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The client-side project manager: A practitioner of Design Thinking

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Abstract

SYNOPSIS

Our research adds to the client-side project management body of literature by demonstrating that these professionals display all the characteristics of Design Thinking Mentalities, Thinking Styles and Practices as identified by Hassi and Laakso (2011, p. 6) and that they utilize a broad range of the Design Thinking tools identified by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125) when they deliver construction projects.

RELEVANCE FOR PRACTICE/EDUCATION

Our findings indicate that client-side project managers should view their role differently from what has been traditionally accepted. The use of Design Thinking within the project management construct highlights that practitioners need to develop skills and tools that address, not just the compliance and control elements of project management, but also information gathering and problem-solving techniques. This change of perspective creates opportunities for project managers to broaden their skill set in order to be able to create further value in the Construction process.

RESEARCH DESIGN

Our research uses a Grounded Theory methodology to explore the 'lived experience' of client-side project managers to determine if they utilize Design Thinking when managing Construction projects. This is achieved by creating a framework from the work of Hassi and

Laakso (2011, p. 6), Johansson-Sköldberg et al. (2013, p. 125) and Liedtka (2015, p. 928) to guide semi-structured interviews with a cohort of ten client-side project managers.

MAIN FINDINGS

Our research provides evidence of Design Thinking Mentalities, Thinking Styles, Practices and Tools being utilized by client-side project managers when delivering Construction projects. Our findings also identify 15 project management tools used by client-side project managers when delivering Construction projects and highlight that the practice of client-side project management should not be viewed exclusively as part of the 'Implementation' process.

RESEARCH IMPLICATIONS

Our results support existing research on client-side project management and expand the Project Management body of literature by demonstrating how client-side project managers employ Design Thinking to handle poorly-defined projects.

KEYWORDS

Client-side project management; Design Thinking; poorly-defined projects.

1.0   Introduction

In 2006, the UK's Engineering and Physical Sciences Research Council commissioned the Rethinking Project Management Network to investigate future avenues for project management research. One of the Network's findings was the need for project management research to find new ways of conceptualizing the social processes of project management (Winter et al. 2006, p. 639).

At around the same time, researchers began to investigate how Design Thinking could be applied to social constructs outside the traditional design disciplines. This research indicated that the transition from Design science to Management science was possible. However, more empirical investigations were required (Johansson-Sköldberg et al. 2013, p. 128) to overcome a "…*paucity of peer-reviewed articles…*" (Calgren 2013, p. 24).

Our research seeks to address both the need for new conceptualizations regarding the practice of project management and the need for new empirical research into the applications of Design Thinking. This is achieved by investigating whether client-side project managers utilize Design Thinking when managing Construction projects.

This study utilized a Grounded Theory methodology and conducted semi-structured interviews with a purposive sample of ten practicing client-side project management consultants who were managing Construction projects. We found the research participants adopted a wide range of Design Thinking Mentalities, Thinking Styles, Practices, and Tools.

This study augments and adds to the existing body of literature in many ways. Firstly, by reinforcing and expanding Usher and Whitty (2017c, p. 10) findings regarding the use of Design Thinking by client-side project managers. Secondly, by demonstrating how client-side project managers have informally adopted Design Thinking to manage Construction projects. Finally, our results provide a foundation for future investigation into the practice of client-side project management.

2.0   Literature Review

The Rethinking Project Management Network project was tasked with *"…enriching and extending the subject of project management beyond its current conceptual foundations…"* (Winter et al. 2006, p. 643). One of the findings of the Network was a need for new ways of conceptualizing the social process of project management (Winter et al. 2006, p. 639). Our paper attempts to address this need by investigating the 'social construct' of client-side project management through the theoretical lens of Design Thinking.

2.1   CLIENT-SIDE PROJECT MANAGEMENT

Existing research on the practice of client-side project management appears to be limited, indicating a pressing need for research into this form of project management. Research on this topic has, thus far, principally been conducted by Walker and Lloyd-Walker (2014), Usher (2014) and Usher and Whitty (2014; 2017a, 2017b; 2017c; 2017d).

Walker and Lloyd-Walker (2014, p. 566) research focussed on the ethical dilemmas faced by client-side project managers. Usher's (2014, p. 13) research challenges the traditional theoretical foundations of client-side project management and finds that the Strategic Management body of theory may provide a better foundation for the practice of client-side project management than Production Management.

Usher and Whitty (2017b, p. 598) investigate how client-side project managers deal with unexpected events, and in doing so identify a new change typology called 'Drift-changes.' Usher and Whitty (2017a, p. 5) also explore the relationship that exists between project success and client satisfaction within the project management construct. They find that client-side project managers create value in the Construction process by coupling these two elements together to create 'Project Management Yinyang' (Usher & Whitty 2017a, p.7). Usher and Whitty (2017d, p. 785) also developed 'The Final State Convergence Model.' This model conceptualized the non-linearity and complexity that client-side project managers encounter in the Construction process.

Perhaps most important for our research, Usher and Whitty (2017c, p. 2) explored how client-side project manager's deal with paradoxes in the Construction process. In doing, so they identified that client-side project managers appear to adopt some characteristics of Design Thinking. Specifically, that client-side project managers plan multiple pathways for achieving their project's outcome; they progress through a Knowledge Funnel, and they adopt 'action-as-planning' techniques to navigate poorly defined problems. In their findings, Usher and Whitty (2017c, p. 8) claim that client-side project managers adopt Design Thinking when managing Construction projects. We believe Usher and Whitty's (2017c, p. 8) findings are plausible, but far from conclusive. As such we have decided to investigate their claims more comprehensively.

Ben Mahmoud-Jouini et al. (2016, p. 145) highlight that both Design Thinking and Project Management are integrative approaches to problem-solving that can enhance organizational outcomes. However, research by Thomas et al. (2002, p. 23) found that most senior managers consider the discipline of project management to have little value concerning problem framing and solving. Morris (2013, p. 270) notes that this myopic perspective reduces project management to a compliance and control system which can only be used for delivering projects within predefined constraints, and does not necessarily ensure the integration of project deliverables with strategic benefits.

