How Design Thinking Can Add Value to Project Management

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A R T I C L E   I N F O

A B S T R A C T

Project management in recent/previous projects was noticed to lack the project's primary purpose, which is the project delivery quality/output. Design thinking, which is end-user-oriented and mainly focused on generating the best ideas to create the best product, will be a beneficial addition to the project management process. There are multiple phases in design thinking to be integrated into the project management procedures: empathy, ideation, prototype, and testing. The most crucial phase to be integrated into project management's planning is the ideation phase, which will ultimately ensure the project to have a proper completion and as per the client's requirements by generating lots of ideas to achieve the listed requirements and studied problem statements from the empathy phase. Combining both methods and processes will result in the ultimate project planning and execution and ensure the targeted delivery is achieved.

Our research is divided into two sections, and they are:

1- Online Research Section: Going through all the recent and previous projects that have been implemented and based on Design Thinking to investigate the requirements and how well they will integrate with our current procedures.

2- Survey Section: We will conduct a survey involving project managers of all fields to participate, share their constraints, and extract their acceptance of our integration processes and required changes.

Results and Conclusion

1- Enhanced methodology to define the client/customer requirements and achieve them in the project delivery.

2- Smooth integration with beneficial addition to project managers in project implementation as the best-case scenario generated through brain-storming sessions.

1. INTRODUCTION

In project management, there are many keys to success and, most importantly, innovation and end-user-centric outcomes. Integrating multiple effective methods or keys in project management will result in a certain target achievement and end-user satisfaction [1][2]. Design thinking is a well-known method for the required innovative strategies based on its sequenced detailed processes of understanding the need to generate satisfactory ideas and testing them as prototypes to achieve the necessary feedback [3]. The result of integrating design thinking into project management will achieve the project's objective within the studied constraints of scope in a planned period and budget. Also, it will ensure delivery of the expected quality with the allocated resources by eliminating shortages [4][5].

1.1. Problem Statement

Given that the number of projects is increasing in our region, and adding that Dubai is a football pitch for engineers [6], many projects lack the required understanding or address the needs set by the end-

user in their project's scope and delivery. Design thinking will ultimately clarify the needs and ensure the delivery of the required product if integrated into project management.

Hypothesis

H1: Design thinking will reinforce the project planning process and especially in defining the scope constraints.

H2: End-user satisfaction in project delivery will increase if design thinking is integrated into the process.

1.2.   Research Questions
- What are the steps of design thinking?
- How do we integrate the steps of design thinking into project management?
- Will design thinking steps be a challenge to project managers in initial implementations?
- What are the tweaks required in design thinking steps to ensure proper integration?

1.3.   Research Objectives
- Understand the steps of design thinking and their sequences.
- Achieve a complete integration of design thinking steps in project management phases.
- Define the challenges that might be faced and provide solutions to overcome them.
- Simplify the integration to be implementable by all project managers regardless of their experience.

2.   LITERATURE REVIEW

2.1.   Design Thinking

Many fields, such as business, education, and product development, require problem-solving and innovation to achieve end-user satisfaction as their main orientation is human-centric [7]-[10]. Design thinking is used to achieve the target by providing the requirements through understanding and addressing the end users' needs, targets, and challenges [11]-[16].

There are multiple principles in design thinking, and they always start with empathy, which is a deep understanding of the end-user needs and requirements. Ideation follows empathy to generate lots of innovative and creative solutions [17]-[20]. Once the complete set of understandings and ideas have been generated, developed, and combined, a prototype principle begins and pushes the ideas into testing to rework or refine the ideas based on the practical implementation [21].

There are skills required to achieve the complete goal of design thinking that must be adapted and used during the process, and they are collaboration, open-mindedness, and willingness to accept any failure and count it as an additional point for learning and improvement [22]-[25].

Pros and Cons of Design Thinking

In design thinking, there are more pros than cons in almost all implementations, but listing both lists will ensure the integration is successful with fewer limitations and failures.

