

Title

Ambidextrous intrapreneurship: mixed method research, exploring designer's perceptions and mindset, and their influences on intrapreneurial behaviours at the front end of innovation.

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Executive Summary

Traditionally organisations have operated as a top-down bureaucracy. However, the speed in which innovation happens has been accelerating, and organisations are having to innovate faster than ever before. The top-down approach is not viable in today's 21st century VUCA business environment. Business leaders must create ambidextrous organisations that simultaneously and continually generate both linear and non-linear innovations. In recent decades, two antidotes have been prescribed to combat the speed of change and promote organisational ambidexterity: design thinking and intrapreneurship. By facilitating the use of design thinking and intrapreneurial activity, leaders empower their greatest assets - their employees. Creating a creative climate that facilitates both design thinking and intrapreneurial activities, allows employees to act like entrepreneurs within the organisation. However, organisations are awash with paradoxes, and the inertia of the status quo is overwhelming for most organisations, resulting in organisation's producing predominately linear innovations.

The context of the research focuses on one of the most innovative departments within an organisation, the design department. Taking a bottom-up approach, the research explores the designer's paradox mindset, design thinking mindset, juxtaposed with the designer's perceptions of the creative climate and perceptions of the design leader. Furthermore, exploring how mindset and perceptions affect intrapreneurial behaviours at the front end of innovation.

The research project took a mixed-method approach, utilising both quantitative and qualitative forms of data collection and analysis. Generating sixty-nine valid survey responses and conducting three interviews. The results found designers perceptions had a direct relationship and influence upon intrapreneurial behaviour. However, contradictory to the literature, design thinking had no influence or relationship on intrapreneurship. An unforeseen insight emerged from the study, that is, the intermediary relationship paradox mindset has between perception of the creative climate and intrapreneurial behaviour. The major conclusion from the research project is a designers paradox mindset is the greatest predictor for intrapreneurial behaviour.

Key words: Design Innovation; Intrapreneurship; ambidexterity; Design Thinking

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1. Introduction

1.1. Background

The front end of innovation (FFE) is the most important part of the innovation process, as it ultimately dictates the direction and success of an innovation project (Cooper, 2011; Gassmann and Schweitzer, 2013). Recognising the importance of the FFE, design leaders understand the importance of stimulating employee creativity and the sharing of employee ideas and insights (Kim and Mauborgne, 1997, 2015; Isaksen and Tidd, 2006; Edmondson, 2008). Thereby increasing the flow of information from external to internal of the organisation in a bottom-up direction (Brentani and Reid, 2004, 2012). The research paper explores how in-house designer's perceptions and mindset effect bottom-up innovation, otherwise defined as intrapreneurship.

Intrapreneurship, a system that allows employees to act like an entrepreneur within an organisation (Pinchot, 1985). Within design departments, intrapreneurial activities at the FFE are awash with paradoxical tensions and wicked problems, these tensions can cause either learning and creativity or anxiety (Andriopoulos *et al.*, 2018). The in-house designers mindset towards paradoxical tensions often dictates the designer's decisions, behaviours and approaches towards innovation paradoxes (Miron-Spektor *et al.*, 2018; Smith and Lewis, 2022). Integrative and abductive thinking are processes of how designers manage the conflicting tensions of paradoxes (Martin, 2007; Riel and Martin, 2017), the two modes of thinking are part of the design thinking mindset (Martin, 2009; Brown and Martin, 2015).

Design thinking mindset (DTM) offers an organisation a competitive edge in solving complex paradoxical problems. However, design thinking (DT) also challenges the status quo of an organisation (Martin, 2009). Although DT supports employee creativity and intrapreneurship (Dunne, 2018; Lockwood and Papke, 2018), DT needs to be part of the climate of the design department (Reine, 2017; Dosi, Rosati and Vignoli, 2018). DT lends itself well to intrapreneurship. However, the creative climate must allow the designer to design-think and explore innovation paradoxes.

1.2. Gap in knowledge

There have been frameworks to manage the FFE (Herstatt and Verworn, 2004), both from a process (Khurana and Rosenthal, 1998; Cooper, 2011) and climate perspective (Koen *et al.*, 2002). However, the frameworks neglect the early stage of the FFE (Brentani and Reid, 2004), and neglect to encompass all of the 4P's of a creative climate: people, press, process and product (Rhodes, 1961). Further, there is need to understand how paradoxes affect those in the lower levels of an organisation (Raisch and Birkinshaw, 2008). Furthermore, research is lacking at the FFE from a mindset (Miron-Spektor *et al.*, 2018), perception and cognition (Andriopoulos *et al.*, 2018) perspective. Finally, little empirical research exists that attempts to measure design-based activities for the implementation of intrapreneurial endeavours (Brenner and Uebernickel, 2016; Goldsby *et al.*, 2017)

1.3. Research Aims and Objectives

1.3.1. Aim

Design leaders understand the need to stimulate intrapreneurship at the FFE but struggle to utilise their designer's natural creative mindset or efficiently manage an ambidextrous design department. The research aims to investigate how perceptions of the creative climate (PCC) and leadership style (PLS) effect designer's design thinking mindset (DTM) and paradox mindset (PM). Further, explore to what effect these perceptions and mindsets influence intrapreneurial decision-making and behaviours at the FFE. From the designer's perspective the research was conducted using a mixed-methods sequential explanatory design.

1.3.2. Objectives

The objectives of the research are as follows:

1. Investigate what DTM and PM attributes are best associated for intrapreneurship at the FFE.
2. Explore how PCC and PLS can affect the designer's natural creative problem-solving, PM and DTM.

3. Establish a causal relationship between mindset, perception, and behaviours at the FFE, analysing the strength and influence of the relationships upon each other and intrapreneurship.
4. Propose suggestions and interventions that foster a creative climate that facilitates the designer's natural creativity for intrapreneurship.

1.4. Significance of the Research

The research contributes and broadens our understanding of four theories: FFE, PM, DT and intrapreneurship. Specifically, from two positions. (1) DT in intrapreneurship, adding to DT's paradigm shift from product-centred to ecosystem-centred. (2) Intrapreneurship from the employee's perspective, mindset, and cognitive position. In understanding employees DT and PM design leaders can place interventions to utilise their designer's natural design and problem-solving skills. Thereby, fostering intrapreneurship and an ambidextrous design department.

1.5. Thesis Statement

How does perception and mindset affect intrapreneurship? Designers are considered to be natural creative problem-solvers. However, leadership style and the creative climate can have either a positive or negative effect on a designer's expression of creativity. In turn, will have a positive or negative effect on intrapreneurial behaviours and decisions at the front end of innovation.

- **Chapter 2, Literature review:** An examination of academic theory and research pertaining to the relationships between perceptions, mindsets, design thinking and their effects on intrapreneurship.
- **Chapter 3, Research methods:** Description and rationale of the research design. Mixed method two phase approach.
- **Chapter 4, Results:** Findings from the quantitative and qualitative phases. The chapter is a description of the results.
- **Chapter 5, Discussion:** An integration of the quantitative and qualitative phases. The chapter evaluates the findings and discusses the impact the results have on intrapreneurship.

- **Chapter 6, Research Conclusion:** A closing of the research project.

2. Literature Review

The research explores how designer's paradox mindset (PM) and design thinking mindset (DTM) juxtaposed with the perceptions of the creative climate (PCC) and perception of leadership style (PLS) affect non-linear intrapreneurship at the front end of innovation (FFE). The chapter is divided into three sections:

- Theoretical framework.
- Design thinking and ambidextrous organisations.
- Perceptions of leadership style and the creative climate.

Section One

2.1. Theoretical Framework

A theoretical framework was developed to set the foundations of the research project (Grant and Osanloo, 2014), while also mapping the various relationships of the theories and hypotheses (Gentner, 1983). Three hypotheses were developed and tested. See table 1 and figure 1 below.

Variable Types	Variables
Independent variable	Design thinking mindset (DTM).
Dependent variable	Intrapreneurial (BuInnov) decisions and behaviours at the front end of innovation (FFE).
Moderator variables	Perception of the leadership style (PLS) and perception of the creative climate (PCC).
Mediator variable	Engagement of paradoxical and abductive thinking.
Control variable	The innovation projects. Whether the innovation project is top-down or bottom-up, linear, or non-linear has no bearing on the designer's mindset or perception and is not being measured.

Table 1: Variables

Table 1 is an explanation of the variables that create the theoretical framework, see figure 1 below:

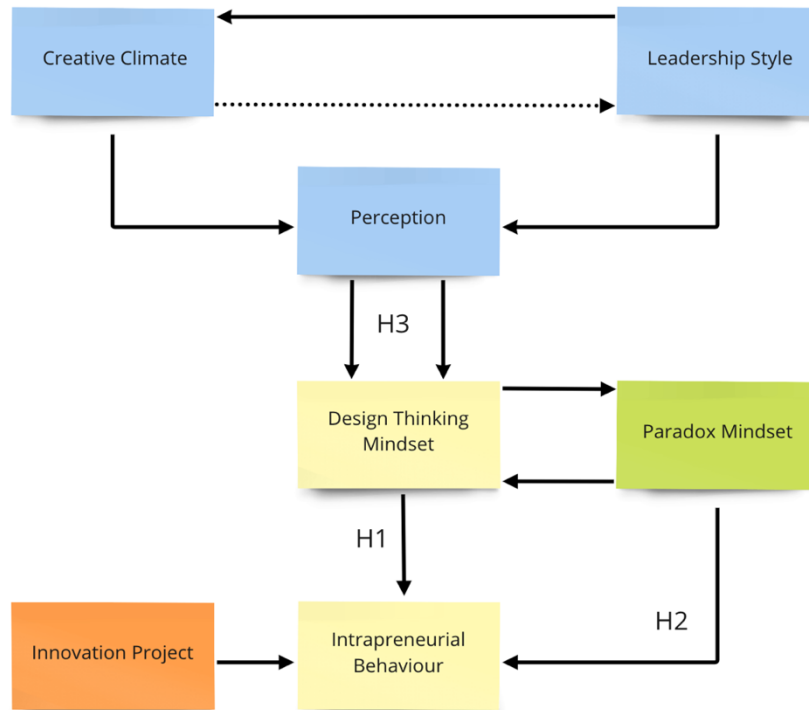


Figure 1: Theoretical framework.

Table 2 below contextualises the three hypotheses.

Research Hypothesis		
Hypothesis 1 (H1)	Theory	The research posits a direct relationship between (DTM) (causal relationship) and intrapreneurial behaviour (dependent variable) at the FFE. Furthermore, research shows DTM and processes can facilitate intrapreneurial activities (Brenner and Uebernickel, 2016; Plattner, Meinel and Leifer, 2016).
	H1	Designer's design thinking mindset is positively related to non-linear intrapreneurial behaviour.
Hypothesis 2 (H2)	Theory	People have a varied approach towards paradoxes, some are more naturally inclined towards seeking out and solving paradoxes (Miron-Spektor <i>et al.</i> , 2018). Paradox mindset can be learnt (Lüscher and Lewis, 2008), and the more one engages in paradoxical behaviours, the more of a positive impact it will have on paradox mindset (PM) and innovative behaviour (Smith and Lewis, 2022).
	H2	The more designers engage in paradoxical thinking will positively impact intrapreneurial behaviour.
Hypothesis 3 (H3)	Theory	Research shows employees perceptions of the creative climate and leadership behaviour influences their innovative productivity (Isaksen and Akkermans, 2011).
	H3	Positive perceptions of leadership style (PLS) and the creative climate (PCC) will positively influence intrapreneurial and ambidextrous behaviour.

Table 2: Hypothesis.

Table 2 above describes the theories and research that support the three hypotheses as depicted in figure 1 above.