In recent years, project management researchers have begun challenging the 'implementation only' view of project management. They claim that modern project management has evolved to manage the poorly-defined objectives and the environmental uncertainty inherent within Complex, Mega and Wicked projects (Morris 2013, p. 58; McCall & Burge 2016, p. 200; Cicmil et al. 2017, p. 676). Lenfle et al. (2016, p. 385) highlight how these projects are (i) emerging and ambiguous; (ii) often have poorly defined objectives; (iii) need to explore new knowledge areas to achieve the project's goals; and (iv) operate in mixed temporalities which focus concurrently on both short-term and long-term horizons.

Of particular interest to this study is the existing research which shows Construction projects displaying many of the characteristics identified by Lenfle et al. (2016, p. 382). Specifically, that Construction projects (i) can occur in emerging and ambiguous environments (Fernandez-Solis 2013, p. 22; Usher and Whitty 2017b, p. 592); (ii) often have poorly defined objectives due to a lack of uniformly agreed stakeholder expectations (Usher and Whitty 2017d, p. 783); and (iii) need to focus concurrently on short-term horizons when managing unexpected events (Usher and Whitty 2017b, p. 594), and long-term horizons to deliver the project's outcome (Usher 2014, p. 12).

2.2 DESIGN THINKING

The Design Thinking body of knowledge has developed around the two discourses (Gaim & Wåhlin 2016, p. 34). The Design discourse focusses on the practices of professionally educated designers, and the Management discourse focusses on how the same practices are applied to strategy and innovation (Johansson-Sköldberg et al. 2013, p. 127).

Brown (2008, p. 86) states that Design Thinking is adopted by anyone who *"…attempts to match people's needs with what is technologically feasible and …convert [it] into customer value…"*. Cross (2011, p. 197) takes this description further by stating that Design Thinking is the ability to resolve ill-defined problems by adopting solution focused cognitive strategies, abductive reasoning and oppositional thinking. While (Verganti 2009, p. 4) states that practitioners use Design Thinking to *"…make sense out of things…"*.

Adopting a 'social constructionist' perspective, Hassi and Laakso (2011, p. 6) have described Design Thinking as a framework of Mentalities, Thinking Styles and Practices. Similarly, Liedtka (2015, p. 930) and Johansson-Sköldberg et al. (2013, p. 132) have used this perspective when identifying a range of Design Thinking Tools. Our research also adopts the 'social constructionist' perspective.

2.2.1 Mentalities

Hassi and Laakso (2011, p. 8) define Mentalities as *"…the mental attitude with which problems are approached…"*. They describe the Design Thinking Mentalities as (i) Experimental and Explorative; (ii) Ambiguity Tolerant; (iii) Optimistic; and (iv) Future-Oriented.

An *Experimental and Explorative* mentality is one which is willing to risk failure by pushing capability, technological and organisational boundaries (Fraser 2009, p. 64). Design Thinkers tend to see early failures, within acceptable risk levels, as the necessary price for discovering creative and innovative solutions (Brown 2008, p. 87). Fraser (2009, p. 64) notes that approaching problems with this mentality requires a tolerance for failure, blended with personal courage.

Design Thinkers are *Ambiguity Tolerant*. Rylander (2009, p. 11) highlights this is because ambiguity is a natural part of any design process. Boland and Collopy (2004, p. 76) note that Design Thinkers need to be comfortable with ambiguity in order to respond creatively to new challenges and opportunities. Being Ambiguity Tolerant provides opportunities for dynamic interactions between seemingly incompatible components (Smith & Lewis 2016, p. 381) and allows Design Thinkers to resist the intellectual temptation for early resolution and closure (Beech et al. 2004, p. 1315).

Design Thinkers are *Optimistic*. They assume that every problem has at least one potential solution (Cooper et al. 2009, p. 53). Gloppen (2009, p. 35) highlights this Optimistic outlook means Design Thinkers enjoy finding solutions to problems and provides the disposition necessary to accept and embrace competing constraints. Dunne and Martin (2006, p. 513) argue that these constraints are welcomed by Design Thinkers because they increase both the challenges and the rewards associated with the final resolution.

Design Thinkers are *Future-Oriented*. Simon (1988, p. 67) described Design Thinking as creating a "…*course of action aimed at changing the existing situation into preferred ones…*". It is this Future-Oriented Mentality that allows Design Thinkers to develop hypotheses about the future and fuels the vision-driven process of intuition (Martin 2009, Chapter 3, Section: 'Solving the Paradox at RIM').

2.2.2   Thinking Styles

The second dimension in Hassi and Laakso (2011, p. 6) Design Thinking framework is Thinking Styles. Hassi and Laakso (2011, p. 8) identified four cognitive activities that Design Thinkers use, and these are; (i) Abductive Reasoning; (ii) Reflective Reframing; (iii) Holistic View; and (iv) Integrative Thinking.

Abductive Reasoning allows Design Thinkers to find patterns based on previous practical experience (Lawson 2005, p. 159). Design Thinkers manage vast amounts of information by utilizing a form of logic that blends '…*past-data-driven analytical thinking…*" with "…*knowing-without-reasoning…*" intuition (Martin 2009, p. 6). This abductive logic allows Design Thinkers to identify patterns within a morass of seemingly unrelated data.

Reflective Reframing has been described as the ability to see past the 'immediate' problem, to ensure that the 'right' problem is addressed (Drews 2009, p. 41; Lockwood 2010, p. 19). Jordi (2011, p. 183) argues Reflective Reframing is necessary for "*meaning-making*." For the Design Thinker, the ability to be able to identify, frame, and reframe a problem is crucial in ensuring the most appropriate solution is identified (Beckman & Barry 2007, p. 36).

