Design Leadership in China:

A Competency Model Bridging Business Practice and Design Education

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I dedicate this thesis to my parents and husband.

You always let me know I am far more capable than I first believed.

Abstract

Design's role has evolved from a focus on aesthetics and craft to a more strategic business function, increasing importance of design leadership. In China, government support for innovation is pushing more designers towards entrepreneurship. However, these designers often lack the required leadership and management competencies, a gap that current Chinese design education does not adequately address. As generic competency models are unsuitable for design-specific challenges, this research aims to develop and validate a Design Leadership Competency Model (DLCM) for Chinese design leaders and explore its implications for design education.

A three-stage triangulating qualitative methodology was employed in this study. Stage 1 constructed a preliminary DLCM involving design leader interviews (N=26), grey literature (N=12) and job descriptions (N=50). Stage 2 validated the model through an expert survey (N=12), stakeholder interviews (educators, students and alumni) (N=14) and a workshop. Stage 3 then used the validated DLCM to map and identify competency gaps within design education from three perspectives: (1) education itself, via a desk review of eight design management and 71 design programmes across 21 universities, and complemented with an extra in-depth case study; (2) policy, by analysing 52 policies to identify what kinds of talent are demanded; (3) industry, by having the 26 design leader also examine taught versus absent competencies.

Finally, this research presents the validated DLCM comprising three main categories, included skills, knowledge and mindset, which consist of 16 competencies and 58 sub-competencies. Moreover, it also demonstrates the DLCM's practical potential by identifying gaps between the model and current design educational offerings, and also provides guidance for pedagogic enhancements to better cultivate future design leaders.

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Abbreviations

AI	Artificial Intelligence
CBE	Competency-Based Education
CDO	Chief Design Officer
CEO	Chief Executive Officer
CPD	Continuing Professional Development
DEO	Design Executive Officer
DFMG	Design Function Maturity Grid
DM	Design Management
DLCM	Design Management Competency Model
DLT	Design Leadership Triangle Framework
Entrecomp	Entrepreneurship Competence Framework
GECM	Generic Entrepreneur Competency Model
HCM	Holistic Competency Model
HCI	Human-Computer Interaction
HR	Human Resources
IPRs	Intellectual Property Rights
KSA	Knowledge, Skills and Abilities
NPD	New Product Development
OBE	Outcome-Based Education
PDE	Prototyping-driven Entrepreneurship
PECs	The Personal Entrepreneurial Characteristics
PG	Postgraduate
SD	Service Design
SLOs	Student Learning Outcomes
SLR	Systematic Literature Review
UG	Undergraduate
VP	Vice President

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Author's Declaration

I hereby declare that:

This thesis has not been submitted to support an application for anther degree at this or any other university. The work presented in this thesis is my own original research and conducted under the supervision of Dr Paul Cureton and Dr Yekta Bakırlıoğlu.

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Under Review:

- **Gao, X.**, & Bakırlıoğlu, Y. (2025). Design Leadership Competency Model: Mapping design leader capabilities for innovation-driven firms in China.

Chapter 1: Introduction

1.1 Research Context

The development of design leadership is not an isolated phenomenon; it is closely linked to the specific industrial, educational and policy environments in which it operates. While the shift from 'designer' to 'design leader' is global, the competencies required to navigate this transition are heavily influenced by local market and specific cultural context. Therefore, this thesis examines the development of a design leadership model specifically within the context of China, where rapid industrial upgrading and government-directed innovation create a unique ecosystem.

The scope of this thesis considers three interconnected areas within this Chinese context: (1) from an industry perspective, there is a growing demand for design to drive China's economic transition from low-end manufacturing to high-quality innovation; (2) from a policy perspective, the active role of Chinese government in promoting venture creation and design-driven developments; and (3) from an education perspective, the disconnect between China's traditional fine-arts-based design education and the market's need for business and strategically minded leaders.

1.1.1 Demand from industry: new competency requirements

Globally, emerging technologies like Artificial Intelligence (AI) and data-driven design are rapidly changing and impacting the market and industry. However, within China, these technological shifts are accelerating within a critical economic transition. The Chinese manufacturing industry is experiencing a transformation, with plans to shift from low-end production towards industrial upgrading, innovation and high-quality development. In this specific Chinese environment, design is no longer just about aesthetics but place design in an important position as a driver of innovation. From this perspective, design is becoming a key differentiator in global markets (Tatosian, 2025), as it can unlock business potential and help companies achieve greater profits and design-centric

companies can stand out from others (Rae, 2016). Consequently, the roles of designers in China are expanding. Successful designer-founded companies are rising (Pinheiro and Franqueira, 2022a), and many SMEs and start-ups established by founders with a design education have achieved great success by integrating design into their core strategy. This new environment requires a new type of leadership: individuals who can combine creative expertise with business competencies.

Similar to the evolution of the design function itself, designers' tasks are shifting from a focus on hands-on skills towards leading complex, multidisciplinary projects. They are increasingly asked to tackle complex problems and align their creative outcomes with organisational objectives. It also signals a role transition from 'designer' to 'design leader' (Sobel and Schweitzer, 2022), with new positions appearing, such as Design Leader, Chief Design Officer (CDO) and VP of Design. However, many designers find themselves in leadership roles without formal management or business training (Christensen *et al.*, 2023), creating a significant skills gap between their design expertise and the required managerial competencies.

1.1.2 Government support: policies promoting design

The Chinese government has published policies to support design and talent development, as it recognises the strategic value of design in promoting economic and societal growth. Examples include the *Outline for Building an Education Powerhouse (2024–2035)* (State Council, 2025) and the *Guiding Opinions on Strengthening the Training of Design Talents* (Henan Provincial Department of Education, 2022). These policies provide a supportive environment for design leadership to thrive by offering targeted encouragement and funding opportunities.

Specifically, policies that encourage individuals to start their own businesses, such as the *Guiding Opinions on Promoting the High-Quality Development of Light Industry* (Ministry of Industry and Information Technology *et al.*, 2022), create direct opportunities for designers. Accordingly, designers in China are being pushed to think beyond traditional design boundaries and to start considering how

to create their own businesses by deploying their strengths, which also promotes the role transition (Section 1.1.1). During this venture-creation process, they face opportunities and challenges related to entrepreneurship and management. Therefore, more design leaders are emerging, along with successful cases where companies find their competitive edge and distinguish themselves from their peers by utilising their design expertise.

This demand raises a question: *What is the current state of design-education programmes in preparing students for design-leadership roles?* The rise of design-management programmes and courses reflects this trend to a certain extent, but a gap still remains in preparing designers for leadership roles, according to industry feedback (Section 1.1.1).

1.1.3 Education: shifting curricula to bridge design and business

As mentioned above, universities are responding to industry and government demands. However, a significant gap remains between design curricula and the demand for strategic leadership in China. For decades, many Chinese design programs have been rooted in fine arts academies, often prioritising craft and aesthetic skills over management and business acumen.

While there have been developments in design education, such as new design management programmes (He, 2024) that integrate business subjects, many curricula have been slow to adapt to the fast-paced demands of the country's industrial transition. Design curricula still tend to have a strong focus on technical craft (e.g. software, aesthetics, prototyping) and design theory (e.g. history, trends), with limited offerings in management and leadership, especially in a practical context (Anon, 2020b). Thus, students rarely learn key management skills, such as how to manage interdisciplinary collaborations or how to communicate effectively with senior leaders and non-design stakeholders (Davis and Dubberly, 2023). This creates a disconnect while the Chinese economy urgently requires design leaders to drive innovation, as discussed previously, its educational institutions are not yet systematically equipped to produce them, due to a lack of a competency framework.

1.1.4 Contextual rationale and research contribution

As introduced previously, the Chinese context is comprised of three pillars – government, industry and education. This unique Chinese context directly informs the development of the competency framework proposed in this thesis. Unlike generic global leadership models, this framework is shaped by the unique interconnection of China's industrial upgrading, policy directives and educational legacy. First, the rapid industrial transition requires the framework to priorities design and innovation, strategic abilities and adaptability over static management skills; second, the strong government push for entrepreneurship necessitates the inclusion of competencies related to venture creation and policy alignment; finally, the historical 'fine arts' focus of Chinese design education highlights a specific gap in business competency cultivation. Therefore, the framework places as a distinct emphasis on bridging this gap, especially incorporating business-related competencies to address the specific needs of Chinese design leaders.

Consequently, current design leadership literature is heavily toward Western, creating a generalisability gap (Section 2.7.1). Existing frameworks often assume a situation of interdisciplinary education and market growth that does not align with China's government-led innovation model and 'fine arts' educational tradition. In this sense, this thesis makes a specific contribution to knowledge by moving beyond the direct translation of Western leadership concepts to offer a context-specific operational framework. It offers a lens that empirically demonstrate how China's 'triple-pillar' environment change the required competencies of a design leader.

Furthermore, this research addresses a significant theoretical limitation in current approaches: the fragmentation of leadership competencies. As identified in the literature (Section 2.7.1), existing studies often rely on isolated lists of skills or abstract discussions of roles, frequently based on small sample sizes or purely conceptual arguments. This thesis responds to this limitation by developing a holistic Design Leadership Competency Model (DLCM). unlike previous fragmented approaches, this framework synthesises the knowledge, skills and mindsets into a unified model.

1.2 Research Motivation

As a student of design management for both my undergraduate and postgraduate studies, I was taught that these programmes are meant to cultivate in students an understanding of both management and design disciplines, to prepare them to become design managers in teams or organisations. With this aim, educators often introduce up-to-date case studies from companies like Apple and Airbnb, which have strong design leadership tendencies. Although those examples are becoming clichés now, five years ago, they still incentivised my curiosity: Why can designers have such a huge impact on the world? A leader who understands design, like Steve Jobs, for instance, can fundamentally change the mobile phone industry.

The curiosity was further enhanced when my master's supervisor introduced me to a book on design leadership. While this book is insightful, I observed that the available resources were predominantly focused on Western contexts and leaders. This led me to realise that there is a gap in focus on the Chinese context, especially when considering the rise of successful Chinese designers moving into venture creation under China's industrial transformation.

This led me to think about several questions concerning design leadership: What common competencies do successful design leaders in the Chinese context share? Could these competencies be synthesised into a formal model? Furthermore, as there is a need for such talent during this transformation, how could a model be utilised as a benchmark to map and enhance current design-education programmes? Motivated by both the challenges and opportunities presented by China's ongoing economic transformation, and my personal curiosity, I have chosen this topic for my PhD research.

1.3 Focus of the Research

To guide this study, the following Research Questions (RQs) were proposed:

RQ1*: What key competencies are required for effective design leadership in the Chinese context, and how can they be synthesised into a preliminary framework?*

***RQ2**: How can a preliminary framework be refined and validated with industry and academic stakeholders to ensure its relevance?*

***RQ3**: To what extent does current Chinese design education reflect validated competencies, and what are the key areas for development?*

Aims of this research

The main aim of this research is to develop a design leadership competency model for Chinese design leaders and explore its implications for design education.

Research objectives

To answer the research questions and achieve the research aim, the following objectives were established:

To answer **RQ1**:

Objective 1.1: To identify and define the core competencies that reflect effective design leadership.

Objective 1.2: To synthesise competencies into a preliminary Design Leadership Competency Model (DLCM).

To answer **RQ2**:

Objective 2.1: To validate and refine the DLCM with industry and academic stakeholders.

To answer **RQ3**:

Objective 3.1: To map the competencies from design education, policy and industry against the validated DLCM.

Objective 3.2: To identify competency gaps and determine the key areas for development in current design education.

1.4 Structure of the Thesis

This thesis comprises seven chapters organised according to the two main research stages as shown in Figure 1: (1) construction of a Design Leadership

Competency Model (DLCM) and (2) an exploration of the DLCM's potential in design education.

The thesis begins with a literature review (**Chapter 2**) that provides the theoretical foundation by reviewing design leadership, competency models and design education to identify key findings and gaps. **Chapter 3** then outlines the research methodology, explaining the rationale and processes for data collection across both research stages. Following this, **Chapter 4** presents the first stage of data analysis, demonstrating how competencies were identified from four sources through thematic analysis to construct a preliminary DLCM. **Chapter 5** details the second stage, exploring the DLCM's potential by mapping it against competencies identified from three perspectives: academic programmes, design policy and industry. Subsequently, **Chapter 6** conducts a discussion on the DLCM, including the interconnections between competencies, the types of design leaders, prominent features and a competency paradox in design education within the Chinese context. Finally, **Chapter 7** concludes the thesis by answering the research questions and outlining the study's contributions and limitations.

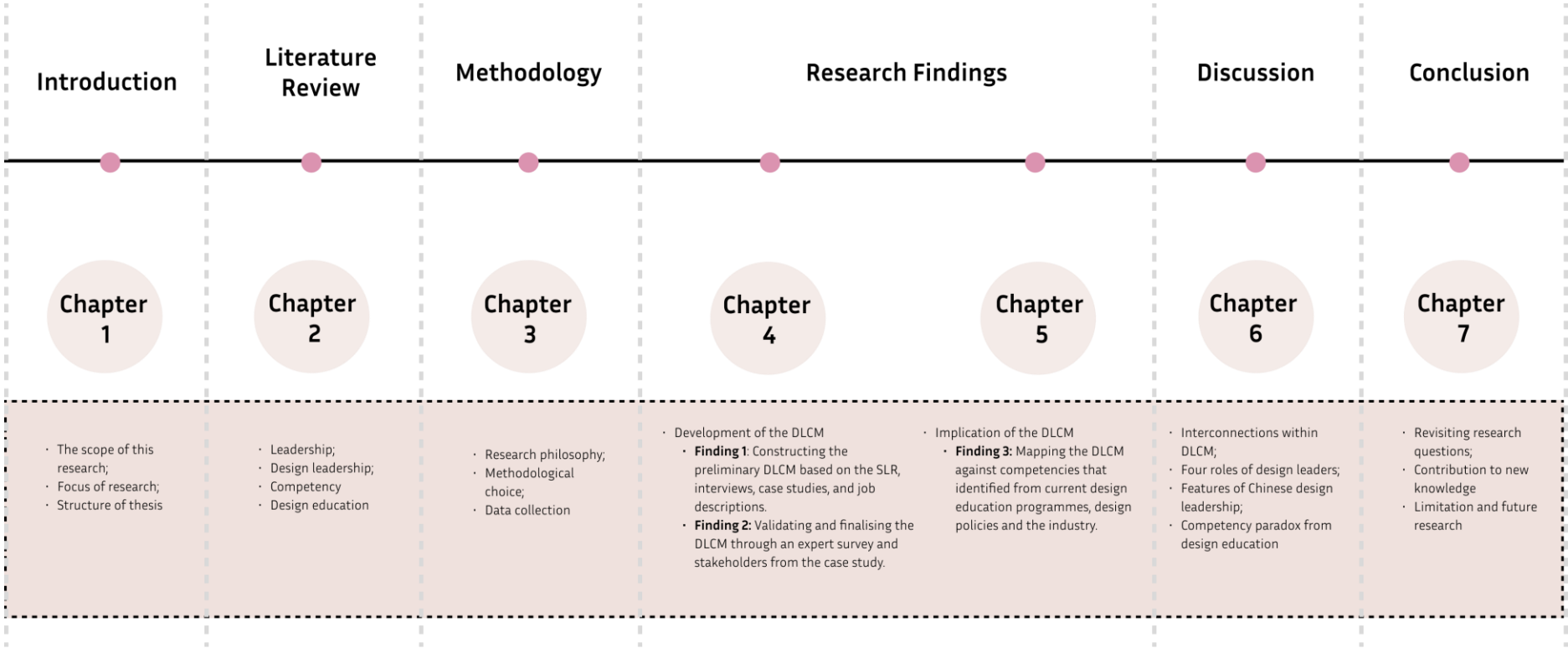


Figure 1: Structure of the thesis

Chapter 2: Literature Review

As discussed in the research context (Section 1.1), despite the growing importance of designer-driven businesses, as emphasised by both industry and government, there is a critical gap in understanding the specific competencies required for effective design leadership within this unique cultural and business context. In the literature, existing competency models are Western-centric and may not be directly applicable; moreover, there is a notable absence of empirical research on design leadership in China. These gaps present a critical challenge for both the professional development of design leaders and the cultivation of Chinese design education.

This chapter reviews the design-leadership literature and builds a comprehensive understanding of this field. Accordingly, the chapter is structured as follows: Section 2.1 introduces leadership theories to provide a broader theoretical foundation; Section 2.2 presents the emergence and nature of design leadership; Section 2.3 demonstrates the characteristics, roles and styles of design leadership; Section 2.4 differentiates design leadership from related concepts, including design management, design entrepreneurship, creative leadership, innovation leadership and service design leadership; Section 2.5 examines competencies and competency models, with a specific discussion of the debate surrounding a design leader's expertise and background; Section 2.6 reviews design education, focusing on key pedagogical approaches and the specific context of China. Finally, Section 2.7 identifies gaps in the literature to guide the formulation of this study's research questions, aims and objectives.

2.1 Leadership

Leadership can be defined as

> ...a construct that develops over the life of a team; that is dynamic in nature; and varies as a function of team inputs, processes and outcomes. (Day *et al.*, 2004, p. 861)

This section clarifies the design leadership concept by reviewing mainstream leadership theories to provide a broader theoretical foundation. It also examines research on leadership within the design context to understand the role of design and its connection with different leadership styles.

2.1.1 Leadership theories

Leadership theories have evolved significantly over time and they have now reached a mature stage with diverse styles such as situational, charismatic, transformational, and shared leadership. This historical progression began with the *Great Man and Trait theories* (Stogdill, 1948), which position leaders as central, and was later developed and complemented by the *skills theory* (Katz, 1980, 2009; Mumford *et al.*, 2017), which focuses on the behavioural aspect of leaders to examine their specific actions.

A significant pivot away from a rigid and 'leader-centric' model came with *Situational and Contingency Leadership* theories. As proposed by Fiedler (1978), these were among the first to argue that effective leadership is not static; it is a dynamic process that involves different stakeholders, including leaders, followers and the environment (Zhendorfer, 2021). The core idea is that the most suitable style is contingent on the variables of a given situation (Amanchukwu *et al.*, 2015).

Building on the idea that a leader should adapt, subsequent theories began to focus more on a leaders' personal ability to influence and inspire followers. This is the core of *Charismatic Leadership,* a concept first introduced by Max Weber and later developed into theoretical models in the 1970s (Conger, 1993; Lepsius, 1986). This style is defined by a leader's ability to form a strong emotional bond with followers through a combination of the leader's charm, confidence and vision (Zhendorfer, 2021).

This focus on inspiration is a foundational element of the closely related and more developed concept of *Transformational Leadership*. Introduced by James MacGregor Burns in 1978 and mainly developed in the 1990s, this theory views leadership as being either transactional or transformational (Bass and Riggio, 2008; Burns, 2010). This style moves beyond mere charisma, to a process of

elevating the morality and motivation of followers, encouraging them to look beyond self-interest and serve collective interests (Burns, 2010). Instead of just directing people, transformational leaders inspire and motivate their followers to achieve common goals or to exceed expectations (Steinmann *et al.*, 2018). From this perspective, transformational leaders typically do this by aligning and changing the organisational culture, generating a new vision and creating shared values (Bass and Avolio, 1994); and moreover, this provides a foundation for the emergence of authentic leadership (Zhendorfer, 2021).

While transformational leadership focuses on inspiring followers to work towards an organisational goal, *Servant Leadership*, as a related style, has a significant overlap with transformational leadership, first proposed by Greenleaf in 1970 (Greenleaf, 1998) and developed in the 2000s. Indeed, some scholars argue that servant leadership can be seen as a form of transformational leadership (Canavesi and Minelli, 2022; Farling *et al.*, 1999). From this perspective, servant leadership can be defined as a form of moral-based leadership in which leaders tend to prioritise the fulfilment of followers' needs over their own (Canavesi and Minelli, 2022). As shown in Table 1, while both styles are related, the key distinction is that servant leadership focuses more on service to followers and is influenced by their needs; transformational leadership highlights the role of a leader in inspiring followers to work towards a common goal (Allen *et al.*, 2016). The transformational leader inspires people to serve a common goal, whereas the servant leader's primary goal is to serve their people.

Table 1: Comparison between servant leaders and transformational leaders (Allen et al., 2016)

Servant Leadership	Transformational Leadership
Focuses on service to followers	Focuses on the goals of the organisation
Influences by serving the needs of others	Influences by modeling ideal behaviour
Promotes team problem solving	Uses persuasion to gain support
Encourages individualised development	Promotes individualised influence
Motivates by providing autonomy and resources	Motivates with charisma to attain a common goal

Servant leadership redefined the leader's role as one of service to their followers, demonstrating an evolution towards a more follower-centric mindset. In this

sense, *Shared leadership* takes this principle further and was proposed after the 2000s. Shared leadership can be defined as

> ...a dynamic, interactive influence process among individuals in groups for which the objective is to lead one another to the achievement of group or organisational goals, or both. (Pearce and Conger, 2003, p. 1)

Shared leadership distributes leadership responsibilities among the employees (Wu and Cormican, 2021), focusing on leadership as a group-level social process, rather than an individual one (Fletcher and Käufer, 2003). It can promote team effectiveness (Wu and Cormican, 2021) and creativity (Sun *et al.*, 2016).

Overall, the evolution of leadership theory shows a distinct shift in perspective (see Table 2). Initially, the focus was leader-centric, with approaches like the *Great Man* and *Traits* theories proposing that leadership was an intrinsic trait one was born with. This view gradually shifted toward *Behavioural* and *Situational* theories, which acknowledged that leadership skills could be learned and should be adapted to the environment. After that, a more significant transformation occurred from the 1990s onwards with the emergence of concepts like *Transformational, Shared, Collaborative* and *Servant Leadership*, representing a fundamental change from leader-centric to follower-centric approach. This evolution reflects a change from focusing on the individual leader toward the process of leadership itself, now viewed as more shared, collaborative and ethical. This shift is particularly relevant to the design context, as design often thrives in a collaborative and flexible environment rather than a rigid, top-down structure.

Table 2: Summary of main leadership styles (Benmira and Agboola, 2021, p. 4; Zhendorfer, 2021, p. 4)

Era	Period	Theory	Description
Trait	1840s	Great man	Natural-born leaders
	1930s–1940s	Trait	Identifying traits and characteristics of effective leaders
Behavioural	1940s–1950s	Behavioural	Actions and skills of leaders
Situational	1960s	Contingent and situational	Leaders adapting their style, taking into account the environment
New leadership	1970s	Charismatic	The powerful role of charisma in leadership

Era	Period	Theory	Description
	1990s	Transformational	Inspirational style pushing followers to ever higher levels of achievement
	2000s onwards	Servant	Prioritising the fulfilment of followers' needs over their own
		Shared	Followers leading each other
		Collective	Engaging followers, a person-centred style

This historical context is important: many of these foundational models have been critiqued for emerging from a predominantly Western, male-dominated managerial discourse (Collinson *et al.*, 2023; Dupree, 2024; Eagly and Karau, 2002; Ehrnrooth *et al.*, 2024; Kark and Buengeler, 2024; Ly, 2020), which may limit their universal applicability and overlook other diverse leadership values. Therefore, understanding these limitations highlights the need for a more context-aware and inclusive framework, like design leadership with a Chinese focus.

2.1.2 Leadership in a design context

To better understand design leadership, it is important to review how established leadership styles manifest within design-related environments. Although the term 'design leadership' may not always be used explicitly, research consistently highlights leadership within design-related environments.