Section Two

2.1. Design Thinking Organisation

Tim Brown and Katz (2019) introduce design thinking (DT) as a collaborative, human-centred, problem-solving process wherein the designer's sensibilities and methods are used to synthesise user desirability with what is technically feasible and viable. Organisations have adopted DT to make sense of the competitive landscape and solve ever-complex system-level problems between people, events, places, objects and ideas (Mootee, 2013). However, publications such as Bloomberg Businessweek and Harvard Business Review have oversimplify DT (Mootee, 2013). Some critics call DT a failed experiment (Nussbaum, 2011), suggesting in the pursuit of mass adoption, DT has been turned into a linear process. However, others argue DT organisations create more meaningful innovations and user experiences (Lockwood and Papke, 2018), bridging the gap between problem and solution (Cross, 2006, 2011). DT is a competitive advantage from both an organisational (Martin, 2009) and individual level (Brown and Katz, 2019).

2.2. Design Thinker

Design is a natural human activity (Razzouk and Shute, 2012). DT is an inherent cognitive process, complementing and enhancing the designer's techniques, skills and behaviours for analysing forms, relationships, behaviour, human interactions and emotions for creative problem-solving (Mootee, 2013; Brown and Katz, 2019). DT is more than just doing design but thinking as a designer (Cross, 2006; Luchs *et al.*, 2016; Brown and Katz, 2019). Thinking, behaviour and mindset are interlinked (Hassi and Laakso, 2011), therefore understanding the mindset helps understand the characteristics of the 'design thinker' (Dosi, Rosati and Vignoli, 2018). Organisations and people within them regularly use analytical thinking (deductive and inductive

thinking). However, Martin (2009) argues for a third type, abductive thinking, i.e., design thinking.

The reflective, intuitive and abductive nature of DT, coupled with it being action orientated (Cross, 2006, 2011) encourages what Schön (1983) calls reflection-in-action, the practice of thinking while doing. DT allows organisations and individuals to travel back and forth through the knowledge funnel (Martin, 2009), allowing the designer to discover, synthesise and simplify ideas. Using DT to travel along the knowledge funnel allows for the solving of wicked problems. Resulting in linear and non-linear innovations and a balance between exploration and exploitation.

2.3. Ambidextrous Organisation

There are many names for innovation, for instance, O'Reilly III and Tushman (2013) incremental and discontinuous, Kim and Mauborgne (2015) red and blue oceans, Christensen (2016) sustaining and disruptive, and Govindarajan (2016) box1 and box3. In conclusion, innovation can be categorised into two types:

Linear Innovation	Non-linear Innovation
Maintaining and exploiting today's performance engine . Improving the organisations current business model, product, service, by a succession of small-scale incremental changes.	Exploring future disruptive and/or radical innovations to drive tomorrow's innovation engine - the organisations future business models, products, and services.

Table 3: Innovation types.

Table 3 defines the innovation terms used in this research. Exploiting linear innovations and exploring non-linear innovations are critical for long-term organisational survival. The most successful organisations manage the tensions and competing demands of both the performance and innovation engines (Hamel and Prahalad, 2007; Kuratko, Covin and Hornsby, 2014; Hamel and Zanini, 2020). These ambidextrous organisations continually and simultaneously exploit linear and explore non-linear innovations (O'Reilly III and Tushman, 2011; Govindarajan, 2016). Resulting in a balanced innovation portfolio comprising of a mixture of old/new, linear/non-linear products and services (Davis *et al.*, 2000). However, between the

exploitative performance engine and exploratory innovation engine, an organisation is awash with paradoxes and tensions (Smith and Lewis, 2011), and cognitive biases (Govindarajan, 2016). Organisations that resist either/or thinking and embrace paradoxical thinking, engaging in contradictory behaviours, are more adept to innovating linear and non-linear innovations (Andriopoulos and Lewis, 2009; Smith, Lewis and Tushman, 2016).

2.4. Ambidextrous Designer

Govindarajan (2016) posits tensions between the two engines are cognitive, as are the barriers to innovation (Anthony *et al.*, 2020). Moreover, skills, competencies, and mental models that fuel the performance engine choke the innovation engine (Govindarajan and Trimble, 2018). Kauppila and Tempelaar (2016) posit ambidexterity is based upon an individual's competence to engaging in behaviours within the two engines. Ambidexterity may start within the designer's mind but manifests itself as behaviour. Designers who develop the ability to focus systematically and simultaneously on the present and future are better adapted at solving complex and paradoxical problems (Rothenberg, 1971).

Paradoxes are “contradictory yet interdependent elements that exist simultaneously and persist over time” (Smith and Lewis, 2022, p. 16). Becoming confident in coping with paradoxes requires a conscious effort on the part of confronting paradoxes and double-loop learning (Lewis, 2000), i.e., reflection and learning from behaviours and observations (Argyris, 2008). Furthermore, accepting some paradoxes as unsolvable improves a designers paradox mindset, skills and ability to think about the problem (Smith and Lewis, 2011). Suggesting, that when one embraces paradoxes, it can increase cognitive flexibility and the searching for new ideas, solutions, and strategies - building a latticework of mental models. Developing mental models can increase a designer's paradox mindset, thereby increasing tolerance toward innovation tensions and the ability to solve complex and contradictory problems (Miron-Spektor *et al.*, 2018). Understanding designer's perceptions that influence behaviour is vital for learning to cope with paradoxes.

DT plays a significant role in developing an innovation paradox mindset (PM). Designers far too often rely on inductive and deductive reasoning, making either/or decisions (Martin, 2007). Inductive and deductive thinking have biases towards

readily available data (Kahneman, 2013). However, non-linear innovations and wicked problems often lack information and data (Rittel and Webber, 1973; Camillus, 2008). Suggesting designers are biased toward linear innovation, i.e., towards what is and what ought to be, developing linear thinking for linear results and innovations.

Integrative thinking and abductive thinking focuses on what might/could be, circumnavigating the linear and/or decision of option A or B, by imagining and creating a non-linear option C (Martin, 2007; Riel and Martin, 2017). These two types of thinking are laden with creativity and allow designers to confront paradoxes. DT, in its truest form facilitates the use of deductive, inductive, and abductive thinking, while incorporating the logic of integrative thinking (Martin, 2009; Dorst, 2011). There is a connection between DT and ambidexterity (Zheng, 2018). However, designers may not combine DTM and PM, as it's suggested there is a lack of cognitive practice with abductive and paradoxical thinking.

2.5. Intrapreneurship

In today's ever-increasing VUCA¹ environment organisations are having to innovate faster than ever (Brown and Eisenhardt, 1997). Although organisations desire non-linear innovation, a study conducted by Cooper (2011) shows between the years 1990 – 2000, linear innovations increased while non-linear innovations decreased. The traditional way of business functions as a top-down hierarchy (Hamel and Zanini, 2020), wherein execution-as-efficiency is favoured over execution-as-learning (Edmondson, 2008). Although correlation does not imply causation, Stacey (2001, 2011, 2012) posits traditional top-down leadership approaches for managing VUCA conditions are obsolete and not conducive to non-linear innovations. To develop non-linear innovations, research suggests a new type of leadership approach is required that facilitates organisational learning and bottom-up innovation, i.e., intrapreneurship.

Several ground-breaking books (e.g., Hamel, 2002; Drucker, 2014; Kim and Mauborgne, 2015; Christensen, 2016; Govindarajan, 2016) stress the importance of simultaneously optimising the performance engine while searching for and developing tomorrow's innovation engine. To successfully manage the two engines, scholars (Pinchot, 1985; Pinchot and Pellman, 1999; Morris, Kuratko and Covin,

¹ volatile, uncertain, complex, and ambiguous.

2011; Lumpkin, 2014) have suggested intrapreneurship - acting like an entrepreneur within an organisation (Pinchot, 1985), as a method of stimulating employee creativity, learning and bottom-up innovation. However, organisations often lack tools and processes for successful intrapreneurship (Desouza, 2011). Design leaders recognise the need to supplement the two engines and the importance of employee bottom-up innovation. However, they lack a bottom-up innovation process.

DT is a way of thinking with processes and toolkits that drive innovation by bridging the gap between creativity and design. DT combines processes, mindset and toolkits for an effective innovation process (Uebernicketel, Brenner and Abrell, 2016). Both DT and intrapreneurship have deep roots within innovation, and combining the two theoretical frameworks has become topical in recent innovation discourse (Hassi and Laakso, 2011; Morris, Kuratko and Covin, 2011; Brenner and Uebernicketel, 2016). DT offers, a designerly way of knowing (Cross, 2006), processes geared to solving wicked problems (Buchanan, 1992; Brown, 2008), and tools (Kumar, 2013; Stickdorn and Schneider, 2019) that change the way designers innovate within organisations. DT drives an innovation process of learning that is iterative, reflective, fast, dynamic, tangible, and human-centred (Plattner, Meinel and Leifer, 2016). By supporting intrapreneurs to identify business and user needs, generate creative solutions from a systems perspective to deliver linear and non-linear innovations. One can conclude that DT processes facilitate intrapreneurial activities (Dunne, 2018; Lockwood and Papke, 2018; Marx *et al.*, 2022).

2.6. Front End of Innovation

The FFE, a process of information flowing from the external environment into the organisation in a bottom-up direction (Brentani and Reid, 2004, 2012; Verganti, 2009), and is the pre-project activity, where a need is identified and developed prior to entering the formal NPD process (Cooper, 2011). The FFE is the most important but VUCA part of the innovation process² (Khurana and Rosenthal, 1998; Smith and Reinertsen, 1998), as it defines the cost, design, direction and ultimately the success of an innovation project (Herstatt and Verworn, 2004; Cooper, 2008). A well-managed FFE will yield better innovation outcomes (Luchs *et al.*, 2016).

² Innovation process: fuzzy front end, new product development (NPD) and commercialization (Koen *et al.*, 2002).

However, the FFE is the most difficult to manage part of the innovation process. This is due to its inherent wicked and paradoxical tensions, exacerbated by the need for designers to make choices based on incomplete information (Luchs *et al.*, 2016). Rather than attempting the wicked nature of non-linear innovations at the FFE, organisations have a bias towards the linear and predictability of the NPD stage of the innovation process (Gassmann and Schweitzer, 2013).

Processes at the FFE are informal and performed on an ad hoc basis (Brentani and Reid, 2004). Organisational management style is founded upon linear processes and matrixes such as KPIs, OKRs and ROIs (Govindarajan and Trimble, 2010). Creating organisational structures that are bias towards linear innovation and prejudiced against non-linear innovations. Often managers are the gatekeepers of innovation (Christensen, 2016; Govindarajan, 2016; Hamel and Zanini, 2020). If an innovation is deemed too wicked, uncertain, risky, or requires a new management style and innovation method the idea may be rejected (Govindarajan and Trimble, 2010, 2018; Stacey, 2011). Without protection, non-linear ideas often fall foul of the organisations biases twofold: one, by losing their wickedness and becoming linear (Govindarajan and Trimble, 2018). Or two, killed before entering the NPD process (Cooper, 2011). The informal FFE process puts non-linear innovations at constant threat of being prematurely killed or changed to linear innovations.

The FFE requires iterating between observations, exploration and experimentation (Gassmann and Schweitzer, 2013; Koen, Bertels and Kleinschmidt, 2014b), and a rigorous innovation process and idea selection (Koen *et al.*, 2002; Cooper, 2011). Drucker (2014) recommends a systematic innovation approach, a purposeful and organised search for innovation, positing six external and internal sources of innovation (Drucker, 2002). Once ideas are collected, DT methods such as rapid prototyping and iterations can help designers innovate faster (Gassmann and Schweitzer, 2013).

However, non-linear innovation is a cognitive effort of the actors involved (Koberg, Detienne and Heppard, 2003). Be it a top-down or bottom-up innovation, linear or non-linear, what rings true is designers are required to use human-centred methods to 'sense' future trends, needs and concerns. Understanding weak and strong signals allow designers to generate novel insights into users and the market environment (Drucker, 2014; Govindarajan, 2016; Luchs *et al.*, 2016). Moreover, there is a requirement to look beyond the bias of solution-fixation, focusing instead

on a problem-oriented mindset (Leifer and Meinel, 2019). Focusing on a problem-oriented mindset, designers can reframe problems and explore the problem behind the problem (Paton and Dorst, 2011), suggesting by embracing the paradoxes at the FFE, designers can create novel solutions. However, the process requires time to explore the uncertainty, learning, and reflection, and designer's perceptions can affect these processes.

