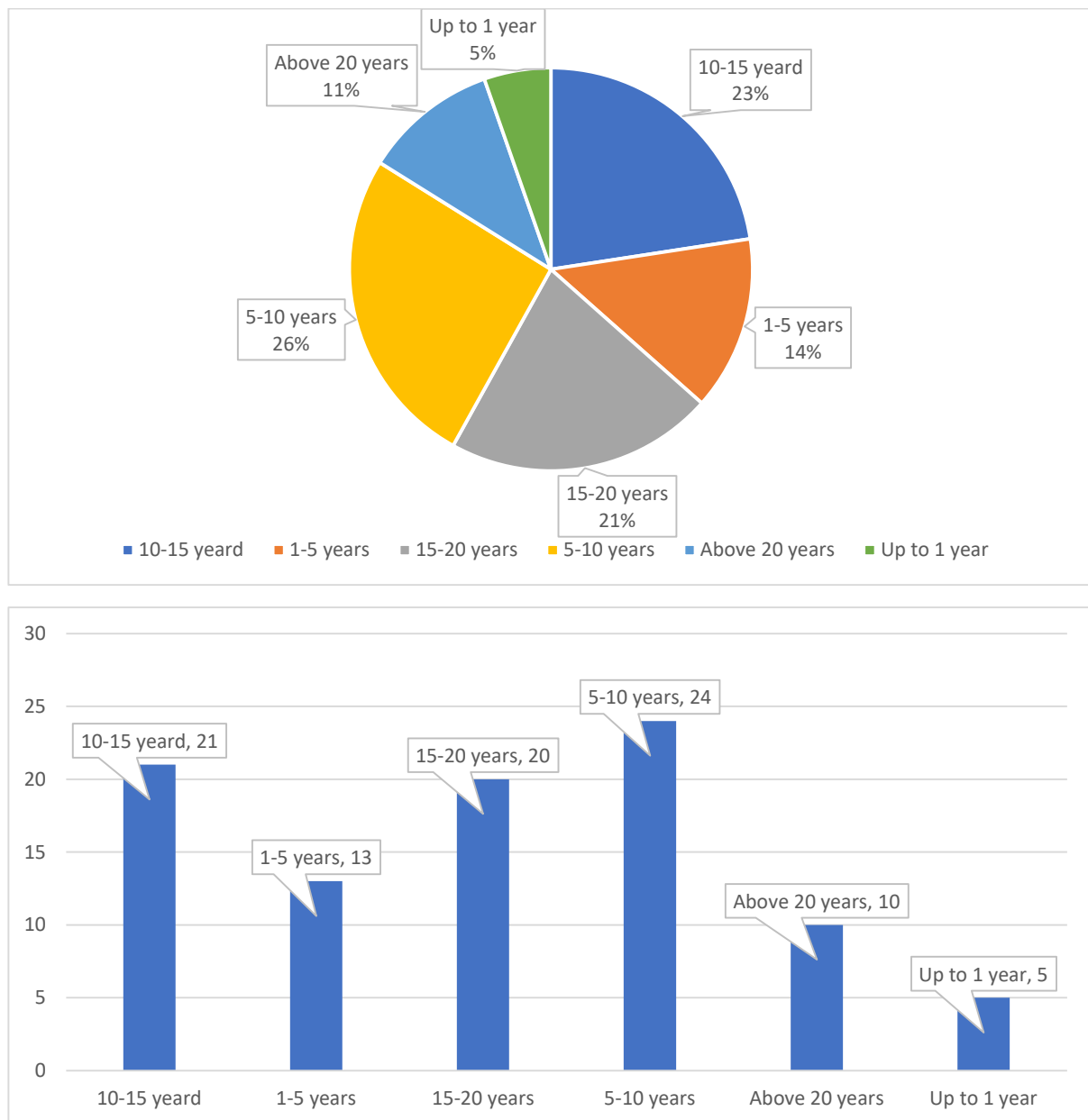


Chart 2

The survey results in Chart 2 illustrate the work experience of IT professionals. In this context, it is evaluated that about 26% of the data respondents who took part in this survey have an experience between 5 and 10 years of experience. On the other hand, it is also checked that the professional experience of 23% of the research participants is between 10 and 15 years. On the other hand, it

can be evaluated that around 21% of those questioned have 15 years to 20 years of experience in the field of IT. Rests are 1 to 5 years or less experience. Therefore, findings suggest that the experience of a significant portion of the survey sample is satisfactory, as most respondents have been managers and executives level experience people.

4.2.3 Work Role Distribution

What is your Designation / Role?

93 responses

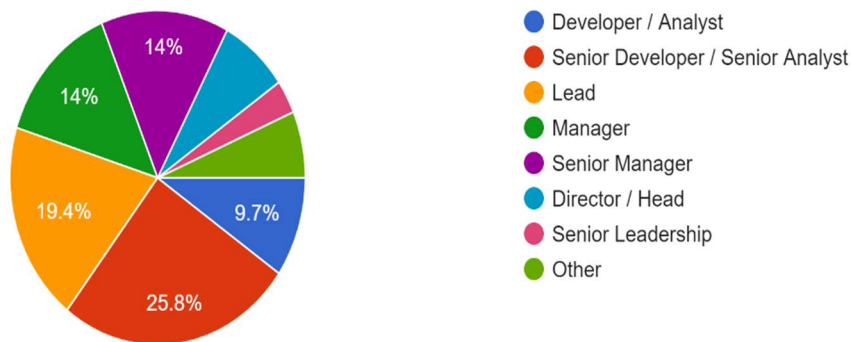


Chart 3

The survey results in Chart 3 illustrate Senior Developer / Senior Analyst – 26%, Lead – 19%, Senior Manager- 14%, Manager – 14%, Developer / Analyst – 10%, Director / Head – 8%, Other – 6%, Senior Leadership – 3%. This finding suggests that a major responder is a manager and above in roles.

4.2.4 Frequency of Practicing Design Thinking as Individual IT Professionals

How often do you, yourself, practice design thinking?

93 responses

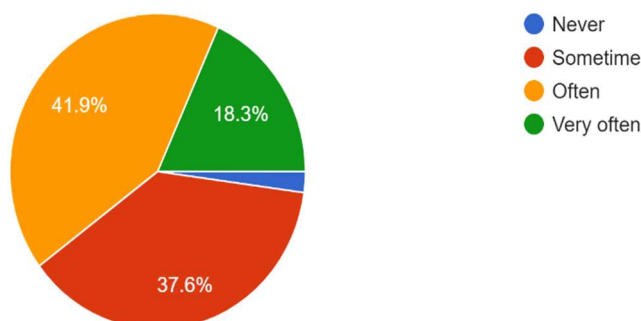


Chart 4

The survey results in Chart 4 illustrate that the frequency of using Design Thinking as individuals 42% are often, 38% are Sometimes, 18% are Very often, and 2% are Never. This showing Design Thinking can take more role play for individual professionals. This insight gives confidence in more usage of Design Thinking.

4.2.5 Frequency of Practicing Design Thinking in Organizations

How often your organization use design thinking method?

93 responses

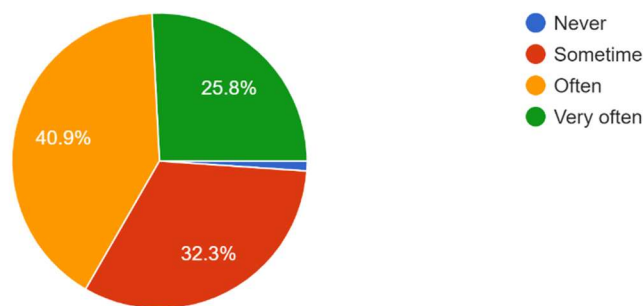


Chart 5

The survey results in Chart 5 show that the frequency of using Design Thinking in their organizations is 41% are often, 32% are Sometimes, 26% are Very often, and 1% are Never. This showing Design Thinking is already in practice in more than half of the organizations, whereas it can still take more role to play organizations.

4.2.6 Experience level-wise Design Thinking usage

The survey result in Table 1 shows the experience-wise Design Thinking usage of the individual professionals. This survey insight clearly shows that there is more scope to have better usage of the Design Thinking process in different experience levels.