Design Thinking requires practitioners to be able to take a *Holistic View* of problems (Hassi & Laakso 2011, p. 8). Sato et al. (2010, p. 51) explain that this Holistic View is necessary to ensure that Design Thinkers understand, not only the functional and technical requirements of the problem but also social challenges inherent within the problem's construct. Fraser (2009, p. 65) describes this Holistic View as the ability to conceptualize a problem as a "…*living organism rather than as a fixed model…*". This ability allows Design Thinkers to see potential solutions as interconnected networks between technical, business and human dimensions (Dunne & Martin 2006, p. 512; Clark & Smith 2008, p. 8; Holloway 2009, p. 53).

Design Thinkers utilize *Integrative Thinking*. Brown (2008, p. 87) describes this as the ability to see all aspects of the problem in order to create novel solutions. Smith and Lewis (2011, p. 395) argue that Integrative Thinking stands in stark contrast to Contingency Thinking which asks "…*under what conditions would A or B be more effective…*". Instead, Integrative Thinking

requires a 'Janusian' approach (Rothenberg 1971, p. 195) which acknowledges that multiple competing demands can be simultaneously true and irrevocably interrelated.

2.2.3   Practices

Hassi and Laakso (2011b, p. 6) outline five Practices that indicate Design Thinking is being applied in any problem-solving context. These are: (i) A Human-centered approach; (ii) Thinking-by-doing; (iii) Visualization; (iv) Combining divergent and convergent approaches; and (v) a Collaborative work style.

Plattner et al. (2010, Introduction para 2.) highlight that by adopting a *Human-centered approach* Design Thinkers ensure the resolution of technical difficulties are achieved in such a way as to satisfy the human need from which it first evolved.

The practice of *Thinking-by-doing* is a necessity when dealing with the 'chance discoveries' inherent in any form of problem-solving (Plattner et al. 2010, Section 5.1). The application of Thinking-by-doing is closely aligned with the concept of the progressive elaboration of a project described in PMBOK guide (2013, p. 74), and Usher and Whitty's (2017c, p. 10) findings that client-side project managers adopt an 'action-as-planning' approach when faced with paradox and complexity.

Visualization is central to the Design Thinking process (Eppler & Kernbach 2016, p. 91). Ewenstein and Whyte (2007, p. 82) explain that the use of Visualization tools such as pictures, diagrams, and boundary objects, allows multi-disciplinary groups to develop creative solutions. Many authors have noted that the Visualization process is vital for discovering and developing the creative solutions that Design Thinking is renowned for (Dorst & Cross 2001, p. 434; Stempfle & Badke-Schaub 2002, p. 479; Dorst 2011, p. 529).

Drews (2009, p. 40) explains that *Divergent Thinking* is required in order to be able to challenge pre-existing assumptions and to create multiple alternatives. Boland and Collopy (2004, Chapter 1, Section: The Decision Attitude) balance this by highlighting the importance of utilizing *Convergent Thinking* to synthesize solutions, create acceptance, and gain the endorsement of a preferred design solution. The concept of combining Divergent and Convergent thinking is closely aligned to Usher and Whitty's (2017a, p. 19) findings regarding the management of success and satisfaction within the Project Management Yinyang framework.

Researchers have noted the need Design Thinkers have for a *Collaborative work style*. Gloppen (2009, p. 42) argues that a Collaborative work style is a necessity when facing complex problems as it allows the problem solver to gain new knowledge and perspectives from a range of different disciplines. Boland and Collopy (2004, Chapter 27, Section: Interaction) and Dunne and Martin (2006, p. 519) make the interesting observation that Design Thinkers appear to be at their most creative when operating collaboratively.

2.2.4   Tools

Liedtka (2015, p. 928) outlines a range of tools which Design Thinkers use and explains how these tools are used to generate multiple potential solutions. Design Thinkers then prototype and experiment with these to identify the solution that best fits the human, organizational, environmental, and technological constraints of the problem.

Johansson-Sköldberg et al. (2013, p. 125) highlight that the real purpose of Design Thinking tools is to create a *"…working hypothesis…"* which allows problem framing, setting, and solution to occur concurrently. These hypotheses allow the Design Thinker to choose "…

which contexts should dominate …" (Wylant 2010, p. 228). Table 1 synthesizes the work of Hassi and Laakso (2011a, p. 6), Liedtka (2015, p. 928), and Johansson-Sköldberg et al. (2013, p. 125) to show a relationship between the Design Thinking practices and tools.

Table 1   Design Thinking Practices and Tools

Design Thinking Practices (Hassi & Laakso 2011, p. 6)	Design Thinking Tools (Johansson-Sköldberg et al. 2013, p. 125; Liedtka 2015, p. 928)
Human-centered approach	Interviewing, ethnographic studies, observation, focus groups.
Thinking by doing	Journey mapping, hypotheses testing, field experiments.
Visualization	Prototyping, charts, graphs, storytelling, use of metaphor, analogies, 'whiteboarding' and sketching to capture ideas.
Combination of divergent and convergent approaches	Sense-making, hypotheses development, challenging assumptions.
Collaborative Work Style	Brainstorming, concept development, combined ideation.

3.0   Research Question

Ben Mahmoud-Jouini et al. (2016, p. 145) note that both Project Management and Design Thinking are integrative approaches that attempt to improve organisational outcomes. This comment is interesting when we consider Thomas et al. (2002, p. 23) findings that senior organisational managers considered project management to have little value in problem-framing and to solve.

We argue that, as Design Thinking is a problem-solving cognitive activity, any evidence of the utilization of these Mentalities, Thinking Styles, Practices, and Tools by client-side project managers would indicate that the discipline has moved beyond simple compliance and control tools. With this in mind, our paper investigates:

Do client-side project managers utilize Design Thinking when managing Construction projects?