A key distinction of leadership in a design context is the importance of a *people-centric* leadership style, which manifests through characteristics such as being participative, employee-centric and motivational. For example, Cheung *et al.* (2001) found that both 'charismatic' and 'participative' leadership styles were essential for design-team satisfaction. This link between participation and positive outcomes is well-supported; participative leadership has been shown to encourage innovation and stimulate creativity in various contexts (Lam *et al.*, 2015; Murphy and Ensher, 2008; Zhang and Bartol, 2010). Furthermore, studies of design professionals also support this distinction. A study of architects found that while they valued a task-oriented approach, this was most effective when combined with supportive and collaborative styles (Kasapoğlu, 2011). Similarly, research on Design Executive Officers (DEO) in Korea identified a strong 'employee-centred'

mindset and intuitive decision-making as key characteristics, which share similarities with both transformational and participative styles (Lee *et al.*, 2022).

Moreover, this strong human-centred tendency is accompanied by a 'rejection' of the traditional *hero paradigm*. Gronn (2002) critiques this paradigm, arguing that the idea of a single, heroic leader is unsuitable for the design process. He believed that the 'hero paradigm' does not align with the practical realities of design work and the collaborative nature of design.

Therefore, building on this preference for a people-centric, anti-heroic preference, *shared leadership* has been discussed within the design context. As introduced previously, shared leadership is "a dynamic interactive influence process among individuals in groups" (Pearce and Conger, 2003, p1). Lehtonen (2024) directly connected this concept to design, framing shared leadership as a dynamic practice that develops through the interaction of individuals, objects and values. This aligns with a broader shift in understanding leadership as a social and distributed phenomenon (Fletcher and Käufer, 2003).

In summary, as Amanchukwu *et al.* (2015) state, leadership is not a "one size fits all" phenomenon (p. 9). The evidence suggests that effective leadership in a design context is not a singular style but a dynamic combination of approaches. It should be people-centric to foster creativity, embrace flexibility over rigid heroic structures, and promote a shared, collaborative process of design.

2.2 Emergence and Nature of Design Leadership

Building on the review of foundational leadership theories, this section now examines the emergence and nature of design leadership, focusing on two key aspects: its definition and evolution.

2.2.1 Definition of design leadership

Design leadership is regarded as a new form of organisational leadership (Bucolo *et al.*, 2012; Muenjohn and McMurray, 2017; Ren and Bao, 2014); generally, it can be seen as a combination of 'design' and 'leadership', which means "both to design and to lead, that is, to lead design and to lead business by design" (Design

Management Institute, 2006, as cited in Muenjohn and McMurray, 2016, p. 480; Turner and Topalian, 2002).

Specifically, design leadership refers to leadership style in the design business involving the creative staff and a range of creative factors (Ren and Bao, 2014). Furthermore, Tan and Chapman (2017, pp. 11–12) provided a comprehensive definition of design leadership, which has four dimensions: (1) using resources effectively; (2) achieving market leadership; (3) advocating for design and design expertise; and (4) designing with and for people. Additionally, design leadership has emerged in the digital health field, applying design structure, culture and organisation and improving healthcare value journey (Koomans and Hilders, 2016; Voorheis *et al.*, 2023). Within this context, design leadership is defined as a differentiator in both customer value and competitive positioning (Koomans and Hilders, 2016, p. 51).

Researchers more commonly define design leadership in a singular way at a strategic level, either as a direction or a strategic ability to achieve goals in the organisation (Borja De Mozota and Wolff, 2019; Choudhary and Shahid, 2025; Hsieh *et al.*, 2021a; Turner and Topalian, 2002). In detail, design leadership is about "helping organisations to envision the future and to ensure design is used to turn those visions into reality" (Turner, in Best, 2006, p. 186). Therefore, design leadership is not about designing itself, but is about enabling the organisation to do design (Gemser *et al.*, 2022). Supporting this definition, Borja De Mozota and Wolff (2019) defined design leadership within a broader design management context, which can reflect a relationship between these two areas in some way, which will be discussed in detail in Section 2.4.1.

Overall, design leadership is a multifaceted concept that can be understood at both operational and strategic levels. Operationally, it is defined by four key dimensions: using resources effectively, achieving market leadership, advocating for design and focusing on a user-centred process. Strategically, it can be defined as a strategic ability to achieve goals and enable the organisation to design. In a specific context, such as the health sector, design leadership can be defined as a differentiator, driving customer value and creating a competitive edge.

2.2.2 Evolution of design leadership

Under changing circumstances, design leadership is continually evolving (Cooper, 2012). Over time, research on design leadership has progressed through various stages. For example, Borja De Mozota and Wolff (2019b, p. 9) claim that design leadership has experienced stages including leading brand identity, developing new products, integrating design strategy and focusing on societal problems. Based on the literature, this study divides the evolution of design leadership into three stages: (1) early conceptualisation, (2) broadening of scope and integration and (3) responding to contemporary challenges. This division aligns with the latest version of the design ladder (Melander, 2025), which adds two higher steps – systemic change and a cultural focus – demonstrating the trend of evolution within an expanded scope of design.

2.2.2.1 The 1st stage: conceptual foundations from the perspective of Topalian's longitudinal research

Early discussion on design leadership as a term and a research area was rooted in the design management field. A foundational theme across the literature is that design leadership is consistently linked to discussions of design management (Miller and Moultrie, 2013a; Tan and Chapman, 2017; Topalian, 1990, 1986). Cheetham was the first to mention design leadership in an interview, arguing for the importance of design directors (Cheetham, 1965, as cited in Cooper and Junginger, 2011).

With the development of design leadership, Topalian emerged as a pioneer in this area. His publications from 1973 to 2013 provide valuable insights into the evolution of design leadership over four decades, and his work in the earlier stage (1970 to 2002) offers a perspective that helps to understand design leadership in its initial phases. In addition, Topalian's research after 2002 will be analysed in the second sections, along with other studies. His early work, between the 1970s and 1980s, focuses on design project management (Topalian, 1977, 1978, 1979, as cited in Alto Design Management, 2013; Topalian, 1980); later, from 1980 to 1985, he expanded his focus to include corporate design management. This period can

be seen as a preliminary stage in the emergence of design leadership. Although his research still focused on areas of design management (e.g. responsibilities and required skills), he simultaneously began to shift towards the evolving role of designers as directors (Topalian,1980, 1981, as cited in Topalian, 2013). Building on this foundation, he later proposed the concept of design leadership at the company board level (Topalian, 1984).

Starting in 1989, Topalian began to focus more explicitly on design leadership. He formally introduced design leadership at the highest and strategic levels (Topalian, 1990) and examined the skills and responsibilities of design leaders (Topalian, 1994, as cited in Topalian, 2013; Topalian, 2002; Turner and Topalian, 2002). In these studies, he argued that design leaders can be found at various levels within a company and provided a list of their responsibilities and skills.

Apart from Topalian's work, research on design leadership remains limited. As introduced in Section 2.1.2, some research focuses on leadership within a design context (e.g. Cheung *et al.*, 2001), and applying foundational leadership theories to the design field. Additionally, there has been some discussion about the relationship between design leadership and the new strategic management theory developed by Sanchez and Heene in 2004 (as cited in Kumar *et al.*, 2016).

2.2.2.2 The 2nd stage: broadening scope and integration

After the early conceptualisation stage, there was a rising focus on business integration, driven by growing interest in creativity and innovation to enhance competitiveness (Lee and Cassidy, 2007). However, design leadership research still remained sparse at this point (Joziasse, 2011b).

Certain trends began to emerge during this period. Topalian (2011) identified five dimensions that broadened the scope of design leadership: (1) distinctive and innovative design approaches and solutions; (2) leading through design; (3) leaders in design; (4) design leadership over time; and (5) gaining acknowledgment for achievements through design. Building on this, researchers explored not only the breadth of a broader leadership field (Cheng and Wang, 2017), but also the depth of design leadership.

Design leadership itself also developed further in depth. Researchers began exploring its typology and forms (e.g. Bianchini and Maffei, 2012; Bucolo *et al.*, 2012; Kasapoğlu, 2011; Lili *et al.*, 2009; Nam and Jung, 2008; Ren and Bao, 2014; Riedel *et al.*, 2009; Walton, 2008; Tan and Chapman, 2017), its principles (e.g. Han and Bromilow, 2010; Lee and Cassidy, 2007) and design leaders' skills and abilities (e.g. Han and Bromilow, 2010; Joziasse, 2011b; Lee and Cassidy, 2007; Miller and Moultrie, 2013b; Riedel *et al.*, 2009).

As design leadership has taken on a broader remit (Joziasse, 2011b; Topalian, 2012), an increasing number of studies have positioned design leadership at the strategic level (Nam and Jung, 2008). Meanwhile, this expanded scope has come to include not only design consultants but also a variety of design practitioners, such as those in industrial design (Lee and Cassidy, 2007), graphic design (Han and Bromilow, 2010), the service industry (Gloppen, 2009a) and fashion (Miller and Moultrie, 2013a). Researchers also explored relationships between design leadership and design thinking (e.g. Gloppen, 2009a), the design process (e.g. Muenjohn *et al.*, 2013; Walton, 2008), especially in the New Product Development (NPD) (e.g. Maciver, 2012) and how design leadership promotes innovation (e.g. Koomans and Hilders, 2016; Muenjohn and McMurray, 2017, 2016).

Additionally, there was a focus on cultivating design leadership through skills-development programmes (e.g. Conley, 2007; Topalian, 2002), and the education of future design leaders, including methods for teaching design leadership in management education (Yuille *et al.*, 2014), with particular emphasis on integrating a design-oriented mindset (Galli *et al.*, 2017).

Furthermore, research on 'design entrepreneurship' also emerged during this period, addressing topics such as design entrepreneurship in SMEs (e.g. Mortati and Cruickshank, 2011; O'Grady, 2012) and the integration of design into entrepreneurial thinking and entrepreneurship education (Von Kortzfleisch *et al.*, 2013). As will be discussed in Section 2.4.2, design entrepreneurship can be viewed as a subset of design leadership research, as one area of design leadership focuses on individuals, particularly strategic-level design leaders. This overlaps

with design entrepreneurship research, which also emphasises the venture-creation aspects of design leaders.

2.2.2.3 The 3rd stage: responding to contemporary challenges

Unlike earlier stages, which considered design leadership at various levels within organisations, the current discourse is primarily centred at the top or strategic levels. The emphasis is now on C-level executives and their capacity to generate new value and formulate company strategy (e.g. Gemser *et al.*, 2023; Hsieh *et al.*, 2021a; Joziasse, 2023; Porter, 2019), leading to the emergence of a new form of leadership referred to as 'DEO leadership' (Lee *et al.*, 2022). Furthermore, Pinheiro and Franqueira (2022a, 2024) trace the Chief Design Officer's (CDO) journey from an external consultant to a strategic internal leader.

Moreover, at this stage, there is a growing emphasis on adopting a more systemic and global perspective, with a focus on sustainability, ethics and cultural issues (e.g. Earley, 2018; Lindberg *et al.*, 2024; Muenjohn and McMurray, 2017; Muenjohn *et al.*, 2024), digital innovation (e.g. Voorheis *et al.*, 2023) and the post-pandemic environment (e.g. Cabral *et al.*, 2020). This trend is supported by Pinheiro and Franqueira (2022), who demonstrated trends in design leadership during the 2015–2020 period. Earley (2018) discussed design leadership from the perspective of circular design in the textile industry, noting that 'design research leadership' can be critical to addressing complex challenges and represents a new direction for design leadership. Discussions around ethical, environmental and cultural issues also illustrate the important role of design leaders in promoting ethics in the design process and the workplace.

To sum up, the evolution of design leadership has progressed through three stages: conceptualisation, integration and adaptation to contemporary challenges. This three-stage framework provides a valuable lens for understanding the past of design leadership, assessing its present state and anticipating its future trends within the industry.

2.3 Characteristics, Roles and Styles of the Design Leadership

To build a holistic understanding of design leadership, this section conducts a comprehensive review across four key aspects: its core characteristics, its specific roles, its function within the design process and its various styles and typologies.

2.3.1 Characteristics of design leadership

The foundational characteristics of design leadership can be grouped into three main dimensions: driving vision, promoting collaboration, and enacting a 'designerly' approach.

(1) Driving vision and direction

A critical characteristic of design leadership is the ability to clarify an organisation's future direction. This involves defining initial concepts, envisioning the future and developing strategies to turn that vision into reality. Multiple scholars position this visionary dimension as the critical overlap between strategic, client and project leadership (Maciver, 2012; Turner and Topalian, 2002; Walton, 2008).

(2) Promoting collaboration and orchestration

As design leadership is inherently people-centric, it requires the active orchestration of resources and relationships to influence organisational change (Pinheiro and Franqueira, 2024). Effective design leaders must build alliance, embrace diversity, and foster dynamic networks necessary to guide teams through the creative process (Ariffin *et al.*, 2019; Earley, 2018; Maciver, 2012).

(3) Enacting a 'Designerly' approach

Finally, design leaders apply a human-centred, aesthetically sensitive, which often rooted in design thinking, to broader organisational challenges (Yuille *et al.*, 2014, p.116). This aligns with Boland and Collopy's (2004) foundational argument that management itself should be integrated with design: by adopting a 'design attitude', leaders move away from simply choosing between existing alternative and instead view complex ogransational challenges as opportunities, to invent new solutions. The core function of this 'designerly' mind frame is to transform

isolated thinking into overall organisational awareness (Dalrymple *et al.*, 2020; Galli *et al.*, 2017; Møller Nielsen *et al.*, 2013). While some literature expands this approach into specific entrepreneurial models (such as prototyping-driven entrepreneurship; see Klenner *et al.,*2022; Petrakis *et al.,*2021), the underlying characteristic remains the integration of design logic with strategic business goals.

To sum up, while these three dimensions effectively outline what a design leader should have, translating these high-level characteristics into measurable, operational actions requires a focus on specific competencies, which emphasise necessitates the development of the DLCM.

2.3.2 Roles of a design leader

The concept of a design leader is often defined across two dimensions: as "an organisation's position in the market (e.g. Apple, Boeing, Braun etc.)" and as an "individual who finds himself in a position of leadership or who chooses to provide a lead" (British Standard, 2008, p.14; Topalian, 1990, p. 41). As individuals, design leaders lead through design (Topalian, 2012) and are embedded in the management teams of business units to help ensure that design has an impact across the entire value chain, from ideas generation to client delivery (Girling and Carney, 2017). Consequently, even when studies focus on the organisational outcomes, the operational focus frequently narrows to the individual design leader integrating these processes (e.g. Goto, 2024; Pinheiro and Franqueira, 2024).

To understand how these individuals function, research often maps their tasks and contributions across project lifecycles. For example, Figure 2 shows the expected contribution of different stakeholders in a design project (Rajabalinejad and Spitas, 2012). At the project level, a design leader's role is defined by their unique responsibilities to maintain a holistic perspective across the entire project's lifespan, from the very beginning to the end. As shown in Figure 2, their focus spans the full timeline, starting at the 'fuzzy front end' and extending through to the service phase. Crucially, the design leader is most active during the initial stages, which are characterised by high uncertainty and scarce project information. Thus, different definitions of design leaders can be proposed and phrased as various

roles, such as innovator, balancer or design advocate (see Table 3, below). However, while mapping a design leader's involvement across a timeline highlights when they act, it is primarily descriptive. It fails to capture the underlying, transferable capabilities they must deploy to actively manage this uncertainty and align diverse stakeholders.

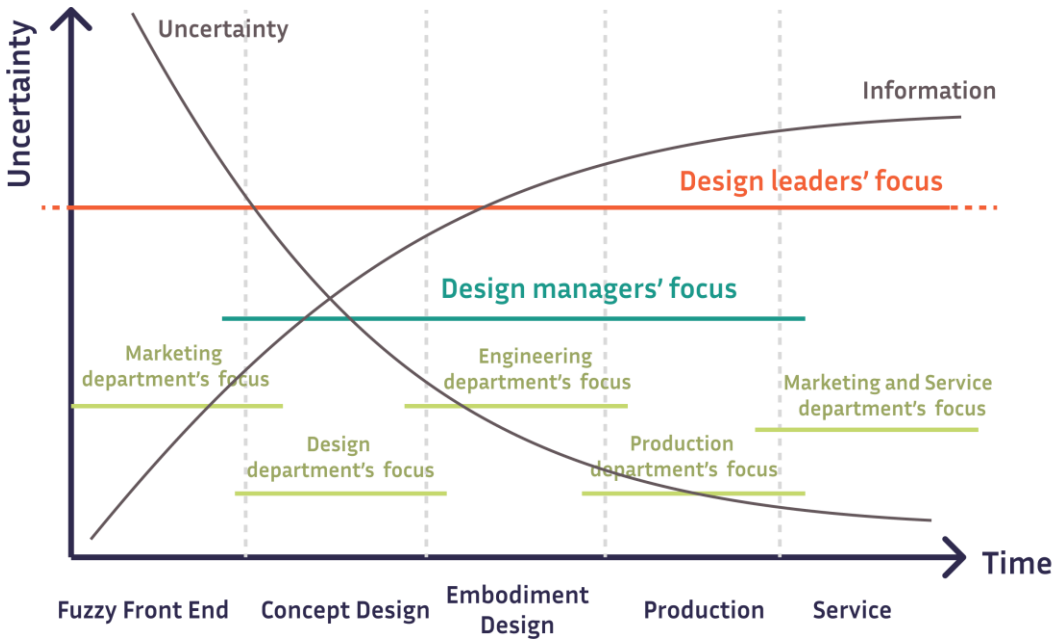


Figure 2: Dealing with uncertainty for design leaders, design managers and different departments in a design project (Rajabalinejad and Spitas, 2012)

Additionally, the roles of a designer-entrepreneur and a creative-artistic entrepreneur have become more relevant to creating new ventures (Hargadon, 2005; Leick *et al.*, 2023; Valencia *et al.*, 2023).

Because of this contextual complexity, the literature frequently fragments the individual design leader into a variety of context-dependent roles (Table 3). Rather than a singular definition, scholars have proposed roles ranging from the strategic 'innovator' or 'balancer' (Reinmoeller, 2002;Vogel et al.,2023), to the communicative 'advocate' or 'interpreter' (Bucolo et al.,2012;Tan and Chapman, 2017), and the operational 'driving force' or 'participatory designer' (Cabral et al.,2020; Voorheis et al.,2023). Furthermore, in venture creation, specialised roles such as the designer-entrepreneur have emerged (Hargadon, 2010; Leick et al., 2023; Valencia et al., 2023), which will be discussed further in Section 2.4.2. While categorising these roles provides a useful theoretical landscape, but it still remains

fragmented – all these role-based definitions lack a unified capability model to explain how a design leader successfully executes.

Table 3: Various design-leader roles have emerged in research

Design leader role	Explanation	Reference
Both a design advocate and a design interpreter	Supports design integration within the organisation; communicates design proposals to both internal and external stakeholders	Bucolo *et al.* (2012)
Driving force	Rapidly assembles teams and fosters collaboration to achieve a common goal	Cabral *et al.* (2020)
Innovator	Offers innovative designs and leads in sectors	Vogel *et al.* (2023)
Balancer	Achieves a synthesis between vision and reality	Reinmoeller (2002)
Participatory designer	Engages with other stakeholders (e.g. patients, public end-users) in the design process	Voorheis *et al.* (2023)
Combination role	Acts as an advocate, interpreter and connector of design expertise, ensuring that design not only meets business objectives but also drives innovation	Tan and Chapman (2017)
Design lead / head of design	Operational level: leads design efforts for a particular business unit, function or region of an organisation; Executive level: head of the design function who occupies the most senior role within the organisation's hierarchy in terms of design	Gemser *et al.* (2022); Lee and Joo (2015); Liu *et al.* (2022)
Long-term manager	Long-term managers with a deep understanding of the organisation	Dunne (2018)
Designer-entrepreneur	Designer who creates ventures	Hargadon, (2010); Valencia *et al.* (2023)
Creative-artistic entrepreneur	Creates ventures within the creative-design sector, aligns with the creative economy	Leick *et al.* (2023)

Beyond functional roles, design leadership is also frequently reflected by formal job titles, such as design lead/head of design (Table 3) or DEO (Design Executive Officer). Lee and Joo (2015, p. 53) conceptualise the DEO as a leader who blends design thinking with traditional management to build creative infrastructure as competitive advantage. However, relying on formal job titles or hierarchical positions to define design leadership is limiting. This reflects a gap in the literature that focuses on positional authority rather than actual capability. Translating design leadership from abstract roles into tangible competencies requires a shift in focus – a shift that the DLCM is specifically designed to facilitate.

2.3.3 Design leadership in the process

As discussed in the previous section (Section 2.2.1), design leadership is demonstrated through design integration practices. While there is an increasing focus on research concerning how design integrates into a broader organisational context, much of this literature remains descriptive. This integration has become a critical aspect in discussions of effective design leadership. For example, both Muenjohn *et al.*(2013) and Cheng and Wang (2017) clarify the relationship between design leadership and the creative process, claiming it can significantly influence design outcomes. To better position this concept, this section explores how design leadership functions across three process-oriented layers: strategy formulation, design process improvement and the NPD process.

The Design Function Maturity Grid (DFMG), proposed by Gardien and Gilsing (2013) and the Design Excellence Model by Gemser *et al.* (2022, p. 7) provide a structured framework for identifying design leadership at a macro level (Figure 3 and Figure 4, below). The DFMG categories three key differentiators: design as capability (competencies and culture), design as an approach (strategies and processes linking design with vision and reality) and design as outcome (design creating organisational value). This framework provides a definitional lens by breaking down the concept of design leadership and identifying its core components. However, a critical limitation of the DFMG is its focus on high-level layers which, while useful for definition, lacks the perspective of how a leader intervenes and transitions and organisation from one maturity level to the next.

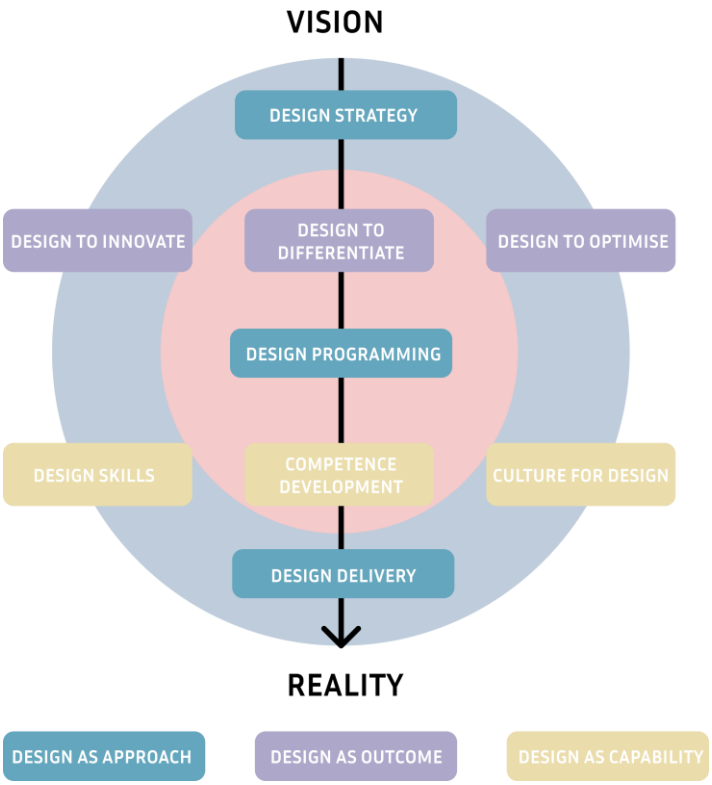


Figure 3: Key differentiators of the Design Function Maturity Grid (Gardien and Gilsing, 2013)

Similarly, Gemser *et al.* (2022) establish a link between effective design leadership and design excellence through three stages: (1) establishing a design foundation (setting design directions); (2) empowering the design team (defining design functions); and (3) elevating to design excellence (scaling design functions). However, while it provides a clear structural pathway for an organisation, its focus remains macro scope. It effectively outlines the organisation stages for design maturity, but lack the specific, individual capabilities required by the leader to actually execute these transitions. As Kotter (1996) argues, the ability to advance organisational transformation relies on a leader's individual 'competitive capacity'. Because elevating an organisational to 'design excellence' is inherently a major change, Gemser's roadmap is insufficient without leaders who possess the continuous drive and 'lifelong learning' habits that required to navigate complex environments. Therefore, Gemser's model focuses more on process rather than individual competencies, highlighting a gap that the DLCM is specifically designed to address.