Experience Level	Often	Sometime	Very often	Never
10-15	38%	43%	19%	0%
1-5 years	54%	31%	15%	0%
15-20	35%	45%	20%	0%
5-10 years	46%	33%	17%	4%
Above 20	40%	40%	20%	0%
Up to 1 year	40%	20%	20%	20%

Table 1

4.2.7 Roles wise Design Thinking Usage

The survey result in Table 2 shows the different role-wise Design Thinking usage of the individual professionals below table. Both of these data points show that most of the level of professionals are using Design Thinking at a certain level to get a competitive edge. However, the scope of better usage of Design thinking is still there for getting better competitive advantages.

Role Wise	Never	Often	Sometime	Very often
Senior Developer / Senior Analyst	4%	38%	33%	25%
Lead	0%	44%	22%	33%
Senior Manager	0%	31%	38%	31%
Manager	0%	46%	38%	15%
Developer / Analyst	0%	44%	33%	22%
Director / Head	0%	29%	57%	14%
Other	0%	67%	0%	33%
Senior Leadership	0%	33%	33%	33%

Table 2

4.2.8 Design Thinking experience aspect

Which of the following best describes your experience or thought process with Design Thinking?

93 responses

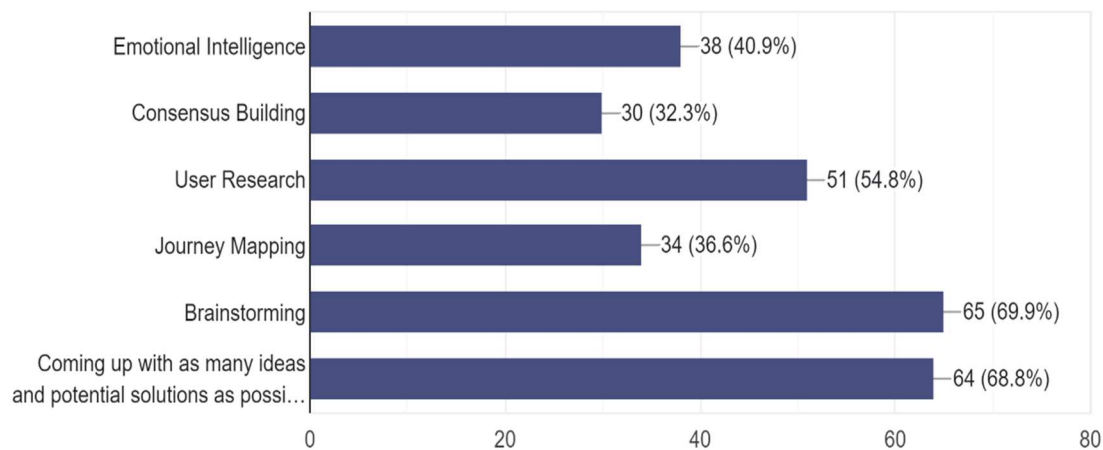


Chart 6

The survey results in Chart 6 illustrate a clear insight came on the mindset of the professionals on what best describes their experience or thought process with Design Thinking. 23% times Brainstorming, 23% times Coming up with as many ideas and potential solutions as possible, 18% times User Research, 13% times Emotional Intelligence, 12% times Journey Mapping, and 11% times Consensus Building came out of the insight as the Design Thinking image. It gives a clear picture of

how professionals think about Design Thinking. This insight gives a clear idea that most of the expectation triggers innovation toward management practice.

These results also clearly indicate the following three hypotheses are true.

1. Design thinking has a significant and positive impact on product innovation.
2. Design thinking has a positive and significant impact on process innovation.
3. Design thinking has a positive and significant impact on organizational innovation.

4.2.9 Design Thinking Experience in Terms of organization success

Based on your experience, how much does design thinking drive success in each of the following aspects?

93 responses

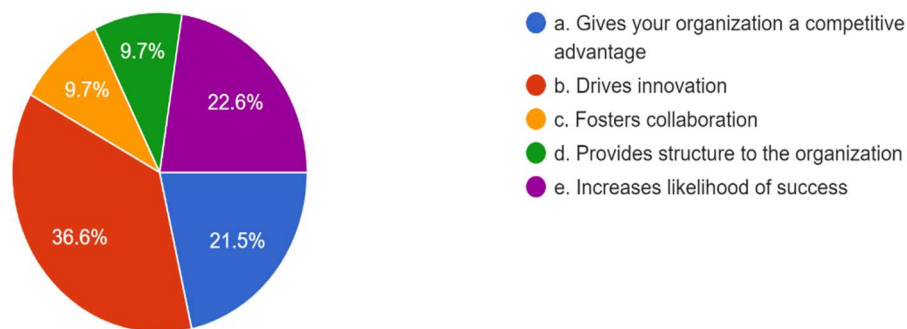


Chart 7

The survey results in Chart 7 illustrate another aspect and insight of Design Thinking coming of this study on how much design thinking drive success in each of the following aspects for organizations. 36.6% of professionals believe that Design Thinking drives innovation. 22.6% of professionals believe that Design Thinking increases the likelihood of success. 21.5% of professionals believe that Design Thinking gives the organization a competitive advantage. 9.7% of professionals believe that Design Thinking fosters collaboration in organizations. And 9.7% of professionals believe that Design Thinking provides structure to organizations. It clearly shows the close connection between innovation, Innovative management, and Design thinking. Also, clearly illustrates the competitive advances of Design Thinking for an organization.

These results indicate the following hypothesis is true.

- Design thinking has a positive and significant impact on organizational innovation.

Design Thinking Aspects	Senior Developer	Lead	Senior Manager	Manager	Developer / Analyst	Director / Head	Other	Senior Leadership	Grand Total
Drives innovation	7	6	4	6	1	4	4	2	34
Increases likelihood of success	3	5	5	2	3	2		1	21
Gives your organization a competitive advantage	8	4	3	2	1		2		20
Provides structure to the organization	2	1		2	4				9
Fosters collaboration	4	2	1	1		1			9
Grand Total	24	18	13	13	9	7	6	3	93

Table 3

In Table 3, the same study is presented role-wise, where it clearly can be seen that drive innovations leading for most of the professionals as Design Thinking experience aspect.

4.2.10 Design Thinking Implications

The survey result in Table 4 gives another critical insight into the implications of Design Thinking, and the data points show very interesting aspects of Design Thinking between professionals and organizations. From this study also, it is clear coming out that Design thinking helps organizations to grow and get competitive advantages.

#	Implications of Design Thinking	Agree	Disagree
a.	Design thinking negatively affects efficiency.	10%	90%
b.	Design thinking requires a collaborative environment to work well.	95%	5%
c.	Anyone can learn and practice design thinking.	91%	9%
d.	Design thinking is rigid.	10%	90%
e.	Design thinking requires all involved to be human-centered.	56%	44%
f.	Design thinking takes a lot of time.	44%	56%
g.	Design thinking has a low return on investment.	11%	89%
h.	Design thinking empowers personal growth.	96%	4%
i.	Design thinking grows interpersonal relationships.	88%	12%
j.	Design thinking improves organizational progress	97%	3%

Table 4

These results indicate the following hypothesis is true.

- Design thinking has a positive and significant impact on organizational innovation

4.2.11 Design Thinking impact areas in Organizations

Does Design Thinking impact the following in an organization?