4.0   Research Methodology

Our research will explore the 'lived experience' of client-side project managers who are managing Construction projects. To do this, we adopted a qualitative, 'Grounded Theory' methodology. This particular methodology was selected for two reasons.

Firstly, we considered the recommendations of Easterby-Smith et al. (2012, p. 49) who argue for the adoption of explorative and qualitative research methods when faced with a research field with limited prior empirical studies. Based on the lack of empirical Design Thinking studies (Calgren 2013, p. 24; Johansson-Sköldberg et al. 2013, p. 123) and our difficulty in finding peer-reviewed literature on client-side project management, a qualitative research methodology seemed appropriate.

Secondly, we considered the work of Bryant and Charmaz (2007, p. 31), Edmondson and McManus (2007, p. 1155) and Glaser (2014, p. 48). These authors recommend that a 'Grounded Theory' methodology be adopted when attempting to generate theory from social processes and 'lived experiences.'

4.1   RESEARCH DESIGN

Our research investigates the 'lived experience' of client-side project managers by creating a framework from Hassi and Laakso (2011a, p. 6) Design Thinking Mentalities, Thinking Styles and Practices; and Johansson-Sköldberg et al. (2013, p. 125) and Liedtka (2015, p. 928) Design Thinking Tools. We used this framework for developing semi-structured interviews. These interviews were conducted with a purposively selected sample of ten client-side project managers within the Australian construction environment. In selecting this sample size, we considered the work of Algeo (2012, p. 5) who argued that a sample as small as five is sufficient to ensure validity within targeted, qualitative research such as ours.

All of our research participants were male with between three and eighteen years' experience as client-side project managers in the Australian Construction sector. At the time of conducting the interviews each of the research participants were managing multiple Construction projects. The research participant's clients included Federal and State government departments and agencies (8 projects); Institutional clients such as education or health (4 projects); and private organisations including Not-for-Profits and private developers (6 projects).

The interviews were digitally recorded before being transcribed into a data analysis program (Nvivo). All of the recordings, transcripts, and data analysis are retained on a password protected computer. The privacy of each research participant is maintained through the application of a re-identifiable code (PM01-PM10) during the transcription process.

The data analysis was conducted by reducing the collected data into 'thought units' ranging from sentences to paragraphs using a process similar to that outlined by Ashill et al. (2003, p. 437). These thought units were reviewed using Hassi and Laakso (2011a, p. 6) Design Thinking framework of Mentalities, Thinking Styles and Practices as the coding categories. Once this was completed a second review of the collected data was undertaken using the Design Thinking Tools framework synthesized from the works of Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125) as the coding categories.

5.0   Results

Our results will be presented in the form of abstracts from the research transcripts, using the re-identifiable code for each participant as the citation. Our commentary will be added to provide additional clarity regarding the transcript abstracts.

5.1   DESIGN THINKING MENTALITIES

The data was reviewed looking for evidence of the research participants approaching and addressing problems using the Design Thinking Mentalities identified by Hassi and Laakso (2011, p. 6). These are: (i) Experimental and Explorative; (ii) Ambiguity Tolerant; (iii) Optimistic; (iv) Future-Oriented.

5.1.1. Experimental and Explorative

To test for an *Experimental and Explorative* Mentality, the research participants were asked whether they were able to comprehensively plan their projects with the information they were provided at the commencement of their project. In total seven of the research participants (70%) referred to the projects as being a process of exploration. The research participants explained:

> "…*Every building is a one-off prototype…you make decisions as you walk down the road…*" (PM10)

> "… *the plan is to head towards where you want to go…you just head off in the right direction… (PM02).*

> "…*[The projects are] always unique. It's necessary to have the original planning; to have some direction…[but that] initial plan can become almost completed irrelevant…it [the project] becomes something completely different…*" (PM08).

> "...*There is a range of outcomes that could be achieved …you don't know at that stage [commencement] what the physical delivery looks like or includes…*" (PM09).

The data indicates the research participants thought of their projects as experimental (i.e. "prototypes") and that the process for successfully delivering the project outcomes required an element of exploration. As PM02 succinctly puts it "…*you just head off in the right direction…*".

Within the data, there were regular references to the research participants adapting their initial plans and an acceptance that the outcome could be "…*completely different…*" (PM08) to what was first envisaged. The responses indicate a constant reassessment of the likely project outcome. We saw in this evidence that the process that is both Experimental and Explorative.

5.1.2. Ambiguity Tolerant

To test for *Ambiguity Tolerance*, the research participants were asked if they received all the inputs that they needed to plan the project when they commenced the Construction process. All ten of the research participants (100%) indicated their role required them to progress despite gaps in critical project information. The research participant has told us:

> "…*we need to have some level of flexibility…you have got to be ready to roll if and when things do change… the only thing you can be sure of is that things will change…*" (PM02).

> "…*there are a series of unknowns and things can change quickly…*" (PM04)

> "… *[Delivering construction projects] can be quite a fluid process, constantly changing and you need to be flexible…there's always something changing…*" (PM08)

> "… *What you should be doing as a client-side project manager is enabling [the stakeholders] to proceed in the midst of ambiguity…*" (PM10)

The data demonstrate that the research participants accept they will need to progress their projects despite incomplete information and a high probability that future information will impact their plans. Interestingly, none of the research participants appeared concerned about this ambiguity. One research participant, PM06, indicated that the challenge created by this ambiguity and uncertainty was part of the attraction for him in making client-side project management his career "… *[the ambiguity] is challenging…diverse, fun…that's what makes it*

stimulating. No day is the same, that's for sure…". PM06's response reinforces the findings of Dunne and Martin (2006, p. 513) who proposed that the challenges created by poorly defined problems are often welcomed by Design Thinkers because they add to the sense of satisfaction felt once a successful solution is identified.