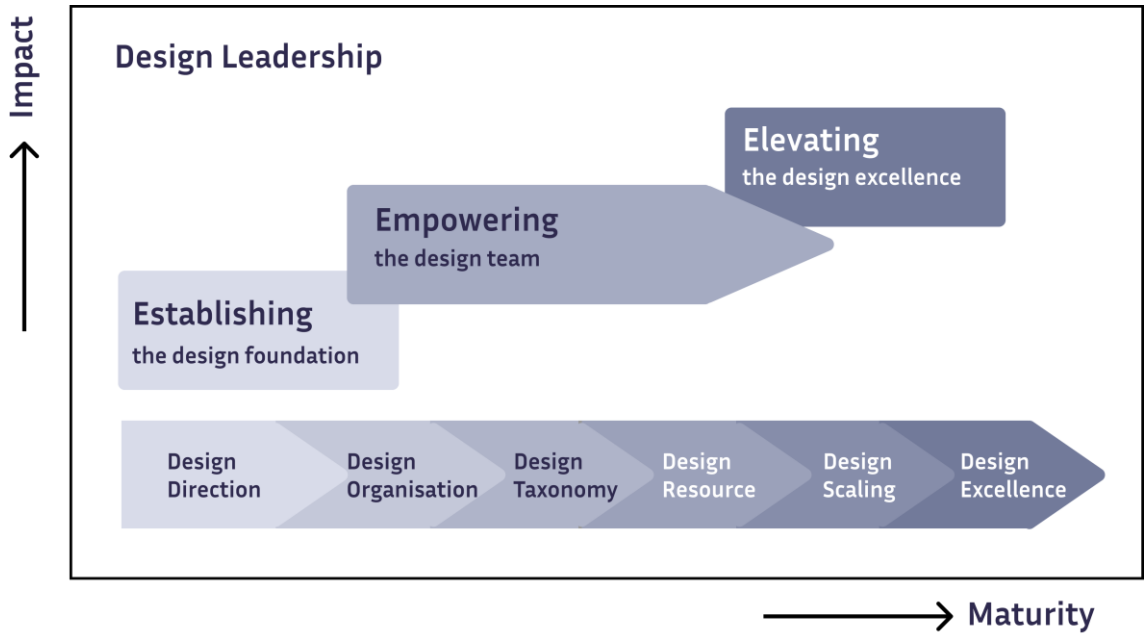


Figure 4: Leadership in the Design Excellence Model (Gemser et al., 2022)

In contrast to macro models above, Nam and Jung (2008) proposed a bottom-up design leadership model that focuses on a specific, strategy-led design process (Figure 5). Similar to other project-focused design processes, this also starts with research that has a cultural view, seeking to integrating various dimensions including company vision, strategies, market competition and customers. From this perspective, a strategy-led design process is critical, as it can improve designers' understanding of the strategy-formulation process and how to structure it in a hierarchical format. As shown in Figure 5, strategy formulation can be divided into three different levels: corporate, business and product/design. This strategy-led process uses a top-down structure, but Nam and Jung illustrated a bottom-up influence: when a design solution created at the project level is effective, its impact can flow from the bottom of hierarchy to achieve a high-level corporate goal (e.g. creating a new market).

However, this model presents limitations regarding its practical execution. First, it may overstate the ease with which bottom-up influence occurs; in practice, the rigid hierarchy between 'lower-level' operational design and 'higher-level' company strategy often acts as a barrier that project-level success alone cannot always break. Second, much like the macro frameworks, Nam and Jung's model remains heavily process centric. It maps the structural pathway for influence but fails to

research on the specific leadership capabilities required by the designer to actively push this solution up the corporate ladder. The assumption that good design automatically translates to corporate strategy without specific individual competencies further reinforces the need for the DLCM.

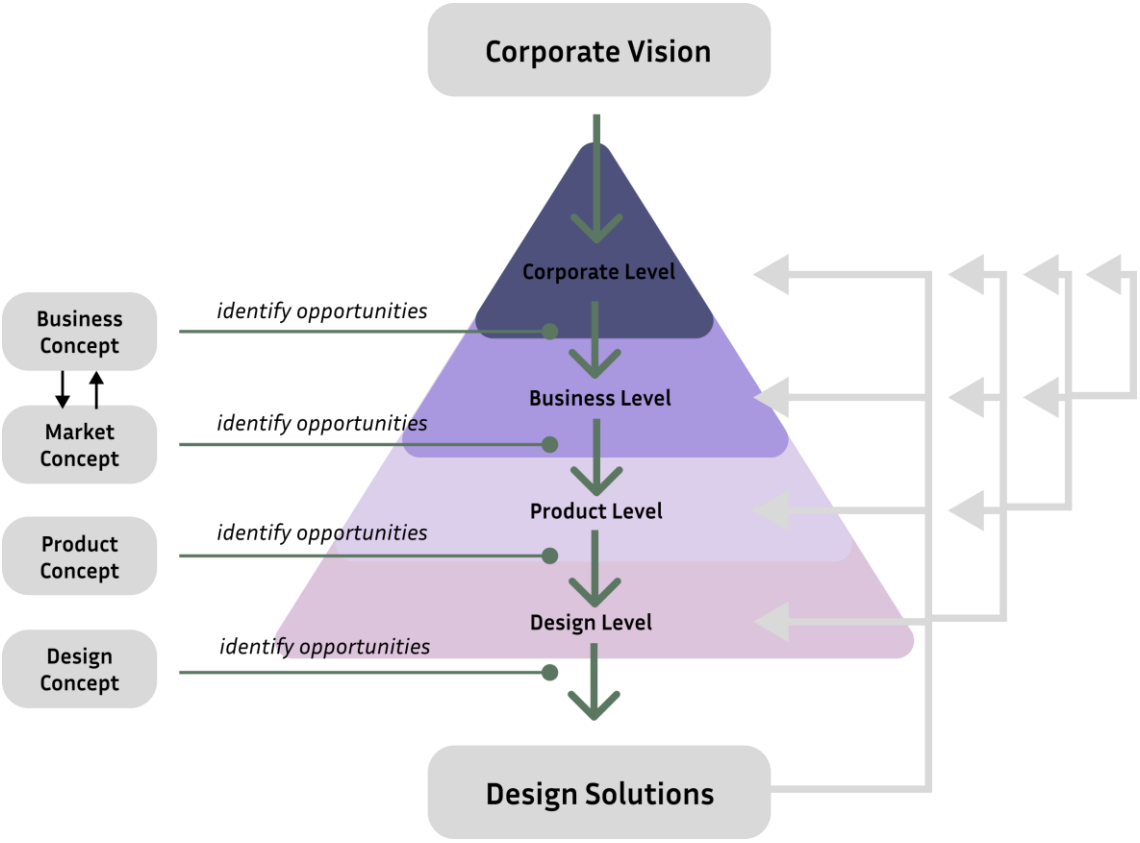


Figure 5: Strategy development model for creating new markets through design projects (Nam and Jung, 2008)

To understand how leadership functions as the operational level, it is necessary to examine the individual within the New Product Development (NPD) process. From this perspective, Maciver (2016, p. 635) introduced the specific term 'designer leadership'. This term focuses on the individual who does the design leadership work and is defined by a hands-on application within an NPD process, involving the specific actions, skills and responsibilities a designer adopts to lead a team or project.

Maciver's model (Figure 6) illustrates designer leadership in action within the NPD framework, demonstrating how the role transitions from conceptual and strategic in the exploration phase to functional and analytical during development and

launch. While this model successfully operationalises design leadership into narrower project phases, but its scope is limited to the NPD lifecycle. Because it focuses exclusively on single projects, the model does not explain how designers sustain their influence post-launch, or how they interact with the broader organisational strategies discussed previously (Gardien and Gilsing, 2013; Nam and Jung, 2008). Furthermore, while Maciver describes shifting roles across project phases, the framework does not explicitly detail the underlying, transferable capabilities required to successfully navigate these transitions within complex corporate environments. This disconnect between short-term project roles and continuous organisational leadership demonstrates the theoretical gap that the DLCM aims to resolve.

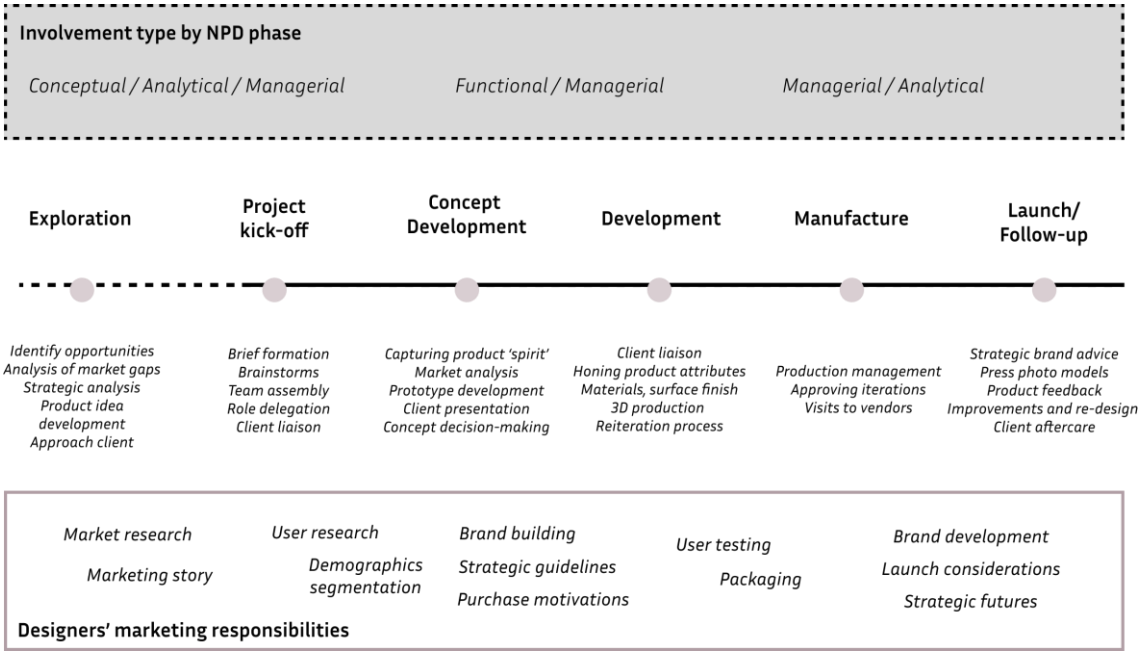


Figure 6: Design leadership across NPD (Maciver, 2016, p.635)

2.3.4 Styles and typologies of design leadership

Research on design leadership has discussed and identified a variety of styles and typologies, generally focusing on design leaders' behaviours and how they interact with their teams and organisations. For example, early work by Kasapoğlu (2011) categorised different leadership behaviours, including authoritarian and task-oriented, participative, achievement-oriented and employee-oriented leadership, linking them to team performance. More recently, Lee *et al.* (2022), identified a

unique attribute of leadership: DEOs tend to adopt an employee-centred approach, viewing their employees as ‘users’ and responding to their needs with empathy. Supported by 40 quotations in their research, they imply that DEOs pay more attention to employees than to themselves.

Compared with identifying an individual’s behaviours, some research offers a more systematic way by synthesising behaviours into frameworks. For instance, Gemser *et al.* (2023) introduced a paradoxical perspective, proposing five pairs of opposing behaviours exhibited by design leaders: transformative and affirmative, directive and accommodating, proactive and responsive, intuitive and systematic and holistic and specific (Gemser *et al.*, 2023, p. 48). Ng (2022) developed a multi-dimensional framework for the public sector, outlining styles like networked governance and adaptive leadership. However, while these behavioural frameworks effectively describe how successful design leaders act, they remain primarily descriptive. Labelling a leader’s style as ‘paradoxical’ or ‘adaptive’ provides an observational category, but it lacks specific capabilities that reflects operational perspective.

Additionally, there is a different that focus on the typology of design leaders rather than behaviours. Dalrymple *et al.* (2020, pp. 4–5) identified the five archetypes of design leaders based on a 200-sample survey: the executive, the functional head, the community leader, the multiple managers and the hybrid leaders (see Figure 7, below); Valencia *et al.* (2021) categorised design entrepreneurs as four types based on their mindsets: artisan (design and craft endeavour), configurator (value-proposition focus), opportunity-seeker (pursuing change to develop a business) and design leader (scaling up business). Joziasse (2023, p. 31) found that design leadership evolves through distinct maturity levels, reflecting how leaders grow over time. The five levels of design-leadership behaviour identified are: business-enabler, growth-driver, bridge-builder, capability-developer and catalyst for change. Although archetypes offer a convenient shorthand for understanding a leader's primary disposition, they present a static view of leadership. In reality, the demands of design leadership are highly dynamic; as discussed in Section 2.3.1, 2.3.2 and 2.3.3, a leader may need to transition from a ‘functional head’ during

operational phases to an 'executive' during strategic alignments. Typology models do not account for the transferable, dynamic capabilities required to navigate between these identities.

Although design leaders' roles were reviewed in Section 2.3.2, and the typology and role share significant similarities, differences exist. The role of a design leader is about the function and responsibilities; the typology is about their style and archetype. For example, a design leader whose typology is 'Bridge-builder' will be particularly effective in the 'design advocate and design interpreter' roles mentioned in Table 3. Additionally, while these studies are not focused on the Chinese context, these frameworks offer a valuable understanding of design leadership at various levels and provide a guide for the typology of design leaders for this study (discussed in Section 6.2).

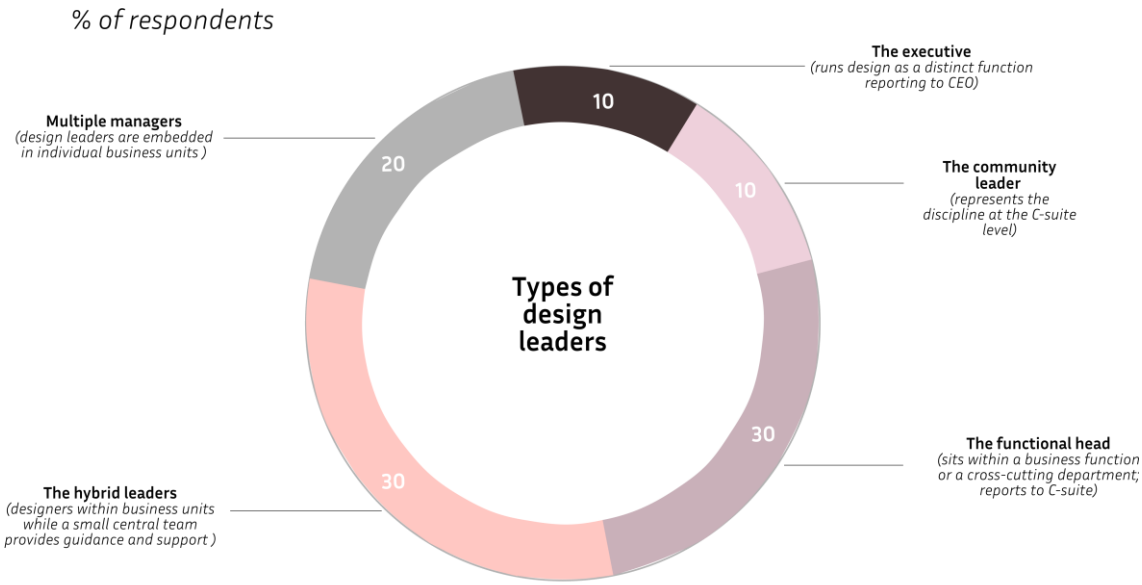


Figure 7: Five archetypes for design leaders (Dalrymple et al., 2020)

2.4 Differentiating Design Leadership from Related Concepts

Now that the emergence and nature of design leadership have been explored (Section 2.2), it is important to further clarify the concept by differentiating it from several similar and overlapping concepts. To provide a clear context and define the scope of this study, this section will distinguish design leadership from related concepts.

Figure 8 shows the relationships between these different fields, illustrating their convergence. Within the design field, design leadership is the intersection of the leadership field and the broader field of design management (Lockwood, 2009). Specifically, design entrepreneurship is situated entirely within the design leadership intersection, indicating a specific subset of the broader practice of design leadership. To clarify these distinctions, the following sections will provide a detailed comparison of design leadership with each of these related concepts, including design management, design entrepreneurship, creative leadership, innovation leadership and service design leadership.

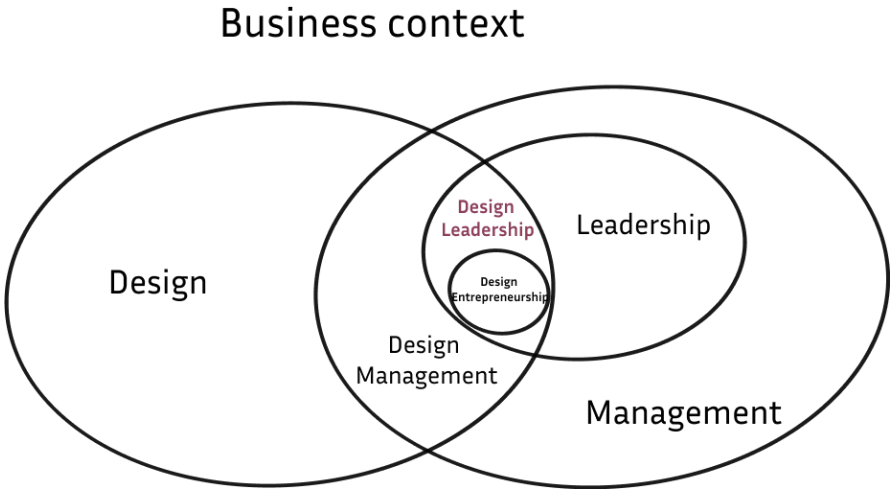


Figure 8: Relationships between design, management and leadership

2.4.1 Design leadership and design management

A degree of ambiguity exists between design leadership and design management, with several studies exploring the unclear relationship between them in both academic and organisational contexts (Borja De Mozota and Wolff, 2019; Gloppen, 2009b; Ren and Bao, 2014). As mentioned previously, much of the research on design leadership evolved from themes within design management, discussing the competencies of both managers and leaders together and highlighting the significant overlaps (Cooper and Junginger, 2011; Borja De Mozota and Wolff, 2019). This not only enhances the overlap between design management and design leadership but also demonstrates their potential relationship: design leadership is derived from design management.

To clarify the difference, it is important to define these concepts. Generally, design management is "the ongoing management and leadership of design organisation, design process and design programme" (Cooper *et al.*, 2009). Specifically, design management is also concerned with the execution of design activities. It can be seen as the totality of design activity, delivering successful design solutions in an efficient, cost-effective way (Turner, in Best, 2006, p. 186; British Standard, 2008, p. 14). This involves managing projects, processes and resources to ensure the delivery of design projects (Gloppen, 2009a). In essence, design management addresses the 'how' and 'when' of a design project and process. Based on Michlewski and Buchanan (2016), when design is purely managed, it operates primarily at an operational level. In their research, design and designers are often seen simply as tools in manager's hands; in this way, there role is largely restricted to acting upon a design brief provided by other functional parts of the organisation.

In contrast, as discussed in Section 2.2.1, although design leadership occurs across different levels, it mainly operates at a more strategic level. It is a visionary function focused on defining the future and ensuring design is used to its full potential to achieve organisational goals (Turner, in Best, 2006, p. 186; Klimczuk-Kochańska, 2020). The core responsibility of design leadership is to integrate design thinking into the wider business culture and to set a clear direction. This role is about the 'why' and 'what', it refers to why design is important and what it should achieve. At this strategic level, design leadership address broader issues involving resources allocation, organisational design and general strategic direction (Michlewski and Buchanan, 2016). When integrated strategically rather than just managed, design culture and values are injected into the organisation, generating a more profound way of looking at innovation.

Confusion between these two roles often arises because effective leaders must also understand management, and senior roles may require both. For example, a CEO can demonstrate design leadership by setting visions for design as a strategic resource. Simultaneously, they oversee the effective management of that design to create new products and services (Song and Chung, 2008, pp. 42–43). In this

sense, the differentiate is simple: leadership provides the direction; management ensures smooth progress.

Design leaders and design managers

Design leaders and design managers have different responsibilities. Zaleznik (1981) differentiates leadership and management based on their core tasks: a leader focuses on vision, while a manager ensures that tasks are completed. Similarly, research differentiates design managers and design leaders based on this clarification. As mentioned in the discussion of the different roles of a design leader (Section 2.3.2), Figure 2 demonstrates the difference between design leaders and design managers at a project level. From this perspective, design leaders need to have an overall perspective from beginning to end, while design managers are more focused on the conceptualisation to production stage. Design leaders need to deal with high uncertainty at the front end, while design managers should cooperate with the design leader to ensure a project can be delivered on time.

Furthermore, at a broader level, design managers oversee design personnel, budgets, timetables, work processes and infrastructure. In contrast, design leaders can be seen as decision-makers, who concentrate on envisioning the future, manifesting strategic intent, directing design investments, managing corporate reputation, nurturing innovation and developing emerging design leaders (Turner and Topalian, 2002; Turner, 2013; Song and Chung, 2008).

Ren and Bao (2014, p. 418) further argued that a key distinction between these roles is that leaders must exert significant influence over followers to achieve goals, whereas they typically do not engage in routine managerial tasks such as project organisation and planning. However, in some contexts, design leaders perform both leadership and management roles. Miller and Moultrie (2013a, p. 173) also supported this dual role by questioning whether a true difference exists between these two. They believe that design leaders often embody a blend of both leadership and management roles, especially in some SMEs, making it difficult to distinguish between the two from an individual perspective.

However, this dual role can present a risk in balancing vision and operations. To clarify the distinction, a design leader's responsibility is not just to lead people but also to guide the entire organisation and anticipate the future. If an individual in this role fails to prioritise this visionary work, focusing only on operational tasks, the title 'design manager' might be more appropriate. This is why being visionary, as one of the core abilities of a design leader, has been emphasised in many studies (Galli *et al.*, 2017; Han and Bromilow, 2010; Joziasse, 2011b; Kumar *et al.*, 2016; Lee and Cassidy, 2007; Miller and Moultrie, 2013a; Turner and Topalian, 2002).

Strategic design management

Strategic design management emerged within the design management field. It concerns the impact of design on strategy-related dimensions within an organisation (De Mozota, 1998), including (1) competitive forces, (2) strategic fit and value creation, (3) resources and capabilities and (4) strategic visions (Lalaounis, 2017). From this point of view, design leadership and strategic design management have significant similarities, as both have a strategic focus. The primary difference between them lies not in whether they are strategic, but in their attitude and application. Design leadership operates at the highest level, such as a company strategy that incorporates prospective and strategic design (Borja De Mozota and Wolff, 2019); strategic design management acts as the crucial bridge between vision and execution, with a focus on how vision is translated into strategy that aligns with business goals (Joziasse, 2011a), which ensures that visions is actionable. As previously discussed, a dual role combining design management and design leadership is often found in some SMEs and start-ups; similarly, while a difference exists between strategic design management and design leadership, they are also sometimes integrated in practice.