93 responses

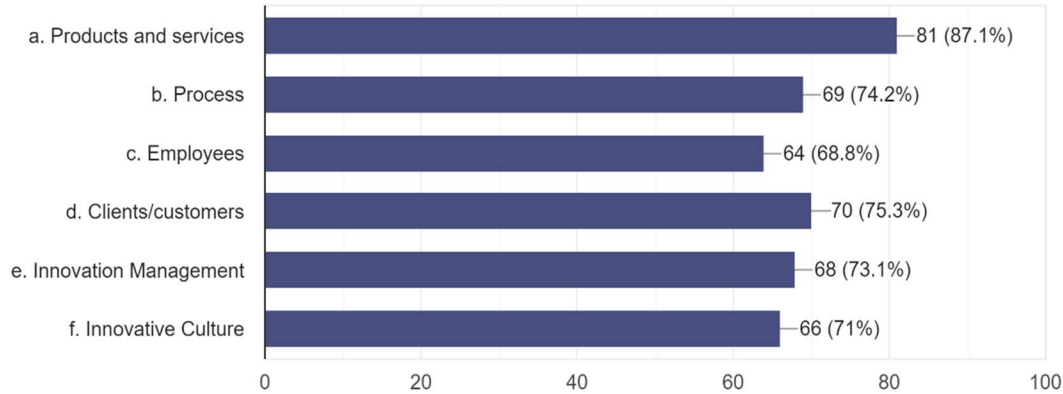


Chart 8

The survey results in Chart 8 illustrate the insight into how Design Thinking impact in an organization. As per the study, the most impacts are Products and services – 19%, Processes – 17%, Employees – 15%, Clients – 17%, Innovation Management – 16%, and Innovative Culture – 16%. It clearly shows that innovation and Innovation management have the most useful impact on Design Thinking.

These results indicate the following three hypotheses are true.

1. Design thinking has a significant and positive impact on product innovation
2. Design thinking has a positive and significant impact on process innovation
3. Design thinking has a positive and significant impact on organizational innovation

4.2.12 Design Thinking gives competitive advantages to the organization.

Do you think Design Thinking and Innovation Management culture can give competitive advantage to any organization during this VUCA world?

93 responses

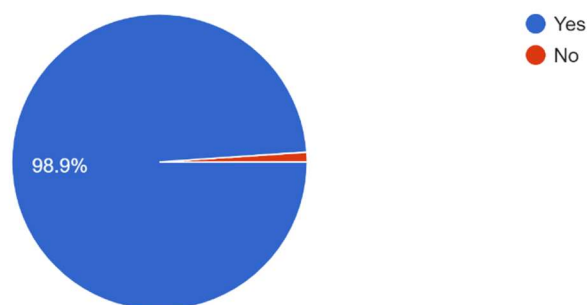


Chart 9

The survey results in Chart 9 illustrate that the Design Thinking and Innovation Management culture can give a competitive advantage to any organization during this VUCA world. And 99% of professionals think that it will have an impact, and only 1% think that there is no impact. This data showcases the importance of having a Design Thinking and Innovation Management Culture in organizations to have a competitive advantage in this VUCA world.

These results indicate the following hypothesis is true.

- Design thinking has a positive and significant impact on organizational innovation.

The survey results of the survey show a positive attitude of professionals towards new creative approaches to work, the need and search for non-standard methods for making complex decisions and creating innovation using Design Thinking which uses Innovation Management.

4.2.13 Testing the Hypothesis

The current study used a resampling bootstrap method with 93 samples with each bootstrap sample, they contained the same number of observations as the original sample to generate standard errors and t-values (Chin, 1988). The study evaluates assessed way relations among the idle factors in the model through the sign and magnitude of path coefficients. Taking into account the outcomes in Table 5, in case the t-value of each route was greater than 1.96, and the path coefficient stayed between 0 and +1, it could be concluded that there was a positive and direct impact between the two factors.

These results also clearly indicate the following three hypotheses are true.

1. Design thinking has a significant and positive impact on product innovation.
2. Design thinking has a positive and significant impact on process innovation.
3. Design thinking has a positive and significant impact on organizational innovation.

Structural path		Path coefficient	T-values	P-values	conclusion
Independent variable	Dependent variable				
<i>Design Thinking</i>	<i>Product Innovation</i>	0.739	14.018*	0.000	H1 supported
<i>Design Thinking</i>	<i>Process Innovation</i>	0.523	10.674*	0.000	H2 supported
<i>Design Thinking</i>	<i>Organizational Innovation</i>	0.380	4.822*	0.000	H3 supported
Note: t >1.96 at p=0.05 level; * t >3.29 at p=0.001 level.					

Table 5: Significant testing results of the structural model

4.2.14 Qualitative Analysis of the Interviews and the Outcome

Interviewing professionals who practice Design Thinking in their daily professional life as their core activity, very interesting insight came from this study about their clients where they see the outcome of Design Thinking which leads to Innovation Management towards the success of client teams, projects, or organizations. Some of those insights into successful use cases from the study are given below.

Interviewee 1 Response:

Through empathy-driven research and prototyping using the Design Thinking approach, one of the organization team was able to gain a deeper understanding of the user's experiences and identify the problem. They found that the users were facing difficulties in understanding how to use the product, leading to a low adoption rate. They then used this insight to redesign the user experience, making it more intuitive and user-friendly. After that, we have an improvement in the adaptation rate.

Interviewee 2 Response:

In another organization, a professional team was tasked with developing a new product for a specific market segment. Their traditional approach to product development was to gather data, analyze it, and then make decisions based on that analysis. This process was time-consuming and often resulted in products that missed the mark. When they shifted to Design Thinking approaches, it gave them much faster and better outcomes. To address this issue, they decided to try a Design Thinking approach. Their team started by talking to potential customers, observing their behaviors, and gathering insights into their needs and wants. This process helped them gain a deep understanding of their target market, which was key in developing a product that truly met client needs. The success of this approach was evident in the positive feedback one of the organizations received from their clients, as well as the strong sales of the new product. Their design thinking approaches not only saved time but also ensured that their product was developed with the client at the center. This approach was successful because it allowed them to take a more human-centered approach to product development, and it helped them develop a solution that truly met the needs of our clients.

Interviewee 3 Response:

One of the organizations was developing a product to build a knowledge graph from scratch. However, it was not useful to the users if they already had a domain-centric knowledge graph at a small scale. They applied Design Thinking to come up with a solution to merge the domain-centric and general knowledge graphs and applied zero-shot learning in our application that solved the business problem.

Interviewee 4 Response:

It helped one of the professionals multiple times while drafting solutions for their clients using a product-deployment model. Have found it very effective in terms of broadening the range of thoughts and possibilities while innovation takes place and proximity to success is much closer and they are confident since a lot of user perspectives could be collected as opposed to limited/ restricted requirement lists the customer journey is well discussed and sketched. Design thinking is involved in

the prototype stage of one organization's product development life cycle. It benefits them to conceptualize computational and other relational problems more simply. While modeling the data, their organization tries to consume the Design Thinking approach to get a more reliable, faster, and accurate output.

Interviewee 5 Response:

One Data Analytics manager needed to find information about their team quickly and faster. Also, they needed to centralize all their data in one single platform. With Design Thinking, he talked with their leadership and developed a BI platform and an App. With this tool (and another working behind), they had all data in one platform, and it always contains the most refreshed data giving them the opportunity as a consultant to visualize our improvement areas and giving their managers all data that they need to take actions based on data.

Interviewee 6 Response:

Design thinking positively influenced one of the projects in the O2C workflow by improving the customer experience and increasing efficiency. One specific situation where the organization applied design thinking was in the payment processing stage of the workflow for one of the leading international Clients in Technology Manufacturing. Client operations were experiencing a high rate of payment delays and customer complaints related to the payment process. To address these issues, design thinking was applied to re-envision the payment process and make it more user-friendly. The team started by gathering cross-functional teams that included representatives from customer service, finance, and design, then conducted research through surveys, customer data & interviews, and observations to identify the pain points and frustrations customers experienced during the payment process. Through research, the team discovered that the payment process was confusing and difficult for customers to understand and that customers had difficulty accessing their account information and payment history. Finally, the team designed, developed & tested the new payment process & solution with a small group of customers to get feedback and refine the design further. Based on the positive feedback, we then launched the redesigned payment process solution and tracked its impact on payment delays and customer satisfaction. Using Design Thinking, they were able to identify and address the pain points in the payment process, resulting in a more efficient and user-friendly payment process. This, in turn, led to reduced payment delays, increased customer satisfaction, and, ultimately, increased revenue.