Section Three

Designer's perception of leaders plays a critical role in non-linear and paradoxical intrapreneurship at the front end of innovation.

2.7. Leadership Perception

The only antidote for VUCA environments is for leaders to accept the leadership challenge. Without leaders, there will not be the extraordinary commitment and effort necessary for non-linear innovation. Kouzes and Posner (2012), in their decades-long research posit exemplary leaders exhibit five key traits:

Exemplary Leaders Traits	Description
Model the way	They create standards of excellence and then set an example for others to follow, e.g., they unravel bureaucracy when it impedes action.
Inspire a shared vision	They envision and share the future, creating an ideal and unique image of what the organisation can become.
Challenge the process	Search for opportunities to change the status quo and look for innovative ways to improve the department/organisation.
Enable others to act	Actively involve others, giving them autonomy to their constituents. Strengthen others, making each person feel capable and powerful.
Encourage the Heart	Leaders recognise contributions that individuals make, rewards them for their efforts and celebrate accomplishments. They make people feel like heroes.

Table 4: Exemplary leaders (adapted from Kouzes and Posner, 2012).

Kouzes and Posner (2003) further posit credibility, that is, doing what you say you will do, is the foundation of leadership. Credibility is how leaders earn the trust and

confidence of their constituents, for them to willingly contribute physically and emotionally to a cause (Kouzes and Posner, 2003; Palanski and Yammarino, 2011). Suggesting if employees perceive an incongruence between words and actions, credibility and trust in their leaders will be lost.

Leaders recognise the importance of embracing paradoxical tensions and increasingly embed them into the organisation's strategy but struggle to manage them effectively (Smith, 2014; Smith, Lewis and Tushman, 2016). For instance, leaders express the importance of non-linear innovations, but designers may perceive risks associated to non-linear and intrapreneurial behaviour (Hill *et al.*, 2014; Hamel and Zanini, 2020). Moreover, if the benefits (promotions, pay increase etc.) of linear innovation out way the risks of non-linear innovation (failing, embarrassment etc.), the designer will opt for the safer option (Kerr, 1975; Viki, 2020). Suggesting, both leaders and employees want to perform non-linear innovations, but in reality, the inertia towards the status quo is overpowering.

Organisational leaders are trained for operational excellence and optimisation (Govindarajan and Trimble, 2010, 2018; Mootee, 2013). Creating organisational structures that are top-down and hierarchical, leading to a top-down management approach and linear innovations (Hamel and Zanini, 2020). That is, leadership puts forward an idea that is taken as the solution, and the design team incrementally innovate towards its implementation (Merholz and Skinner, 2016). The leader's role is not to innovate, but to set the stage to allow others to innovate (Hill *et al.*, 2014). For an organisation to develop a DTM and designers to embrace their natural DTM and PM, it is the leader's role to set the stage (Mootee, 2013; Lockwood and Papke, 2018). By facilitating bottom-up innovation, leaders, develop a creative climate of ideas and an ecosystem of intrapreneurship.

2.8. Creative Climate Perception

Leadership studies show leaders significantly influence and create the climate for innovation and intrapreneurship (Amabile and Grysiewicz, 1989; Ekvall and Ryhammar, 1998), particularly at the FFE (Koen, Bertels and Kleinschmidt, 2014a). DT requires a particular creative climate (Mootee, 2013; Brown and Katz, 2019). Leaders attempt to integrate a climate of DT to solve complex, paradoxical problems and facilitate bottom-up innovation (Reine, 2017). However, bottom-up innovation

can be hindered by human's natural bias towards the familiar and comfortable (Gordon, 1961). The climate of FFE intrapreneurship often contradicts the conditions of the performance engine (Meng and Roberts, 1996).

Perceptions of the creative climate influences designer's creativity (Gumusluoglu and Ilsev, 2009) and DT behaviours (Reine, 2017). However, how people perceive the creative climate may not be grounded in evidence (Edmondson, 2018), people instinctively pattern-match, make assumptions and judgements, that can lead to errors of bias (Kahneman, 2013). The creative climate requires continual nurturing from leadership (Isaksen and Tidd, 2006). Without explicit intent, DT can become a victim of organisational status quo bias (Martin, 2009), wherein designer's operate within the performance engine, focusing on tight-coupling (linear) but neglect loose-coupling (non-linear) innovations (Danneels, 2003). Creative climates that focus on generating linear ideas, use linear processes to achieve linear outcomes, will result in organisations that will become irrelevant and a relic of the past (Hamel and Prahalad, 1994; Drucker, 2014; Christensen, 2016; Kim and Mauborgne, 2017).

DT requires leadership to create a climate of innovation, allowing designers to explore innovation paradoxes. In today's twenty-first-century knowledge economy design departments whose 'product' is creativity, design leaders must foster a creative climate that reflects and reinforces intrapreneurship.

2.9. Literature Review Conclusion

There have been few studies of the FFE, with many focused on linear innovation projects (Koen, Bertels and Kleinschmidt, 2014a). Although there has been more research combining intrapreneurship and DT, it has been a recent phenomenon (Brenner and Uebernickel, 2016). Research that combines the FFE, DT and intrapreneurial frameworks has been sparse, resulting in a patchwork of citations as opposed to research focusing on one body of literature.

To contribute to the under researched body of work, the chapter investigated the role DT has in developing an ambidextrous and intrapreneurial design department. Creating three interlinking hypotheses, the chapter explores the nuances between the designer's perceptions and mindset and the influence they have on intrapreneurship at the FFE. Setting a foundation on which the rest of the research is built upon. The following chapter describes the research methods.

3. Research Methods

The research employed a mixed-methods sequential explanatory design applying both survey and interview methods. The objective was to explore how designer's perceptions of the creative climate and leadership style influence intrapreneurship at the front end of innovation. The purpose of the chapter was to describe the research design and lay out a description of the research framework. The following sections cover the research questions, position, philosophy, and approach. Then, further describing the research strategy, data collection and analysis, finishing with the limitations and chapter conclusion.

Research Questions	
Question 1	What is the relationship between designer's perceptions of the leadership style & the creative climate and designer's design thinking & paradox mindset? And what relationship do they have with intrapreneurship?
Question 2	Which one of the following variables: designer's perceptions of leadership style, the creative climate, design thinking mindset, or paradox mindset, has the greater influence on intrapreneurship at the front end of innovation?
Question 3	In what way does the designer's design thinking & paradox mindset and perceptions of leadership style & the creative climate effect intrapreneurial behaviours at the front end of innovation?

Table 5: Research questions.

3.1. Research Position, Philosophy and Approach

Before considering a research methodology, the researcher first established the research's theoretical (Crouch and Pearce, 2012) and philosophical (Saunders, Lewis and Thornhill, 2007; Collins, 2019) positions. A reflexive approach was taken to understand the researchers ontological, epistemological values and personal biases (Crouch and Pearce, 2012). The research project adopted a pragmatic philosophical position because fully answering the research question takes precedence over the researcher's philosophical position (Saunders, Lewis and Thornhill, 2007). Furthermore, a pragmatic position is appropriate when using mixed

methods (Collins, 2019). A pragmatic philosophical position overall, the research takes a positivist position in phase one and interpretivist position in phase two. Although positivist and interpretivist seem to be two contradictory philosophical positions, to best answer the research questions, using the two as a continuum as opposed to opposites is appropriate in mixed-method research (Tashakkori and Teddlie, 1998). The research design used a deductive rather than an inductive process. A theory and hypotheses were first posited. The design research was developed to test the hypotheses and causal relationships between the independent and dependent variables (Collins, 2019).

3.1. Research Strategy

As the research questions dictate the philosophical position, it also dictates the research strategy, and methodology. The methodology selected was a mixed-methods sequential explanatory design (Ivankova, Creswell and Stick, 2006). Consisting of two distinct and consecutive phases: first, quantitative data was collected and analysed to establish relationships and influences between variables and their impact on intrapreneurship. Secondly, following up with three purposefully selected designers to conduct interviews to explore the effect perceptions and mindset have on intrapreneurial behaviour. Qualitative data was collected and analysed. Concluding with an integration of data from the two methods (Creswell *et al.*, 2003; Ivankova, Creswell and Stick, 2006). Priority was given to the quantitative phase as the quantitative phase one, informed the qualitative phase two (Creswell *et al.*, 2003; Ivankova, Creswell and Stick, 2006). However, a disadvantage of the methodology is it is time-consuming (Ivankova, Creswell and Stick, 2006). But, combining quantitative and qualitative phases allows for a more robust analysis (Miles and Huberman, 1994).

3.2. Type of Study

The research employs an explanatory method during the quantitative phase one as there is an emphasis on studying a situation to explain the relationships between variables (Saunders, Lewis and Thornhill, 2007). During qualitative phase two, an exploratory method was used to unearth new insights and ask questions to assess

the phenomena in a new light (Robson, 2002). The method is advantageous when clarifying the nature of a problem (Saunders, Lewis and Thornhill, 2007), such as intrapreneurship. Although descriptive research may have been possible in phase two, a synthesis of quantitative and qualitative results was required to generate insights, therefore, descriptive research was not appropriate.

3.3. Data Collection

Two forms of data collection were conducted, quantitative and qualitative.

3.3.1. Quantitative Collection

An online survey was developed to achieve research objective three. The online survey was divided into three sections: section one, five general multiple-choice questions to qualify the participant. A qualified participant is defined as a designer who works within a small to mid-sized enterprise (SME), or large organisation, and reports to a design manager, head, director, or chief design officer (CDO). Section two has nine questions to measure the participant's design thinking mindset (DTM) (Dosi, Rosati and Vignoli, 2018) and paradox mindset (PM) (Miron-Spektor *et al.*, 2018). Section three, seventeen questions that focused on the designer's perceptions of the creative climate (PCC) (Isaksen and Akkermans, 2011), fair process (Kim and Mauborgne, 1997), psychological safety (Edmondson, 2018), perceptions of the leadership style (PLS) (Kouzes and Posner, 2012) and credibility (Kouzes and Posner, 2003). Totalling thirty-one questions. A 7-point Likert scale was used to gather an accurate measurement of the participant's true evaluation (Finstad, 2010).

3.3.2. Frameworks for Quantitative Data Analysis

Table 6 below shows the number of responses and their seniority.

Survey Responses	
Total survey response	74
Current in-house designer	49 (66.2%)
Previous in-house designer	20 (27%)
Not an in-house designer	5 (6.8%)
Seniority	
Employee	49 (67.1%)
Manager	11 (15.1%)
Leader	13 (17.8%)

Table 6: Survey responses.

The five non-in-house designers were removed from the dataset, n = 69. The analysis was conducted using several quantitative data analysis methods using SPSS (IBM SPSS Statistics, 2022). Table 7.

Analysis Methods	
Median and mode	The median, the middle observation, arranged in the increasing or decreasing order. The mode is the most frequently occurring value. It is particularly useful in analysing categorical data such as design thinking mindset, paradox mindset and perceptions. Moreover, the comparison of the median and mean gave a distribution of the observations.
Internal reliability	Commonly used to test the internal consistency of multiple Likert questions.
Reliability	The survey used a set of questions to measure each parameter considered for the study. It was important to analyse the internal reliability of the responses for each parameter.
Correlation matrix	A correlation matrix was used to analyse the relationships between various parameters, for instance the relationship between the independent variable (design thinking mindset) and moderator variables (perception of the creative climate and/or leadership style).
Inferential statistic: standard multiple regression	The regression analysis is used to test the three hypotheses and estimate the relationship between independent variables (design thinking mindset, perception of creative climate and leadership style) and dependent variable (intrapreneurship). Further assess generalisation to a broader population.