Summary

Based on the above discussion, theoretically, the distinction between design leadership and design management lies in their orientation and strategic focus, and they can be differentiated by their core objectives (Figure 9, below). The action of design leadership is typically top-down, directed toward teams and

organisations to ensure everyone understands the purpose. In contrast, design management's action is upwards, reporting on what is actually possible with available resources, time, etc.

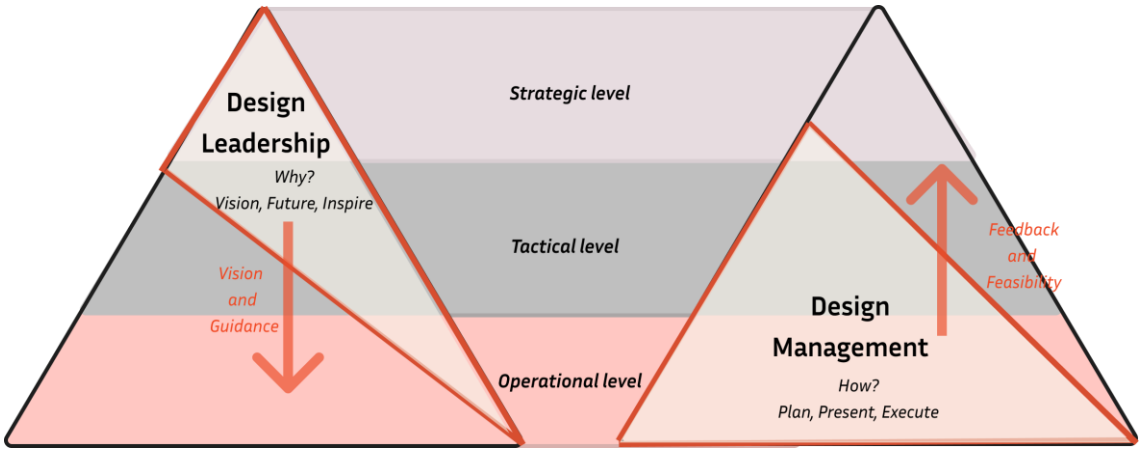


Figure 9: Difference between design leadership and design management

Furthermore, Table 4 demonstrates differences scope, roles, process and reasoning. The main difference lies in their objectives: leadership connects design to building competitive advantage, while management focuses on directing internal operations. Design leadership is proactive and strategic, it clarifies 'where to go'; design management is considered reactive and more operational, it demonstrates 'how to get there' (Gloppen, 2009a, 2009b; Joziasse, 2011a; Turner and Topalian, 2002).

Table 4: Profile of design management and design leadership (Lockwood, 2009)

Terminology	Objective	Scope	Process	Typical Player	Reasoning
Design Leadership	Connects design to business; builds competitive advantage	Design and business integration; top-level advocacy; design for the triple bottom line	Influences and guides top management decisions	Chief design officer, design council, expert consultant, CEO, VP	Deductive thinking
Design Management	Directs design operations, processes, resources and projects	Corporate level, business unit, project level	Management of people, processes, projects and budgets	Design manager, brand manager, project manager	Inductive and deductive thinking

However, despite these clear theoretical differences, the boundary between these roles often blurs in practice. This is especially true within smaller organisations, such as start-ups and SMEs, where a single individual is often required to both set

the visionary direction and manage day-to-day execution. Therefore, while leadership acts as the visionary compass and management provides the operational guidance, an individual in a design leadership role within these contexts must often be skilled at using both.

2.4.2 Design leadership and design entrepreneurship

An entrepreneur is defined as an individual who starts a new business involving new opportunities by applying enterprise behaviours and competencies into the creation of cultural, social or economic values (Cambridge Dictionary, 2025; QAA, 2018, p. 7). Gunes (2012, p. 65) defined design entrepreneurship as "about creating business and new opportunities with the help of design". A *design entrepreneur*, therefore, can be defined as a risk-taking, business-minded and visionary designer who uses design principles to create their own business (Heller and Talarico, 2008).

As introduced in the discussion of the design leadership's definition and roles (Section 2.2.1 and Section 2.3.2), it is a broad concept with two main aspects. The first is design as a leading power, which involves using design and design thinking at a strategic level to set goals, solve problems, navigate uncertainty and identify new opportunities. The second aspect is the individual design leader, who guides people, focusing on the practices and responsibilities of managing the design function within the organisation across different levels. Therefore, *design entrepreneurship* can be understood as a specific and tangible application of design leadership principles in the context of venture creation. While a design leader typically operates within an existing organisation, a design entrepreneur applies the same strategic vision to build a new business.

In this sense, design entrepreneurship represents the direct application of design leadership principles to a specific goal: the creation of a new or updated business model. This focus shifts from leading within a company to becoming the founder or co-founder of one. Essentially, it is design leadership manifested in its venture-oriented form.

2.4.3 Design leadership, creative leadership, innovation leadership and service design leadership

In the evolving fields of design management and design leadership, several related leadership terms have emerged, including creative leadership, innovation leadership and service-design leadership.

Creative leadership

Creative leadership was proposed in 2007 and developed from inclusive design practice by Gheerawo. It is commonly defined as a concept involving problem-solving and solution generation, which can tackle contemporary social and environmental problems (Eikhaug, 2019; Kim, 2019; Mumford *et al.*, 2003; Gheerawo *et al.*, 2020). Moreover, creative leadership has transformational characteristics. Gheerawo *et al.* (2020) argued that creative leadership is a transformational process in which individuals integrate creativity to lead themselves and others in achieving organisational and project goals. In their research, they propose three core attributes of creative leadership: empathy, clarity and creativity. These attributes share similarities with the core principles of design thinking (Brown, 2008). Furthermore, Kim (2019) argued that creative leadership is a type of transformational leadership developed by designers and through the design process.

Therefore, based on these research, creative leadership can be understood as the process of fostering innovation and generating novel solutions to complex problems. Its focus is on *how* to be creative. In contrast, design leadership is the strategic application of this process, concerned with leading business *through* design. Its focus is on using design to answer what the business should do and why. Rather than being broader or narrower, creative leadership can be seen as the foundation on which design leadership is built. It is hard to be an effective design leader without first being a creative leader; however, a creative leader is not necessarily a design leader.

Innovation leadership

Innovation leadership has been proposed in response to increasingly complex environments and problems, much like creative leadership. Innovation leadership consists of two dimensions: an innovative approach to leadership and leadership for innovation (Horth and Buchner, 2014). An innovative approach to leadership means that individuals need to bring new thinking and actions to their leadership and work; leadership for innovation emphasises how leaders promote and apply innovative thinking within the organisational culture. Based on the latter definition, the main characteristic and core of innovation leadership is innovative thinking, which relies on intuitive and abductive reasoning.

While design leadership and innovation leadership share a common foundation in fostering creativity and generating new solutions, they are distinct leadership styles with different primary focuses. While not explicitly stating the term 'design leadership', Horth and Buchner (2014) compare design and innovation leadership. They described these two as 'two sides of the same coin' because they both rely on what can be termed innovative thinking, as shown in Figure 10 (below).

The difference can be found in their purpose and application. In terms of purpose, innovation leadership is primarily concerned with creating the organisational conditions for new ideas to emerge and thrive. Its main goal is to build and maintain a corporate culture of innovation. Design leadership, in contrast, is the application of that innovative thinking to solve specific problems around its users or customers. From this perspective, innovative thinking can be converted into tangible products, services and experiences. While an innovation leader asks, '*How can our organisation be more innovative?*', a design leader is more concerned with '*How can we apply innovative thinking to create a better experience for our clients and drive business success?*'

Another distinction between the two leadership styles is evident in how they apply innovative thinking. As shown in Figure 10 (below), while both leadership types involve 'paying attention', an innovation leader might focus on identifying barriers to new ideas within the company, whereas a design leader would focus on interpreting client or user needs from different perspectives. Therefore, it is more

accurate to see innovation leadership as creating the correct environment, while design leadership generates solutions within this environment, and enhances this environment.

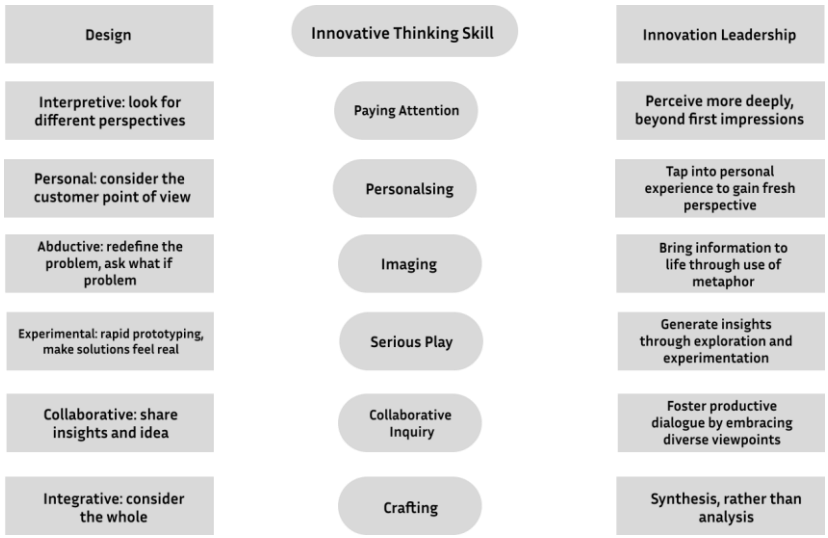


Figure 10: Two sides of the same coin (Horth and Buchner, 2014, p. 11)

Service design leadership

Service design leadership (SD Leadership) has emerged from the needs of the service economy (Gloppen, 2009b; Leavy, 2017; Seidelin and Moeslund Sivertsen, 2022). It is defined as an approach in which leaders in service organisations recognise and utilise the power and value of design and design thinking to create visionary strategies for developing innovative services. SD Leadership is considered a type of design leadership with a specific focus on the service sector (Gloppen, 2009b). As Figure 11 shows, SD Leadership is understood as existing at the intersection of two overlapping fields: design and organisational leadership. It applies the principles from both within a broader services context. From this perspective, SD Leadership builds upon the foundation of design leadership and can be viewed as a *subset* within the broader concept of design leadership, as it is specifically concerned with the context of the service economy.

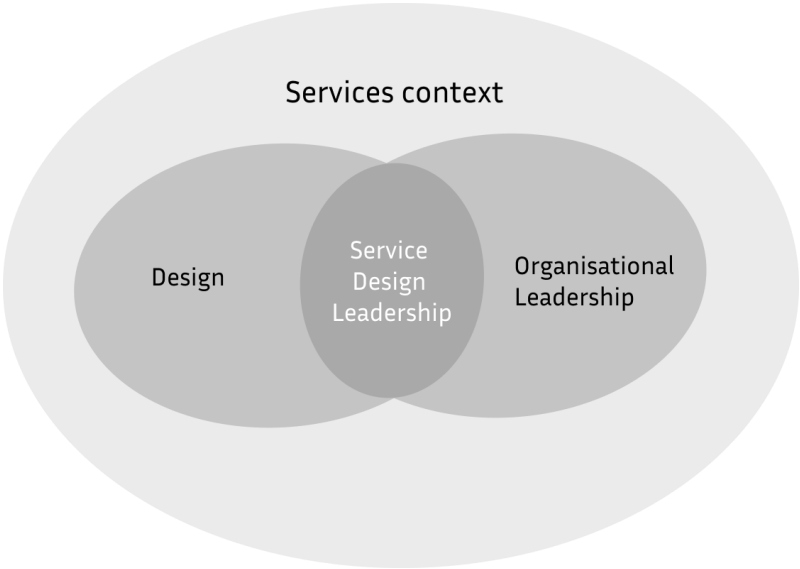


Figure 11: Service-design Leadership (Gloppen, 2009b)

2.5 Competencies for Design Leadership

With the scope and definition of design leadership addressed, the focus now shifts from the conceptual to the practical. This section explores the competency research by reviewing foundational models in the broader field of leadership before narrowing its focus to design leadership specifically. To build this understanding, this section is structured as follows: first, it clarifies what 'competency' refers to in this study; second, it examines relevant competency models to provide some contexts; then, the review narrows to a comprehensive analysis of design leadership competency models to understand their current status; and finally, it addresses the debate on design expertise and the backgrounds of design leaders, clarifying key issues both within the literature and for this study.

2.5.1 Definition of competency

The term 'competency' is complex, with various definitions across the academic literature. A common point of confusion is the distinction between 'competence' and 'competency', as they are often used interchangeably (Vitello *et al.*, 2021a). In the dictionary, competence is defined around a task (e.g. 'competence to lead' signifies multiple aspects as a group); competency refers to specific aspects or jobs (e.g. X, Y and Z competencies are needed to lead) (Cambridge Dictionary,

2025a). To ensure clarity for this study, which focuses on individual design leaders, the term *competency* will be used. This is because it focuses more on the underlying characteristics and behaviours of individuals (Spencer and Spencer, 1993) and is commonly used in the design context (Jovanovic and Tomovic, 2008; Kang *et al.*, 2015; Pei and Colombo, 2023; Thandlam Sudhindra *et al.*, 2023; Wang *et al.*, 2024b; Yalçın *et al.*, 2021; Zhou *et al.*, 2025).

Competency is composed of different components. Many scholars define the competency as including skills, knowledge, abilities, capabilities and behaviours needed to perform a job, and state that competency can be seen as a resource for leaders to possess (El Asame and Wakrim, 2018; Hlavac, 2023; Jovanovic and Tomovic, 2008; Swanson *et al.*, 2020). The foundational components of most competency models are knowledge, skills and abilities (the KSA framework), referring to what an individual knows and is able to do (Cooper and Graham, 2001; Hlavac, 2023). This framework is often used in competency-based education (Parson *et al.*, 2018). However, a simple KSA framework is too limited as it does not cover other attributes (Hlavac, 2023); therefore, additional aspects and characteristics should be included.

In this sense, mindset holds an important position in leadership. Mindset can be perceived as a critical component of leadership (Chase, 2010; Knippenberg and Ginkel, 2022; Thompson and King, 2023; Gottfredson and Reina, 2020), one that translates the values, norms and visions of the organisation (Thompson and King, 2023).

Building on these ideas, the comprehensive definition of competency must also incorporate the essential element of mindset. This acknowledges that for a leader, how they think and perceive challenges is as important as what they know and can do. For the purposes of this study, competency is therefore defined as the integrated set of skills, knowledge and mindset that a design leader requires to perform effectively. Each component will be introduced in the following sections.

2.5.2 Components of competency

To fully understand the definition of competency used in this study, it is important to introduce each component: skills, knowledge and mindset. While scholars identify several types of competencies, including attitudes, beliefs and values (Arocas and Morley, 2015; Vitello *et al.*, 2021), this framework integrates these concepts within the primary categories.

Skill is the demonstration of knowledge or the capability to apply knowledge, and it is a complex concept with several dimensions (Green, 2011; Hlavac, 2023; Lamri and Lubart, 2023). Specifically, skills refer to actions that involve applying knowledge, which may be tacit or explicit (Vitello *et al.*, 2021, p. 12), and they can be observable and measurable (Hlavac, 2023). From this perspective, skills should not be viewed as separate from knowledge and judgement, as they are based on both (Evans and Donnelly, 2006).

To further clarify the concept of skill, it is helpful to distinguish it from the closely related term *ability*. While ability is sometimes considered to be another type of competency, its definition overlaps significantly with and is similar to that of skills, as it refers to the power or capacity to act or to do certain things in a particular way (Hlavac, 2023). Manzanera-Román and Brändle (2016) argued that it is difficult to clearly differentiate between ability and skill; however, ability can be seen as being "related to an individual's personality that allows the execution of tasks and determines the successful development of a task or activity" (p. 40). In this sense, skills are the application of that underlying ability, developed through learning and training. For the purpose of this study, skill is therefore defined as the measurable application of knowledge built upon of an underlying ability.

Knowledge is seen as essential information, including facts, concepts, practices and theories at the core of a specific area of study or work (Vitello *et al.*, 2021a). It also describes a person's cognitive grasp and understanding of a subject and can reflect familiarity that does not necessarily involve action (Hlavac, 2023). Based on the definition of skill, knowledge can be seen as a prerequisite for individuals to acquire skills.

Mindset is the critical third component, which can be seen as an individual's mental predisposition (Arocas and Morley, 2015; Michaels *et al.*, 2001). Mindsets manifest differently between leaders and followers. As shown in Table 5, clear differences exist between leaders and followers (Owen, 2021, p. 8). Leaders tend to be more proactive, take responsibility, look for solutions and focus on growth from learning situations. In contrast, followers tend to be more reactive and defensive, often avoiding responsibility and sometimes showing a lack of personal growth.

For leaders, a mindset often manifests as a passionate belief in achieving excellence, which cannot be developed solely through Human Resource (HR) processes (Michaels *et al.*, 2001). Furthermore, a leadership mindset is crucial as it contains the values and vision that set the pace for the entire organisation (Thompson and King, 2023). Therefore, mindset plays a critical role in this study, as the main focus is on design leaders.

Table 5: Differences between mindsets (Owen, 2021)

Leader Mindset	Follower Mindset
What are some possible solutions/ options/ways forward?	What went wrong?
What can I do now to regain control and build momentum?	Why have I been put in this position?
Whose support do I need and how will I get it?	Who messed up? Who is going to put this right?
What can I learn from this?	How do I avoid the blame?

2.5.3 Competency models in leadership

Dušek (2021, p. 67) defined a competency model as

> a combination of prior skills, abilities and knowledge that are necessary to effectively perform the tasks related to a specific position within an organisation.

A competency model contains three components: competency labels, competency definitions and behavioural anchors (Alldredge and Nilan, 2000). Moreover, Dušek (2021) claimed that competency models can be divided into two types: generic and specific models. The generic model is defined as a universally

applicable model that can reflect the requirements for any position in an organisation; conversely, the specific model describes the required competencies of a particular position within a company (pp. 67–68). Thus, this section and the following one mainly discuss these two categories of competency models: classic generic models (below) and competency models that have emerged in a design leadership context (Section 2.5.4).

A foundational approach to competencies, and also one of the most common competency models, is the *Iceberg Model*, which was initially proposed by McClelland (1973). He highlighted that competencies include personal characteristics, self-concepts, traits and motives. Later, Spencer and Spencer (1993) updated the model and provided a 'New Iceberg Model', which includes five components divided into two parts: a visible part and a hidden part (Figure 12). The visible part consists of skills and knowledge, while the hidden part includes a self-concept (attitude), personal characteristics (traits) and motivations.

Figure 12: Iceberg Model (Spencer and Spencer, 1993)

Building on the idea of the Iceberg Model, more models of general leadership were developed. For example, Cheetham and Chivers (1996, 2005) first proposed the *Holistic Competency Model* (HCM), and building on this, Le Deist and Winterton (2005) developed a model with four consistent and coherent dimensions:

Cognitive Competence (CC), Functional Competence (FC), Social Competence (SC) and Meta-Competence (MC) (Figure 13). CC refers to knowledge; FC refers to an individual's skills to perform work; SC refers to an individual's behaviour and attitude; and MC is distinct from the other three, as it refers to the ability to facilitate the acquisition of other substantive competences. The HCM also integrates two different approaches to leadership research: a person-centred behavioural approach in the CC and MC dimensions, and a task-oriented approach in the FC and SC dimensions.

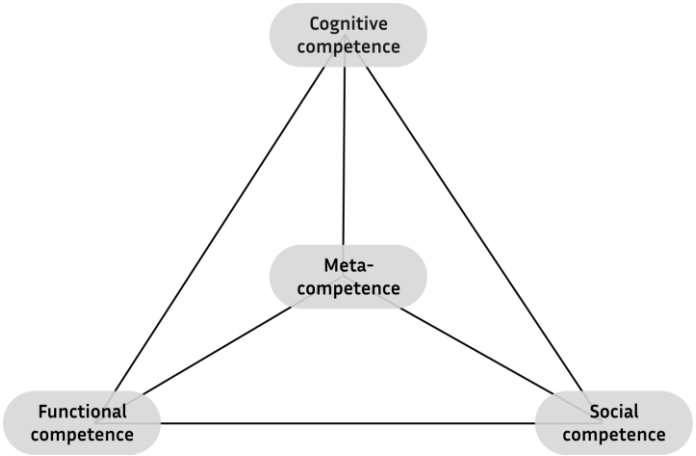


Figure 13: Holistic Competence Model (Le Deist and Winterton, 2005)

A more practical, corporate-focused approach can be found in the *Korn Ferry Leadership Framework* (also known as Leadership Architect™), which is a comprehensive, research-based model used by organisations worldwide to identify, develop and assess leadership talent (Ferry, 2014). It provides a holistic view of what makes a successful leader by looking beyond just their skills and behaviours. As shown in Table 6, the framework contains 38 competencies, which are organised into four practical clusters: (1) Thought: competencies related to strategy, innovation and decision-making; (2) Results: competencies focused on execution and achieving organisational goals; (3) People: competencies related to leading and influencing others; (4) Self: competencies that demonstrate self-awareness and personal management. This is a framework that lists competencies in a structured way, providing a reference for identifying design leadership competencies for this study.

Table 6: Korn Ferry Leadership Architect™ Global Competency Framework (Ferry, 2014)

Factors	Cluster	Competency
FACTOR I: THOUGHT	A: Understanding the business	Business insight
		Customer focus
		Financial acumen
		Tech savvy
	B: Making complex decisions	Manages complexity
		Decision quality
		Balances stakeholders
	C: Creating the new and different	Global perspective
		Cultivates innovation
		Strategic mindset
FACTOR II: RESULTS	D: Taking the initiative	Action oriented
		Resourcefulness
	E: Managing execution	Directs work
		Plans and aligns
		Optimises work processes
	F: Focusing on performance	Ensures accountability
		Drives results
FACTOR III: PEOPLE	G: Building collaborative relationships	Collaborates
		Manages conflict
		Interpersonal savvy
		Builds networks
	H: Optimising diverse talent	Attracts top talent
		Develops talent
		Values differences
		Builds effective teams
	I: Influencing people	Communicates effectively
		Drives engagement
		Organisational savvy
		Persuades
		Drives vision and purpose
FACTOR IV: SELF	J: Being authentic	Courage
		Instils trust
	K: Being open	Demonstrates self-awareness
		Self-development
	L: Being flexible and adaptable	Manages ambiguity
		Nimble learning
		Situational adaptability
		Being resilient

A parallel stream of research has applied these competency concepts specifically to entrepreneurship. The *Generic Entrepreneur Competency Model* (GECM), also known as *Personal Entrepreneurial Characteristics* (PECs), was developed through a project led by McClelland and funded by the U.S. Agency for International Development (USAID) in the 1980s (Spencer and Spencer, 1993). The aim of this project was to determine what makes entrepreneurs in developing countries successful by identifying the specific, observable behaviours that differentiate high-performing business owners from average ones. Deeply rooted in the Iceberg Model mentioned above, this framework was established through in-depth studies in several countries, including India, Malawi and Ecuador. The researchers

identified a core set of key competencies consistently present in successful entrepreneurs, regardless of their culture or business type. As detailed in Table 7, the model is organised into three clusters and ten key competencies, each with detailed behaviours. It provides a 'dictionary' of generic competencies for this study, as it can be applied across various roles and industries.

Table 7: Generic Entrepreneur Competency Model (Spencer and Spencer, 1993)

Cluster	Competency
Achievement	Opportunity seeking & Initiative
	Persistence
	Commitment to the Work Contract
	Demand for Efficiency & Quality
	Risk-taking
Planning	Goal-setting
	Information-seeking
	Systematic Planning & Monitoring
Power	Persuasion & Networking
	Independence & Self-Confidence

Moreover, because design entrepreneurship is a subset of design leadership (Section 2.4.2), an *Entrepreneurship Competence Framework* (EntreComp), developed by the European Commission, is a comprehensive tool designed to promote an entrepreneurial skills and mindset in all areas of life (European Commission, 2016). This framework is structured around three main areas, which contain a total of 15 specific competencies (see Figure 14). This framework targets a specific venture creation focus. In this study, it provides a lens on the venture-creation aspect of design leadership, serving as a complementary model for understanding design leadership competency models.