Interviewee 7 Response:

Design thinking has helped one of the organizations to acquire and deliver a lot of projects without any hindrances. It has always proved to be super-efficient in carrying out the project implementation and execution part in a very smooth manner. While implementing a technical solution for a large US-based pharmaceutical major, an organization applied Design Thinking and tried to understand the current challenges faced by its users, and we understood that it was low operational efficiencies at being unable to work on multiple products in one go. While producing the new solution, they tried to keep these nonfunctional requirements as a priority as well and came up with a solution where the user could choose and update multiple products both from UI as well as Excel upload, and that drove high adoption of the solution.

Post covid era, shifting the working model from working from home to working in an office had many challenges which limited the ideas. Design thinking helps organizations reach the perfect solution in this scenario.

All these business cases from the study show a very positive result of using Design Thinking and which triggers innovation management to the success of organizations by getting a competitive edge in the market. Design Thinking can take the lead as a culture to give a different way of working in the organization toward success.

Qualitative analysis using Open AI of the interview outcomes:

The above interview responses show several successful use cases of Design Thinking in various organizations. Through empathy-driven research and prototyping, Design Thinking helped an organization gain a deeper understanding of users' experiences, identify the problem, and redesign the user experience, leading to an improvement in the adoption rate. In another organization, Design Thinking was used to develop a new product for a specific market segment by talking to potential customers, observing their behaviors, and gathering insights into their needs and wants. This approach helped them gain a deep understanding of their target market, resulting in positive feedback from their clients and strong sales of the new product. Another organization applied Design Thinking to come up with a solution to merge the domain-centric and general knowledge graphs and applied zero-shot learning in their application, which solved the business problem. Design Thinking has helped organizations to acquire and deliver a lot of projects efficiently, and it has proved to be super-efficient in carrying out the project implementation and execution part in a very smooth manner. Design Thinking has helped one organization to understand the current challenges faced by its users and come up with a solution where the user could choose and update multiple products from UI as well as Excel upload, driving high adoption of the solution. Design Thinking helped organizations to address the pain points in the payment process, resulting in a more efficient and user-friendly payment process, reduced payment delays, increased customer satisfaction, and ultimately, increased revenue. In the post-COVID era, Design Thinking helped organizations reach the perfect solution for shifting the working model from working from home to working in an office, which had many challenges that limited the ideas. Overall, the text shows that Design Thinking triggers innovation management toward the success of client teams, projects, or organizations, and it allows organizations to take a more human-centered approach to product development, ensuring that their product is developed with the client at the center.

All these business cases from the study show a very positive result of using Design Thinking and which triggers innovation management to the success of organizations by getting a competitive edge in the market. Design Thinking can take the lead as a culture to give a different way of working in the organization toward success. Also, it clearly shows the evidence of the following two hypotheses.

- Design thinking has a significant and positive impact on product innovation.
- Design thinking has a positive and significant impact on process innovation.

Chapter 5: Discussion

This study examines the way IT organizations' professionals and management team practices and adopt the level of Design Thinking and the ways companies can adopt Design Thinking for innovation management practice toward gaining competitive advantage.

Toward the beginning of 2013, IBM Design started a fresh new program called IBM Design Thinking to revive the organization: adopting their designing-driven strategy and transforming it into a supportable, client-focused culture. The organization has contributed more than \$100 million in attempting to rework its corporate culture as design-accommodating. "Our teams had a very engineering-centric culture, and we wanted to shift that culture towards a focus on users' outcomes," said Charlie Hill, CTO of IBM Design. (Martin, 2017)

It is given that IBM is not a design organization. How could they need to change their organization that way?

Design Thinking has become very much a popular expression since David Kelly, a Stanford professor and the organizer behind IDEO, presented it. Be that as it may, as there is no single, normal meaning of Design Thinking, many probably won't have an unmistakable thought on how it functions or how it very well may be applied to the executives.

Idris Mootee, Chief of Thought Couture, portrays the Design Thinking process obviously in his book: Design Thinking for Strategic Innovation. He presents a useful use of Design Thinking inside the cutting-edge undertaking, trying to further develop its innovation execution.

With Btrax's history of counseling clients on the most proficient method to further develop their essential cycles utilizing Design Thinking, they summed up the book The 10 essential principles for any organization trying to Innovate.

"Design Thinking begins with 'why' and creates the process for innovation." – Brandon K. Hill, CEO of Btrax (Myerson, 2016)

5.1: Design Thinking Principles for Innovative Organizations can be ten folds which can be plotted from this research findings.

5.1.1. Action-Oriented

"The challenges of the future will require multidisciplinary thinkers who will think first and work on solutions second," Idris explains. To make your organization more creative, a cross-disciplinary learning-by-doing way to deal with critical thinking is fundamental. It assists your group with recognizing the difficulties you face and concocting various plans to tackle issues. Talk is cheap.

5.1.2. Comfortable with Change

A considerable lot of us are frightened to take the underlying jump, feeling OK with the norm. In any case, the overwhelming and dubious issues these days require a better approach to thinking,

liberated from old customary techniques or moderate sluggish dynamic cycles, which simply exacerbate the situation.

Adjusting the sense that everything is safe and secure with vulnerabilities and dangers among the group makes similar conditions fun and energizing, and it empowers innovation.

5.1.3. Human-Centric: By Humans for Humans

Compassion is quite possibly the most fundamental thing in the Design Thinking process. Since the difficulties you attempt to tackle are not your own, you should acquire compassion for what individuals do and how they interface with their current circumstances. To zero in on two of the client's (or end client's) physical and close-to-home necessities and comprehend the way they get things done and why different observational and listening-based research strategies are required.

Stanford's introductory process guide for Design Thinking points out, "The best solutions come out of the best insights into human behavior." Observing people helps you obtain new insights, which in turn leads to innovative solutions. This also could be applied when it comes to re-organizing your team to prepare to tackle unpredictable problems.

5.1.4. Integrate Foresight

This is particularly valid for those overall and laid out organizations, yet many find it hard to improve as their general surroundings change quickly.

To acquire adaptability and work like a startup or even an experienced organization with an innovative culture, your group needs foreknowledge, which assists you with opening to a future brimming with vulnerabilities. It likewise supports a corporate culture that is OK with questionable preparation and lacking data during the time spent finding and producing an unmistakable result. With that, you will find arising open doors for cutting-edge development.

5.1.5. A Dynamic Constructive Process

As indicated by research done by Deloitte, individuals on the whole look at their telephones over 8 billion times every day, except efficiency is scarcely rising. How must be accomplished innovation is "designing a productive and meaningful employee experience through solutions that are compelling, enjoyable, and simple."

This requires resistance. An iterative methodology is typically troublesome and must be talked about among all your colleagues. Along these lines, Design Thinking assists your representatives with connecting at all stages when they design your group. Along these lines, changing organizational culture with inventive systems yields exceptional effects among your representatives.

5.1.6. Promote Empathy

Design Thinking is a way to put your representative at the center of everything. In Deloitte's review this year, respondents at organizations where HR conveys the most elevated levels of significant worth are very nearly multiple times bound to utilize design thinking in their projects than their friends.

Design Thinking assists companies with better grasping their workers, like their ways of behaving, assumptions, values, inspirations, and necessities. The reception of Design Thinking in HR saw an extraordinary change in the division from "process developer" to "experience architect."

5.1.7. Reduce Risks

Even though you ought not to fear chances, Design Thinking assists you with figuring out how to limit likely disappointments. There will constantly be barricades while fostering another item or administration. Design your organization to distinguish the components in the advancement environment, like innovation, the market, contenders, clients, and the production network. It will assist you with relieving the dangers of trial and error, and it furthermore expands the return on money invested in Research and development.

“We encourage companies to allocate a percentage of their R&D budgets for seriously exploring new value propositions and business models.” - Alex Osterwalder, co-founder of Strategyzer

5.1.8. Create Meaning

Making importance is the hardest piece of the design interaction as it requires investment and arises through various emphases and discussions. This stage is your opportunity to characterize the issue because of its specific situation and what you have found out about your clients or group.

This will seem OK with the data you have assembled after you gain significant sympathy for the client/group and the individual for whom you are designing. Combining data will make it conceivable to make a significant and noteworthy issue proclamation that gives you strong experiences during the cycle.

A good point-of-view (POV) – “the explicit expression of the problem you are striving to address” – assists you with molding the issue with concentration and rouses your group. It likewise engages them to settle on free choices inequality, which will make areas of strength for a.