5.1.3   Optimistic

To test for an *Optimistic* Mentality, the research participants were asked how they felt about having to manage their projects in the midst of incomplete information, ambiguity, and uncertainty. The research participants explained:

> *"…you can only try your best to get where they [stakeholders] want to be…you just have to go for it…" (PM02).*

> *"…you have to have a positive outlook… [and] stay in an optimistic frame of mind…" (PM09)*

> *"…[Ambiguity is a risk] to people who look at things as a threat, whereas…you need to be looking at them as an opportunity to see how you can exploit opportunities to get the right solution…[our role is to make stakeholder's see] the impossible that can be possible…" (PM10)*

The data indicates the research participants approach the challenges associated with ambiguity with a positive mindset; confident in their abilities to manage whatever might occur throughout the construction process. We saw this as evidence of an *Optimistic* Mentality.

5.1.4   Future-Oriented

To test for a *Future-Oriented* Mentality, the research participants were asked how they managed risks. Their responses demonstrate an ability to look beyond the present and focus on the project's future outcomes. This *Future-Oriented* perspective allowed them to 'foresee' how present-day decisions would impact on their projects.

> *"… [client-side project managers] have a role in keeping the project moving forward…we start to sideline unfeasible options reasonable quickly… You need to advise them [Sponsors and stakeholders] on what the likely outcome is going to be of whatever issue they are facing…" (PM03)*

> *"…you are continually looking at what's lying ahead…looking forward and then discussing that with them [Sponsor and stakeholders] and then working out a plan together …" (PM09)*

> *"…you just have to keep everything moving forward…so you need to know what you need from them in advance …" (PM10)*

The phraseology utilized by the research participants was interesting. Comments such as *"…moving forward…" (PM03, PM07 & PM10)* and *"…looking forward…" (PM09)* all indicate a *Future-Oriented* Mentality. The data appears to indicate that the research participants were a group who are not content with 'what is,' but prefer to keep their focus on 'what could be.'

5.2   THINKING STYLES

Hassi and Laakso (2011, p.6) identified four Thinking Styles that Design Thinkers adopt. These are (i) Abductive Reasoning; (ii) Reflective Reframing; (iii) Holistic View; and (iv) Integrative Thinking.

The data was analyzed for evidence that demonstrated the research participants were utilizing these Thinking Styles.

5.2.1 Abductive Reasoning

To test for *Abductive Reasoning*, we looked for evidence that the research participants were using a combination of experience and intuition to manage poorly defined problems. We asked the research participants how they managed their projects when faced with incomplete information.

> *"…some of it is intuition, some of it is experience based…" (PM02)*

> *"… I think it's something you learn from going through projects… I think its experience in the field that helps you know which way to go…" (PM06).*

> *"… I make recommendations [to the Sponsor and stakeholders]… that's part of our experience in assessing the details… [being able to] advise if there are implications to decisions that are made or changes and [knowing] how that can impact the project strategically…" (PM09)*

The data indicated that the research participants were utilizing a combination of intuition (PM02) and experience (PM06 & PM09). The use of both intuition and experience is a hallmark of Abductive Reasoning.

5.2.2 Reflective Reframing

To test for *Reflective Reframing*, the research participants were asked how they filled the information gaps in their projects. The research participants told us:

> *"… [a lot of the questions I ask are]…testing my assumptions as a client-side project manager…" (PM02).*

> *"… the most fundamental thing I found in project management is being able to ask the right question and to style the questions… [to] get them to define what they want to achieve, not how they want it to look…" (PM04).*

> *"… [we say] this is how we understand your words and your comments, can you please confirm this…" (PM06).*

> *"… what you need to do is to frame the argument; all the decision, all the information, in a certain way that…empowers them [Sponsor and stakeholders] to make the decisions…" (PM10).*

The data demonstrated a pattern of gathering information, reframing it to highlight the gaps in the information, and then articulating and documenting this information in such a way so that stakeholders could either fill in the gaps or endorse the research participant's understanding. We saw these responses as evidence of *Reflective Reframing*.

5.2.3 Holistic View

To test for a *Holistic View*, the research participants were asked how they perceived their role in the Construction process. The research respondents explained:

> *"… [a client-side project manager must have] oversight and understanding of the strategy, finances…all of the works, and the staff… of the wider political issues…the client-side project*

manager must be across the business… cost, time, facility benefit… and then marry this back to the original project benefit…" (PM03).

"…The client-side project manager generally provides a more strategic oversight because they're looking beyond just building [the facility]. They're looking at through-life support, maintenance, and the broader factors…" (PM04).

"… [the client-side project manager must be] mindful of their decisions on the business side of things…to keep the project within the micro-positioning …" (PM10)

The responses indicated that the research participants perceived their role from a *Holistic View*. They were not just concerned with the successful delivery of a facility but felt obligated to understand and provide direction on how the project's outcomes would achieve the Sponsoring organisation's strategic goals.

5.2.4 Integrative Thinking

To test for *Integrative Thinking*, the research participants were asked whether they felt the elements of the Construction process were an interrelated system or discrete elements.

"… [you have] the users, the client, the contractor… [we need to] be seen trying to balance everybody…" (PM01)

"… Stakeholders will have different requirements, quite often they will need to be balanced…"(PM02)

"… [all the project elements] are interrelated and they can have knock-on effects…" (PM05).

"…certainly a lot … are related to other aspects, and it's not just an isolated outcome…" (PM09).

"… [the client-side project manager] is the central cog…when you think that you could have a thousand people, some on the other side of the world, who buy-in to this delivery… there are cogs connected to cogs…my job is to keep all the other cogs moving, and moving together…" (PM10).

The data indicates that the research participants viewed the Construction process as a series of interconnected elements and decisions. Comments such as "…*balancing*…" (PM01 & PM02) indicate the research participants saw an interconnectedness in the divergent perspectives of the project stakeholders. PM10's comments regarding the client-side project manager being the central "…*cog*…" provides a clear mental image of *Integrative Thinking*.