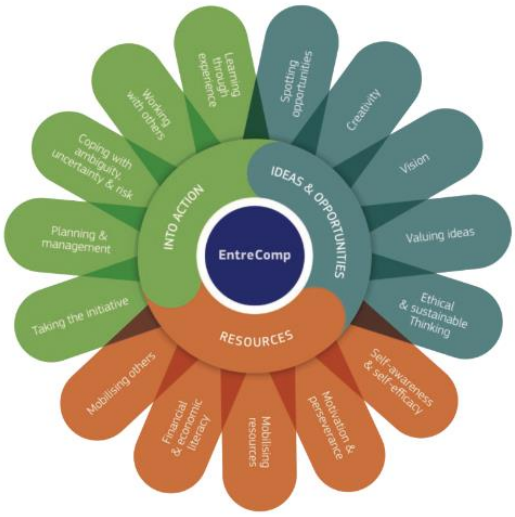


Figure 14: EntreComp conceptual model (European Commission, 2016, soucre: QAA, 2018)

To summarise, while these models vary in their specific contexts, from corporate leadership to entrepreneurship, they share a common goal: to break down the concept of 'competency' into distinct and achievable categories (e.g. skills, knowledge) and to provide guidance for future talent development. In detail, the Iceberg Model provides a foundation for analysing design leadership competencies in this study; the Korn Framework and GECM provide references for the following competency identification process, and the EntreComp provides a specific subset for the entrepreneurial scope of this study.

2.5.4 Competency models in design leadership

The competencies essential for effective design leadership and design management are discussed across various dimensions in the literature. As discussed in Section 2.4.1, there is a significant overlap between design leaders and design managers. Because of this overlap, much of the research relevant to design leadership competencies is found within the design management literature. For example, some studies focus on design managers (Alawad *et al.*, 2017; Kang *et al.*, 2015; Klimczuk-Kochańska, 2020), while others explore organisational competencies and frameworks for design management (Manzakoğlu and Er, 2018;

Liu and Rieple, 2019). These studies can be categorised into two main focuses: competency framework research and specific competencies research.

Proposed *competency frameworks* provide a fundamental understanding of design leadership. Joziasse (2023) summarised the evolution of design leadership and proposed the *Design Leadership Triangle* (DLT) framework (Figure 15), which includes three competencies: business intelligence (BQ), creative intelligence (CQ) and emotional intelligence (EQ). Ariffin *et al.* (2019) discussed leadership in design consultancy and conceptualised competencies as different forms of capital (human, emotional, social, cultural and leadership).

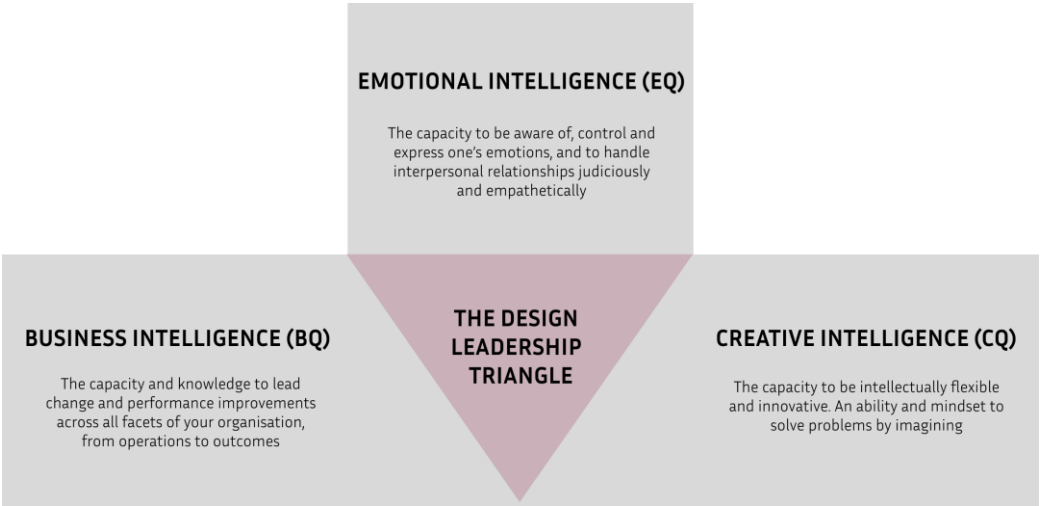


Figure 15: Design Leadership Triangle (Park 2023, as cited in Joziasse, 2023, p. 32)

While these frameworks provide a structural overview, other research has focused more granularly on the specific behaviours and mindsets that define a design leader. With a focus on the behaviours of design leaders, Gemser *et al.* (2023) introduced a sophisticated framework of paradoxical leadership behaviours. Similarly, Valencia *et al.* (2021) identified four mindsets of design leaders, including Artisan, Configurator, Opportunity Seeker and Design Leader, describing them as 'designer-entrepreneurs' (D-entrepreneurs), which reflect dynamic entrepreneurial competencies.

Specific competencies are further detailed in the literature and can be broadly categorised into different groups. For example, Koomans and Hilders (2016) identified various design capabilities and activities within the healthcare sector.

They developed a Design Value Innovation Grid with two dimensions, design maturity and meaning of value, to identify 27 capabilities of design-driven leadership. Miller and Moultrie (2013a, 2013b) discussed and compared design managers and design leaders from the perspective of the design management role, providing a list of skills for design leaders and defining their competencies as a combination of cognitive, interpersonal, business, technical and leadership abilities.

Moreover, Best (2006) proposed a list with three 'parts': design strategy, design process and design implementation (Table 8, below). Specifically, several aspects of the model, especially those related to design strategy, are highly relevant to understanding design leadership competencies.

Table 8: Knowledge and skills list (Best, 2006a)

Part	Knowledge/ Skills	Details
PART ONE – Managing the Design Strategy	Knowledge	Identifying Opportunities for Design
		Understanding the Audience and Market
		Interpreting Client and Customer Needs
		Auditing the Use of Design
		Establishing the Design Strategy
		Promoting and Selling the Design Strategy
		Planning for Long-term Growth
	Key Skills	Managing Client Relations
		Guiding Design Decisions
		Developing Good Working Relationships
		Verbal Communication
PART TWO – Managing the Design Process	Knowledge	Giving Form to Business Strategy
		Increasing Awareness with Design
		Expressing the Brand through Design
		Initiating Design Projects
		Design Methods
		Design Processes
		Competitive Advantage Through Design
	Key Skills	Managing Creative Teams
		Facilitating the Design Process
		Developing a Collaborative Cultures
		Visual Communication
PART THREE – Managing the Design Implementation	Knowledge	The Project Management Process
		Project Management in Practice
		Social and Environmental Responsibilities
		Design Policies, Procedures and Guidelines
		Translating Global Design into Local Design
		Measuring the Success of Design
		Reviewing and Revising the Design Strategy
	Key Skills	Management and Leadership
		Leading and Advocating Design
		Written Communication

In addition, as mentioned in Section 2.4.1, strategic vision is one of the most frequently mentioned competencies in the literature. This includes envisioning future scenarios and aligning design with strategic objectives (Hsieh *et al.*, 2021a; Joziasse, 2011b; Pinheiro and Franqueira, 2024; Turner and Topalian, 2002). Additionally, some entrepreneurial competencies are also mentioned, including entrepreneurial self-efficacy, marketing expertise and the agility to pivot effectively (Christensen *et al.*, 2023; Crilly, 2018). Further details can be found in Appendix B.

In summary, the design leadership literature provides a variety of competency models, from foundational frameworks like the Iceberg Model to more applied tools such as the Korn Ferry Leadership Framework and the DLT framework. While these models offer structural overviews, research also identifies a number of specific competencies that are important for design leadership. However, a clear and comprehensive design leadership framework is still underdeveloped.

2.5.5 The debate on a design leader's expertise and background

A debate in design leadership has emerged around the necessity of formal design expertise. Although Topalian (1990, pp. 41–42) noted that a lack of design expertise may limit a leader and 'the most obvious leaders are outstanding designers', he also suggested that a design leader does not necessarily need to be a design expert. He pointed to "design impresarios" who are explicitly "often not design trained", arguing that delivering outstanding outcomes requires leveraging a blend of creative and design management skills. This raises an important question: *Does effective design leadership depend on a formal design background, which includes design expertise?*

A significant body of research argued that a formal design education background is critical, as it provides necessary design expertise, knowledge and experience. For example, Miller and Moultrie (2013a) found that 'true' design leaders with formal design training respond more effectively to rapid and demanding environments. Similarly, Galli *et al.* (2017, p. 4183) and Gemser *et al.* (2023) argued that design expertise is essential for an intuitive approach and the ability to integrate design into higher-level goals; furthermore, a lack of design expertise may make it more

difficult to steer and guide designers (Gemser *et al.*, 2022, pp. 17–19). Additionally, Lee and Joo (2015) stated that most CEOs without a design education limit design's impact within design teams.

Specifically, a lack of deep design knowledge in leadership can create problems. Research by Dunne (2018) on leaders with mixed backgrounds revealed a misunderstanding and under-acknowledgement of design thinking when it is integrated into organisations. This is supported by Lima and Sangiorgi (2018), who found similar problems in the knowledge-transfer process between expert designers and non-professional designers.

In contrast, design expertise provides distinct advantages. It is a critical factor in identifying clear business opportunities (Hung *et al.*, 2016) and is essential for effective communication. Design leaders with design expertise often use a unique leadership style built on visual cues to carry out their functions (e.g. communication, award and authorisation), a method non-design leaders typically lack (Lee and Joo, 2015). Furthermore, another advantage of this expertise is the ability to lower the barrier in co-creation of a NPD process, by visualising abstract ideas (Tung, 2022).

Additionally, evidence from practice also supports the importance of a design background, which most prominent design leaders in Finland usually have (Falay *et al.*, 2007). Furthermore, standards such as the British Standard (2008, p. 14) explicitly state that a design leader needs to have design expertise (see detailed definition in Section 2.3.2). Moreover, design leaders with such a background are actively involved in design decisions in high-growth companies, and a strong relationship can be found between involvement in design decisions and investment in design (Dickson *et al.*, 1995; Song and Chung, 2008). This shows a tendency that, compared with other leaders, design leaders with a design education or expertise are equipped with native intuition for design that naturally emphasises and integrates design within the organisation.

However, this view has been challenged. Topalian (1990, 2012) and Joziasse (2011a) suggested that the primary goal of design leaders is delivering outcomes

by blending creative and management skills, not necessarily deep design expertise. More recently, De Bont and Wrigley (2023, p. 88) have questioned why professionals from related, research-driven fields, such as an architect or marketer, cannot be design leaders. They argue that designers might actually make poor leaders due to a lack of humility, using the analogy of successful football coaches who are great leaders but were not necessarily the best players. This perspective suggests that leadership skills are more critical than specific technical expertise.

Based on this debate, this study sides with the view that design expertise is a critical differentiator for a design leader. From a design leadership stance, while leadership skills are undeniably important, concerning the abilities to make intuitive design decisions, to transform abstract idea and to authentically integrate design at the strategic level of the organisation stem from a formal design background. It is these specific aspects that differentiate design leadership from other leadership theories. Therefore, for the purpose of this study – based on the discussion of definition and roles of design leadership (Sections 2.2.1, 2.3.2), and differentiated from related concepts (Section 2.4) – a design leader is defined *as an individual with a formal design background who holds a middle or upper-level leadership position in a large company or has founded their own business (mostly in SMEs and start-ups)*.

2.6 Design Education: Educating for Design Leadership

To understand how the competencies of design leadership are developed and cultivated, it is important to examine the educational systems that train future practitioners. As this study specifically focuses on the Chinese context (Section 1.1), this section mainly analyses the evolution and the current state of Chinese design education. Thus, this section will first examine the key pedagogical approaches in design education, including competency-based education, entrepreneurship education and design management education. Then, the current state of design education in China will be reviewed, with a focus on its evolution and teaching modes.

2.6.1 Key pedagogical approaches in design

This section introduces three main aspects. First, it discusses the trend towards new educational approaches, including Competency-Based Education (CBE) and Outcome-Based Education (OBE), in comparison with traditional methods. Second, it examines the emergence of design in management education and management in design education, with a focus on the latter. This leads to the third aspect: a discussion of design-management education.

2.6.1.1 Shift towards competency-based education

The traditional mode of education is facing challenges. Several scholars critique this approach, which is fundamentally teacher-centred and exam-driven (e.g. Gowda and Suma, 2017; Chukwuemeka, 2025; Cantos *et al.*, 2021; Thirumoorthy, 2021). In this mode, the syllabus is viewed as a rigid, non-negotiable guide that divides content into distinct subjects. The learning process is often confined to textbooks and worksheets, with the teacher acting as the primary role responsible for transmitting knowledge and motivating students. From this perspective, learners typically assume a passive role, depending on the lecturer for instruction.

For these reasons, traditional education is increasingly misaligned with the dynamic demands of an evolving environment. A predominant disconnection is the 'skills gap', which is widely reported by industry. Employers are increasingly reporting this, as traditional graduates may have a degree but lack the specific, practical skills needed for a targeted job. Moreover, with technological developments such as AI, big data and the Internet of Things (IoT), as well as the acceleration of new trends and forms of design education due to the COVID-19 pandemic (Lu and Lin, 2025; Rodríguez-Martínez *et al.*, 2023; Zhou *et al.*, 2025), these limitations highlight the urgent need for a critical shift towards a more effective, learner-centred framework.

Therefore, this situation has given rise to two educational modes, including *Outcome-Based Education* (OBE) and *Competency-Based Education* (CBE), which are the forms most frequently discussed today as they represent a critical shift away from a traditional mode of education.

OBE is now applied in many universities across various countries (Kaliannan and Chandran, 2012; Thirumoorthy, 2021). It focuses on what students are able to do successfully at the end of their learning experience (Spady, 1994). In this sense, it focuses more on the end result of a learning period based on programme or course outcomes. To achieve an outcome, institutions such as universities define what a student should know, understand and be able to do by the end of a course or programme. However, OBE emphasises a structured curriculum, which has compelled faculties to re-examine the programmes and courses offered (Kaliannan and Chandran, 2012). Learning in an OBE system is still typically structured around a fixed timeline, such as a 12-week semester. Although its assessments are different from traditional education and are aimed to improve student learning outcomes (SLOs) (Thirumoorthy, 2021), it still often relies on grading exams, essays or projects.

Building on these principles, CBE offers a more flexible approach. Unlike OBE, which focuses on the end result of a course, CBE centres on the development of competencies – that is, mastering specific knowledge and skills (Kelly and Columbus, 2016; Oroszi, 2020). This introduces a fundamental change in the structure, as shown in Table 9. The pace is learner-driven, and assessments are often 'on-demand'. In contrast to a rigid 9–5 and semester-based schedule, CBE better considers a student's individual pace to master competencies, and allows them to learn when and where they can. In this sense, CBE not only provides students with opportunities to apply their existing skills and knowledge to complete courses, increasing the likelihood that learning experiences will lead to performance-based organisational outcomes (Chyung *et al.*, 2006); but it also makes for a better approach for job preparation (Oroszi, 2020; Rainwater, 2016). Therefore, CBE is becoming increasingly important for preparing students to cope with future careers and challenges (Lu and Lin, 2025).

Table 9: Differences between CBE and OBE

Aspects	Competency-Based Education (CBE)	Outcome-Based Education (OBE)
Primary focus	Mastery of skills and knowledge (competencies)	The end result of a course or programme

Aspects	Competency-Based Education (CBE)	Outcome-Based Education (OBE)
Time period	Time is variable; learning is constant	Fixed, learning happens within a traditional semester or term
Pacing	Learner-paced	Instructor-paced but with a learner-focus
Structure	Requires non-traditional structures (modules, direct assessment, flexible enrolment)	Can be applied within traditional structures (courses, credits, semesters)
Assessment	Assessments are often 'on-demand', students take a test or submit a project when they feel ready to prove mastery	Measures if outcomes have been met at midterms, in finals, in final projects

The primary driver behind CBE is its direct response to industry competency requirements, which helps to resolve the aforementioned misalignment. By focusing on demonstrable competencies that are often designed in collaboration with stakeholders from industry, CBE directly addresses the skills gap and provides a better approach for job preparation. As shown in Table 9, CBE's flexibility is crucial for continuous learning, as it allows students and professionals to update their skills and learn new ones, helping them keep pace with the evolving demands of the jobs market.

Design education does not suit a passive education system but prefers one that is active and interactive approaches where student involvement is critical (Bakarman, 2011). In design education, there are always concerns among design educators and professionals regarding designers' competencies (Contreras, 2023; Jovanovic and Tomovic, 2008), as the current curriculum does not meet the changing demands of design and its environment (Eckert, 2017). Although certain practices have been adopted by industry in the professional sphere, integrating them into the curriculum remains a significant challenge (Eckert, 2017). Therefore, rethinking design education through a CBE framework is especially important now, particularly with the rise of a new group of design-leaders requiring advanced competencies (Sections 1.1.1 and 1.1.3).

2.6.1.2 Role of entrepreneurship education

Entrepreneurship education is increasingly understood as a critical educational that focuses on developing enterprise skills, such as opportunity identification and venture creation (Gaiardo, 2019; QAA, 2018). There is a broad consensus that such

skills are best learned through direct, practical experience (Gaiardo, 2019; Lackéus, 2015).

Given the practical characteristics of design education, design thinking and entrepreneurship are complementary processes (White and Kennedy, 2022). In recent years, this has led to an increasing focus on integrating *design thinking* with entrepreneurship education (e.g. Baggen *et al.*, 2022; Cesinger and Dittenberger, 2025; Linton and Klinton, 2019; Lynch *et al.*, 2021; Sarooghi *et al.*, 2019) and, conversely, embedding *entrepreneurship within design education* (Odewole, 2025; Telalbasic, 2021; Yu *et al.*, 2019). This integration is positive, as it can broaden the role of designers in business and innovation (Gaiardo, 2019), provide a foundation for an innovation-driven economy (Gunes, 2012) and improve students' awareness of self-employment to create more diverse job opportunities (Gunes, 2012; Odewole, 2025), which can especially address the increasing difficulty of finding suitable employment in China (Li *et al.*, 2022).

While design and entrepreneurship blend in education, the fundamentals of design education and entrepreneurship education are two vastly different educational systems, as evidenced by the differences between designers and managers (Christensen *et al.*, 2023). In detail, design education is often rooted in the material or technical sciences, while business education is fundamentally a social science (Christensen *et al.*, 2023). This core difference shapes their thinking, professional identities and core competencies, raising a barrier to effective integration.

This barrier may explain why, despite the growing interest, the attention paid to creating concrete design entrepreneurship curricula is still insufficient (Tung, 2017). Consequently, there is an urgent need to rethink the current curricular framework (Odewole, 2025) because of two main problems: (1) superficial integration, where entrepreneurship is often taught at a surface level with theoretical guidance that is not deeply integrated into the professional context of design; and (2) extracurricular focus, where these initiatives are frequently offered as optional activities, making it hard to ensure their effectiveness and students' motivation (Yu *et al.*, 2019).

To address these gaps, scholars have proposed more structured approaches. For example, Gunes (2012, p. 65) proposed that design entrepreneurship education should cover four key issues:

(1) *Basics*: Basics of economics, introduction to microeconomics, concepts of economic thought, consumption and consumer culture.
(2) *Competency Awareness*: The nature of competition, market economies, the importance of strategic innovation and design thinking, decision making in an economic environment, entrepreneurs, practising entrepreneurial skills, designer as entrepreneur, social and cultural aspects of entrepreneurship, future role of industrial design.
(3) *Creative Application*: Enabling students to be self-employed and self-reliant, learn how to create high growth-oriented design ventures, clarifying the confusion that exists between entrepreneurship and small business training, networking as a basic driver.
(4) *Business Models*: State-of-the-art competitive models such as Blue Ocean Strategy, Disruptive Innovation Theory, Co-creation of Value, Design-driven Innovation, Karaoke Capitalism, New Economy, Funky Business, Spaghetti Organisation, Everyone is a Designer, IKEA Effect, Trophy Effect and I Design Myself. (Gunes, 2012, p. 67)

In summary, the literature indicates that while the integration of design and entrepreneurship education is seen as valuable, its current application is often limited due to underlying disciplinary differences. A conceptual framework like the one proposed by Gunes offers a path toward a more comprehensive and effective curriculum for design-entrepreneurship education but needs further empirical research.

2.6.1.3 Design-management education

Two primary modes can be identified in the integration of design and management education: design-thinking in management (a management-centric approach) and management in design (a design-centric approach).

The *management-centric* approach integrates design thinking and principles into a traditional business and management curriculum (Çeviker-Çınar *et al.*, 2017; Lugmayr *et al.*, 2014). The core focus remains on business management, with design serving as a tool for innovation and strategic advantage. This approach is primarily from the United States, centred on business transformations that begin with people (Cooper *et al.*, 2009a). For example, institutions such as the d.school at Stanford University and the Pratt Institute have integrated design into management (Çeviker-Çınar *et al.*, 2017). The establishment of this mode is based on a growing realisation of how important design integration is for business management (Dunne and Martin, 2006).

However, the practical adoption of this mode has faced some challenges. For instance, Matthews and Wrigley (2017) found that relatively few MBA programmes have deeply integrated design thinking into their core curriculum. This aligns with earlier concerns from Formosa and Kroeter (2002) regarding the lack of design approaches within broader management education. Together, these findings suggest that integrating design as an approach within business schools is not yet widespread in practice.

In contrast, the *design-centric* mode approaches management education within the design field. The rise of design thinking in management and business disciplines has positively impacted on design, helping to clarify the scope and content of design management (Cooper *et al.*, 2009a); moreover, its development can benefit from a strengthened relationship with business schools, including sharing resources with MBA courses (Liu and Zhan, 2008). This approach is commonly employed within design management education, which is defined as "standalone programmes or modules within design programmes"(Bakırlıoğlu and Yetiş, 2025, p. 2).

Design management education not only emphasises concepts like design thinking and human-centred methods but also integrates strategic design to develop team leaders and design managers at the project and operational levels. The goal is to cultivate the design-management competencies of future designers, such as strategic-management and marketing-management skills (Matthews and Wrigley,

2017). Design management education is common in the United Kingdom. For instance, many UK universities, including Lancaster University, the University of Southampton and Loughborough University, offer programmes where design departments integrate rigorous management principles.

The importance of the design management education is emphasised by recent critiques of traditional design education. Meyer and Norman (2020) argue that standalone art-and-design schools are largely 'unfit for the challenges of the 21st century'. They criticise these institutions for being are often too focused on craft and lack the academic breadth, specifically citing a lack of management and leadership skills.

In this sense, Meyer and Norman (2020) proposed a solution: that design programmes should be integrated into broader research universities and adopt a more academically rigorous, interdisciplinary curriculum that includes management and leadership skills. This is strongly aligns with what a design management education aims to do. From this perspective, design management education is critical because it directly addresses the shortcomings of traditional design education and is designed to cultivate the design leaders needed to navigate the complex challenges in the future.

2.6.2 Current state of design education in China

Chinese design education has developed rapidly and trained large numbers of designers (Li *et al.*, 2023; Zhang and Pan, 2023). While there is no specific ranking for design thinking, China ranks second globally in creative thinking, a position attributed to its large number of academic and design institutions. This strong presence enables China to take a leading role in the production of knowledge related to creative thinking (Samaniego *et al.*, 2024), which also reflects the large scale of design education in China and the significant demand from industry. Design education in China is offered in three types of institutions: comprehensive universities, art colleges and universities with strengths in engineering; moreover, Chinese design-management education has also developed alongside an evolving design-centric approach.