5.1.9. Bring Enterprise Creativity to the Next Level

Idris brings up: the true design of the board thwarts supervisors from being innovative yet asks them to abstain from doing some unacceptable things or facing additional challenges. Design Thinking supports corporate culture with additional remunerating encounters, empowering conflict to step forward among your group and creating an open climate where your colleagues can straightforwardly examine what they truly feel.

That is how it makes solid "institutionalization" and "reasonableness" to urge your colleagues to sincerely draw in and commit.

5.1.10. The New “Competitive Logic of Business Strategy.”

The world is getting more perplexing, and we are just a little piece of it. We need to perceive the need for new ways for the executives in the consistently changing and problematic 21st Hundred years. Design Thinking empowers an organization to be imaginative and rouses them to develop items and administrations which can be their upper hand that no different organizations can duplicate.

The findings also support the above discussion that the adoption level of Design Thinking in global IT organizations is increasing.

The second aim of the research is to evaluate how Design Thinking helps in creating Innovation Management which helps IT organizations in competitive advantages during this VUCA world.

5.2: Using this research, we found that Design Thinking can nurture a culture of innovation in 5 ways:

5.2.1. The tools you use should be exactly that - just tools to be used

Guarantee there is a characterized objective that you are attempting to accomplish. It is significant not to get too focused on the hardware or software you need to utilize and to recollect that they are just there to settle a specific objective. Design Thinking urges employees to attempt better approaches to getting things done, utilize new materials, and attempt new strategies. This approach requires colleagues to leave their usual range of familiarity yet frequently brings about new and creative approaches to working and teaming up.

5.2.2. The customer is the key focus of design thinking

Design Thinking expects the employee to know their client personally. Get their contemplations, info, and input as frequently as could be expected. This will guarantee employees are as yet making something that will be of worth to their clients.

5.2.3. Listen to your customer's feedback

Capture it, record it, consider, and assess it. This input, hard, however, it very well might be to hear or try and acknowledge, will at last direct the achievement or disappointment of the item you are building. Many organizations have accomplished amazing turns (course adjustments) because Design Thinking drove criticism, which informed choices about which items to assemble, grow and amend.

5.2.4. Share the insights learned from a Design Thinking approach

It's a good idea to guarantee however many individuals see the thoughts created as would be prudent. Design Thinking can assist with empowering an interior culture of posing idiotic inquiries. How can it respond? For what reason is it confronting that way? How would you turn it on/off? It is astounding how frequently awful items are created because nobody felt open to inquiring as to why something was how it was. Many organizations frequently record similar experiences on different occasions without acknowledging another person has previously done such. A Design Thinking motivated sharing time approach can assist with guaranteeing that innovation is quickly exhibited and conveyed inside the organization.

5.2.5. Understand that the practical implication of Design Thinking within managed constraints will drive and inspire creativity and innovation

Human creativity exceeds all rational limitations, and unfocused innovation can prompt unusable and unused items. Paul Allen, one-half of the extremely effective originators behind Microsoft, attempted to help an unassuming innovation place. Sadly, unbounded, a reasonable heading or monetary imperatives, the task fiercely overspent with nothing important to show for it. Allen needed to close the drive down; finishing a lot of opportunities was not helpful for fruitful innovation in an organization.

For the Design Thinking cycle to further develop execution, it is principal to remember design for the early business definition stages. Studies at Stanford Center for Design Research, Hanyang University, and California State University Long Beach have shown that when design groups are remembered for vital preparation and key measures are remembered for a Helpful Design Brief; projects make more fitting ideas as well as offer more benefit to financial backers.

Contrast Allen's model and Macintosh's methodology from 1997 until now, where Steve Jobs's Design Thinking drove vision has been implanted inside the drawn-out business system of Mac. His vision is recognizable in current Apple items and shows the advantages of an overseen Design Thinking approach. (Tuncer Manzakoglu & Dimli Oraklibel, 2021)

The Institute of Design Management has found that design-driven companies outperform other companies by 228% compared to Standard & Poor's 500. Using design thinking as a way of working - and thinking about work - can be effective in purposefully creating a positive organizational culture in which creativity and innovation thrive, morale and collaboration are high, and as a result, business results are high (Behal C., Moore A., 2018).

Roger Martin, former dean of Rotman University in Toronto and author of Business Design, said: "The design thinking companies are divided in their readiness to engage with the task of the constant redesign of their business, to create a progress both in innovation and efficiency, the combination that creates the strongest competitive advantage."

The innovative manager can design the way he leads, manages, creates, and innovates. Moura Quayle, the author of Design Leadership, said of him: "Great leaders strive to manage 'by design, with a sense of purpose and foresight,' because Design Thinking minimizes risk, reduces costs, improves speed, and energizes employees." Design Thinking provides leaders with a framework for tackling complex human-oriented challenges and making the best possible decisions about * redefining value, * rethinking business models, * changing markets and behavior, * changing organizational culture, * and complex societal challenges such as health, education, food, water, and climate change, * issues affecting different stakeholders and multiple systems." (Naiman L., 2018)

The possibility for future research in favor of business is found in the universal applicability of the methodology in its various industries and activities, where to define an application model or to develop quantitative research to measure qualitatively unusually large benefits of Design Thinking.

An innovative approach is a high priority today for ensured outcomes in business endurance and development procedures. Design Thinking and Innovation management prepare current and hopeful innovation directors with design thinking standards and inventive critical thinking apparatuses to address business difficulties and guide their organization's strategy.

- Characterize clients' unequivocal trouble spots and idle necessities.
- Rethink the innovation set to recognize the most game-changing contributor to the issue.
- Break down the organizational climate for the best circumstances for astute thinking.
- Foster the design rules that will assist you with making client-centered thoughts.
- Explore different avenues regarding ideation devices for breaking mental fixedness and creating thoughts.
- Investigate organized, however unconditional ways to deal with ideation like substitute universes and conceptualizing.
- Refine innovation thoughts utilizing design heuristics.
- Apply research-based personas and conduct models to make innovations simpler to embrace.
- Consolidate thoughts into complex innovation ideas.
- Study and fortify ideas utilizing assessment devices.

- Guide prototyping by making basic inquiries connected with an idea's allure, possibility, and feasibility.
- Evaluate engineer and client viewpoints for predisposition that might influence the execution.
- Apply structures to fortify interchanges about an innovation's worth.
- Consider the executive's abilities to support a culture of innovation.

5.3. Design thinking for Business Process Modelling (BPM) in IT organizations

Business process demonstrating (BPM) is an approach to separating business processes into their essential parts, works performed for the business. BPM shows, obviously and briefly, how an item or administration changes as it travels through the association process, normally close to ongoing. Technique models work with correspondence between partners: Business experts and process accomplices. BPM models give a common perspective with the goal that everybody can give data to different process-related advances: Process Guide, Process Identification, Process Impersonation, Process Examination, and Process Improvement. It has come over the most recent couple of many years and has supplanted the association's past powerful bundles: Time and Development (TMS) and Absolute Quality Administration (TQM). System models work with correspondence between partners: Business examiners, process accomplices, and designers in IT organizations.

5.3.1. Advantages of BPM in IT organizations:

- Align operations with business strategy
- Improves process communication
- Increase control and consistency
- Improve operational efficiencies
- Gain a competitive advantage

5.3.2. Agile in Virtual Collaboration

Agile methods are so famous in the product business any way they have gotten such an excess of recognition that different enterprises additionally need to seek after its advantages in their businesses. Working in a worldwide climate makes these designs exceptionally testing to work. The Agile method can oblige changes whenever contrasted with the cascade method, and to that end, coordinated effort between bunched bunches dials back processes quicker. Without correspondence; collaborations, enhancements, altering, surveys, audit times and so on it likewise enormously lessens time and exertion. Remote or conveyed execution is viewed as cutthroat and is viewed as a reasonable execution model. Organizations likewise offer it as a choice to their representatives. Businesses need to sustain their ability constantly, use the best ability that can be found locally, the least expensive work on the planet, the higher efficiency, and the more essential reasons. With the developing interest in far-off activity, it is unsuitable to express that quicker methods won't work with dispersed groups. Albeit a couple of enticements will arise, with the assistance of instruments and strategies for moving to a distant work environment it is conceivable.