5.3 PRACTICES

Design Thinking is a cognitive strategy utilized to solve poorly defined problems. In order to identify and develop creative solutions, Design Thinkers adopt certain practices. Hassi and Laakso (2011, p. 6) identified five Practices adopted by Design Thinkers, and these are; (i) A Human-centered approach; (ii) Thinking-by-doing; (iii) Visualization; (iv) Combining divergent and convergent approaches; and (v) A Collaborative work style.

5.3.1 Human-Centred Approach

To test for a *Human-Centered Approach*, we asked the research participants what they considered was their primary role in the Construction process. We anticipated the data would

show a strong bias towards technical and contractual elements. However, the data revealed some surprising responses.

"…my role is all about People Management. It's an influencing role…" (PM01)

"…it's expectation management, that's what it comes down too…" (PM02).

"…project management is about facilitation, and that's all about communication. If everyone knows what's going on if everyone knows what they need to know…everything is a lot smoother…" (PM06)

"…the role needs negotiation skills…regular meetings…explaining… communicating… trying to get everyone on the same page…so it's very much those people skills…" (PM09).

Interestingly, the data indicates a strong bias towards a *Human-Centered Approach* to the Construction process by the research participants. They explained how *"…People Management…"* (PM01), *"…expectation management …"* (PM02) and *"…people skills…"* (PM09) play a central role in the client-side project management of Construction projects. We saw this as evidence that a *Human-Centered Approach* was being adopted.

5.3.2   Thinking-by-doing

To test for *Thinking-by-doing*, the research participants were asked how they managed to move their projects forward in light of information gaps. The research participants explained:

"…the statement that helps me with some complex projects is 'fix it as you go.' Plan what you've got…progress as best you can at the start and then reorient and start working through it again…" (PM02)

"…You develop a plan of how you intend to do the project…and then it's a matter of adapting that plan and updating the plan, keeping everybody informed…" (PM09)

"…you make decisions as you walk down the road…so you just sort of plan it as you go…" (PM10)

The data demonstrates the research participants were adopting a *Thinking – by - doing* approach. This supports the findings of Usher and Whitty (2017c, p. 10) regarding client-side project manager's bias towards an 'action-as-planning' approach to managing paradoxes in Construction projects.

5.3.3   Visualisation

To test for the practice of *Visualisation*, the research participants were asked what tools they used to explain complex issues to their Sponsor and stakeholders.

"…I do love a really good diagrammatical representation…" (PM02)

"…I used a Gantt chart to illustrate that another path was necessary, it didn't create the path. That was created after…" (PM03).

"…Time will be a form of graphical program showing all the various stages and the breakdown of those stages – what depends on what elements and how the critical path flows…" (PM09).

"…the budget document, preparation of a time-based program. Just to show visually how we got through things…" (PM10)

The research participants indicated that they regularly use *Visualization* tools to explore the potential project pathways, to explain the interconnectedness of activities, and to demonstrate the flow-on effects of particular decisions.

5.3.4   Combining divergent and convergent approaches

To test for the practice of *Divergent and Convergent Approaches*, the research participants were asked a range of questions about how they validated assumptions and how they managed different Stakeholder expectations. The participants told us:

Adopting a divergent approach:

> When discussing a review of a business case at the commencement of a project
>
> *"…I presented the case to the steering committee… [and asked] do you need this [facility]? What is the benefit?..."* (PM03)
>
> *"… you need to generate a bit of conflict in the organization to find the real need, which is based on a series of assumptions, facts, and constraints…"* (PM04)

When discussing whether stakeholders have a unified vision of the project outcome PM07 noted, *"…they think they know what they want…but that's often created by strong personalities with a particular preference…[I have to] interrogate that by questioning in detail what they think they want…start to chip away…[then I find] there are a lot of questions that haven't been considered…"*

Adopting a convergent approach

> *"… [I build consensus] by allowing them [Sponsor and stakeholders] to revalidate their decisions and assumptions…"* (PM06)
>
> *"…they all have a slightly blinkered view…but the client–side project manager has to integrate these blinkered views with the next person's…"* (PM10)

These responses indicated both *Divergent and Convergent Approaches* being adopted by the research participants. The Divergent Approach was used to challenge preconceived ideas, biases, and group-think in order to interrogate the issues, drivers, requirements, and constraints of the project. The Convergent Approach was used to bring different perceptions together in order to unify understanding of the project's requirements and manage the stakeholder's expectations regarding the outcomes of the project.

5.3.5   Collaborative work style

To test for a *Collaborative Work Style*, the research participants were asked: (a) How they gathered information at the commencement of the project scoping process; (b) How they managed challenges throughout the Construction process, and (c) How they aligned disparate Sponsor and stakeholder expectations. The respondents told us:

> *"…a good project manager will be flexible…and adaptable and be willing to listen…and get advice on what could and should be done…[to make sure] all the players are involved…"* (PM04)

"…[delivering any project is about]…a group of people, teaming up towards the delivery of the same facility…that means consulting with them…" (PM06)

"…there is a lot of consultation and collaboration…[to] ensure they [Sponsor and stakeholders] retain ownership…" (PM09)

"…there is always a lot of collective knowledge that should be used to make decisions…" (PM10)

The responses demonstrate the research participants were adopting a *Collaborative Working Style*. The research participants described themselves as being part of a team with a common goal (PM06) which requires *"…consulting and collaboration…"* (PM09) to achieve a successful outcome. PM10 seems to summarise the comments of the other research participants when talking about the *"…collective knowledge…"* that needs to be accessed in order to make decisions during the project.

5.4   TOOLS

The data was reviewed searching for any indication that the research participants were adopting Design Thinking tools. Our analysis identified 15 different tools that the research participants used during the Construction process. The tools are listed in Table 2.