2.6.2.1 Chinese context: the states of design education

Chinese design education originally developed from art education and was elevated to a first-level discipline in 2012 (Liu and Nah, 2020). This development distinguishes Chinese design education from others types, as design in China is often viewed as being closely related to artistic concepts (Zhang and Pan, 2023).

Chinese design education has experienced distinct trends during different periods, which can be divided into two stages: 2010–2015, and 2016 onwards. According to Li *et al.* (2023), between 2010 and 2015, Chinese design education had an entrepreneurial orientation, with a focus on strategy, markets and innovation. During this period, technological innovations such as cloud design (design applications and systems specifically run on cloud infrastructure) and interaction design also emerged.

After 2016, design education shifted towards a more interdisciplinary focus, integrating with the engineering and medical fields. At this stage, the boundaries of design education became broader and less clearly defined. Although this period emphasised interdisciplinarity, design entrepreneurship and innovation continued to receive significant attention, particularly in the context of the growing creative industry (Li *et al.*, 2023). This aligns with Samaniego *et al.* (2024), who found that the advancement and cultivation of creative thinking remain prominent. Meanwhile, with the rising importance of entrepreneurship, several mature design management programmes tend to enhance students' business awareness, foster venture creation and better prepare them for industry and real-world challenges (Gunes, 2012). Based on this development, it is clear that in China, design management programmes are deeply influenced by the rising focus on and attention to design entrepreneurship.

Design management education in China

As mentioned previously (Section 2.6.1.3), a design-centric approach has also been developed in China alongside the development of design management education. According to Cai *et al.* (2017), formal design-management education in China began to take shape in the 2000s, with a focus on formalising the field

through high-profile international events and structured academic collaborations. In 2002, Tsinghua University hosted the International Design Management Symposium in China, representing the first formal introduction of design management. During this time, design-management education became an established area of long-term study, and Chinese institutions became more integrated into global design education networks.

However, establishing a successful design management programme goes far beyond merely creating courses. Deng (2011) argued that its success depends on achieving two key goals: promoting design innovation and building collaboration between universities and industry. Furthermore, Deng suggested that achieving these goals depends on how well they are adapted to three layers of Chinese culture: national culture, management culture and teaching or learning culture.

To support these goals, Li (2014) identified supplementary strategies for cultivating design-management talent, all centred on international collaboration and academic exchange. These methods include (1) sending students to study abroad through university partnerships, (2) hosting intensive advanced seminars, (3) organising high-profile summits to connect industry with academia and (4) establishing dedicated research institutes for advanced study and cooperation.

Building on the need for collaboration, Liu and Zhan (2008) explored modes for effective cooperation between industry and academia (Table 10). They proposed four potential modes for design management education: (1) an MBA mode, (2) Master of Engineering mode, (3) short-course training mode and (4) distance-learning mode.

Table 10: Modes for design management education in China (Liu and Zhan, 2008)

Mode	Core Idea	Target Audience	Example
MBA	An independent, international, class-based programme focused on market principles	Business and management practitioners at various career levels	China Europe International Business School (CEIBS)
Master of Engineering	A practice-oriented postgraduate degree that requires industry projects instead of a research thesis	Practitioners in the engineering and business fields	Tsinghua University's Industrial Design Department
Short-course Training	Flexible, specialised training that can be customised for companies to meet immediate skill demands	Professionals needing to update specific knowledge and management expertise	The Executive Education Programme (EEP) at CEIBS

Mode	Core Idea	Target Audience	Example
Distance-learning	An alternative format using technology to overcome faculty shortages and geographical barriers	For those needing remote access	A planned international consortium to adapt the European curriculum

In summary, these combined insights from historical, strategic and structural perspectives show that the Chinese approach to implementing and developing design management education focuses on a blend of formal curricula, international collaboration and industry-focused models. Moreover, it also demonstrates a key characteristic: the integration of global knowledge with local cultural and industrial needs. This holistic view is therefore valuable not only for understanding design education within the Chinese context, but also for providing a perspective for design-management development in other cultural contexts.

2.6.2.2 Teaching modes of Chinese design education

Chinese design education mainly adopts a 'dual-track system', offering two types of programmes: art-based and technology or practice-based (Huang *et al.*, 2021; Li *et al.*, 2023). Several Chinese universities have developed modes based on this to cultivate design talent to meet current professional demands. According to Liu and Nah (2020), *Jiangnan University* has established a '1+2+1' curriculum structure: the first year focuses on foundational studies, the second and third years on innovation and commercial topics and the final year on complex social issues through interdisciplinary collaboration. *Tongji University* has implemented a '1+3' model, where students spend their first year in a general 'Freshmen College' before choosing a major. Additionally, Tongji's 'three-dimensional T' framework structures undergraduate education around professional depth, postgraduate education around interdisciplinary breadth, and doctoral education around advanced expertise. The *Central Academy of Fine Arts* (CAFA) emphasises professional engagement and critical thinking over mere skillS acquisition, assessing students in areas such as logical reasoning, creativity and social awareness. At the *Guangzhou Academy of Fine Arts* (GAFA), the curriculum incorporates a studio- and project-based learning approach: after an initial foundational year, students join professional studios in their third year to undertake graduation projects connected with local industry (Liu and Nah, 2020).

These modes show the increasing focus of design education on problem-oriented and project-based learning (Liu and Nah, 2020), which demonstrates an improvement that contrasts with past phenomenon, where design education emphasised presentation skills rather than problem-solving and focused more on the final product than on the design process (Yu and Lo, 2001). From this perspective, Chinese design education is evolving in a positive direction and becoming more aligned with industry and real-world business.

2.7 Discussion of Findings from the Literature, Research Questions and Objectives

Following a comprehensive review of the design leadership literature, this section identifies existing limitations and research gaps (Section 2.7.1). In addition, as a secondary finding from the literature review, a summary of the methodological approach (Appendix A) is also outlined to guide the research design presented in **Chapter 3**. Based on these findings, the research questions and objectives are developed and clarified (Section 2.7.3).

Furthermore, building on the previous discussions and concept differentiations, including design leadership, design management and design entrepreneurship, other similar types of leadership and design leaders (Sections 2.4 and 2.5.5), key terminology and concepts are defined to establish a clear scope for this study (Section 2.7.4).

2.7.1 Gaps identification: discussion of findings from the literature

In the design leadership literature, a key finding has emerged: the identification of research gaps. The gaps in design leadership research can be divided into four main aspects: (1) generalisability, (2) sample size, (3) empirical validation gap and (4) a missing focus on comprehensive and personal competencies. A summary of selected gaps and examples can be found in Table 11, below.

While four gaps have been found, this study will not address all of them. Instead, it will primarily focus on addressing the fourth gap by exploring the comprehensive and personal competencies of design leaders; meanwhile, it will also address the

third gap by providing new and supportive empirical data. Finally, by grounding the study in the Chinese context, this work begins to address the first gap concerning the generalisability of design leadership research at a primary level.

Table 11: Examples of research gaps (partial)

Gap	Example research	Detail
Small sample size	Tcheparova & Doychinov (2024)	94 questionnaires from 5 universities
	Riedel *et al*. (2009)	Six companies
	Kasapoğlu (2011)	40 questionnaires
	Attia (2019)	six design entrepreneurs
	Qonatirila *et al*. (2020)	Five design entrepreneurs
	Rodriguez-Martinez *et al*. (2013)	17 questionnaires small sample
Generalisability (Geographic Context)	Valentino *et al*. (2023)	Switzerland
	Tcheparova & Doychinov (2024)	Bulgaria
	Kaygan *et al*. (2023)	Turkey
	Liang *et al*. (2022)	Media design industry in Taiwan
	Waqas *et al*. (2022)	Pakistan
	Lee *et al*. (2022)	Korea
	Choudhary and Shahid (2025)	Australia and Pakistan
	Klenner *et al*. (2022)	Australia
	Ariffin *et al*. (2019)	Malaysia
	Nielsen *et al*. (2018)	Denmark
	Rodriguez-Martinez *et al*. (2013)	Mexico
	Lee and Cassidy (2007)	Taiwan
	Cautela *et al*. (2017)	Australia, Denmark, Italy, UK and US
	Han and Bromilow (2010)	UK
	Kasapoğlu (2011)	Turkey
	Cheung *et al*. (2001)	Hong Kong
	Muenjohn and McMurray (2017)	Thailand and Vietnam
	Muenjohn *et al*. (2020)	China, Thailand, Japan, Vietnam
	Tan and Chapman (2017)	Singapore
	Lindberg *et al*. (2024)	Sweden
	Seidelin & Sivertsen (2022)	Copenhagen
	Koomans & Hilders (2016)	Netherlands

Generalisability

The most frequent limitation is the generalisability gap, which arises from the narrow scope of existing studies and restricts the applicability of their findings to other settings. In design-leadership research, this gap is evident in three specific aspects: (1) a focus on specific country contexts; (2) a focus on specific industries or sectors; and (3) a reliance on the single case study method.

For example, from a geographical perspective, most research is conducted in specific contexts, often focusing on a single country (shown in Table 11), and the researchers explicitly state that cultural differences may limit the generalisability of their findings elsewhere. Similarly, some studies focus on a particular industry or sector, such as fashion or design-related companies, or they concentrate solely

on large companies or SMEs, making it difficult to generalise the findings to other types of organisations. Finally, the use of the single case study method (examining a specific company, university programme or project) also results in research conducted in a narrow context. While this approach provides depth, it makes the findings highly contextual and not easily transferable.

Sample size

Sample size also contributes to the gaps in design leadership research, as some studies use only small samples. A small sample sizes raises concerns about the significance of the data and whether the participants are truly representative of the larger population.

Empirical validation gap

As a relatively new and underexplored area, design-leadership research includes a large body of conceptual and literature-based studies that have been crucial for defining this field. However, this has created a tension in the literature. As shown in Appendix A, while the design-leadership field has produced a large volume of both theoretical frameworks and empirical investigations, a gap exists in the synthesis and validation that connect them.

Many foundational papers are conceptual, aiming to develop new models and arguments from a synthesis of existing literature and professional experience (e.g. Pinheiro and Franqueira, 2022; Hsieh *et al.*, 2021). For example, Hsieh *et al.* (2021) discussed the impact of design leadership on organisational innovation and argued that design thinking strengthens leadership based on a review of existing theories. In addition, others take a more reflective approach, drawing on the researcher's professional experience to offer insights into and reflections on design leadership (e.g. Cooper, 2012; Frishberg and Convertino, 2020; Joziasse, 2023; Turner, 2013). Literature reviews, in turn, explicitly focus on synthesising the current state of knowledge, including both systematic literature reviews (e.g. Zheng and Liu, 2022) and conceptual reviews (e.g. Telalbasic, 2021).

A key criticism of this conceptual research is that it often lacks further empirical validation or application. For example, although the frameworks proposed by

Joziasse (2023) and Lindberg *et al.* (2024) offer comprehensive conceptual models, they require additional empirical validation and development in both real-world industry and design education. This highlights the need for future research to explore and test these concepts in real business settings. Therefore, more empirical research is required to test, refine and build upon these conceptual frameworks. While the field has already employed a variety of strong empirical methodologies (e.g. case studies, grounded theory), there is a clear need to apply these methods more rigorously to validate of existing theories.

Missing focus on comprehensive and personal competencies

In research with a competency focus, another gap lies in the emphasis on design leaders' roles rather than their underlying personal competencies. For instance, Gemser *et al.* (2023) prioritised a process and behavioural view of leadership, exploring how design leaders enact their roles and mediate innovation, rather than identifying and detailing the specific competencies required for effective design leadership.

Consequently, the existing literature is fragmented. While some studies provide valuable insights into leadership behaviours and processes, and others offer lists of design leaders' competencies, these often lack comprehensiveness. Many focus on a single dimension such as skills (e.g. Miller and Moultrie, 2013b and Turner, 2013) or mindset (e.g. Valencia *et al.*, 2021). As a result, there is still no clear, holistic competency framework that designers and educators can use to assess and develop design-leadership competencies.

2.7.2 Absence of design leadership research in China

As introduced in Section 1.1, the number of design leaders in China has grown rapidly in recent years, supported by government policies. However, based on the literature review, there is a clear lack of research focusing on Chinese design leaders. Moreover, as discussed above, given the limitations on generalisability, the findings of and conclusions drawn from studies conducted in other countries or contexts may not be applicable to Chinese design leaders, as these are rooted in different cultural backgrounds and possess unique characteristics. Additionally,

the lack of focus on comprehensive design-leadership competencies further highlights the need to understand and develop a more complete list of competencies for design leaders in China. Furthermore, with the increasing emphasis on design entrepreneurship and venture creation in China, there is a growing need to develop the competencies of design leaders, which can then inform the design education and preparation of future design leaders.

While Chinese design education is evolving in a positive direction, several problems remain. The primary issues identified include a lack of cooperation among institutions, a mismatch between education and industry needs and the challenge of keeping curricula aligned with rapid technological and economic changes (Huang *et al.*, 2021; Li *et al.*, 2023; Liu and Nah, 2020). Specifically, there is a lack of consistency between course syllabi in design programmes (Manan *et al.*, 2022). These problems can result in unqualified graduates and further widen the gap between design education and industry needs. From this perspective, competency-based education that incorporates design leadership could be an effective way to address these issues, and competency models are commonly used in educational settings (Markus *et al.*, 2005).

Therefore, it is necessary to conduct research on the competencies of design leaders from various sectors and organisations within the specific context of China, in order to construct a more comprehensive competency model for Chinese design leaders. Such a model could then be applied in design education as a guide for educators and students in cultivating these competencies, thereby better preparing future design leaders.

2.7.3 Research Questions (RQs) and research objectives

Based on the current situation and the gaps identified in the literature review (Sections 2.7.1 and 2.7.2), three research questions are proposed:

RQ1*: What key competencies are required for effective design leadership in the Chinese context, and how can they be synthesised into a preliminary framework?*

RQ2*: How can a preliminary framework be refined and validated with industry and academic stakeholders to ensure its relevance?*

***RQ3**: To what extent does current Chinese design education reflect validated competencies, and what are the key areas for development?*

To address these questions, the main aim of this research is to develop a design leadership competency model for Chinese design leaders and explore its implications for design education. Accordingly, specific objectives are proposed to guide the process of answering each research question:

Objective 1.1: To identify and define the core competencies that reflect effective design leadership.

Objective 1.2: To synthesise competencies into a preliminary Design Leadership Competency Model (DLCM).

Objective 2.1: To validate and refine the DLCM with industry and academic stakeholders.

Objective 3.1: To map the competencies from design education, policy and industry against the validated DLCM.

Objective 3.2: To identify competency gaps and determine the key areas for development in current design education.

2.7.4 Terms definitions in this thesis

Based on the review of competency-related literature (Sections 2.5.1 and 2.5.2), in this thesis, the author uses the term '**competency**' (or 'competencies') to describe the characteristics of design leaders that help them achieve their goals and succeed in venture creation or career advancement. According to the previous discussion of design leadership (e.g. its definition in Section 2.2.1 and its characteristics in Section 2.3), this study defines **design leadership** as a type of leadership that acknowledges and integrates the value of design and demonstrates visionary and strategic functions, with a focus on clarifying direction.

As discussed in Section 2.4, design leadership is considered to have a broader scope, encompassing design entrepreneurship and parts of design management.

Given that many design-related organisations are typically small (e.g. SMEs, start-ups), the overlap between design leaders and design managers – as well as the role of strategic design management – was also discussed in Section 2.4.1, providing an additional lens through which to examine design leaders.

Therefore, based on the clarification above and the discussion of design expertise (Section 2.5.5), and considering the varying contexts and supervisory responsibilities associated with different company sizes, this study provides a two-part definition of a **design leader:**

(1) In the context of SMEs and start-ups, a design leader is defined as an individual with a design educational background who either establishes their own business or holds a top or strategic position within an organisation;
(2) In the context of larger companies, a design leader is defined as someone who occupies a department director position or higher strategic role.

Summary

In summary, this study aims to develop a competency model that identifies the key competencies of Chinese design leaders and to map it within design education to identity gaps and areas for improvement. Based on the literature review, several areas were examined. First, various dimensions of design leadership were reviewed, including its definition and evolution (Section 2.2); its characteristics, roles and styles (Section 2.3); and its relationship with other concepts (Section 2.4). Second, in Section 2.5, broader competency-related concepts, components and models were reviewed to build an understanding of design leadership competencies; additionally, the debate surrounding design leaders' expertise and educational backgrounds was also discussed. Finally, Section 2.6 explored design education, reviewing key pedagogical approaches and the current situation of Chinese design education.

The discussion of research gaps (Section 2.7.1) revealed that design leadership research is not only rare in China, but is also limited worldwide. As a result, all

these findings inform the development of this study's research questions, objectives (Section 2.7.3) and conceptual clarification (Section 2.7.4).

In addition, according to the review findings (Appendix A), two main methodological characteristics emerge. On the one hand, there is a dominance of qualitative and exploratory research, shown by the prevalence of case studies and grounded theory, which highlights the field's focus on exploring 'how' and 'why' questions. On the other hand, there is an emphasis on the importance of context, with methods (e.g. interviews) chosen to capture the rich, contextual details crucial for understanding design leadership. These findings provide a direction and guidance for the methodological choices in Chapter 3.

Chapter 3: Methodology

The comprehensive literature review (Chapter 2) identified a gap in existing knowledge: the absence of an empirically validated competency model for design leadership specific to the Chinese context. To address this gap, the following research questions, aims and objectives are proposed and developed:

RQ1*: What key competencies are required for effective design leadership in the Chinese context, and how can they be synthesised into a preliminary framework?*

RQ2*: How can a preliminary framework be refined and validated with industry and academic stakeholders to ensure its relevance?*

RQ3*: To what extent does current Chinese design education reflect validated competencies, and what are the key areas for development?*

The main **aim** of this research is to develop a design leadership competency model for Chinese design leaders and explore its implications for design education.

To answer the research questions and achieve the research aim, the following **research objectives** have been established:

To answer **RQ1**:

Objective 1.1: To identify and define the core competencies that reflect effective design leadership.

Objective 1.2: To synthesise competencies into a preliminary Design Leadership Competency Model (DLCM).

To answer **RQ2**:

Objective 2.1: To validate and refine the DLCM with industry and academic stakeholders.

To answer **RQ3**:

Objective 3.1: To map the competencies from design education, policy and industry against the validated DLCM.

Objective 3.2: To identify competency gaps and determine the key areas for development in current design education.

Research design is a crucial part of achieving research objectives, and this chapter presents the overall research design and research process for this study. This chapter adheres to the 'research onion' framework (Saunders *et al.*, 2009), which provides a structured approach that moves from a philosophical stance to the final research methods, improving the coherence of both the methodology and the chapter's structure. As this framework was originally proposed for a business context, it is particularly applicable to this research.

Following this framework, the chapter is divided into seven sections (Figure 16). It begins with a short introduction (Section 3.1) and then discusses each component in detail in the following sections: research philosophy and paradigm (Section 3.2), research approach (Section 3.3), methodological choices (Section 3.4), the stages of data collection (Section 3.5) and a brief introduction to data analysis (Section 3.6). Finally, the chapter concludes with a summary (Section 3.7).

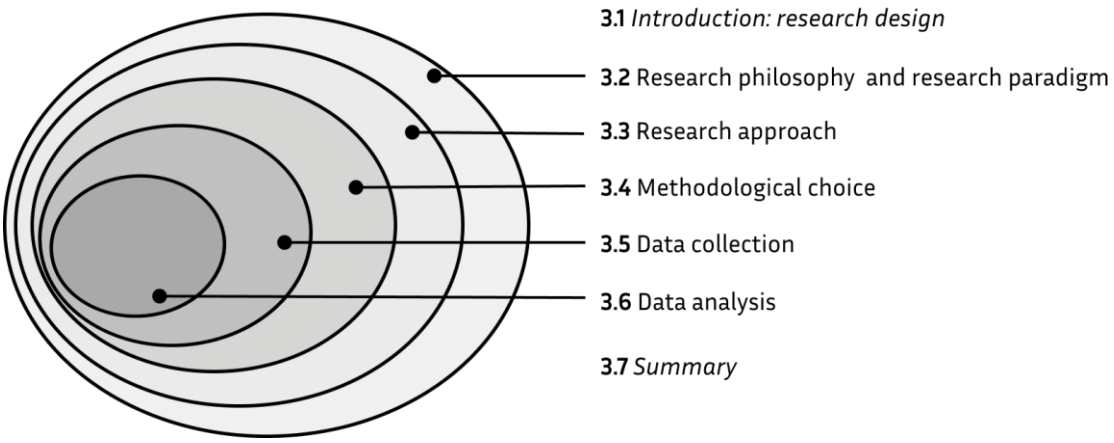


Figure 16: Overview of this chapter (adapted from Saunders et al., 2023)

3.1 Introduction: Research Design

Research design is a general plan about what the researcher will do to answer the research questions. Hence, a *research-design framework* is necessary (Creswell, 2003), as it can assist researchers in conducting research systematically and logically, step by step. In this context, Crotty's (1998) research is the "groundwork" of this framework (Creswell, 2003, p. 4). In detail, Crotty proposed four

components that need to be considered before designing the research framework (Figure 17):

- *Epistemology* informs the research, including objectivism, constructivism, subjectivism, etc.
- *The theoretical perspective* includes positivism, post-positivism, interpretivism, critical theory, etc.
- *Methodology* includes experimental research, survey research, ethnography, etc.
- *Methods* includes questionnaire, interview, focus group, etc. (Crotty 1998, p. 4)

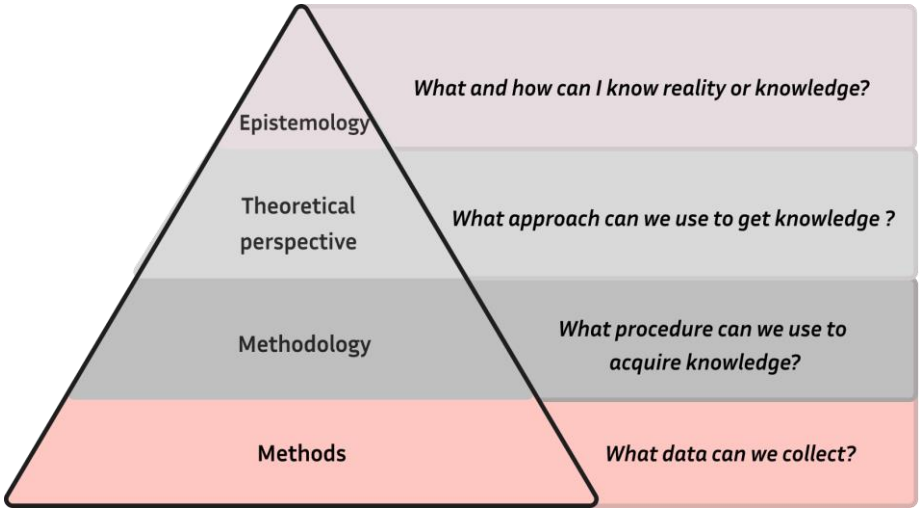


Figure 17: Relationship between components (Crotty, 1998, p. 4)

In addition to the research design framework proposed by Creswell (2008), the 'research onion' (Saunders *et al.*, 2023), is one of the most useful tools to facilitate the research design, as it presents a structured framework by portraying an onion with its many layers, clearly showing the flow and logic of each component clearly. The 'research onion' was developed based on a combination of both Creswell's (2008) and Crotty's (1998) work, and consists of six components: design philosophy, approach to theory development, methodological choice, design strategy, time horizon and procedures and techniques. Moreover, this systematic approach is common in business studies and therefore aligns well with the context

of this research, which focuses on design leadership within a business setting (Saunders *et al.*, 2023).