Table 7: Analysis of methods.

3.3.3. Qualitative Collection

Table 8 below shows information on the three participants that took part in the semi-structured interviews.

Participant Interviews				
Participant	Location	Date and time	Status	Interview length
P1, service designer, manager	Microsoft Teams	03/08/2022. 11:00	Ex in-house designer	43:14 minutes
P2, UX/UI designer, employee	In person	03/08/2022. 13:30	Ex in-house designer	36.47 minutes
P3, service designer, employee	Microsoft Teams	04/08/2022. 15:00	Current in-house designer	47:28 minutes

Table 8: Participant interviews.

As an established qualitative research method (King and Horrocks, 2010; Gubrium *et al.*, 2012; Robson and McCartan, 2016), semi-structured interviews were conducted as they are useful when the information is non-tangible, e.g., opinions, views, cognitive processes and participants interpretation of reality (Klandermans and Staggenborg, 2002). Furthermore, to gain deeper insights participants were encouraged to reflect and tell stories of their wants, needs and dreams (Visser *et al.*, 2005). Moreover, the researcher employed a thick description method (Geertz, 1975), interpreting what was said and not said, i.e., non-verbal signals.

Interview Protocol & Ethical Consideration	
How participants were sourced	Participants who took part in the online survey, input their email address in a specific box at the end of the survey, confirming they wish to participate in a post-survey interview. Participants were then emailed to arrange a time and date for the interview.
How participants were selected	Participants who agreed to take part in the interviews who were (1) current or previous in-house designers, (2) is an employee or manager – the research takes a bottom-up approach, design leaders were deemed inappropriate for this section of the study.
Interview participation and consent forms	Interview participation and consent forms were emailed to the participant day of the interview.
Interview location	Interviews were conducted via Microsoft Teams or in-person.
Pre-interview	Participants read through and confirmed they understood the interview participation and consent form and sign the consent form.
Anonymization and data protection	Participants were told that all information is anonymised and adheres to GDPR data protection regulations. Participants were again told, “there are no right or wrong answers, be honest and share your thoughts”. Further, if the participant wants to withdraw or omit something, they are free to do so. Furthermore, each participant was told to relax, take their time and if they needed a break – feel free too.
During the interview	To get the participant comfortable, a few simple questions were asked, e.g., education, background, DT training, role, and an overview an the intrapreneurial project.
Post interview	Participants were thanked for their time, interview was concluded. A post interview email was sent, again thanking the participant for their time.

Table 9: Interview protocol and ethics.

The interviews supported data collected from the quantitative phase. Questions were developed following insights gathered from the first phase (Ivankova, Creswell and Stick, 2006). The objective of phase two was to explore and elaborate on results from the study’s first phase (Creswell *et al.*, 2003). The semi-structured interviews provided greater depth and breadth of information, allowing the participants to express their thoughts. However, interviewee’s personal biases and the difference between what happened versus what actually happened had to be considered when analysing the data (Thomas, 2013). The researcher Hader Ali also had to reflect on his personal biases (Thomas, 2013).

3.3.4. Frameworks for Qualitative Data Analysis

Qualitative data were analysed using a predefined set of codes in a deductive coding method (Fereday and Muir-Cochrane, 2006), coupled with a constant comparative thematic analysis method (Braun and Clarke, 2014). The data was analysed using Braun and Clarke's (2006, 2013) six-phase approach (table 10). To analyse the data, each interview was treated as an individual case as opposed to cross cases (Yin, 2013).

Phase	Description
Phase 1	The researcher familiarised himself with the data: reading and listening to each transcript multiple times, while making memos.
Phase 2	Generating initial codes
Phase 3	Searching for themes
Phase 4	Reviewing themes
Phase 5	Defining and naming themes
Phase 6	Producing the report

Table 10: Six phase approach (adapted from Braun and Clarke, 2006).

3.3.5. Integration

The stage where integration of the quantitative and qualitative methods occurs (Tashakkori and Teddlie, 1998), see chapter five, discussion.

3.4. Research Methods Conclusion

For data collection, the sample size is hard to calculate, and sampling should continue till no new results appear (Baker and Edwards, 2012). However, this was not practical given the lack of time and resources. Survey questions pertaining to both PM and DTM, questions adapted from two surveys (Dosi, Rosati and Vignoli, 2018; Miron-Spektor *et al.*, 2018), were selected specifically for their impact on intrapreneurship at the FFE. However, the questions had to be dramatically reduced, creating a lack of nuance in respondent's answers and analysis.

Mixed method research was conducted because a standalone quantitative or qualitative study would have been insufficient to answer the research hypothesis and questions. Phase one, built upon several established research, a survey was created

to identify designer's mindset and perceptions. An analysis was conducted using SPSS, identifying relationships between variables and their influence on intrapreneurship. Phase two, informed by the first phase, semi-structured interviews were conducted to explore intrapreneurial behaviours at the FFE of innovation. Taking a deductive analysis method coupled with Braun and Clarke's (2006) six phase approach for thematic analysis. An analysis was conducted to explore how designer's intrapreneurial behaviours are influenced by their perceptions and mindset. The following chapter describes and summarises the results of the two phases.

4. Results

The research seeks to explore the designer's perceptions of the creative climate (PCC) and leadership style (PLS) juxtaposed with the designer's paradox (PM) and design thinking mindsets (DTM). Describing the nuanced relationships of the variables, influences and intrapreneurial behaviour at the front end of innovation (FFE). The chapter is comprised of two sections:

- **Section one:** Quantitative phase one, analysing relational correlation and multiple regression of influence.
- **Section two:** Qualitative phase two, the most relevant quotes that support the pre-defined themes.

Section One

4.1. Quantitative Phase One

Preliminary analyses were performed to ensure assumptions of normality in the form of an internal liability analysis, conducted using Cronbach alpha to test how closely related each group of questions are (Field, 2017), example, when multiple questions are grouped to create a singular variable (appendix A). Results from the Cronbach alpha test suggest the groups are closely related and can be used for the analysis of data.

4.1.1. Quantitative Analysis

Pearson's r correlation analysis was used to explore the strength of the relationship between two or more continuous variables (Pallant, 2020). Pearson correlation coefficient - considered an inferential statistic - was used to test statistical hypotheses. Specifically the relationships between the dependant and independent variables (Pallant, 2020). See table 11.

Correlation Analysis

		Design Thinking Mindset	Paradox Mindset	Perception: Leadership Style	Perception: Creative Climate	intrapreneurship
DTM	Pearson Correlation	1	-.072	-.077	-.199	-.123
	Sig. (2-tailed)		.555	.528	.102	.313
	N	69	69	69	69	69
PM	Pearson Correlation	-.072	1	.402**	.570**	.697**
	Sig. (2-tailed)	.555		<.001	<.001	<.001
	N	69	69	69	69	69
LdrS	Pearson Correlation	-.077	.402**	1	.851**	.683**
	Sig. (2-tailed)	.528	<.001		<.001	<.001
	N	69	69	69	69	69
CC	Pearson Correlation	-.199	.570**	.851**	1	.759**
	Sig. (2-tailed)	.102	<.001	<.001		<.001
	N	69	69	69	69	69
BUInnov	Pearson Correlation	-.123	.697**	.683**	.759**	1
	Sig. (2-tailed)	.313	<.001	<.001	<.001	
	N	69	69	69	69	69

** . Correlation is significant at the 0.01 level (2-tailed).

Table 11: Correlation analysis, from SPSS.

The above correlation analysis table was simplified and conditionally formatted.

Table 12 below.

Pearson Correlations						
		DTM	PM	PLS	PCC	Bulnnov
Design Thinking Mindset (DTM)	Pearson Correlation					
Paradox Mindset (PM)	Pearson Correlation	-0.072				
Perception Leadership Style (PLS)	Pearson Correlation	-0.077	0.402			
Perception Creative Climate (PCC)	Pearson Correlation	-0.199	0.570	0.851		
Intrapreneurship (Bulnnov)	Pearson Correlation	-0.123	0.697	0.683	0.759	
	Key		-1	0	1	

Table 12: Simple correlation analysis.

Pearson correlation coefficients (r) range from -1 to +1. Closer to the whole number suggests a stronger relationship either in the positive (green) or negative (red) (Pallant, 2020). The stronger the relationship, the darker the colour. Describing the relationship between DT and Intrapreneurship. Results show a weak and negative relationship between the independent variable DTM and the dependant variable intrapreneurship (figure 2).

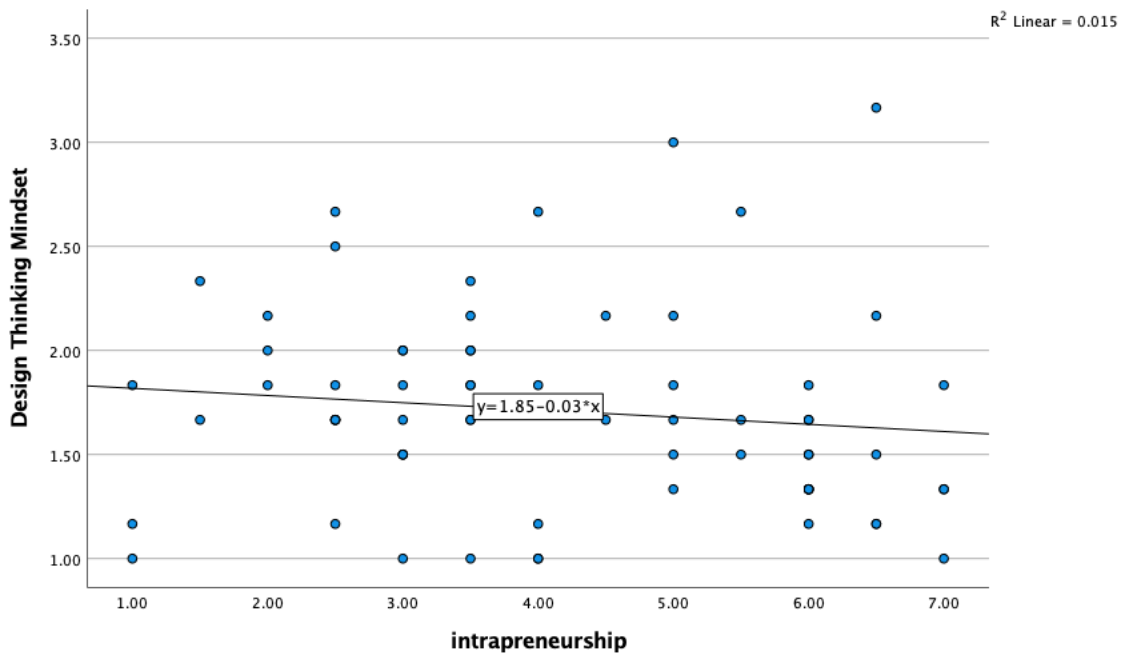


Figure 2: Simple linear regression, from SPSS.

Figure 2 above shows that higher the DTM does not necessitate an increase in intrapreneurship.

DTM and PCC have a shared variance of 3.61%, $r = -.199$, $p = .313$. Given the p -value is $> .05$, the result is not statistically significant. The relationship between PM and intrapreneurship. $r = .697$, determining a strong relationship strength and a shared variance of 48.5. $n = 69$, $p = <.001$, suggesting the result is statistically significant. The following describes the relationships of the dependant variable intrapreneurship, with two of the independent variables (1) perceptions of the creative climate, and (2) perceptions of leadership style:

1. Perceptions of leadership style: $r = .683$, shared variance = 46.6, $p = <.001$.
2. Perceptions of creative climate: $r = .759$, shared variance = 57.6, $p = <.001$.

Results show strong and positive relationships between the dependent variable intrapreneurship and the two independent variables, perceptions of the creative climate and perceptions of leadership style. Moreover, the relationships between the dependent and independent variables are shown to be statistically significant.