2.2.   Pros of Design Thinking:
1- **User-Centric:** The first principle of design thinking focuses on deeply understanding the end-user requirements and addressing all the required data to generate ideas [26]-[28].
2- **Innovation & Creativity:** Uniqueness is a must in projects, and they are the anchor of development upon success. Design thinking ensures problem-solving by generating creative and innovative ideas [29]-[33].
3- **Collaboration:** Teamwork is a must in design thinking, especially during the ideation phase, as an effective brain-storming session is a target and multiples, if required, to generate the most implementable and adapting ideas [34]-[38].
4- **Iterative:** The prototype phase is quick and requires a meager cost to implement a small testing unit of a product or process, so the failure of the prototype will reduce the risk of the whole project failure [39]-[42].
5- **Adaptability:** In the ideation principle, a considerable number of ideas are generated to ensure the best approach/solution on the table, so the outcomes of the product must be adaptable to the situation [43].

2.3.   Cons of Design Thinking:
1- **Time-Consuming:** Design thinking principles and phases require time to ensure the best approach is present, studied, and tested. In project

management, some projects are very limited in time and require immediate/quick actions and completions [44].

2- **Subjectivity:** During the empathy phase, the focus is on extracting the exact requirement/need of the end-user, so it will be subjective and might not benefit other fields related to the project [45]-[50].

3- **Resistance to Change:** Design thinking requires open-mindedness, and some organizations find it very hard to exit their comfort zone and accept new ideas/cultures [51].

4- **Risk of Stagnation:** Delayed problem solving might occur during the ideation process as innovation might increase the number of ideas and renewal of ideas, which will delay or harden the implementation process, as the ideas must always be up to date and refined during the process [52]-[56].

2.4. *Integration of Design Thinking with Project Management*

Design thinking phases and project management methodologies share innovation adoption within their process. Also, they both implement problem-solving and enhance stakeholder engagement. The empathy phase, which is end-user-centric, and iterative prototyping are both adapting to the iterative requirement of project management [57]-[61].

Once design thinking phases are integrated, flexibility and increased responsiveness will increase to attend the project's requirements [62][63][64]. The primary concept of integration is to have more efficient project operation and effective project outcomes, which can be achieved by merging design thinking with project management [65]-[69].

2.5. *Challenges of Integration and Solutions*

When combining two different procedures of producing a product, there will be challenges faced to achieve integration, and we aim to address them first and then attend to them all by finding the best approach to meet each challenge.

List of challenges:

1- Mindset shift: Innovation and creativity are necessary in design thinking, especially in an end-user-centered mindset. All project managers must be able to adapt to the required approaches in design thinking through several training and procedure update acceptances [70]-[75].

2- Time and Resource Constraints: In project management, the project timeline is critical, and the project must be executed by a planned time and completed on the expected delivery [76]. On the other hand, design thinking requires more time during research, brainstorming, and prototyping, so fast-paced projects will be challenging to add the design thinking initial phases [77]-[81].

3- Resistance to Change: Stakeholders and project teams may resist the proposed integration/change as it will be considered leaving the comfort zone and traditional procedure for unnecessary change [82][83][84][85].

4- Integration with Existing Process: Finding a method to keep both processes, design thinking and project management, complementing each other and smoothly combined might be challenging and time-consuming [86].

5- Measuring ROI: In project management, one of the key points of feasibility studies is the ROI, which is hard to estimate in design thinking as its outcomes are more focused on the solutions and meeting the end-user needs/satisfaction [87]-[89].

6- Skill and Expertise Gaps: All project management individuals must be trained in multiple required skills to achieve the benefit of design thinking, and these skills are related to researching, ideation, and prototyping [90].

7- Scalability: Design thinking will efficiently be implemented in a small group with no issues or struggles. However, once the group gets bigger, the challenge will increase as the initial steps/phases of design thinking require direct focus and multiple sessions to find the best solutions [91][92].

8- Maintaining Focus: Increased generation in the ideation process of design thinking and overemphasizing will cause the project to be delayed by delaying the execution and

prototyping of the vast number of solutions.