5.3.3. Design Thinking in Business Process Modelling (BPM)

By revealing how things are finished in the association, and contrasting that and how they ought to be finished, BPM features reliance and relational connections, cycle, and innovation — and when those components are fit to be moved along.

Design thinking is likewise centered around improvement; however, it takes the experience of the end client or customer as a beginning stage. Fundamentally, design thinking utilizes empathy to comprehend how individuals feel about utilizing a help or item, including where their disappointment falsehoods, and afterward expands on that information to construct progress, with a definitive objective of further developing customer lives and information.

- **Allow Openness:** As a company or leader create a transparent environment. Give a feeling of trust in the team individuals for the choices they make to organize meetings with them so they align these choices with the goals and vision of the company. Try not to keep your obligations confidential. Explain the elements of the capabilities. Make sure the outcomes are public as a whole. Gather the answer. Establish open communication channels.
- **Establish a culture of continuous improvement:** Call for improvement inside the team. See valuable open doors for improvement and get ideas from the gathering. Stand by listening to the ideas and take appropriate action. The Agile Goal drives continuous development and accordingly, team individuals are available to open doors for development. Generate calculated tests to utilize improvement endeavors.
- **Communication:** Communication is probably the main ability in any gathering. the way you organize your communication is what decides the result. Practice profound communication at all levels. An excess of emphasis on communication is vital. Communication doesn't just have to happen through emails, calls, or gatherings, yet in business, most communication is finished with the assistance of ERP apparatuses that assist you with staying occupied all the time.
- **Rhythm Building:** There are three essential components in a fast-paced workflow: Clarity, testing, and flexibility. Scrum is also called the three pillars of Scrum (Scrum Guide, 2005). We really must form a beat that works near these Scrum pillars. I have already said that drive to create a collaborative team that is leading Agile greatness.
- **Develop a culture of courage and flexibility:** This also remains closely connected with the idea of immediate failure. Failure isn't bad; it's okay to fail. Here, however, the main issue is the immediate failure. Set up a place where the team dares to take action to have a go at something new. The idea is to diminish delays. Find failure rapidly and yet again engineer your plans.
- **Establish a stable environment and work-life balance:** A very circulated team usually keeps its generally expected working hours leading to extra time or working additional time. Establish decide and guarantee that no individual from the team violates these terms, inciting partners to apply this guideline. Plan accordingly and set reasonable expectations.
- **Visualize the whole thing:** The main step. Task planning is a basic utility device that provides you with a clear interpretation of tasks to be finished. Establish an answer that allows team individuals to screen the progression of work, show who is working on it, guide together and have the option to pick the perfect need at the ideal time. This arrangement will assist you with scanning trouble spots and reestablishing them appropriately to work on your processes.

5.4. Design Thinking for Strategic Innovation in IT Organizations

Strategic Management: Strategic management is the most common way of putting forth objectives, methods, and goals to make an organization or association more serious. Ordinarily, strategic management takes a gander at successfully sending staff and assets to accomplish these objectives.

Innovation Management: the idea has different angles and aspects and is contributed in light of the numerous disciplines of the review that has different speculations and structures.

5.4.1. Types of Innovations

1. Troublesome versus Supporting Innovation

The idea of troublesome innovation is connected with the idea, item, or administration which will make new worth to the current market and make a new market. While supporting innovation is based idea of improving and developing the current business sectors.

2. Revolutionary versus gradual innovation Extremist innovation happens when another innovation upsets an existing business or economy and makes another plan of action. Steady innovation, thusly, alludes to a progression of little, continuously constructed enhancements to existing items, cycles, or techniques to keep up with cutthroat situations after some time.

3. The Innovation Lattice

To explain the previously mentioned aspects and to more readily show them, we took each of the four terms and consolidated them with our Innovation Framework. Fundamentally problematic - Innovation that bridles innovation and makes another plan of action. Has no reasonable contenders. Fundamentally maintaining - Enhancement for an item or cycle in a current market that offers new benefits for the client. Steadily problematic - A gradual improvement in innovation that prompts an emotional disturbance. Steadily supporting - Little and aggregate changes in a current item, innovation, or administration.

4. Building versus Secluded Innovation

Building innovation is portrayed as the reconfiguration of existing item advancements. Secluded innovation (or part innovation), running against the norm, is the specific inverse. In secluded innovations, at least one part of an item is changed while the general design remains something similar.

5.4.2. Strategic Innovation

Strategic innovation is an association's course of reevaluating or redesigning its corporate procedure to drive business development, produce an incentive for the organization and its clients, and make an upper hand. This sort of innovation is fundamental for associations to adjust to the speed of innovation change.

5.4.3. Features of Strategic Innovation

Strategic innovation requests an all-encompassing methodology for the exercises of the associations at different levels in the association. The highlights of strategic innovation are as under;

1. This idea depends on the drawn-out points of view and is created in light of the creating strategy which matches the innovations in the association.
2. The principal objective of strategic innovation is to make cutthroat space for the items and administrations presented by the association.
3. The course of strategic innovation consolidates business processes with savvy fixes to the issues in the associations.
4. Gather data about the business from whimsical sources and give creative methodology to the difficulties in the association.
5. Improvement of the association cycle which can oblige the progressions in the association and construct robots business interaction and techniques in the association.

5.4.4. Scope of Strategic Innovation

1. Managed Innovation: In this process, the facilitating process includes external and internal perceptions about the organization's capabilities, processes, procedures, and customers.
2. Strategic Alignment: This is created for the development of shared vision, goals, and actions among the key stakeholders in the organization.
3. Industry Foresight: This process includes a deeper understanding of the driving forces, influence of the new technology, competition dynamics, and changing market trends.
4. Customer Insight: Strategic innovation provides a deeper understanding of the customers' needs and demands and provides innovative strategies for the growth of the market.
5. Technology: The perspective of technology is assessed through strategic innovation on the aspect of internal technology capabilities, organization capabilities, and reaching higher customer satisfaction.
6. Readiness of the organization: Strategic innovation provides insight into the readiness of the company to the changing innovations and also provides insights on the capability of the organization to accept the changes in the business environment.
7. Implementation: Strategic innovation provides insight into the process of implementation of the strategy through the aspect of process and procedures and policies which align the organization to the innovation in the organization.

5.4.5. Practices of Integrating Design Thinking in Strategic Innovation

Reviewing: Design thinking depends on the information gathered through different sources, which incorporate clients, workers, and other partners. Because of the information gathered prototype is created through the idea of design thinking. This advancement support being developed of the right procedure for innovation in the association.

Simulating: The idea of recreation gives bits of knowledge on the experience of the person in genuine business. Simulating opens up procedure practice since it incites administrators to shape a sympathetic commitment with the client experience, in this manner making the market setting promptly appraisable.

Conversing: Conversing was especially significant in empowering aggregate reflection and getting arrangements between members with assorted understandings of the procedure. All together words, this part of design-drove planning enhanced administrators' thoughtfulness regarding the genuine fit inside item market fit

Collaborating: This training was particularly helpful when groups were managing complex issues that could without much of a stretch be neglected or lost in conversational exchange. As opposed to attempting to sympathetically see every supervisor's viewpoint (as in the conversing practice) the spotlight in cooperative interpretation was on producing a common answer for a perplexing issue.

5.5. Create cultural change using Design Thinking & Innovation Management in IT organizations

Digitization is affecting each industry, from Hospitality to Healthcare. Financial Administrations to Retail. According to a business viewpoint, we are seeing radically unique business models arise and traditional ways of generating value for clients being challenged. As far as we might be concerned, as individuals, each aspect of our lives is also being transformed, from the way we consume, the way we live, to the way we work.

Today's innovation climate is unique. The differentiating factor is attached to two things, the speed of change and the stakes in question. At the point when overlaid by the broader macroeconomic patterns, for example, increasing globalization, and changing demographics along with the volatile political and monetary environment, we can start to see the speed, chaos, and intricacy digital disruption brings. The one thing we can be certain of is that digitization in business and our lives will increase, and the valuable chance to create and shape the future as business individuals, workers, and residents are greater than ever previously.