Suggesting that the more positive the perception, the more significant the impact it will have on intrapreneurship. Another significant relationship: perception of the creative climate shows a stronger relationship towards intrapreneurship than the perception of the leadership style. Moreover, designer's perception of leadership style significantly affected the perception of the creative climate. $r = 0.851$ was the strongest relationship of all variables.

Although there is a high level of confidence in the results of the correlation analysis, the survey is not considered large (e.g., $n=100+$), which may result in inconsistent r values (Pallant, 2020). Therefore, to further test the strengths of the dependant and independent variables, relationships and influences, a multiple regression analysis was conducted.

4.1.2. Multiple Regression Analysis

Standard multiple linear regression was conducted to (1) understand the influence and contribution the predictive independent variables (DTM, PLS and PCC) have upon the estimated dependant variable (intrapreneurship). (2) Test the statistical significance of the results, i.e., the model and individual independent variables (Pallant, 2020).

4.1.3. Interpretation of Standard Multiple Regression

Before conducting the multiple regression, certain assumptions about the data were made (Field, 2017; Pallant, 2020). All assumptions were met. However, the assumption of normality was in question due to the Shapiro-Wilk p value of .004 which was .001 below the required .005. However, the analysis was able to continue, see appendix B. Figure 3 below shows the statistical regression model, determining the variance in the dependent variable that can be explained by the multiple independent variables (Cronk, 2012).

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.836 ^a	.698	.679	.97524

a. Predictors: (Constant), DTM, PM, PLS, PCC

b. Dependent Variable: BUInnov

Figure 3: Multiple regression summary, from SPSS.

R square explains 69% of the dependent variable. Due to the small sample size, the adjusted R square is considered the true value in the population (Pallant, 2020). Adjusted R square = 67%. 67% of intrapreneurship has been explained by the regression - a very respectable amount (Pallant, 2020).

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	140.739	4	35.185	36.994	<.001 ^b
	Residual	60.870	64	.951		
	Total	201.609	68			

a. Dependent Variable: BUInnov

b. Predictors: (Constant), DTM, PM, PLS, PCC

Figure 4: ANOVA, from SPSS.

F statistic tests the regression of the entire regression. p-value = <.001, the regression is statistically significant because p-value is < 0.05 (Field, 2017).

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.280	.597		.468	.641
	DTM	-.054	.255	-.015	-.210	.834
	PM	.469	.094	.425	4.972	<.001
	PLS	.373	.189	.268	1.976	.053
	PCC	.405	.217	.286	1.864	.067

a. Dependent Variable: BUInnov

Figure 5: Coefficients, from SPSS.

Evaluating each independent variable's standardised coefficients, Beta, shows PM makes the strongest unique contribution to explaining intrapreneurship. Moreover, $p\text{-value} = <.001$, PM makes a significant contribution to influencing and predicting intrapreneurship. Thus, rejecting the null hypothesis and concluding that a regression relationship does exist between PM and intrapreneurship. Concluding, PM influences intrapreneurship in the following: the higher PM the more the designer engages in intrapreneurship. Leadership style (.268) and creative climate (.286) have similar contributions toward intrapreneurship. However, both variables have $p\text{-values} >.05$, concluding the two variables do not significantly influence intrapreneurship. Finally, results suggest DTM has no bearing on intrapreneurship, Beta showing $-.015$ and $p\text{-value} = .834$.

A separate multiple linear regression was conducted to test paradox mindset (as the dependent variable) and PCC and PLS (as independent variables). Results show PCC has a significant contribution for a designers PM (appendix C). The results suggest PM as an intermediary variable between intrapreneurship and perception of the creative climate, which strongly correlates with perception of leadership style. How the relationship and perceptions influence, intrapreneurial behaviour is presented in section two below.

Section Two

4.2. Qualitative Phase Two

Informed by previous research and data from the quantitative phase, semi-structured interviews were conducted and analysed using predefined sets of codes in a deductive coding method (Fereday and Muir-Cochrane, 2006). See table 13 below:

Interview Themes and Codes					
Themes	Perceptions		Mindset		Intrapreneurship
Codes and sub-codes	Perception of leadership style	Perception of creative climate	Design thinking mindset	Paradox mindset	Insights
	Not listening to non-linear ideas	Status quo bias of execution		Innovation paradoxes	Information flow
	Top-down creative leadership	Performance engine			Fuzzy front end of innovation
		Innovation engine			

Table 13: Interview themes and codes.

Table 13 outlines the analysis of the interviews, expressing the themes, codes, and sub-codes.

4.3. Perceptions

4.3.1. Leadership Style

When asked about leader’s reaction to non-linear innovation ideas, two respondents noted that leadership often stick to the rules and discourage non-linear innovation ideas:

I report it to my leader, but I don't think I get any feedback from my leaders. He says that's okay, yes, we are doing it right now, but they dont. Because there's a lot of orders like new orders...[T]he leader also always follows the rules... I could go to him with small changes, but anything too complex, I don't think he ever listened to it because maybe it needs a lot of different departments - P2, UX/UI, employee.

That there's a kind of a stifling of this flame of innovation right that we're like, “oh, let's change everything, let's do so much, let's explore these crazy ideas,” and then it's like. “Don't” - P3, service designer, employee.

Leaders are open to listening to linear innovation ideas, but either do not listen to or shut down non-linear innovation ideas. These perceptions can stifle “the flame of innovation”.

Participants were asked if innovation ideas result from a top-down or bottom-up process. Linear innovation is a bottom-up process. However, non-linear innovation is exclusive within the remit of leadership and a top-down process, as two participants explained:

I was working for someone who had very clear ideas of what they wanted and how things would be done, and I was trying to adapt to their way of working. Not realizing that what they were actually doing was belittling me and my expertise and it got to the point where I felt like I couldn't do my job anymore because of what they were doing. I know they held all these great ideas that made no sense, and I was trying to adapt my way of working to theirs. And I could never win because it was constantly changing, never clear.... They were doing things new constantly, but what it actually did was just crush me. I was absolutely crushed... That person had ideas and was trying to squash them on me, and I had no idea what they were talking about. So, I was trying to make sense of it. So rather than doing the thing I love and the thing I'm an expert at, I was trying to adapt to someone else's way of working. That made no sense to me – P1, service designer, manager.

[H]e takes all the responsibility for the idea's innovations. The others in the department just do their jobs and simply design the interface...I don't think he's the kind of guy like actually asks you, “do you have any ideas?” P2, UX/UI, employee.

Design leaders are creative and innovative. However, when non-linear innovation is exclusive to design leaders, it can lead to low self-esteem, self-efficacy and an unfair process (Kim and Mauborgne, 2015) - resulting in uncertainty, confusion, and the suppression of creative ideas.

4.3.2. Creative Climate

When asked about the creative climate, participants expressed a bias of execution-as-efficiency over execution-as-learning. Participants believed the status

quo bias had a negative effect on both innovation and creativity, as well as their morale.

One and only time I did the [user] feedback interviews, I was excited because I'm also a designer, not just someone who does the interface. I actually come up with really good ideas that I think that maybe the company needs. But then I just mentioned one thing, and he (design director) said, "Yeah, it's a good idea", but I've felt that he's never going to do it. So, I just shut it down and just keep doing my interface work. So, at first, I was excited about working at an AR glasses company, but now I think of it, I feel unappreciated... I felt down, I did my job, and that's it, and it became boring. I became like a robot, by doing the same jobs every day, there was no excitement anymore... I think my leader needs a new way to communicate with our teammates because I think they may have really good ideas because one graduated from sketching and another come from an architecture background. So, we all can have like different ideas, but I don't think he ever tries to listen. So, if he occasionally in meetings, instead of him just talking, maybe he can ask all of our ideas and just brainstorm things, we might have felt appreciated and given more ideas - P2, UX/UI, employee.

To be honest. I'm a little ashamed of my answer. In the beginning, I would conform. I would let my ideas be shut down and attach myself to the work that the product teams expected of service design... But the overall culture, let's say. There's a disconnect between what the presentation of the culture is versus what the culture actually is, and then the climate and individual business units... The disconnect in terms, at least in the organisation that I'm working in, is the way that things have been done in the past, the product team develop ideas and the design team executes --- P3, service design, employee.

It is clear the designers wish to explore and share their creative ideas, and although there's a creative climate that promotes linear innovation, this climate does not extend to non-linear ideas.

When asked to elaborate on the bias towards the status quo, participants explained there was a bias towards short-term revenue and linear innovations that fed the performance engine. Although non-linear innovation was desired by leadership, execution of job role and linear innovations were rewarded.

I did is all the interfaces like from website or the mobile platform, they all have a template, so I just need to stick with the template... He approved the small things. When it comes to user interface, I can just be creative as I want because my leader adopted to my ideas. But more complex and bigger thing, like when it comes to the product or for example selling cell phone with the AR glasses, and that kind of stuff, I don't think he ever listened because this needs a lot of different departments... It's a really busy company, they always had new tasks coming up. There were really tight schedules, mostly interface related. So, it ends with interface stuff, and when it comes to things I'm actually excited about, just none of my business... So, I never even bothered or tried to push the limits. Maybe it's because of the culture over there, everything is so restricted. So, I tried to hold myself back and focused on my job that my leader needs me to do - P2, UX/UI, employee.

product has their baseline and are trying to push their road map. So, there's a little bit of friction there, [if an innovation] takes longer than a programming Sprint they don't really like to implement it. Not only in my business unit, but if we look at the company as a whole, there's this huge problem with exactly that. Leaders asking for radical innovation but rewarding incremental. We keep repackaging the same customer experience with the 100,000 different kind of marketing ideas. They just changed the wrapping of the present. So, it doesn't matter what route the customers are coming from. They repackage the service or product and sell the same thing, because interior operations are rewarding the incremental. So, there's all these cost KPI, and motivation of the backstage, this is where my bonus comes from. I'm limited in what I can do and say because, my personal motivators are linked to something which they expect radical, but I'm rewarded for incremental. So, yeah, expecting A while rewarding B, has a negative effect on intrapreneurship - P3, service designer, employee.

The results highlight an incongruence between leaders' words and actions. Showing non-linear innovation was discouraged, while meeting of targets, KPIs was encouraged. Employees were holding back on non-linear innovations and their natural inclination to creative problem-solving. Resulting in behaviours that negatively affected non-linear innovation and intrapreneurship.

When asked about the nature of the status quo, the participants tended to agree it was due to the workload of the performance engine, easier to manage with lots of short-term wins, and a process of solving symptoms rather than the cure, i.e., the root cause of the problem. P1 went on to explain:

[T]he main problem will never present itself as the main solution to be addressed. It never will because there's so much low-hanging fruit. Everyone would say, "ohh if that big thing were improved, that big problem wouldn't exist". But they can't see it, they just see the small problems. They're not small. They're important. So I'm being quite vague. There was an awful website, and the website was so bad that people couldn't find anything. So, what they would do is phone up, and so there's a huge demand on the phone. People can't deal with the problem with the volume of calls. People are left on hold for hours and hours. And they're trying to fix call times, they're trying to make call handlers answer calls quicker, or try and triage quicker. It's like if you just fix that website, then those who can self-serve, can self-serve, and then you just deal with those who can't use a website or have more complex problems. However, they're not doing that. They're dealing with symptoms and get the calls answered... This thing is fundamental. All these other problems that we're dealing with can be resolved if you fix this thing. Fixing this thing will take a lot of effort, a lot of resources, and a lot of time. But what you've done is that all these other things are gonna be minimised. But they don't see that, they see they're getting all this low-hanging fruit. Let's fix all these little bits. Like we're not doing that thing (the root cause of the problem) now - P1, service designer, manager.

The performance engine does not allow the time to 'sit in' the paradoxes and explore the tensions. Further, the performance engine is reactionary to problems and encourages deductive and analytical as opposed to abductive thinking, opting for short wins rather than complex victories.