3. RESEARCH METHODOLOGY
3.1. Research Design
The methodology undertaken for this research is a qualitative research methodology, as some of the benefits of this methodology include flexibility and maintaining the meaningful insights of the participants, as noted by Pritha Bhandari [1]. Alongside the qualitative method, the exploratory approach is used as it aids in uncovering new insights regarding an emerging field, such as applying design thinking in project management or questions that might not have been researched extensively. The primary data is gathered through personal interviews with three experienced participants of a project management team working for (insert company name: maybe Dosan). The project team members agreed to the interview on the condition that their names be hidden. As such, they will be referred to as their job position. The two hypotheses are explained, and the participants shared their insights and thoughts regarding the topic. The secondary data, on the other hand, is obtained through recognized journals on the internet regarding global cases.

3.2. Data Collection Tools
The primary source of data collection used was the one-on-one interview method. An online interview was set up with interview guidelines of 5 open-ended questions. The three participants are project managers in the same company, and they all have over ten years of experience as project managers. Insightful information is obtained from the three participants, and the secondary data is also obtained through recognized journals found online with the keywords "project management" and "design thinking" alongside the criteria of being published within the last five years to ensure the latest data is used.

3.3. Research Approach
The use of inductive research is vital in this research as this research first uses a qualitative methodology, and secondly, this field of study is relatively new, and there is a lack of extensive research about this field which would allow us to develop our own theory [3].

3.4. Data Analysis Techniques:
We have used a qualitative approach in our research, as it is the most suitable method for our study and will give us rich data results. The techniques we have used are one-on-one interviews with two project managers and a project leader; as they are more knowledgeable and experienced in their field, the answers we will get from them will be very potent for our research. We also gathered data as secondary data from well-known and recognized journals.

The interview findings have been put into perspective and backed by the insights from the published review. The challenges and ways to overcome them, as well as the positive and negative aspects, are examined to offer an in-depth knowledge of the effects of implementing design thinking.

To identify the commonalities and differences among the project managers' points of view, the challenges that were recently identified, along with possible solutions, will also be looked at. This will make it possible to investigate the practical implications of integrating design thinking into project management in-depth.

3.5. One-on-one technique:
This technique helped us gain more knowledge from the project managers, and the result we achieved was more than we expected. The information that we gathered not only validated our hypotheses but also gave an in-depth overview of how design thinking increases end-user happiness enhances project planning, and can solve many obstacles encountered by project managers.

3.6. Secondary data from recognized journals:
Secondary data that we looked at played an important role in enriching our research and helped us by providing important information that aid us in making the interview questions understandable, well-rounded information and to the point.

4. RESULTS ANALYSIS
The result analysis from what we conducted of both qualitative methods, one-on-one, and the data we gathered gave us results and helped us check whether the hypotheses were right or wrong.
Starting with a review of the answers about design

thinking phases, how they fit into project management, and any obstacles project managers might encounter. Project managers' experiences provide insights that align with the goals and research questions to address the hypotheses successfully [93]-[100].

Qualitative data gathered from the interview gave us an answer for whether design thinking in project management will benefit them in their following projects, and from their answers, we saw that design thinking in project management will greatly help them reach end-user satisfaction [100]-[108].

In conclusion, the outcome we got helped reinforce our hypothesis regarding implementing design thinking in project management, and based on our interview, we see that our hypotheses are correct, and it will help project managers reach higher satisfaction from stakeholders. It will also increase innovation, creativity, and collaboration in future projects [109]-[113].

5. DISCUSSION

Design thinking methodology accompanies a set of elements shared in other methodologies, such as brainstorming, prototyping, and heterogeneous teams, to name a few. Those elements are found in different methodologies, such as Lean start-up and Agile development [4][114][115][116], which is also in agreement with what Project Manager B said when asked about the advantages of integrating design thinking into project management:

"It's rather vague since we already apply some of the principles," said Project Manager B.