As enterprises become increasingly digital, there is a developing awareness that constant and rapid change is turning into the new normal. For digital businesses, start-ups, and scale-ups, that can drive innovation, rapidly penetrate a market, and scale faster, this presents a great open door. At the flip side of the scale, for the larger, deep-rooted organizations, there are often two mentalities the appreciation of the changing landscape and the acknowledgment that innovation, right off the bat, is critical to survival, the inquiry is how, or a profound certainty that disruption won't ever happen.

The clashing attitudes can perhaps be grasped through Amara's Law. Roy Amara was a researcher, researcher, and futurist, the president of The Organization Representing Things to Come. His thought proposes that "we will generally overestimate the impact of innovation in the short-run and underestimate the impact over the long haul". There is a lot of publicity perhaps around Artificial knowledge and mechanical technology. Today, we're quite far from robots controlling the world, however, the potential impact on our future is significant. In any case, the results of complacency, can, and will have quick and extreme impacts. Business development and sustainability are intrinsically connected to a culture of innovation, the ability to disturb from the inside. The capability to rethink value through new items, administrations, and arrangements, is based upon an innovative attitude, creativity, the courage to take gambles, and a receptiveness to change.

At the point when we imagine the world's most innovative companies, the rest cases, open bars, and ping pong tables come into view. What is less examined is the strength, drive, and coarseness that is expected to make due. Innovation is hard, and it's nothing unexpected, many perceive the requirement for change, yet essentially don't have any idea how or even where to start. Large established companies have organized processes, frameworks, and governance, that are profoundly ingrained into the ways of working. Their prosperity today has brought about a large client base, access to capital, and a solid brand.

A deviation from the standard can potentially represent a gamble on this steadfast achievement. In any case, these advantages are gradually being dissolved by the smaller digital disruptors who can leverage faster innovation, a culture of experimentation, and chance-taking. Here they are unconstrained by a lack of experience, which gives the consent to test and investigation, to fail however to learn. The stunt isn't to indiscriminately discard what has made you fruitful today and just recreate the latest digital tactics, but to challenge the assumptions that have supported past progress, and stress test the ways you create value for your client, shareholders, and individuals.

5.5.1. If there are no best practices in IT organizations:

The way we make feeling about our general surroundings needs to develop. Already our environments were easier. It was easier to assimilate information, categorize and immediately recognize where best practice existed, and follow after accordingly. As intricacy increases because of the rapid pace of change, we are expected to now detect, test and analyze changes, and even act, to send new or even clever practices. An untrodden path is daunting. Ultimately the challenge for all is how would we see the intricacy and contradiction, and have the certainty to act. The answer is organizational and individual agility.

5.5.2. Culture change — a mindset shift using an agile approach:

Our established way of conveying a change in a business like Lean, Six Sigma, and Without a Moment to Spare, have revolved around driving effectiveness. In straightforward terms, creating the same result with fewer assets, (be now is the right time, cash or labor, and so forth). This approach has allowed us to decrease flex, waste, and redundancy in our processes. In doing as such, the result is that our processes and our organizations become fragile. The issue we face is when something comes at us completely unexpected, we don't have the time, cash, or labor to have the option to deviate and answer. Our ability to operate with agility is restricted, yet it is a higher priority than ever previously.

As business people in IT organizations:

- IT people should have the option to detect the changes in our internal and external environment, and profoundly understand what it means for our business, shareholders, representatives, and clients
- IT people should have the option to collaborate actually, utilizing aggregate insight to genuinely make proof-based and data-driven choices
- IT people want to send dynamic apparatuses and methods that enable us to anticipate, test, learn and turn while creating new processes, items, and arrangements

5.5.3. Take control and create change using Design Thinking in IT Organization

The value of Design Thinking is that it centers around issues that are complicated by nature, and on issues that are centered around individuals. This means broadly understanding the Design Thinking reasoning (Drench, Frame, Ideate, Model, Test) yet with some important nuance that's specifically relevant for navigating change in larger IT organizations.

1. Build a Strong Team

These are people who will ultimately be responsible for driving change through the various departments and business units of the organization. Need to look for people who can help lead change at different levels in the organization. These are the people who will go through the journey with you and will help shape the plan. Roles you'll need:

- Sponsor / Decider — this person is funding the project and will be needed to make strategic decisions on the direction
- Naysayer — this person is often overlooked but has great ideas about the real issues and barriers in your way. You want one of these people in your team to help you focus on the right problems to solve
- Functional expertise — people from different parts of the organization who will be affected by the culture change project and who will ultimately be responsible for helping move the change through the business
- Middle-Management — consider including people from the middle of the organization, where initiatives often falter,
- Project Manager — dedicate some resources for help scheduling meetings and sessions and documenting actions

2. Behaviours first, culture second

Culture is a tricky fish definition. Clearly, it exists, it applies colossal power to how individuals operate, yet when we attempt and change it, we realize it resembles chasing a shadow.

'Culture' is the aggregated result of how individuals in an organization normally behave. It's the zoomed-out perspective on the values and standards that drive individual and gathering behavior. Yet, tackling that 'zoomed out' view is inconceivable without getting into the drivers of culture: the behaviors individuals live and breathe consistently.

This is where everything becomes real. The tangible, 'hard stuff' that you can notice, understand, impact, and change. It's the point at which we center around this degree of culture, the day-to-day behaviors, that we can make small changes that can have dramatic results.

3. It's a marathon, not a sprint

Cultural change takes time. Try not to anticipate that everybody should jump aboard with better approaches for working in year one. In truth, your most memorable year will be spent laying the foundations for change: changing frameworks, eliminating barriers, and over-communicating the vision and roadmap. You'll zero in on your early adopters in year one — these are individuals who are naturally keen on adopting better approaches to working. Try not to get yourself in a position for a fall here — change takes time and you ought to set expectations internally that your most memorable

year is about learning and experimentation, year two is rollout and adoption, and year three maneuvers towards these new behaviors being self-perpetuating.

4. Help your team trip over the truth

Teams leading culture change will quite often be senior, which is all well and good. They also will generally be very disengaged with the reality of representatives and clients. The higher you get, the more announcing is packed and abstracted. This is a real issue while you're attempting to tackle real issues, with real implications, that affect how individuals feel about carrying their 'best self' to work.

There's just a single solution for this. You have to get teams to 'trip over the truth'. This means getting them out into the business and having real conversations with real individuals. This is the sort of thing individuals dread, yet reliably view as stimulating and motivating.

5. Stand on the shoulders of giants

Each business is one of a kind and each cultural change program ought to be customized. In any case, that doesn't mean that you're quick to encounter the challenges you're facing.

The constellation of challenges workers face in moving culture is one of a kind — however, the individual challenges are not. Communication, innovation, training, attitudes, and environments — challenges in these areas have been tackled effectively by many organizations, repeatedly. Rather than start from scratch, look outside your organization for inspiration. Utilize your network and start conversations with individuals who can assist you with getting a new point of view on what's conceivable.

6. Learning > Thinking

No plan endures first contact. It doesn't matter how great the experiences are, the reality won't ever be very as you anticipate. The intricacy of the environment will dictate our approach: basic environments allow us to apply best practices rapidly. Complicated environments require somewhat more cross-functional thinking and so we can be satisfied with 'great' practice.

However, the second move into complex environments (namely most frameworks and certainly most IT organizations) - the approach needs to change. This means testing and learning rapidly. This is where most culture change programs sit - the framework is too perplexing to be in any way predictable and while you have a great feeling of where to move straightaway, the best way to get data to help direction is to create it.

Get serious areas of strength to model arrangements and start having conversations. A Design Sprint methodology can work here however don't get too balanced up on the loyalty of your answers at this time. Indeed, even a sketch that can sit and have a decent conversation with some about can teach all manner of valuable things. Encourage the team to utilize speedy lean analyses on new initiatives to construct data about where to move close to drive the behaviors want to see.

5.6. How to measure the success of design thinking processes in IT organizations?

One method for assessing the success of design thinking is through KPIs.