Participants were asked about the innovation engine, only one participant had an experience of the innovation engine. Depicting the innovation engine as a space for freedom of expression, experimentation, and learning. The participant went on to describe it as a playground:

I worked in a research department and the structure of the team was that. We were multidisciplinary teams of about 8 to 10 people, and we had a theme and I worked on the theme around devices. So, we worked on something that didn't exist. We were sort of pushing the boundaries of these technologies and the kind of experiences that people want... There wasn't a need, there was an opportunity, "Hey, there's some new technology let's play with it"... Leadership gave us space to explore, I think that's space was accidental because I wasn't on a project, I wasn't assigned to a piece of work. So I had the freedom to explore and look for opportunities - P1, service designer, manager.

It is clear from the response that a space for exploring the innovation engine is required and facilitated by the design leader. However, this space is an exception rather than the rule.

4.4. Mindset

4.4.1. Design Thinking

The participants spoke at great length about their design thinking skills and experiences. Designers are drawn to organisations that train and use design thinking. However, recognised the risks of a prescribed and linear format of the framework.

Convergent and divergent thinking throughout the day, the objective was to make a thing, so I decided what that thing would be, make a thing, evaluate it, and learn something from it... I would pick the methods, the tools, and the outcomes that were relevant to the thing we were doing, so we're doing some with voice interface and voice interactions. I decided we're gonna write scripts. And so these were post-it notes scripts. Then I decided we were gonna do a role play. So someone was gonna sit behind a screen with a thing that they were gonna talked to. And then everyone else would be hidden behind the screen and read through their script... So my work is about pulling back and asking, "OK, what is the problem you're trying to solve?" Where does this problem show itself? Who does it impact? What other things are impacting this? So I do my best to get to the bottom of what's going on. Asking, "what things we're gonna do and what things we're gonna learn?" So, we started the day by understanding, we ended the day by learning something, so at some point, there was a prototype. And at some point, it was evaluated - P1, service designer, manager.

The reason I wanted to join the company; they have a program called D-designed. Which is, in a nutshell like the first few weeks of the MICL (masters of innovation, creativity and leadership), and it's part of your onboarding process, no matter what position you're in. So, there is this kind of like little creative climate push for design thinking and innovation at all levels. The problem with it, I think is it's too prescribed, it's too structured. So, there's a little bit of repetition. It's become like something we do and not something that we use. So, the service design team right now we're actually implementing that in a different way. So, we're using design vocabulary to share that language with the rest of the company. Implementing a little more design thinking and design research into everything we do - P3, service designer, employee.

It is clear designers are attracted to design thinking organisations. They seek out and flourish using design thinking.

4.4.2. Paradox Mindset

When asked about innovation tensions and paradoxes, participants unanimously agreed the importance of exploring innovation tensions. But agreed they do not or are unable to explore innovation paradoxes. This is due to demands of the performance engine, the status quo, or because of past experiences.

Completely honestly, I feel I don't play or explore the innovation paradoxes enough. I come from a background of industrial engineering, process and continuous improvements, I always looked at innovation in a different light, create these more radical changes. It wasn't just like, "let's change this process like this", I'd say "let's change everything" because it would create something better, right? And then find that middle space [between radical and achievable] ... Yes, your right, because of processes, constraints, leadership criteria, and just being realistic, a radical idea can easily become incremental... I would just say here, no, I haven't been able to [explore paradoxes]. I think it's because of the speed of the company and because of the history of how it's run - P3, service designer, employee.

I suppose this is about experience as well. Like where am I putting my personal energy? It is about that more than what the client wants. Like, do I really need to spend my days fighting for this thing you don't want? You have other priorities, it's kind of a bit messy - P1, service designer, manager.

The results show two service designers, both with post-graduate degrees in design, at different stages of their career, i.e., P3, employee one year into his design career and P1, manager, a decade into her career. One is optimistic about challenging the status quo and exploring innovation tensions, while P1's experience says its smarter to pick your battles.

4.4.3. Intrapreneurship

When asked about insights, participants believed this to be a critical part of the innovation stage. However, they were confronted with challenges, saying:

As someone in the service design team, to gain customer access to customers, is by requesting it from the design research team - which is a team that sits closer to the product team. I give them the kind of information I'm looking for and they'll source customer insights for me. But I can't make that customer connection and can't get that immediate feedback. There could be a great opportunity to collaborate and work together with the research team. But what a lot of the time happens is "ohh we've already done something similar, here is our information". It's similar but, it's distilled from a different point of view, which is good. But at the same time, I can't access those reactions that you see in person or read the room. Zoom recordings only last like 30 days, so if it's longer than that, I can't access the original. I can read the transcript, but I can't access the original footage - P3, service designer, employee.

The AR glasses are mainly adapted to work on Android phones, and sometimes it gets a lot of bugs when you use several different types of phones. So, I suggested to my leaders, what do you think if when we sell the AR glasses, we also sell them a cell phone that goes with the glasses. Because usually the customers are in factories or traveling for business when they use our product. So, they use a separate phone to use the AR glasses, which is an inconvenience, and bugs can be really bad when presenting to their clients. So, I thought we can create a package, of selling the AR glasses alongside a phone, reducing customer effort, and increasing our revenue - P2, UX/UI, employee.

Respondents said insights were effectively outsourced to other departments, or non-linear insights were ignored. The two participants went on to say there are organisational gatekeepers who control the information flow, see below:

I shared my insights with my leader, and I asked for their thoughts about selling a phone and AR glasses package. And he said it's a really good idea, but they didn't do it. That information-flow stops when it's too much like, innovative or new - P2, UX/UI, employee.

There is always pushback from the product team. So, you mention it to your peers or, and they're like, "oh, that sounds like such a good idea. Where did you find that? Let me see, I see the same thing". However, the product team are the gatekeepers of innovation - P3, service designer, employee.

When asked about intrapreneurship, participants agreed it is a long-term strategy for organisational success. Both agree intrapreneurship needs to take a systems

approach. An understanding of organisational needs and strategy is required. The below participants express intrapreneurship needs to be nurtured and a holistic approach is required.

[Intrapreneurship] slows down, so luckily, that peer-to-peer Thursday therapy session. That is enough to re-spark some of that flame, to rekindle some of that flame, because throughout the week, let's say we're trying to sell some of these new ideas, opportunities or things we discovered, you know to explore, let's look into that, let's see what exists there. But if they don't align with products roadmap, then it's kind of pushed back, then that [intrapreneurship] flame sometimes that kind of dwindles - P3, service designer, employee.

For me, it's about building trust, and it's about understanding the brief and understanding the client. Just because I think it's a good idea, doesn't actually mean anything, because the client or the team, or the department, or whoever has a reason for doing these things that I don't know. So, part of my work is understanding the context of this thing... It's for me to recommend what I think, given the evidence I have, if the client or the department doesn't want it. I'm not personally wedded to it; I don't feel it. It's not my thing, it's their thing. So, I don't try and convince people, if you don't want it, fine, if you realise that later date that what I said made sense, let's continue. But my job isn't to convince people to have things that they don't want. I can recommend things, and I can tell them why I recommend it... Designers are there to solve problems of clients or for people in this space. I'm not an artist, I'm a designer. This isn't about me and what I want and how I want to express myself. It's not about me at all. This is someone that has a problem, they've asked me to fix it. What they do with that is up to them. I'm not invested in it in the way that I would be if I were making art, which is actually about me - P1, service designer, manager.

Intrapreneurship activity deals with both the internal cognition of the designer and the external environment, and must encompass political, managerial, and technical considerations.

4.5. Results Conclusion

The chapter, a description of relationships, and influences of the independent variables that affect intrapreneurial behaviours at the FFE. DTM and intrapreneurship had a negative correlation, reasons for the relationship will be discussed in the next chapter. PLS and PCC had positive relationships towards

intrapreneurship, the latter had a stronger relationship and influence. However, neither were deemed to be statistically significant in their influence upon intrapreneurship. PM had the most significant relationship and influence on intrapreneurship than any other variable and was statistically significant. Further, paradoxes were constantly pervasive within each of the three themes. Furthermore, the research also unearthed a strong, positive, influential, and statistically significant relationship between PCC, PM, and intrapreneurship.

The interviews brought to light the tensions between the performance and innovation engines. Although intrapreneurship is considered critically important, an inertia towards the performance engine's status quo has left designers unable to behave in a way where they can think like a designer, employ abductive thinking, and explore innovation tensions. The lack of exploration of innovation paradoxes restricts design innovation to the linear performance engine. Linear behaviour and thinking can result in the designer becoming apathetic towards the notion of intrapreneurship. In the following chapter, the results from this chapter will be integrated and discussed.

5. Discussion

The research project investigated the nuanced interplay between the designer's mindset and perceptions. Aiming to investigate the relationships and influences of mindset and perceptions. Finally, exploring the effect, they have on intrapreneurial decision-making and behaviours at the front end of innovation. The results indicate design thinking has no relationship or influence on intrapreneurship. Whereas perceptions of the creative climate and leadership style both have a positive relationship and influence on intrapreneurship. However, the designer's paradox mindset is the most significant predictor of intrapreneurial behaviour and activity, which is significantly influenced by the creative climate.

The chapter is an integration and synthesis of the quantitative and qualitative results. Although the relationships and influences of the dependent and independent variables are non-linear and iterative, for simplicity, the chapter is comprised of three sections:

- **Section one:** Relationships and influences.
- **Section two:** Behaviours.
- **Section three:** Recommendations for leadership and conclusion.

Section One

Section one discusses the quantitative research questions one and two.

5.1. Relationships and Influence

The results indicate DT has a negative and weak relationship with intrapreneurship. Moreover, DT does not influence intrapreneurship. The study's results contradict other research that posit DT has a positive relationship and influence on intrapreneurship (Brenner and Uebernickel, 2016; Plattner, Meinel and Leifer, 2016). Furthermore, the literature declares that DT and occupying tools help solve wicked problems (Buchanan, 1992; Brown, 2008; Martin, 2009; Dorst, 2011; von Thienen, Meinel and Nicolai, 2014), supporting the designer's ambidexterity in innovating both linear and non-linear innovation (Martin, 2009; Zheng, 2018). However, upon

reflection, two presuppositions were made when developing hypothesis one. (1) The designer will use their full DTM potential. (2) The creative climate will be conducive for full expression of the designer's DTM. Results in section two of this chapter show that the two presuppositions were incorrect, explaining why hypothesis one was wrong (further discussed in section 5.4 below).

The results suggest that positive perceptions of leadership style and the creative climate have a positive relationship on intrapreneurship. These findings are consistent with other research (Ekvall and Ryhammar, 1998). Further, the results suggest leadership style significantly impacts the creative climate, which again, is a consensus among scholars (Ekvall and Ryhammar, 1998; Isaksen and Tidd, 2006). In line with previous studies (e.g. Rhodes, 1961; Isaksen and Tidd, 2006; Isaksen and Akkermans, 2011) the results suggest the creative climate has a strong relationship and influence on intrapreneurship. However, the influence of the creative climate on intrapreneurship is questioned as the research results were not statistically significant.

A notable finding in the results was the relationship and influence the creative climate had upon PM. The finding suggests PM not only has a strong relationship and a positive influence on intrapreneurship, but also acts as an intermediary between perception of the creative climate and intrapreneurship. The more a designer engages/embraces paradoxes, will result in an increase in the designers PM and creativity. Confirming previous research conducted by scholars that put forward, engaging in paradoxical behaviour increases creativity (Rothenberg, 1971; Miron-Spektor *et al.*, 2018), and helps with generating and focusing ideas (Dorst, 2006). Moreover, it improves insights gathering, knowledge and learning (Ward, 2004; Smith and Lewis, 2022), and innovation at the FFE (Andriopoulos *et al.*, 2018). The quantitative phase results prove hypotheses two and three correct but disproved hypothesis one, which will be further explored in section two below.

Section Two

Section two discusses the quantitative phase of the research, analysis intrapreneurial behaviours, research question three, and further discusses why hypothesis one was disproved.