The elements of design thinking are found in other methodologies, but what sets design thinking apart is the solution-based approach, which focuses on the solution rather than the problem [5][117][118]119], thus having the result user-centric as the end-user satisfaction is integrated into every step of design thinking which agrees with what Project Manager A said about the advantages of design thinking in project management in terms of end-user satisfaction [20][21].

"Client satisfaction will be higher since you are reinforcing client or end-user satisfaction as the main goal and actively involving them."- Project Manager A.

However, project management focuses only on three things: time, budget, and quality [5][122][123][124]. However, are they enough to judge the success of the project? Some argue the need to redefine traditional project management as not all projects have clear goals and methods. Turner and Cochrane, through the goals-and-method matrix table, explained that projects with both unclear goals and methods have a greater chance of failure [6][7][125][1126] and could benefit from design thinking. A study in which 112 project managers were asked to rate the reason for project failures ended with a lack of communication, unable to understand business objectives and manage customer expectations ranked as top reasons for project failures, followed by cost and time overrun [8][127][128][129].

When asked about design thinking, the Lead Project Manager emphasizes customer satisfaction, and Project Manager B thinks the same as they answered:

"After years of experience, I learned that if I failed to communicate properly with the stakeholders, you will always end up with tons of complains and rejection and you can skip that by applying design thinking and focus on what the end-users think and want." – Project Manager B.

"We (project managers) always apply the principles of design thinking. In the end, you would want the project sponsor, stakeholders, client or whoever commissioned the project to be satisfied, and you achieve that by meeting their expectation." – Lead Project Manager.

- ***Recommendations***

Design thinking and project management are two separate methodologies but contain similar concepts, resulting in a high compatibility between them as four of the characteristics listed by the authors of the article named "Design thinking and project management: an analysis of the relationship between its characteristics" of design thinking and project management share the same name and purpose which are Collaboration, Integration, Optimism, and Visualizatio [9][130]-[135].

In another study, 112 Project managers were asked to evaluate the most important aspect of design thinking, and the result was that user-centeredness was valued to be the most important [10][136][137][138]. This is the most lacking aspect of project management, which brings us to the case of integrating design thinking into project

management.

[10] mentions that the most important step in integrating design thinking into project management would be to conduct a comprehensive assessment of the project areas that would benefit from the design thinking approach [139]-[142]. Not all aspects of the project are compatible with the design thinking approach so assessing all areas beforehand of each project is a necessary step as all projects are unique [143].

Use qualitative data rather than quantitative data. [11] mentions that a considerable part of the message's meaning is lost in the email as humans use bodily and social cues such as tone and context to convey the meaning of their words, which makes surveys, email, and other forms of indirect query fail to properly convey the issue and what the end-user goals and objectives [144]-[149]. Direct forms of communication and qualitative approaches, such as one-on-one interviews and group sessions, provide more "insight" so that project managers can achieve user satisfaction at the end of the project [7][150][151]. When asked about suggestions he would provide to companies who want to apply design thinking to their project management team, Project Manager A said, "Training, it seems simple enough, but you would require the skills to communicate and understand the end-user requirements [152][153]." What the project manager stated implies that communication is an essential tool and skill that project managers need to gain more "insight" from their end-users properly [154].

Though highly compatible with each other, design thinking and project management require some training and experience to integrate the two concepts fully [155]-[60]. Our primary data emphasized the skills and requirements needed as the interview answers to the question about the suggestion of applying design thinking to project management:

"Design thinking requires experienced project managers to come up with suitable, realistic ideas while taking into consideration time and cost [161]-[163]."- Lead Project Manager

"It is easy to diverge from the end user requirements due to project constraints." – Project Manager B

- ***Limitations of Research***

There is a limited amount of research regarding the implementation or the impact of using design thinking in project management for a couple of reasons, one being that design thinking can be considered relatively new compared to project management [164]-[168]. Another reason would be the similarity between design thinking and project management as they share most of the characteristics of each other but with some differences [169]. The difference is due to the nature of project management being full of constraints such as the time, cost, and quality constraints of the projects [170]-[173].