Table 2   Tools research participants used during the Construction process

#	Client-side Project Management Tool	Abbreviation	Research Participant									
			1	2	3	4	5	6	7	8	9	10
1	User Requirements Brief	URB	✓	✓		✓		✓	✓	✓	✓	✓
2	Functional Design Brief	FDB	✓	✓		✓	✓	✓	✓	✓	✓	
3	Workshops	Wsh	✓	✓						✓	✓	✓
4	Interviews/Consultation	I/Con	✓								✓	✓
5	Feasibility Studies/Business Case	FS/BC	✓		✓	✓				✓	✓	
6	Options Analysis	OA	✓		✓	✓				✓	✓	
7	Contracts	Con					✓				✓	
8	Value Management Workshops	VM					✓		✓			
9	Monthly Reports	MR			✓					✓		
10	Gateways/Hold Points	Gate	✓		✓		✓	✓	✓	✓	✓	
11	Risk Analysis	RA			✓				✓	✓	✓	✓
12	Communication	Comm										
13	Cost Plan/Budget	Bud		✓	✓		✓	✓	✓	✓	✓	✓
14	Program	Pro	✓	✓	✓		✓	✓	✓	✓	✓	✓
15	Project Management Plan	PMP			✓	✓	✓	✓			✓	✓

The identified client-side project management tools were reviewed against the Design Thinking tools already documented by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125). This review interrogated the data looking at how the research participants described the way they used the client-side project management tools and assessed whether these aligned with the identified Design Thinking tools. Table 3 demonstrates how each of the identified tools aligns with the Design Thinking tools identified by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125).

Table 3   Design Thinking Tools vs. Client-Side Construction Project Management Tools

#	Client-side Project Management Tools															Count
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Design Management Tools	URB	FDB	Wsh	I/Con	FS/BC	OA	Con	VM	MR	Gate	RA	Comm	Bud	Pro	PMP	
Interviewing	✓			✓							✓	✓		✓	✓	6
Ethnographic Studies	✓	✓		✓				✓				✓		✓	✓	7
Observations	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	11
Focus Groups			✓	✓		✓		✓		✓	✓	✓			✓	8
Journey Mapping	✓	✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	12
Hypothesis Testing		✓	✓		✓	✓		✓	✓			✓	✓	✓	✓	10
Field Experiments			✓			✓		✓	✓			✓	✓	✓		7
Prototyping		✓	✓		✓	✓		✓	✓	✓		✓		✓	✓	10
Charts			✓		✓	✓			✓		✓	✓	✓	✓	✓	9
Graphs		✓	✓		✓	✓			✓		✓	✓	✓		✓	9
Story telling	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	13
Metaphor				✓												1
Analogies				✓												1
White-boarding			✓			✓					✓	✓				4
Sketching			✓			✓						✓		✓		4
Sense-making	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	14
Hypothesis development	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓		✓	✓	12
Challenging assumptions	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	14
Brainstorming	✓		✓			✓		✓			✓	✓				6
Concept development	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	13
Combined Ideation	✓		✓			✓		✓			✓	✓		✓		7

As Table 3 demonstrates, the Design Thinking tools used most regularly by the research participants were 'Sense-making' (14), 'Challenging assumptions'(14); 'Storytelling' (13), and 'Journey mapping' (12). Interestingly, Contracts ('Con') did not correlate to any of the Design Thinking tools outlined by either Liedtka (2015, p. 928) or Johansson-Sköldberg et al. (2013, p. 125). We suspect this is because Contracts prescribe what is expected, what is monitored, how progress will be assessed and how parties are required to behave. Hence, Contracts are not 'problem-solving' tools they are compliance and control tools.

6.0   Discussion

We will now discuss the results of this research regarding the Research Question and how these results contribute to the literature.

6.1 DESIGN THINKING IN PROJECT MANAGEMENT

Our research posed the question: Do client-side project managers utilize Design Thinking when managing Construction projects? This research adopted Hassi and Laakso (2011, p. 6) Design Thinking frameworks as our method of analysis. Their framework has three dimensions; (i) Design Thinking Mentalities; (ii) Design Thinking Thinking Styles; and (iii) Design Thinking Practices. Besides, our research also investigated whether client-side project managers in the Construction sector utilize the Design Thinking tools outlined by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125).

6.1.1   Design Thinking Mentalities

The results indicate that the client-side project managers involved in this research adopted all four of the Design Thinking Mentalities outlined by Hassi and Laakso (2011, p. 6). The research participants demonstrated an *Experimental and Explorative* Mentality in the way they approached their projects as one-off prototypes. They progressed their projects despite understanding the project's outcome might be considerably different from the one that was originally envisaged by themselves, the Sponsor, and the stakeholders.

In progressing their projects forward, the research participants proved to be decidedly *Ambiguity Tolerant*. All the research participants indicated they could progress their projects despite the ambiguity created by gaps in critical project information.

The data indicated that client-side project managers are *Optimistic*. They were confident in their ability to manage all aspects of their projects to a successful outcome. This was in spite of having to contend with incomplete information and in the understanding that unexpected challenges could impact their ability to deliver the project successfully.

Finally, client-side project managers appear to have a robust *Future-Oriented* Mentality. When faced with information gaps, unforeseen challenges, and in the knowledge that unexpected events may hinder their progress, they overcome obstacles by focusing on the future outcomes to be achieved, not the difficulty immediately in front of them.

6.1.2   Design Thinking Thinking Styles

Our findings indicate that client-side project managers utilize all of the Thinking Styles outlined in Hassi and Laakso's (2011, p. 6) Design Thinking framework. The research participants indicated they draw on both intuition and experience when planning the progress of their projects, recommending options, or determining the potential impact of risks. This indicates the application of *Abductive Reasoning*.

The research participants spoke of using *Reflective Reframing* to help them understand the Sponsor's and stakeholder's expectations. They also utilized Reflective Reframing when attempting to understand the Sponsoring organisation's drivers or to test and validate assumptions upon which critical decisions had been made.