5.2. Leadership

Results imply that design leaders have created top-down design departments, wherein bottom-up linear innovation that feeds the performance engine is encouraged. However, bottom-up, non-linear innovation that potentially fuels the innovation engine is discouraged. In the leadership paradox of freedom vs control, results suggested leaders opted for control. This style is typical among leaders who take a hierarchical and bureaucratic managerial approach (Hamel and Zanini, 2020). Designers in their frustration said non-linear innovation is a top-down process exclusive for the creative design leader, Hamel and Zanini (2020) posit bureaucratic leadership can lead to employees feeling exploited and that their efforts do not matter, all participants expressed this sentiment. Moreover, top-down leadership creates behaviours of employees who will not go above and beyond (Kouzes and Posner, 2012). The results of the interview echo this, as we see designers resigning to the impression that their non-linear ideas do not matter. They must simply get the job done “like a robot” - participant P2.

Stacey (2001, 2011, 2012) posits that these types of leaders take a technical, rational, political, and judgemental approach to management, creating a climate that focuses on easy-to-manage linear, short-term and reactionary innovation. The results suggest designers innovate to solve the symptoms rather than the cure, i.e., wicked and paradoxical problems, creating behaviours that are biased toward the linear performance engine (Christensen and Raynor, 2003; Christensen, 2016; Hamel and Zanini, 2020). Interviews show leadership ask for non-linear innovation but reward linear innovation. Kerr (1975) posits that under these circumstances, employees will behave in a way that promotes their self-interest, i.e., performing linear innovation and achieving performance engine KPIs to obtain a promotion etc. Moreover, incongruence in leader’s words and actions can lead to employees being sceptical of change and non-linear innovation efforts (Anthony *et al.*, 2020). Furthermore, can lead to leaders losing credibility (Kouzes and Posner, 2003). This scepticism was echoed by participant P1, who said, “I am not an artist, I am a designer”, meaning in her private life, she is creative, but at work, she has a job to do, which is dictated by the leadership/department’s needs.

5.3. Creative Climate

Leadership creates a creative climate where designers withhold insights and non-linear innovation ideas. Moreover, there is a bias for the performance engine where execution-as-efficiency is preferred over execution-as-learning. Edmondson (2008) posits that when leaders focus on execution as opposed to learning, they create a climate of employees holding back on non-linear innovations. Edmondson (1999, 2018) further posits that this climate will yield a psychologically unsafe climate. Learning is a crucial component of DT, and DT needs to be embedded in the climate to balance the linear and non-linear innovation behaviours (Reine, 2017). However, results suggest the creative climate does not allow freedom, risk-taking, idea time, and idea support. Isaksen and Akkermans (2011) express that in these conditions, employees will suppress their creativity and natural problem-solving skills and behaviours.

5.4. Design Thinking

Rodgers, Innella and Bremner (2017) posit, that DT itself is embedded with paradoxes, and it is well understood the way designers deal with paradoxes is a key element of design practice (Whitbeck, 2011). The results show participants have a high DTM, but this does not necessitate the full use of their DTM. The data shows designers work exclusively within the linear performance engine, and DT has become a process of doing rather than thinking. Thinking like a designer is vitally important in DT as it balances analytical and intuitive thinking (Cross, 2006; Brown and Martin, 2015).

In working on linear innovation in the performance engine, there is an overvalue of logical, deductive, and analytical reasoning. And a lack of priority on feeling, intuition, and abductive thinking - vital for non-linear thinking and intrapreneurship. A bias for the logical has been noted by past (Jung, 2017) and contemporary (Martin, 2007) scholars. As non-linear intrapreneurship and DT requires deductive, inductive, and abductive thinking. Results suggest designers were suppressing their creative problem-solving and abductive thinking. Perhaps for this reason there was not a relationship/influence between the independent variable

DT and the dependant variable intrapreneurship. However, this is an inference which requires further research.

5.5. Paradoxes

The results suggest PM was the greatest predictor for intrapreneurship. Designers who employ both/and thinking and fully explore tensions are better equipped to innovate linear and non-linear innovations (Smith and Lewis, 2022). However, the above results show leadership, creative climate, bottom-up thinking, and behaviours are all biased towards linear innovation of the performance engine. The creative climate of the performance engine is high. However, the creative climate for the innovation engine is perceived as low. Danneels (2003), Christensen and Raynor (2003) posit, linear innovation within the performance engine will not yield non-linear results, even if a designer takes a human-centred approach (Norman and Verganti, 2014).

Short-term performance engine success can lead to rigidity in thought, practice and competence (Leonard-Barton, 1992), leading to an escalating commitment bias (Staw, 1981). Further powering the inertia toward the status quo of the performance engine (Christensen and Raynor, 2003). This has been noted in the results of the interview and has led to designers having low morale, self-confidence and self-efficacy, and a lack of motivation in pursuing non-linear innovation. Vyakarnam and Hartman (2011) state that high self-efficacy is critical for non-linear innovation. Without internal or external confidence, non-linear innovation will not be attempted, and new skills and competencies will not be developed – confirmed by Govindarajan and Tangri (2020). Festinger (1957) says this can lead to cognitive dissonance; thinking they are being innovative but not recognising the suppression of their creativity, leading to a blissful unawareness of behaviour that is biased toward the status quo of the performance engine. This ‘fallacy of innovation’ was found in a previous masters research conducted by the researcher Hader Ali (2021).

5.6. Intrapreneurship

The results revealed some design departments were effectively outsourcing insights to other departments. However, scholars posit that to be empathetic and understand

the user, the designers must be as close to the user as possible (Kelley and Littman, 2001, 2005; Battarbee, Suri and Howard, 2015). Intrapreneurs are required to act as boundary spanners, bridging the gap between the external environment and the internal organisation (Brentani and Reid, 2004, 2012; Verganti, 2009). However, if direct contact between designer and user/non-user is not there and/or if designers are not encouraged to explore the external environment, scholars (Drucker, 2014; Kim and Mauborgne, 2015; Christensen, 2016; Christensen *et al.*, 2016; Govindarajan and Tangri, 2020) posit designers may miss weak signals and the true nature of the users jobs-to-be-done. Results show innovation is being designed within the performance engine in the form of linear innovation.

All the designers interviewed agreed that intrapreneurship needs to take a systems approach and understand the organisations short and long-term needs. In addition, design leaders must set a clear strategic vision (Drucker *et al.*, 2008; Kouzes and Posner, 2012; Govindarajan and Tangri, 2020), and engage, explain and confirm expectations of their constituents (Kim and Mauborgne, 2015, 2017a, 2017b). However, results show that the long-term strategy has not been articulated, but instead designers are focused on solving short-term linear problems, and although there is a desire for non-linear innovation, they do not behave in a manner that will generate non-linear insights or innovations, resulting in a suppression of one's creativity, internal paradoxes, and a cognitive dissonance.

The reluctance to perform actions that may create non-linear innovation is understandable, because it is hard to go against the social norms and values of the society/organisation/department (Norman, 2013). Moreover, it is well known non-linear intrapreneurship is a high risk occupation (Hill *et al.*, 2014; Hamel and Zanini, 2020). Designers new to the role, took a risk adverse position, which in the future creates habits of linear innovation and behaviours, leading to designers falling prey to the inertia of the status quo (Festinger, 1957; Gordon, 1961).

Section Three

5.7. Recommendations

From the designer's vantage point, the research explored intrapreneurship, specifically exploring designer's perspective, mindset, cognitive positions, and

behaviours that affect non-linear bottom-up innovation at the front end of innovation. In understanding the designers within their departments, design leaders would be able to place interventions to utilise their designer’s natural problem-solving, design thinking and paradox mindsets. Creating a climate of creativity and an ecosystem of linear and non-linear intrapreneurship and the development of an ambidextrous design department. Below are eight recommendations that will help facilitate this:

Recommendations	
Creative design leader’s role	The role of a leader is not to innovate, but to set the stage for others to innovate (Kouzes and Posner, 2012; Hill <i>et al.</i> , 2014). Employing a process for reflection, the leader must be clear on the department’s strategic vision and how it sits into the broader organisation (Drucker <i>et al.</i> , 2008). Then, articulate the vision to the designers and ask for feedback (Kim and Mauborgne, 2015).
Rephrase the question	Instead of asking “how can we get designers to better serve the department?” Ask, “What sort of design department merits and elicits the best designers can give?” (Hamel and Zanini, 2020).
Insights	Methodically and regularly search and scan the internal and external environment for strong and weak innovation insights (Drucker, 2014).
Creative climate	Create a psychologically safe (Edmondson, 2018) climate where learning is a KPI (Edmondson, 2008), and designers are able to express their natural inclination to solve complex problem (Isaksen and Akkermans, 2011).
Front end process	Create a front-end process that actively seeks linear and non-linear innovation ideas (Cooper, 2011). Not all non-linear innovations are the same, and seek to develop bespoke plans for each novel innovation idea (Govindarajan and Trimble, 2018).
Design Thinking	Deductive, inductive and abductive thinking, leaders must create a climate wherein intuitive think is as important as analytical thinking (Martin, 2007).
Paradoxes	Actively seek to develop your paradox mindset, as well as your designer’s paradox mindset. Cognitively hold two opposing thoughts at once, and shift from an either/or mindset, to both/and mindset (Smith and Lewis, 2022).
The bias organisation	Departments and organisations are filled with biases, processes and tools that fuel the performance engine but choke the innovation engine. Therefore, regular reflection, and a process of planned strategic abandonment must be performed (Drucker <i>et al.</i> , 2008; Drucker, 2014; Govindarajan, 2016).

Table 14: Recommendations.

Developing an ambidextrous department/organisation is critical for business sustainability (O’Reilly III and Tushman, 2011; Govindarajan and Trimble, 2018).

Although table 14 is not an exhaustive list, it offers several 'first step' recommendations for design leaders to develop a climate of ideas and an ecosystem of ambidextrous intrapreneurship.

5.8. Discussion Conclusion

The research confirmed previous studies that propose leaders set the stage for innovation by creating a creative climate that allows designers to simultaneously develop linear and non-linear innovation. Discovering that despite being a department of creative individuals, design leaders and designers have a bias for linear innovation within the performance engine.

In addition, however, the experiment provides new insights on DT's role in supporting intrapreneurship. Moreover, providing insight into the relationship and influence PM has on both the creative climate and intrapreneurship. The following chapter summarises and concludes the research project.

6. Conclusion

The chapter answers the research question, reflects on the research methods, makes recommendations for future research and highlights contributions of the research project.

The research project aimed to identify the nuanced and paradoxical relationships between a designer's perception and mindset and their influence on intrapreneurship at the front end of innovation. Using a quantitative and qualitative analysis of the designer's perception of the creative climate, leadership style, design thinking mindset, paradox mindset and intrapreneurial behaviours at the FFE. It can be concluded that intrapreneurship does not take place in a vacuum but is influenced by the designer's beliefs and perceptions. As such, the design leaders have a critical role in facilitating a creative climate that allows designers to explore and express their creativity. The results indicate that the creative climate and the designer's paradox mindset are the defining variables that determines intrapreneurial behaviours and non-linear innovation.

The research used a mixed-method approach, combining quantitative and qualitative data collection and analysis. The methodology was selected because it builds a robust study that allows for a deeper data collection and analysis. However, it can be a complicated process that requires, as a minimum, rudimentary knowledge of both methods. Moreover, combining the two methods is time-consuming. Despite drawbacks of the methodology, the quantitative method was effective in answering questions exploring the relationship and influences of the dependent and independent variables. Building upon the quantitative, the qualitative methods answered the question pertaining to intrapreneurial behaviours at the FFE.

Hypotheses two (paradoxes) and three (perceptions) were as expected. However, unexpectedly, and contrary to the overwhelming academic evidence, hypothesis one, DTM relationship and influence on intrapreneurship, was proven to be wrong. The results suggest there is no relationship or influence between DTM and intrapreneurship. The research's literature review articulates the importance of DTM on intrapreneurship. However, the results show the misuse of DT. Highlighting the linear restrictions on DT and how underused DT is within the non-linear innovation engine.