Taking the similarities of design thinking and project management, the differences or the complementary aspects of each other could help the other side [174]-[177]. For example, project management could benefit from a more end-user-centric approach, but that does not apply to all situations as every project has a different situation with different limitations, and trying to apply the design thinking aspect could confuse the stakeholders or project sponsors as they are not used to the new concept of the integration of the two.

6. CONCLUSIONS

In conclusion, integrating design thinking into project management is possible, and some of the benefits of the integration include more customer satisfaction and a more defined project objective, which would result in the reinforcement of the project management process, thus proving the two research hypotheses. However, the integration is not possible to be done by any project manager as it requires experience, and due to the nature of each project being unique, such as some of the projects are critical in-time and they are continuously changing during the operation, the integration is not applicable to all project and deep assessment of each project elements is necessary to properly know when, how, and where to apply design thinking in project management.

In the end, even though some project managers consider design thinking to be just a collection of elements that are already studied and applied as they consider them to be "old wine in new bottles" [6] and that our integration is too good to be true, we will continue further and develop a future research plan for more adapting results to all types of projects.

- ***Future Research***

For future research, we recommend interviewing more people, as the more people who participate in the interview, the more subjective information and a broad view of the subject will result. Another suggestion would be to use online journals without limiting them within recent years as this subject is considered limited in research, and any input regarding the matter would be helpful.

The last recommendation is to view in detail the projects under process, try to implement design thinking into each phase, and survey the customers or end-user satisfaction before and after.

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Appendix

Interview Guide:

1. Can you explain how your role relates to design thinking?	
Project manager A	In terms of design thinking, in the beginning of the project, I make sure that the project design is aligned with the stakeholder's expectation of the project outcomes.
Project Manager B	After years of experience, I learned that if I failed to communicate properly with the stakeholders, you will always end up with tons of complains and rejection and you can skip that by applying design thinking and focus on what the end-users think and want.
Lead Project Manager	We (project managers) always apply the principles of design thinking, in the end, you would want the project sponsor, stakeholders, client or whoever commissioned the project to be satisfied and you achieve that by meeting their expectation.

2. What advantages would design thinking bring to project management in terms of the planning process?	
Project manager A	The planning will be more focused on achieving the client requirement through methods of innovation rather than having them compromise.
Project Manager B	It's rather vague since we already apply some of the principles, but there are some advantages such as reinforcing brainstorming to come up with creative ideas.
Lead Project Manager	With the application of design thinking principles, we would be able to take on rather challenging projects where creativity is an important aspect.

3. What advantages would design thinking bring to project management in terms of end-user satisfaction?	
Project manager A	Client satisfaction will be higher since you are reinforcing client or end-user satisfaction as the main goal and actively involving them.
Project Manager B	By increasing the collaboration between the project team the client, the end-user will have a more say in the project which will achieve a boost to their satisfaction by having solutions that align with their desires.
Lead Project Manager	It would bring the end-user satisfaction across the board and provide them with genuine delight by meeting their exact needs.

4. What are some challenges did you experience when you applied design thinking in project management?	
Project manager A	Time. It takes a lot of time to find a solution that meets their satisfaction a hundred percent.
Project Manager B	Not all stakeholders have the proper knowledge, they impose some impossible requirements, and it takes time to explain it to settle the issues.
Lead Project Manager	It takes some time to come with creative ideas, experiment with them, modify them, and finally have a proper idea that we can work with.

5. What suggestions would you provide to companies who want to apply design thinking to their project management team.	
Project manager A	Training, it seems simple enough, but you would require the skills to communicate and understand the end-user requirements.
Project Manager B	Keep track of the end-user requirements. It is easy to diverge from the end user requirements due to project constraints. Communicate the issues and come with a solution that satisfy the end user.
Lead Project Manager	Know your limit, design thinking requires

	experienced project managers to come up with suitable, realistic ideas while taking into consideration time and cost.