The research participants took a *Holistic View* concerning their role on projects. They described how they saw their projects in strategic terms. They felt responsible, not just for the construction of a facility, but for understanding how this facility would operate throughout the whole of its life and how it would fulfill the broader objectives and drivers of the Sponsoring Organization.

Finally, the research participants saw themselves as part of a much bigger process. They described their role as balancing the strategic needs of the business with the project outcomes and the Sponsor and stakeholder's expectations. They demonstrated *Integrative Thinking* when consolidating different expectations of the project Sponsor, stakeholder and project teams together to create a unified vision of the project outcomes.

6.1.3   Design Thinking Practices

The findings of this research demonstrate the research participants adopted all five of the Design Thinking Practices outlined in Hassi and Laakso's (2011, p. 6) framework.

Despite our assumptions to the contrary, the research participants exhibited a highly *Human-Centered Approach* to managing their Construction projects. They repeatedly described

their role as 'people management' and spoke of how they need to manage the fears, concerns, and expectations of the Sponsor and stakeholders.

The research participants showed a strong bias towards *Thinking-by-doing* as the tool for managing complex or poorly-defined project scope and risks. They appeared to treat their programming (i.e., Gantt Charts) as hypotheses to be tested rather than formal plans to be adhered to. The research participants regularly mentioned changing their programs and plans as new information came to light or as unforeseen events impacted on their proposed project plans.

The *Visualisation* was regularly used by the research participants in order to communicate with their Sponsors and stakeholders. The data highlighted how the research participants would use project management artefacts such as Gantt charts and reports to help tell the story of the project, to help the Sponsor and stakeholders make sense of the project and its environment, and to create confidence that the project outcomes were achievable.

The data indicated that the research participants combined *Divergent and Convergent approaches* to progress their projects. At different times throughout the Construction process, the research participants would alternatively "…*generate conflict*…" (PM04) in order to identify or challenge pre-existing assumptions and bias; or "…*integrate*…" (PM10) differing opinions in order to create a consensus and gain a unified endorsement to progress.

Finally, the data demonstrated that the research participants adopted a *Collaborative Work Style* to access the "…*collective knowledge*…" (PM10) that resides within the Sponsor, stakeholders and project team.

6.1.4 Design Thinking Tools

Our research identified 15 specific client-side project management tools that the research participants utilized to manage their Construction projects. Except for 'Contract,' these project management tools were able to be categorized according to the Design Thinking tools previously identified by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125). Based on the data, we surmised that the *Contracts* are not utilized as a problem-solving tool, but instead are a tool developed for monitoring and controlling the project.

6.2 CLIENT-SIDE PROJECT MANAGEMENT

The results of this study augment and expand the limited body of literature regarding client-side project management. Our research has augmented the existing literature by providing support to Usher and Whitty (2017c, p. 10) claims that client-side project managers may utilize Design Thinking and that these practitioners adopt an 'action-as-planning' approach in Construction projects.

Our research has added to the body of literature by demonstrating that client-side project managers display all the characteristics of Design Thinking Mentalities, Thinking Styles and Practices as identified by Hassi and Laakso (2011, p. 6) and that they utilize a broad range of the Design Thinking tools identified by Liedtka (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125). The contribution our research has made to the client-side project management literature is summarized in Table 4.

Table 4   **The contribution of this study to client-side project management literature**

Key point	Supported	Added
Utilization of Design Thinking (Usher and Whitty 2017c, p.11).	*	
Utilization of 'Action-as-planning' techniques in Construction projects (Usher and Whitty 2017c, p10).	*	
Adoption of Design Thinking Mentalities		*
Adoption of Design Thinking Thinking Styles		*
Adoption of Design Thinking Practices		*
Utilization of Design Thinking Tools		*

7.0   Conclusions

Our research finds that client-side project managers utilise Design Thinking when delivering Construction projects. Our research provides clear evidence of all of Hassi and Laakso's (2011, p. 6) Design Thinking Mentalities, Thinking Styles and Practices being utilized by client-side project managers when delivering Construction projects. Furthermore, our research found a strong correlation between Liedtka's (2015, p. 928) and Johansson-Sköldberg et al. (2013, p. 125) Design Thinking tools and the tools utilised by these practitioners. Combined, these findings strongly indicate that Design Thinking is being utilised by client-side project managers when they are delivering Construction projects.

Our findings highlight that the practice of client-side project management should not be viewed exclusively as part of the 'Implementation' process. As such, our research shows that client-side project management has more to offer in the Construction process than merely the delivery of compliance and control systems.

7.1   LIMITATIONS OF THIS RESEARCH

The main limitation we identified in our research is the generalizability of our findings. Our research was conducted in a specific social construct with a small group of research participants. Although the sample size does not affect the validity of the research findings, we concede that it may impact on the generalizability of the results. This could be overcome by conducting future research with a larger sample size.

We also note that our research was conducted with a group of consultant client-side project managers. We believe the findings of this research could be enhanced by undertaking similar research with a more diverse range of Construction sector project managers.

7.2   IMPLICATIONS FOR RESEARCH AND PRACTICE

Our study has implications for project management research. Our research demonstrates a clear link between Design Thinking theory and Project Management theory and has provided some empirical evidence into the use of Design Thinking in a project management construct. However, more research still needs to be conducted, particularly into how Design Thinking Mentalities, Thinking Styles, Practices and Tools are applied within different project management constructs.

The findings of this research have implications for the practice of project management. Our research indicates that project managers should view their role differently from what has been traditionally accepted. Design Thinking is first and foremost, a problem-solving activity. The use of Design Thinking within the project management construct highlights that practitioners need to develop skills and tools that address, not just the compliance and control elements of project management, but also information gathering and problem-solving techniques. This change of perspective creates opportunities for project managers to broaden their skill set in order to be able to create further value in the Construction process.

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