From these various viewpoints, this research adopts the 'research onion' approach (Figure 18, below). The following sections will use its terminology to illustrate the research design, focusing on the *research philosophy and paradigm, the research approach to theory development* and the *methodological choice.* The specific *procedures and techniques* for data collection will then be discussed in detail (Figure 19, below).

To begin with, this research adopts a blend of *interpretivist* and *pragmatic* research paradigms, aiming to understand how design leaders and other stakeholders in design education construct meaning around the competencies needed in design leadership. Building on this, an *inductive* approach is deployed to allow themes to emerge from the data, rather than testing a pre-existing framework. Methodologically, this research is *qualitative***.** Multiple techniques were chosen accordingly, employing various qualitative data sources such as *semi-structured interviews, document analysis* and *case studies*. *Triangulation* was used to ensure validity. The data analysis primarily uses *thematic analysis,* complemented by *template analysis*. The details will be explained in the following sections.

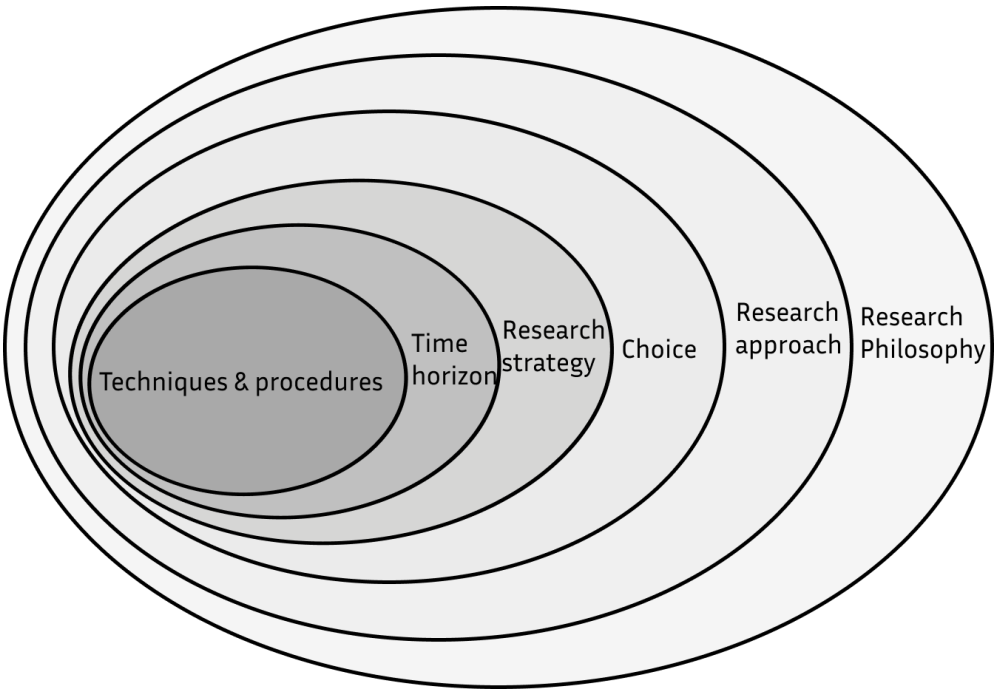


Figure 18: Research onion (Saunders et al., 2009)

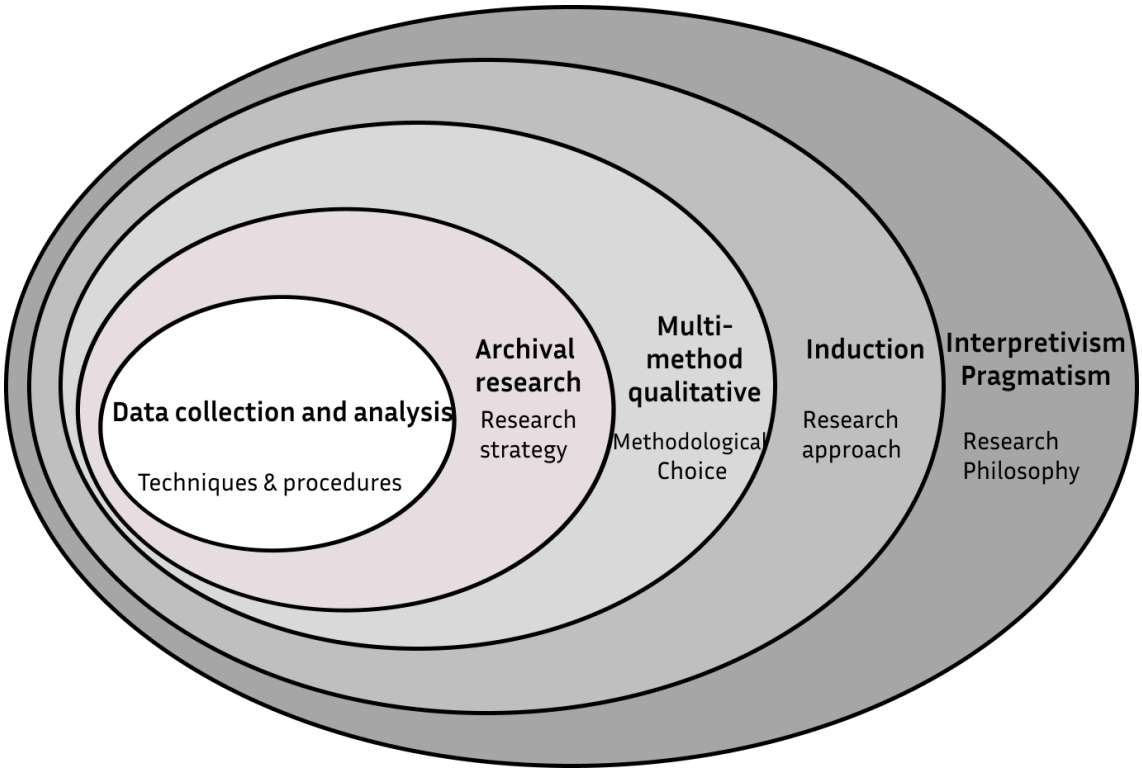


Figure 19: Research design for this research

3.2 Research Philosophy and Research Paradigm

Research philosophy is considered a worldview from a broader philosophical stance. Three main research philosophies determine how researchers know and understand the world: *ontology, epistemology* and *methodology* (Guba and Lincoln, 1994). Ontology concerns the nature of reality or being (Saunders *et al.*, 2023), epistemology asks whether and how knowledge can be obtained and validated (Abdullah Kamal, 2019; Gray, 2004) and methodology sets out the strategy or plan of action through which that knowledge will be acquired (Creswell, 2003). This choice is shaped by the researcher's epistemological perspective (Gray, 2004).

Several scholars have extended this three-pillar model by adding *axiology*, which addresses the role of values and ethics in research (Saunders *et al.*, 2023; Guba and Lincoln, 1994). Accordingly, scholars often refer to the:

- Ontological assumption – '*What is the nature of reality?*' (Saunders *et al.*, 2023; Ylönen and Aven, 2023);
- Epistemology assumption – '*How can knowledge be created, acquired, and communicated?*' (Cohen *et al.*, 2000; Crotty, 1998; Saunders *et al.*, 2023; Gray, 2004);
- Axiology assumption – '*What role do values play in the research process?*' (Saunders et al., 2023, p. 136).

Despite these varying classifications, all research paradigms are informed by and applied within the context of these philosophical foundations (Saunders et al., 2023). A *research paradigm* is defined as a system of beliefs and assumptions about the development of knowledge (Abdullah Kamal 2019; Slevitch 2011; McGregor 2019; Burrell and Morgan 2019).

Researchers group paradigms differently. Guba and Lincoln (1994, p. 109) identify four: *positivism, post-positivism, critical theory* and *constructivism*. Crotty (1998) and Gray (2004) classify positivism and interpretivism as theoretical perspectives and constructivism as an epistemology. Saunders et al. (2023, p. 145) discuss five major paradigms in business and management: positivism, critical realism, interpretivism, postmodernism and pragmatism.

Positivism is "the philosophical stance of natural scientists and entails working with an observable social reality to produce law-like generalisations" (Saunders *et al.*, 2023, p. 145). It assumes an objective reality that can be described and explained through scientific observation (Gray, 2004). In this sense, it allows the researcher to compare findings and formulate generalisations, and this research paradigm is often applied in the natural sciences.

In contrast, *interpretivism,* developed in response to positivism, it emphasises human experience and subjectivity. It recognises that people understand reality in diverse ways and seeks to reveal underlying social dynamics and structures (Saunders *et al.*, 2023; Scotland, 2012). Through this lens, it is important to look at organisations with an individual perspective (e.g. different groups of people) (Saunders *et al.*, 2023, p. 150), such as the design leaders in this research.

Critical realism is based on real-world phenomena and is aligned with societal ideology; it is anti-foundational and challenges naive assumptions about reality (Scotland, 2012). In this sense, critical realism focuses on the explanation of individuals' experiences, especially emphasising the impact of underlying reasons and framework (Saunders *et al.*, 2023), and it often seeks to address social change in a scientific investigation, such as addressing issues of social justice and marginalisation (Scotland, 2012).

Pragmatism bridges objectivism and subjectivism, facts and values, focusing on the practical consequences of theories and ideas (Saunders *et al.*, 2023). From this perspective, researchers follow a process from problem identification and definition to exploring practical solutions for the future (Saunders *et al.*, 2023), with a greater concern for results than for meanings and explanations (Elkjaer and Simpson, 2011).

Postmodernism emphasises "the role of language and power relations, seeking to question accepted ways of thinking and give voice to alternative views" (Saunders *et al.*, 2023, p. 152). A postmodernist focuses on 'deconstructing' (taking apart) realities to search for instabilities within their accepted truths and for what has not been discussed.

Based on the introduction above, this research is guided by both interpretivism and pragmatism to best align with its multi-stage objectives.

In the initial stage (Stages 1 and 2), an **interpretivist paradigm** is important for developing the competency model. This involves an ontological assumption that reality is plural and context-dependent, meaning each design leader's opinions reflect their own lived world. Epistemologically, knowledge is therefore not simply 'observed' but is co-created through the dialogue between the author and participants to uncover how they perceive and understand competencies.

As the research moves to the mapping stage (Stage 3), a **pragmatic paradigm** becomes more prominent. This is reflected in the study's axiology, which is focused on practical improvement. The core value of this research lies in generating useful knowledge that can enhance design education by identifying and

addressing gaps. This pragmatic focus ensures the study delivers a tangible impact beyond theoretical understanding.

3.3 Research Approach to Theory Development

Because research philosophies and paradigms are the nature of theory (Gray, 2004) and shape the foundation of a researcher's stance and their impact on future methodology and method choices, this raises a question: '*How can a researcher generate a theory from this research*?' To answer this, it is essential to understand the available research approaches, which guide researchers' process of reasoning to build theory (Saunders *et al.*, 2023). Broadly, these approaches are divided into deductive proof and inductive discovery (often referred to as simply deduction and induction), a distinction first made by Dewey (1933. p. 81) and widely adopted by scholars (e.g Gray, 2004; Saunders *et al.*, 2023) (Figure 20).

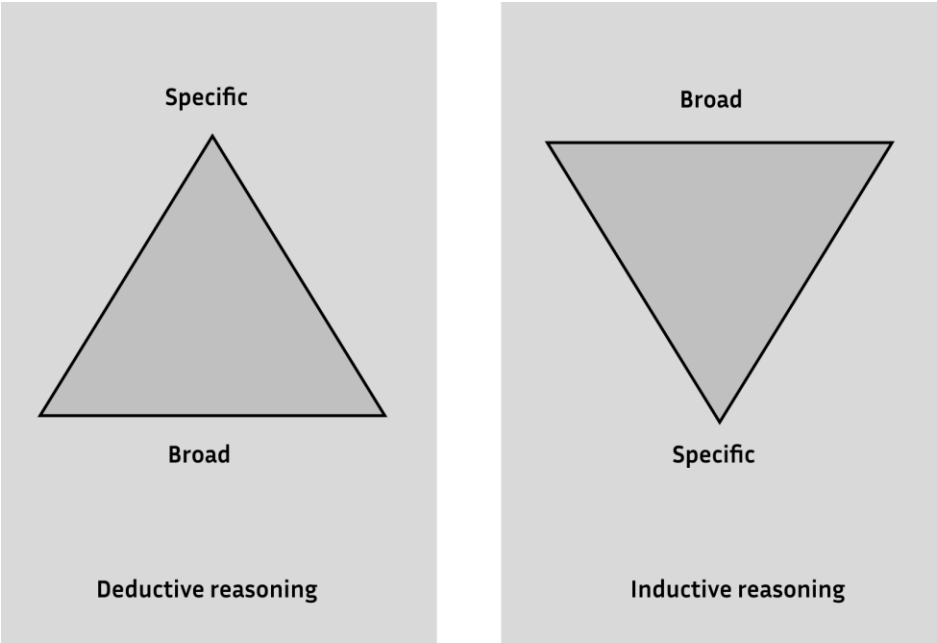


Figure 20: Difference between deductive reasoning and inductive reasoning

As shown in Figure 21*, Induction* builds ideas, and deduction develops, applies and tests those ideas, then shows the proof (Dewey, 1933). Induction moves from fragmentary details of different narrow perspectives to paint a universal and broader picture (e.g. discover a binding principle) (Dewey, 1933; Saunders *et al.*, 2023). In this inductive process, research hypotheses are normally formed after data collection and analysis to check whether any patterns emerge (e.g.

relationships between variables, characteristics)(Gray, 2004). Theories are then proposed based on the results and identified patterns.

Deduction is mostly about testing and interpreting isolated details into a unified experience (Dewey, 1933). In this approach, a principle is confirmed or modified through empirical works (Gray, 2004). Accordingly, hypotheses are always built and formed by concepts in the beginning stage and are then tested or confirmed through empirical observations or experimentations in the following stages (Gray, 2004; Saunders *et al.*, 2023).

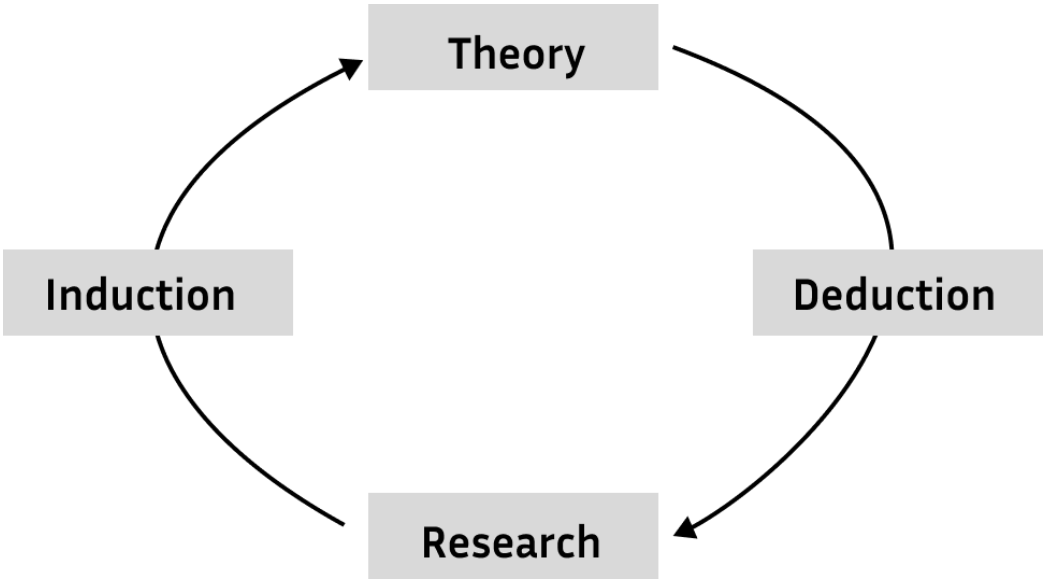


Figure 21: Induction and deduction loop

Researchers may also combine inductive and deductive methods (Gray, 2004). They can begin by selecting facts and formulating a theory inductively, then derive hypotheses deductively and finally test those hypotheses empirically.

A third option is *abductive reasoning*, which "focuses on the descriptive rather than normative aspects of scientific reasoning" (Ketokivi and Mantere, 2010, p.319). Abduction was introduced to address the limitations of pure induction and deduction: deduction often lacks a clear framework for choosing which hypotheses to test (Casula *et al.*, 2021, p. 1708), while induction does not guarantee the truth of conclusions even when all premises are accurate (White, 2015, p.275). Aligned with pragmatism, abduction offers a way to infer the most plausible explanation from the available evidence (Pinillos, 2022).

This research is fundamentally **inductive**, as its primary aim is to build a new model from the ground up. The process begins with fragmentary evidence (such as interview transcripts and job descriptions) from which the author can uncover patterns that reveal the competencies of design leaders. This movement from specific individual data to a general framework, letting competencies emerge rather than being imposed, is the core of this research's contribution and matches the essence of inductive discovery.

To ensure the robustness of this inductively derived model, this research also incorporates two further stages. First, an *abductive* process is used to iteratively refine and validate the preliminary model with experts and stakeholders. This allows the author to move back and forth between the evolving model and additional data, refining the model whenever new evidence arises. Finally, in a brief *deductive* step, the finalised model is applied to an educational context to demonstrate its practical potential. However, the main finding of this research remains the inductive construction of the DLCM.

3.4 Methodological Choices

According to the 'research onion' (Saunders *et al.*, 2023), methodological choices concern the selection of the type of research to be conducted. Therefore, it is important to distinguish these types at the beginning. Taherdoost (2022, p. 53) classified research from three aspects: the application of research (pure research and applied research), the objectives of the research (descriptive, exploratory, explanatory and correlational research) and the data-source approach to research (qualitative research and quantitative research).

Similarly, the research can also be divided into observational research design and experimental research design (6 and Bellamy, 2012), and Creswell (2008) emphasises on quantitative, qualitative and mixed-method research.

Quantitative research is defined as:

> a process of employing numerical values derived from observations to explain and describe the phenomena that the observations can reflect on them. (Taherdoost, 2022, p. 54)

Quantitative research aims to measure variables numerically (e.g. figures, quantities, amounts)(Pawar, 2020), with focuses more on testing a hypotheses (Gray, 2004) and a post-positivist perspective, which includes experimental strategy (e.g. experiments, surveys) (Creswell, 2003).

Aspers and Corte (2019) defined *qualitative research* based on a systematic review:

> An iterative process in which improved understanding to the scientific community is achieved by making new significant distinctions resulting from getting closer to the phenomenon studied. (Aspers and Corte, 2019, p. 139)

Qualitative research aims to demonstrate issues and indicate research questions (Gray, 2004). It focuses on existence, with an emphasis on the depth and richness of context (experiences and perspectives) (Lim, 2024), and is more subjective or non-quantitative (Pawar, 2020). Qualitative research is characterised by openness, aiming to capture complex details of social behaviours and interactions (Lim, 2024).

Mixed-methods research requires a mixing of methods in the data-processing to address the research questions thoroughly (Shorten and Smith 2017; Creswell 2021). It combines both qualitative and quantitative approaches (Taherdoost, 2022; Dawadi *et al.*, 2021; Shorten and Smith, 2017), which includes collecting, analysing and interpreting of both types of data (Dawadi *et al.*, 2021). Mixed-methods research can help the researchers to better understand the interconnection between different data. It also allows participants to express themselves in various ways, helping to paint a more comprehensive picture of the research topic (Creswell 2021; Shorten and Smith 2017).

3.4.1 Justification of the approach

This research aims to (1) identify the competencies of design leadership in China and construct a DLCM; (2) validate the DLCM; and (3) explore its implications for design education.

The selection of China as the country of study is foundational to this research. As discussed in the research context (Section 1.1), China is experiencing an important economic transformation towards an innovation-driven economy, making design and design leadership a critical field. This has raised an urgent demand for a new type of designer and design professional, yet this situation remains under-researched. This makes the Chinese context as an important case for an in-depth investigation.

Therefore, due to the absence of existing design-leadership research in China, this research adopts an exploratory, triangulated **qualitative research** design that includes a structured process for validation and future exploration. As discussed in Section 3.2, this study guides by a blended paradigm. For initial construction and validation stages, an interpretivist paradigm is important to understand how design leaders and stakeholders in design education perceive and articulate competencies. Such perceptions are context-dependent and best captured through rich text rather than numerical measures. Using **archival (documentary) research** as the primary strategy, *semi-structured interviews, documentary analysis of job descriptions* and *grey literature* form the core data sources. This qualitative emphasis aligns with Aspers and Corte's (2019b) description of an iterative process that gains depth by moving ever closer to the phenomenon under investigation.

To enhance the credibility of this research, a **triangulation method** was utilised (details in Section 3.5.1). First, for the DLCM construction, multiple data sources were combined, including a Systematic Literature Review (SLR) (n=98), semi-structured interviews (n=26), grey literature (n=12) and job descriptions (n=50). This approach was used to avoid the bias and limitations inherent to any single source, thereby ensuring the credibility of the findings and capturing a

comprehensive overview of both practical and research contexts. Secondly, during the mapping stage, the DLCM was also triangulated using three data sources: design-education programmes, policy documents and insights from design leaders in industry. This was done to identify any overlaps in competencies between these perspectives, to understand which competencies are taught in design education and to determine how the DLCM can be applied and aligned with these viewpoints.

For the construction of the DLCM, it was important to apply **thematic analysis** in a structured way during the coding process. This structured approach makes the resulting model clearer by establishing a clear and transparent hierarchy. For example, in this research, data were coded into three top-level themes: skills, knowledge and mindset. This enabled the clear construction of a preliminary DLCM from various and heterogeneous sources of evidence.

Moreover, an *expert survey*, feedback from a *case study* and a *workshop* were conducted to ensure the content validity and usability of the DLCM. Alternative quantitative research methods, such as hypothesis-testing or large-scale questionnaires, were not used in this research. This is primarily because reliable measurement instruments for this topic have not yet been developed or researched in the Chinese context. Furthermore, compared with hypothesis-testing, this research is more focused on building an initial understanding of design leadership competencies in China. Therefore, the chosen methodological design aims to maximise the credibility, rigour, transferability and pragmatism of this research.

3.5 Data Collection

Regarding this chapter, the aim of this PhD research is:

To develop a design leadership competency model for Chinese design leaders and explore its implications for design education.

Due to the limited literature in both English and Chinese on this area, this research is *exploratory* in nature and is concerned with gaining insights into the

competencies of design leaders. Therefore, this research is framed in a *qualitative* form to generate thick descriptions and enhance precision. To do so, an *interpretivist* paradigm is primarily employed to interpret the competencies and perceptions of different stakeholders, such as design leaders, academic staff and students (Crotty, 1998). This helps to ensure that the research outcome, a DLCM, is developed within the specific Chinese context (Flick, 2010). Complementing this, the research is also grounded in a *pragmatic paradigm*, which focuses on the practical application of findings. The pragmatic stance mainly employed in the final mapping stage: the exploration of the DLCM's potential in design education. By combining interpretivism with pragmatism, the research ensures that it builds deep, context-specific understanding and then uses that understanding to create an actionable tool.