“Design thinking should be directly tied to your organization’s strategic KPIs” says Misiurny.

“The process is successful if the solution you propose is proven to affect the KPI tied to the problem you were trying to solve. And if it’s invalidated, then you count the learnings and try again.”

Lennon expands on the design thinking process with specific KPIs that he uses on his projects:

- Customer – includes Customer Satisfaction, Net Promoter Score, Customer Loyalty, Share of Wallet
- Product – includes Time to Market, Rate of Adoption, Average products per Customer
- Employees – includes Employee Engagement, Team Collaboration
- Innovation – includes Number of Qualified Innovation Ideas, Employee Participation Rate, Rate of Success in Product Realization

He adds: “Ultimately, bottom line profitability should be boosted also. However, everyone needs to recognize this is a consequence of the successful implementation of design thinking disciplines, not the primary purpose of doing so.”

To acquire an upper hand and thrive in this bold new, fast-changing digital world, IT organizations should be prepared to answer this call.

5.7. Future scope of research:

Based on the scope of the current research, it can be extended to a further level on how to betterment the adoption of innovation using innovative management culture using Design Thinking. What is missing from design thinking writing incorporates a few perspectives like the sensation of democratization or, on the other hand, more friendly issues of organizations for being more open to various characters, how this idea makes a difference in individuals’ interface with similar people, influence the standards and culture, and decrease undesirable social components that can frustrate design and innovation (Carlgren et al., 2014). These bits of knowledge recommend that future exploration might keep on investigating the intervening job of organizational culture on the connection between design thinking and innovation.

5.8. Limitation of this research study:

This research has been done mostly on professionals from IT companies and other industries that are not covered how Design Thinking can create innovation management in those industries to get a competitive advantage.

Chapter 6: Conclusion

Examining both the theoretical formulations and the actual management practice reveals a process that is internally consistent and coherent, and that has successfully established itself with remarkable practical results. The design thinking applied in innovation strategies contributes to the significant success of IT companies. Design Thinking's strategic thinking and complex philosophy make it an innovative tool that initiates new opportunities to deal with market needs.

Design Thinking's methodology goes beyond digital forecasts and traditional market research to create usable offerings and services that lead to charmed and satisfied customers, interested staff, and increased revenue.

Different IT companies integrate design thinking into their business strategies in different ways: radical innovation, product identity design, value-added design, branding, corporate print design, etc.; through analysis, synthesis, and creativity, they try to combine the requirements of the business and the needs of the consumer in the final solution. Designers can anticipate and propose solutions in two contexts - an innovative product or service and an organizational context. They search for new creative conceivable outcomes and afterward imagine their thoughts through design ideas, client situations, and different methods. Designers also produce design prototypes as a step toward defining physical, functional, and user requirements or specifications that uniquely identify all or a single component and determine the degree of interchangeability in the system (Ivanova D., Vodenova P., 2018). Design Thinking supports the system, allows the detection of potential problems in time, and ensures the continuity and sustainability of new programs. It turns out to be an appropriate concept for any activity and business that understands that in today's experience economy, people are more than important, and the client is leading and determines the direction of the development.

Today innovation is everybody's business. Whether you are a supervisor in a worldwide partnership, a business visionary firing up in an administration job, or an educator in a grade school, everybody is supposed to get lean - to improve less. Also, for that reason, we as a whole need design thinking. At each level in each sort of organization, design thinking gives the apparatuses you want to turn into an imaginative mastermind and reveals imaginative open doors that are there - you are simply not seeing them yet.

It is about human-focused innovation. Design Thinking works best with regards to making the human feeling of things and handling challenges such that best addresses human issues, no matter what the degree and authority of the challenge. A traditionalist, controlled, specialized, or direct methodology is, at this point, not ready to wrestle with the recently complicated and delicate necessities of present-day culture. It begins with an aim, a craving, a need, or a longing toward a superior circumstance or state. We don't know whether this is a simple dream or a pragmatic and suitable way to take it; however, Design Thinking gives us the instruments to investigate What Could Be.

Design Thinking can further develop the executives, versatility and start methodical innovation in the organization. Regardless of the type of business, it can be used to create a more progressive culture of leadership and problem-solving. When constantly creating, evaluating, and testing their processes, active organizations can easily outperform their competitors. In this way, they can respond more

quickly to changes in the industry and the market when they have a constant understanding of the wishes and needs of their customers. Once the Design Thinking methodology is used to identify the client, it is easier to understand what is important to him. As a result, it can be ensured that the solution that is designed meets its specific needs. In this sense, dealing with potentially high-risk problems is reduced to minimizing this risk, thanks to pre-identified processes and needs.

It is the lessons learned from the world of design when applied to management, that can turn managers into creative, conscious, and responsible visionaries.

It clearly shows that Design Thinking has significant and positive impacts on product innovation, process innovation, and organizational innovation, which was the hypothesis of this research.

In conclusion, Design Thinking and Innovation management can give an IT company a competitive advantage by enabling it to develop innovative solutions that meet customer needs, foster a culture of continuous improvement, differentiate itself from competitors, and improve its operational efficiency and cost-effectiveness.

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Appendix

Survey Questions Asked:

An online survey was done using Google Forms with the following questions.

- Your gender is: Options are as follows:
 - Male
 - Female
 - Does not want to disclose
- What is your work experience? Options are as follows:
 - Up to 1 year
 - Over 1 to 3 years
 - Over 3 to 5 years
 - Over 5 to 10 years
 - Over 10 years
 - Above 20
- Your Designation/Role? Options are as follows:
 - Developer / Analyst
 - Senior Developer / Senior Analyst
 - Lead
 - Manager
 - Senior Manager
 - Director / Head
 - Senior Leadership
 - Other
- What is your company's business? Options are as follows:
 - Telecommunications
 - IT / Software / Consulting
 - Manufacturing
 - Food and beverage industry
 - Education Industry
 - Banking
 - eCommerce
 - Healthcare research
 - Finance
 - KPO
 - Banking and Finance
 - FS
- Which of the following best describes your experience with design thinking? Options are as follows – Multiple Choices:
 - ✓ Emotional Intelligence
 - ✓ Consensus Building
 - ✓ User Research
 - ✓ Journey Mapping

- ✓ Brainstorming
- ✓ Coming up with as many ideas and potential solutions as possible
- How often do you practice design thinking? Options are as follows:
 - Never
 - Sometime
 - Often
 - Very often
- How often does your organization use the design thinking method? Options are as follows:
 - Never
 - Sometime
 - Often
 - Very often
- Based on your experience, how much does design thinking to drive success in each of the following aspects? Options are as follows:
 - Gives your organization a competitive advantage
 - Drives innovation
 - Fosters collaboration
 - Provides structure to the organization
 - Increases likelihood of success
- Below are several statements regarding attitudes toward design thinking. Please read each one carefully and indicate to what extent you agree or disagree with each statement. Options are as follows with Agree and Disagree:
 - a. Design thinking negatively affects efficiency.
 - b. Design thinking requires a collaborative environment to work well.
 - c. Anyone can learn and practice design thinking.
 - d. Design thinking is rigid.
 - e. Design thinking requires all involved to be human-centered.
 - f. Design thinking takes a lot of time.
 - g. Design thinking has a low return on investment.
 - h. Design thinking empowers personal growth.
 - i. Design thinking grows interpersonal relationships.
 - j. Design thinking improves organizational progress.
- Do you think Design Thinking with an innovation management culture can give a competitive advantage to any organization? Options are as follows:
 - Yes
 - No
- How does design thinking to impact the following? Options are as follows with Agree and Disagree:
 - a. Products and services
 - b. Process
 - c. Employees
 - d. Clients/customers

Survey Link: https://docs.google.com/forms/d/e/1FAIpQLScz7zJuElXzvvo-N0EwHmkeAKyWH8NoIFVYxsu_nB6QwAhNsQ/viewform?usp=pp_url

Interview Questions Asked:

1. Please describe a situation where design thinking positively influenced your organization or yourself and why it was successful.
2. Please describe a situation where design thinking may have negatively influenced your organization and why it was negative.

Reference Creation Method:

Using the APA process and a few online free bibliography creation tools, the references and citations are created.