An unexpected insight was the intermediary nature of the designer's paradox mindset. By measuring only, the PM of a designer, an inference could be made for the measurement of intrapreneurship and the creative climate, and in turn, the leadership style.

6.1. Limitations

Although advantageous to view intrapreneurship from a relational and behavioural perspective, the practicality of mixed methods was restricted by a lack of time for collecting and analysing data. Quantitative $n = 69$ was considered a small sample size, resulting in Pearson r correlation being inconsistent, the normative value was also brought into question, and results of some of the independent variables being statistically insignificant. Moreover, the lack of time meant only three interviews were conducted, resulting in a lack of breadth in the designers' perspectives. For these reasons there is not enough justification to be able to generalise the results. However, the synthesis of several theoretical frameworks was novel, and sets a strong foundation for future research.

6.2. Recommendations for Future Research

From a practical perspective, replication of the study, i.e., a mixed method approach, time management is a critical factor, and data collection should be conducted early. Moreover, learning the analysis tools is critical when the researcher is time-poor. From an academic perspective, two novel insights were gained from the research:

1. The intermediary nature of a paradox mindset.
2. The lack of relationship and influence design thinking mindset has upon intrapreneurship.

The front end of innovation is the most important part of the innovation process and the most 'wicked'. The research highlights how the paradox mindset acts as a bridge between the creative climate and intrapreneurship at the FFE. However, the research does not explore fully the extent of the relationships and influences of the

variables. It is recommended future research further explore the intermediary nature of paradoxes.

The non-relationship between DT and intrapreneurship is indicative of how the public view DT, that is, a process of doing rather than thinking. Therefore, it is recommended that several co-creation workshops are conducted to generate insights into how organisations can embed thinking like a designer into the creative climate, unearthing the biases, and paradoxes, with a view to generate insights to increase paradox, abductive and integrative thinking.

6.3. Research Contribution

The research contributes from both an academic and practitioner perspective. Broadening the understanding of how paradoxes at the top affect designers lower down in the design department. Further, in combining the front end of innovation, intrapreneurship, mindsets, perceptions, cognition and behaviour, the research took a novel perspective on several under-researched fields. Furthermore, the research debunks a recent and common misconception that design thinking is a process of doing design, as opposed to thinking. Shining a light on the paradoxes within design thinking and the fact that a climate of design thinking needs to be sewn into the fabric of a design department and the organisation. Finally, the research makes several recommendations, that allow design departments to take a first step towards creating a climate of ideas and an ecosystem of bottom-up and ambidextrous intrapreneurship.

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8. Appendix

8.1. Appendix A: Standard multiple regression assumptions

Testing multiple regression assumptions:

- Linear relationship between dependant and independent variables.
- Normal distributed error component.
- No multicollinearity or instability of the regression coefficient.
- No heteroskedasticity, and
- Residuals must be constant across predicted values.

Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BUInnov	.143	69	.001	.943	69	.004

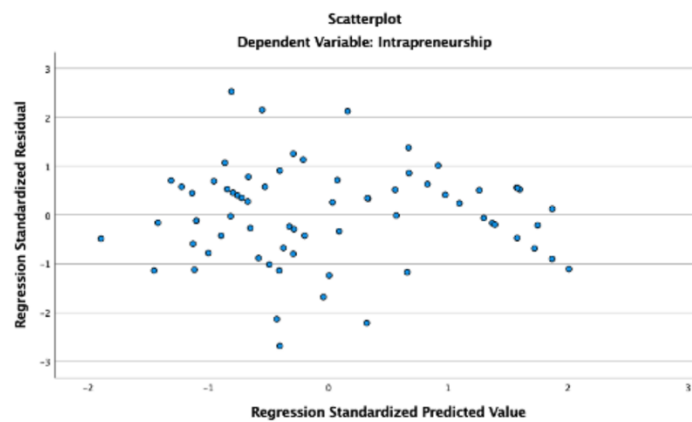
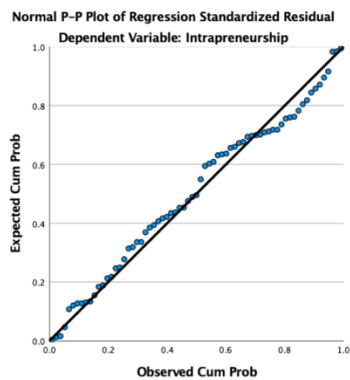
a. Lilliefors Significance Correction

Normal distribution variable, for both Kolmogorov-Smirnov and Shapiro-Wilk P-value (sig) of .005 \geq . However, sig. shows .004, indicating strong evidence that the null hypothesis can be rejected (Field, 2017). Resulting in the null hypothesis, that the data is normally distributed, is rejected. However, with smaller samples, tests don't necessarily have the power to detect non-normality (Field, 2017).

Correlations

		BUInnov	PM	LdrS	CC	DTM
Pearson Correlation	BUInnov	1.000	.697	.683	.759	-.123
	PM	.697	1.000	.402	.570	-.072
	LdrS	.683	.402	1.000	.851	-.077
	CC	.759	.570	.851	1.000	-.199
	DTM	-.123	-.072	-.077	-.199	1.000
Sig. (1-tailed)	BUInnov	.	<.001	<.001	<.001	.156
	PM	.000	.	.000	.000	.278
	LdrS	.000	.000	.	.000	.264
	CC	.000	.000	.000	.	.051
	DTM	.156	.278	.264	.051	.
N	BUInnov	69	69	69	69	69
	PM	69	69	69	69	69
	LdrS	69	69	69	69	69
	CC	69	69	69	69	69
	DTM	69	69	69	69	69

The predictor variables are < 0.7 suggesting no multicollinearity or instability. Moreover, the predictor variables correlate with the outcome variable because they are > .3.



Normal P-P plot, although there are some deviations, there is a linear relationship between the dependant variable and independent variables. The Scatter plot shows a rough rectangular distribution with majority plots concentrated in the middle. The two graphs do not show violations of the assumptions.

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.4722	7.0789	4.1957	1.43864	69
Std. Predicted Value	-1.893	2.004	.000	1.000	69
Standard Error of Predicted Value	.141	.409	.254	.066	69
Adjusted Predicted Value	1.5357	7.2096	4.1927	1.44242	69
Residual	-2.61401	2.46453	.00000	.94612	69
Std. Residual	-2.680	2.527	.000	.970	69
Stud. Residual	-2.730	2.654	.001	1.007	69
Deleted Residual	-2.71181	2.71807	.00293	1.02074	69
Stud. Deleted Residual	-2.882	2.791	.000	1.029	69
Mahal. Distance	.442	10.975	3.942	2.597	69
Cook's Distance	.000	.145	.016	.028	69
Centered Leverage Value	.006	.161	.058	.038	69

a. Dependent Variable: BUIInnov

To measure the strength of the difference between observed and expected values, the standardised residual was measured. Measuring at -2.680 and 2.527, scores are within the requirements of between -3.3 and 3.3 ruling out any outliers in the data (Pallant, 2020). The Cook's distance is <1 ruling out any outliers in the X value (Pallant, 2020).

8.2. Appendix B: Internal Liability

Before analysing the results, reliability of the data was conducted. Using IBM SPSS Statistics (2022) numerical descriptive statistics are presented in table below. The descriptive statistics measures of central tendency like mean, median, mode, and can give a distribution of the data, whether it is normally distributed or clustered in some data segments (Field, 2017).

Descriptive Statistics

		Design Thinking Mindset	Paradox Mindset	Leadership Style	Creative Climate	intrapreneurship
N	Valid	69	69	69	69	69
	Missing	0	0	0	0	0
Mean		1.7077	3.1111	3.3019	3.2576	4.1957
Median		1.6667	2.6667	3.5000	3.0909	4.0000
Mode		1.67	2.67	1.83 ^a	2.45 ^a	6.00
Std. Deviation		.48288	1.56103	1.23546	1.21886	1.72187
Skewness		.801	.794	.228	.133	-.002
Std. Error of Skewness		.289	.289	.289	.289	.289
Kurtosis		.706	-.404	-.547	-1.059	-1.147
Std. Error of Kurtosis		.570	.570	.570	.570	.570
Range		2.17	6.00	5.00	4.82	6.00

a. Multiple modes exist. The smallest value is shown

Table: Descriptive statistics

For all variables, the median and mean values are close representing a normal distribution of data. The standard deviation represents the shape of the distribution of scores (Field, 2017). Paradox mindset and intrapreneurship are relatively high compared to the mean, otherwise other variables the mean is not spread too widely.

The Skewness value provides the symmetry of the distribution (Pallant, 2020). All variables apart from intrapreneurship indicate show positive numbers and indicate the distribution skewness clustering values to the left. Kurtosis, provides information about the 'peakedness' of the distribution (Pallant, 2020). Kurtosis values below zero indicate a flat distribution (Pallant, 2020). The following step of reliability was to test for internal consistency. This test measures if the constituent items assess the same construct, the coefficient α ranges from 0 to 1 (Tavakol and Dennick, 2011)

	Cronbach's alpha	Number of items
Design thinking mindset	.579	6
Paradox mindset	.850	3
Intrapreneurship	.739	2
Perception, leadership style	.859	6
Perception, leadership style	.906	11

Design thinking Cronbach alpha at 0.579 is considered poor, >0.7 is considered acceptable, 0.8 good and 0.9 is considered excellent (Pallant, 2020).

Item Statistics

	Mean	Std. Deviation	N
I am comfortable seeing problems from the user's point of view and can intuitively tune into the user's feelings	1.54	.719	69
To better understand the problem, I think it is important to reframe the initial problem	1.59	.960	69
I am comfortable with learning from observations/experiences and can implement what I have learnt	1.61	.808	69
I am comfortable trying new approaches when solving problems, and I recognise the importance of failing in order to learn	1.67	.834	69
I look for something new in a new situation, and am curious about what I don't know	1.54	.584	69
I am comfortable synthesising information to build hypotheses and conclusions from incomplete information	2.30	1.102	69

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.705	.714	5

Removing the last question significantly increased the Cronbach's alpha to .705, thereby increasing reliability. However, it can be argued with respects to psychological constructs, Cronbach's alpha values $<.7$ can, realistically, be expected because of the diversity of the constructs being measured (Kline, 1999). Furthermore, with short scales number of items being less than ten it is common to find Cronbach alpha values $<.5$ (Field, 2017) subsequently the question was not removed and design thinking mindset Cronbach alpha remained at .579. In this case, it may be more appropriate to report the mean inter-item correlation for the items.

8.3. Appendix C: Paradox and perception

A multiple linear regression was conducted. Paradox mindset as the dependant variable and perceptions of the leadership style and creative climate as the independent variables.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			Sig. F Change
						F Change	df1	df2	
1	.591 ^a	.349	.329	1.27862	.349	17.678	2	66	<.001

a. Predictors: (Constant), PCC, PLS

b. Dependent Variable: PM

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.803	2	28.901	17.678	<.001 ^b
	Residual	107.901	66	1.635		
	Total	165.704	68			

a. Dependent Variable: PM

b. Predictors: (Constant), PCC, PLS

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	.920	.457		2.012	.048			
	PLS	-.376	.239	-.297	-1.574	.120	.402	-.190	-.156
	PCC	1.053	.242	.822	4.355	<.001	.570	.472	.433

a. Dependent Variable: PM

Model summary, adjusted R square, the model explains 32% of the variance of the dependant variable, which is statically significant. Anova table, testing the slope of the null hypothesis is zero, p value <.001 suggesting significance. Coefficients, contribution of perception of the creative climate has a greater impact on paradox mindset than leadership style. Perception of the creative climate has a p value of <.001, making the under the alpha of $\leq .005$. Moreover, the greatest contributor (Part) for PM is PCC at .433.