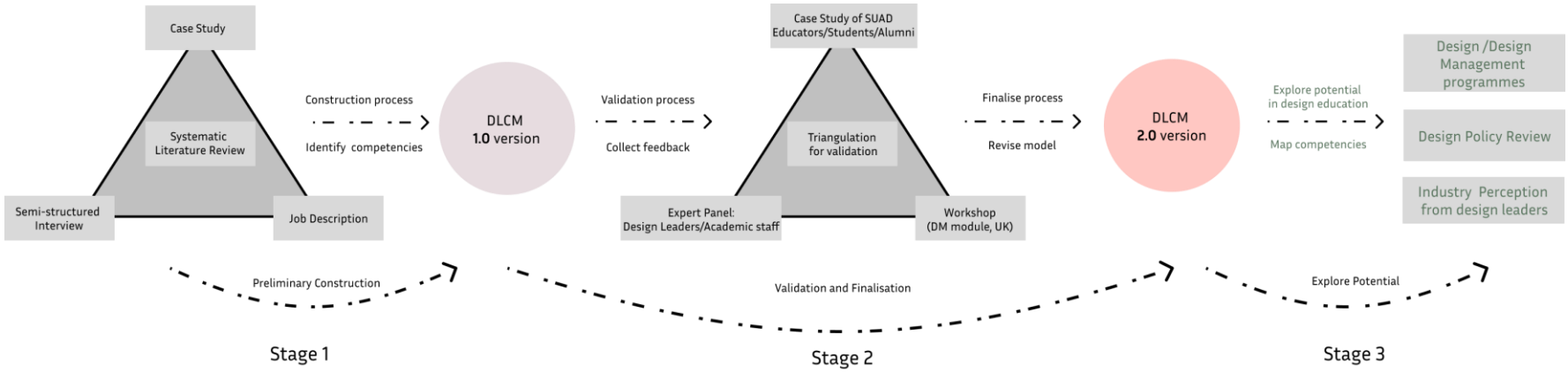
This research is primarily adopted an *inductive approach* (Section 3.3). The SLR of key theoretical concepts, interviews with design leaders, job descriptions and grey literature offer an inductive approach to constructing a competency model. This research analysed interviews and other data to explore how these competencies emerge in practice, potentially identifying new competencies or refining existing ideas.

Based on the research questions and design, this research proceeds in three stages. Stage 1 focuses on the initial construction of a DLCM (Section 3.5.2). Stage 2 aims to validate DLCM (Section 3.5.3). Finally, Stage 3 explores the DLCM's potential in design education by employing a competency mapping method (Section 3.5.4). Detailed stages and data-collection methods are shown in the Figure 22.

Stage 1 focused on building a preliminary version of DLCM (v1.0). Following a triangulation approach, data were gathered from four distinct qualitative sources: (1) the Systematic Literature Review, (2) an analysis of industry job descriptions, (3) grey literature and (4) semi-structured interviews with design leaders. As shown in the data analysis table (Figure 22, below), the data from these sources were synthesised using thematic analysis to identify and define an initial set of core competencies.

Stage 2 was designed to validate and refine the preliminary model. The DLCM v1.0 was tested and critiqued through a further round of triangulation using three methods: (1) an expert survey with senior design leaders and academic staff, (2) a specific case study and (3) a workshop. The feedback and data gathered from these activities were used to revise, merge and finalise the competencies. This validation process led to the final model, DLCM v2.0. The analysis in this stage primarily used template analysis, with the preliminary model serving as the initial template.

Stage 3 explored the practical potential of the validated DLCM v2.0. This stage focused on using the DLCM to map the current state of design education in China. To understand what competencies are currently taught and which are absent or underemphasised in design education, this stage involved analysing three sources: (1) design management and design programmes, (2) design policy documents and (3) industry perceptions gathered from design leaders. Using the final model as a benchmark, this stage identified the extent of competency coverage in current teaching and highlighted key gaps.



	Desk Research					Primary Data		
Data Analysis	Systematic literature review	Job description	Case study (Grey literature)	Programmes choosing	Policy Review	Interview	Survey (Open question)	Workshop
Stage 1	★	★	★			★		
Stage 2						▲	▲	▲
Stage 3				▲	▲	▲		

▲ **Template Analysis**
★ **Thematic Analysis**

Figure 22: Data collection process in this research

3.5.1 Triangulation method

In social science research, triangulation is recognised as an important methodological approach and has received considerable attention within qualitative research (Flick, 2010). Triangulation can be defined as "the combination of methodologies in the study of the same phenomenon", and there are four main types: data triangulation, investigator triangulation, theory triangulation and methodological triangulation (Denzin 2017, p.301). Data triangulation involves using various data sources in a study to verify a specific phenomenon; investigator triangulation entails several researchers conducting the same study; theory triangulation applies different perspectives and theories to interpret research results; and methodological triangulation employs multiple methods to address a research problem. Additionally, Creswell (2008) claims that data triangulation can build a coherent justification for themes. When themes are established through converging several data sources or perspectives, it enhances the validity of the research findings.

To ensure a comprehensive and robust analysis, this research primarily employed data triangulation across three stages, which was complemented by methodological triangulation.

- *Stage 1* (*Construction*): In the initial stage, the DLCM was constructed using four data sources: a systematic literature review, interviews with design leaders, an analysis of job descriptions and grey literature.
- *Stage 2* (*Validation*): The second stage validated the DLCM by triangulating both data and methods, gathering information through an expert survey, feedback from case study stakeholders and a student workshop.
- *Stage 3* (*Implication*): The final stage focused on mapping the DLCM onto design education. This involved collecting data from three perspectives to identify competencies currently taught and those that are absent or underemphasised: the industry perspective (design leaders' perception of design education), the policy perspective (demand for new types of design talents) and the educational perspective (analysis of design-education programmes)

The triangulation approach supports the cross-checking of findings through the convergence of various perspectives, thereby increasing the credibility and validity of the final results (Rahman, 2012). The method not only helps to mitigate potential biases from participants or the researcher but also provides a more comprehensive understanding of design leaders' competencies, contributing to a more holistic competency model.

3.5.2 Stage 1: construction of the DLCM

The preliminary DLCM construction stage comprised four data collection methods: a systematic literature review (Section 3.5.2.1), interviews (Section 3.5.2.2), document analysis (Section 3.5.2.3) and grey literature (Section **Error! Reference source not found.**).

3.5.2.1 The Systematic Literature Review

It is important to understand the current state of design leadership research and identify competencies previously documented in the literature. To ensure a comprehensive and methodologically rigorous review, the research employed a Systematic Literature Review (SLR) approach guided by the PRISMA framework (Page *et al.*, 2021). A detailed diagram of the process is shown in Figure 23.

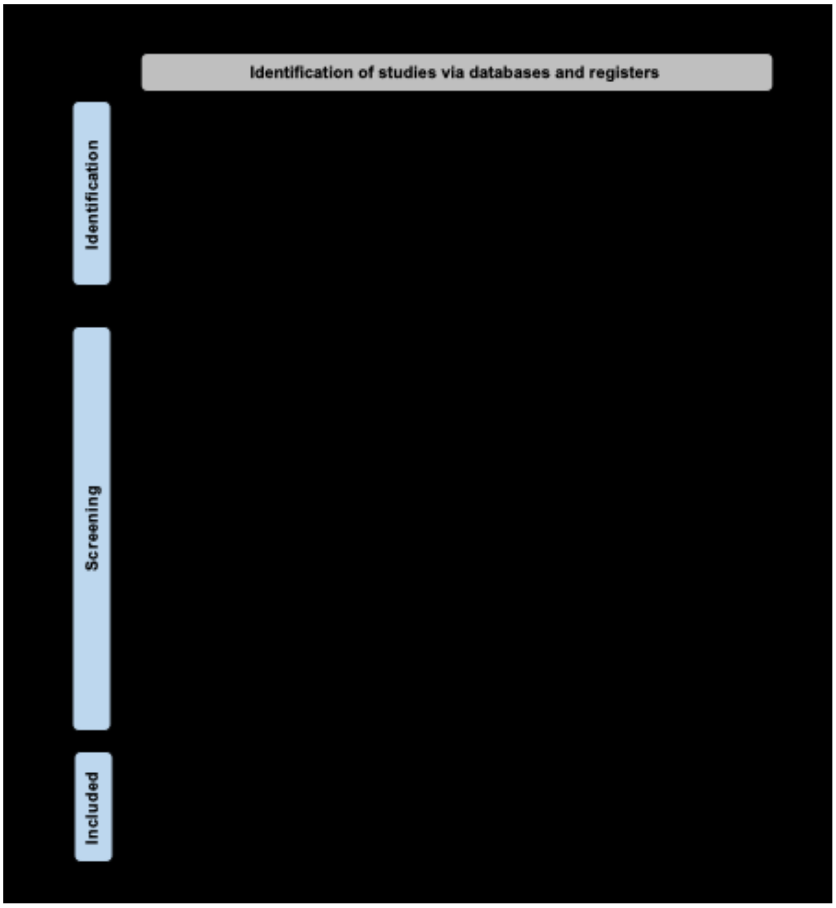


Figure 23: PRISMA flow diagram of the Systematic Literature Review (SLR)

Generating a comprehensive and targeted dataset is essential for robust research. In an SLR, it is particularly important to validate the search syntax to guarantee the rigour and comprehensiveness of the research. The process of determining the final search syntax involved two main steps. First, an initial search was conducted across databases using various terms (e.g. ‘design leadership’, ‘design leaders’, ‘design entrepreneurship’). In addition to helping define the search terms, this step provided a general overview of the existing research. Following this, a list of key terms was identified and combined into a preliminary search syntax. Second, to ensure this preliminary syntax was both relevant and comprehensive, a revision stage was undertaken. This involved incorporating feedback from professionals, such as supervisors and researchers experienced in conducting SLRs. After this revision, the finalised search syntax was determined, resulting in wider coverage and more targeted results. Details of the final search syntax can be found in Table 12, below.

Table 12: Search syntax of the SLR in this research

Constant Concept	Variable Concept
((perspectiv* OR behavior* OR practice*) AND (“designer leadership” OR design leader* OR design leadership) AND (SME* OR SMME* OR enterpris* OR compan* OR business))	Innovation; creative; successful; educat*; polic*; learn*; competen*; designer*; design thinking

Web of Science, ACM Digital Library, IEEE Xplore and Scopus were chosen as the primary databases for this research in order to capture a broad range of studies on design leadership. ACM Digital Library and IEEE Xplore have a focus on HCI, technology and engineering, which helps to capture research related to leadership in UX (User Experience) design and product development. In parallel, Web of Science and Scopus provide a broad, high-quality, multidisciplinary focus that includes management, leadership, innovation and design studies. Therefore, combining two comprehensive databases (Web of Science, Scopus) with two subject-specialist databases (ACM, IEEE) ensured a comprehensive SLR result and reduced potential disciplinary bias.

As this research is focused on the Chinese context, Chinese indexes were also included initially to offer an overview of Chinese design leadership development. Therefore, two of China’s largest databases, China National Knowledge Infrastructure (CNKI) and Wanfang Data, were manually searched. However, only four peer-reviewed articles on design leadership were identified. These articles primarily offered reflections on design leadership, discussed it as a new direction in the design management field (Lin and Li, 2018; Yang, 2020; Yang and Zhang, 2024) or discussed the designers’ new role in a social innovation context (Yang and Lin, 2022). Crucially, none of these papers focused on or mentioned specific competencies and thus did not meet the eligibility criteria (shown below). Due to the scarcity of relevant research in China, the focus of the SLR was therefore placed on international, English-language literature.

After searching each database, all relevant articles were imported into Zotero reference manager. Subsequently, these sources underwent a rigorous eligibility screening process to ensure they were both credible and directly relevant to the

research topic. During this process, the screening was guided by the following five eligibility criteria:

- Language: Only full-text articles written in English or Chinese were considered (reflecting the research's focus on the Chinese context).
- Peer review: All included articles must be peer-reviewed.
- Title and abstract relevance: The title or abstract should mentions design leadership (or related terms) and indicates a business or organisational context.
- Population: The study should focus on design leaders or managers (e.g. Head/Director/VP of Design, Design Manager, Creative Director).
- Context: They study should focus on organisational and industry settings. Generic leadership literature without a design focus and literatures focused solely on educational curricula without reference to industry practice were excluded.

Due to the variety of databases searched, the initial stage yielded 776 articles. A significant number of these were excluded during the screening process; specifically, 546 articles were removed based on their titles and abstracts. The remaining articles proceeded to a full-text evaluation stage. As design leadership involves both leadership and management-related activities (Gemser *et al.*, 2022), relevant literatures from design-management and design-entrepreneurship were also included, a decision supported by the discussion in Section 2.4. Additionally, further articles were identified through citation tracking and included if they met the eligibility criteria. Finally, 98 articles were selected for a final review.

Based on the analysis of these papers, a preliminary competency-focused framework was created. This framework is divided into three parts – skills, knowledge and mindset – with each part containing detailed competencies categorised accordingly. This division is based on both the review of competency components (Section 2.5.2) and the nature of the identified competencies themselves. The detailed analysis process can be found in Section 4.1.1.1, and the results are presented in Appendix B.

3.5.2.2 Interviews with design leaders

Different types of interviews

An interview is a verbal exchange where one individual, the interviewer, seeks to gather information from and understand another individual, the interviewee. It is a critical method in qualitative research (Qu and Dumay, 2011). Interviews serve two primary purposes: gathering information about an individual's knowledge, values, preferences and attitudes; and complementing other research methods, such as surveys, to explore emerging issues further (Rutledge and Hogg, 2020; Harris and Brown, 2010).

There are three types of interviews: structured, semi-structured and unstructured (open-ended) (Stuckey, 2013). Each type has distinct strengths and limitations. Structured interviews allow for rapid data collection but are largely interviewer-led. Unstructured interviews offer depth but can lack focus. Semi-structured interviews, however, balance these extremes. In semi-structured interviews, interviewers use a guide with both open-ended and closed questions but can adapt their approach and probe for deeper insights. For this study, the semi-structured interview was selected as the most appropriate method.

Developing the interview outline

To ensure interview quality and alignment with the research aims, the STAR method (Situation, Task, Action, Result) (Van Der Bijl *et al.*, 2024) and Spencer's five-step Behaviour Event Interview (BEI) technique (Spencer and Spencer, 1993) were employed to formulate the interview questions. The STAR method includes four steps: situation, task, action and result. Spencer's BEI method involves five steps: a brief introduction, exploring job responsibilities, discussing a behavioural event, identifying necessary competencies and summarising. Using these methods helps interviewees provide detailed descriptions of events, allowing for a comprehensive understanding of the competencies possessed by design leaders.

The structured interview outline covered the following areas:

- *Professional background and role*: Discussed the design leader's experience, career trajectory, challenges, motivations, daily responsibilities and aspects they enjoy or dislike about their role.
- *Design evolution*: Explored the interviewee's perceptions of how design has evolved throughout their career, the integration of design within their organisations and future visions for design.
- *Understanding of design leadership*: Examined the dual roles of being a design leader and a designer, challenges during role transitions, differences between design leaders and traditional business leaders and their conception of an ideal design leader.
- *Continuous learning*: Investigated how design leaders acquire new knowledge, keep up with industry trends and update their professional skills.
- *Competencies and design education*: Identified competencies gained through education and professional experience, recognised perceived issues in current design education and elicits suggestions for improving it to better align with industry demands.

Additionally, a question about the 'ideal design leader' was included in the outline. The reason for adding this was to complement the time-limited interviews, as some competencies might otherwise have been missed. This outline enhanced the understanding of the roles and responsibilities of design leaders. It also facilitated the identification of key competencies and highlighted areas for improvement in design education. Moreover, the part on *Competency and design education* was also used in Stage 3 (Section 3.5.4) as a data source on industry perceptions, helping to identify which competencies are taught and which are absent or underemphasised.

Interviewee sampling

To ensure research quality and effectively address the research questions, it was critical to establish clear interviewee-selection criteria. Based on the research aims and the discussion of design leaders expertise in the literature review (Section 2.5.5), four main criteria were identified: geographical scope, industry

diversity, leadership positions and an educational background. A key requirement was that participants must have a design education background. Therefore, all interviewees selected for this study have a formal design education. The other three criteria are detailed below:

- *Geographical scope*: the interviewee should be based in China

This criterion ensures that the research specifically addresses Chinese design leadership, which has distinct cultural characteristics. By selecting interviewees familiar with the local business context and environment, the research gains context-specific insights that are more relevant and applicable.

- *Industry diversity:* the interviewee's company should represent various industries or sectors

Ensuring diversity across different industries helps to prevent industry-specific biases and enhances the generalisability of the design-leadership competency model. Different industries may require distinct leadership styles, behaviours, norms and competencies. Thus, considering industry diversity enriches the research findings and conclusions and addressing a gap in existing research that is often limited to specific industries.

- *Leadership position:* the interviewee should be a company founders or hold a senior leadership positions

As the research focuses on leadership competencies, obtaining insights from founders or senior leaders ensures a deep understanding. Individuals in these positions typically possess rich experience in organisational leadership, vision-setting and employee management, providing valuable insights into the competencies necessary for effective design leadership. In line with the definition of design leaders in Section 2.7.4, interviewees should hold top, strategic positions. For SMEs or Start-ups, this would include roles like CEO, CDO, VP of Design. For a large company, this would include roles such as a Design Director or other similar positions.

Interview guide and pilot study

As part of the research preparation, a pilot study was conducted with one design leader to refine the interview guide. The purpose of the pilot study was to evaluate the clarity, relevance and effectiveness of the questions before beginning formal data collection. The study also assessed whether questions accurately captured the research themes, help to identify redundancy or ambiguity and followed the logical flow and sequence of the questions. The pilot interview, conducted on 19 November 2023, lasted over two hours. The result was satisfactory, leading to four minor modifications based on the feedback received:

- *Removed redundant questions*: Two repetitive questions were eliminated, reducing the total from 15 to 13. For example, the question '*If you need to recruit a designer with leadership abilities, what criteria will you follow?*' was removed due to similarity to '*What competencies should a future design leader have?*'
- *Question sequence adjustments*: The sequence of questions was altered slightly for better logic and flow. A question about design evolution was moved to before a question on design integration within the company.
- *Clarified terminology and prompts*: Clarification was added for the term 'business problem', and the prompt '*What changes have you seen in design throughout your work experience?*' was added to assist interviewees in providing precise responses.
- *Structured interview conclusion*: At the interviewee's request, a clear and structured ending to the interview, leading to specific ending remarks being included.

The pilot study ensured that the final interview guide was structured effectively and aligned closely with the research aims and objectives. After implementing these modifications, formal interviews proceeded with selected participants.

Conducting the interviews

Due to geographical constraints, all interviews were conducted online and participants chose interview dates and times based on their availability. The

geographical distribution of the interviewees is shown in Figure 24. Each interview lasted from 45 minutes to two hours.

Figure 24: Geographical distribution of the interviewees

At the start of each interview, the author provided a brief introduction, explained the consent form and highlighted confidentiality measures. Since some participants were unable to physically sign consent forms, oral consent was obtained twice – prior to the interview and again before recording commenced, with participants stating: "I consent to participate in this research and understand all the rules."

Throughout the interviews, the author listened attentively, avoided interruptions, remained sensitive to emotional cues and refrained from using judgemental language. Neutral expressions such as 'areas for improvement' replaced potentially negative terms like 'failure'.

Interviews continued until data saturation was reached (Vasileiou *et al.*, 2018), after which transcripts were generated through repeated listening and verification with recordings. As a result, 26 interviews were conducted, producing 26 transcripts and the demographics of the interviewees are shown in Table 13, below.

Data limitations and researcher positionality

While semi-structured interviews provide rich, qualitative insights, this research acknowledges the inherent limitations of self-reporting, such as potential recall bias or the tendency for participants to present themselves in a socially desirable image. To address these challenges and ensure the credibility of the data, this study relied on reflection regarding researcher positionality and methodological triangulation.

The researcher's positionality played an important role in mitigating the risks of interviewees' responses. During the data collection process, a specific situation emerged wherein the design leaders viewed the researcher not as a competitor or a peer evaluator, but as a junior student. This perceived status shifted the interview situation from a formal interrogation to a mentorship exchange. Participants frequently adopted a pedagogical stance, as they feel a cultural inclination to 'teach' the researcher about the industry's realities. This situation help researcher to overcome the obstacle of self-reporting in the interview; as the interview progressed, participants became increasingly expansive – which is a phenomenon described in Chinese contexts as *dakai huaxiazi* (opening the chatterbox). Consequently, interviewees felt comfortable sharing 'unspoken norms', more depth knowledge and organisational rules with the researcher.

Furthermore, the researcher's status as a cultural insider significantly impacts the interpretation of the data. Sharing the same cultural background and language as the Chinese interviewees allowed for the detection of subtle nuances and high context dependency communication cues. This shared identity helped establish rapid trust, allowing for a deeper exploration of sensitive topics regarding leadership challenges within the Chinese context.

Finally, as forementioned, to validate the credibility of these self-reported data, this research employed methodological triangulation. The themes identified in the interview were not accepted in isolation; they were cross-referenced and triangulated against three complementary data sources: systematic literature review, grey literature, and job descriptions. this triangulation ensured that the subjective insights gained from the interviews were grounded in and supported by broader objective evidence.

Table 13: Demographics of the interviewees

Interviewee	Gender	Working Years	Education	Major	Job position	Service/Industry	Company Size	Years in Operation	Location
IN1	Female	3	Master's	Graphic Design	Design Director	Online Course and Education	More than 1,000	15	Shanghai
IN2	Female	4	Bachelor's	Design Management	Director of Labour Relations	Logistics and Courier Services	More than 1,000	30	Shenzhen
IN3	Male	22	Bachelor's	Industrial Design	CEO	E-cigarettes and Vaping	11–50	8	Shenzhen
IN4	Female	3	Master's	UX Design	CEO	Handicraft Industry	1–10	3	Guangzhou
IN5	Male	36	Master's	Creative and Marketing	VP CMO/ ECD*	Fashion and Clothing	More than 1,000	54	Shanghai (San Francisco)
IN6	Female	3	Master's	Art & Design	Project Director	Telecommunications and Electronics Industry	More than 1,000	60	Beijing
IN7	Female	3	Master's	Design Management	Head of Projects	Interior design	11–50	10	Hong Kong
IN8	Male	3	Master's	Architectural Design	Chief Design Officer	Urban Planning and Landscape Architecture	501–1000	24	Guangzhou
IN9	Male	16	Bachelor's	Industrial Design	CEO	Transportation Vehicle & Medical Device Design	1–10	14	Shanghai
IN10	Male	12	Bachelor's	Interior Design	Vice General Manager	Interior Design	11–50	21	Weifang
IN11	Male	9	Bachelor's	Design Management	CEO	Consulting	11–50	9	Jinan
IN12	Male	28	Diploma	Art Design	CEO	Brand Consulting	11–50	24	Jinan
IN13	Female	3	Master's	UX Design	Design Director	Electric Vehicle (EV) and Smart Vehicle Sector	More than 1,000	7	Guangzhou
IN14	Male	6	Bachelor's	Graphic Design	Department Manager	Fashion and Clothing	More than 1,000	27	Wenzhou
IN15	Male	9	Bachelor's	Environmental Design	Landscape Design Director	Urban Planning and Landscape Architecture	501–1000	23	Guangzhou
IN16	Male	5	Master's	Environmental Design	Design Director	Smart Home	251–500	12	Shenzhen
IN17	Male	10	Master's	Art & Design	CEO	Landscape Architecture (Property)	11–50	4	Linyi
IN18	Male	15	Bachelor's	Industrial Design	CEO	Cultural and Creative Design Service	11–50	9	Shanghai
IN19	Female	7	Bachelor's	Digital Media Design	Design Director	Gaming	More than 1,000	16	Beijing
IN20	Male	14	Bachelor's	Industrial Design	CEO	Industrial Design and Branding	51–250	10	Shenzhen
IN21	Male	6	Bachelor's	Graphic Design	CEO	Footwear Manufacturing	251–500	6	Putian
IN22	Male	22	Bachelor's	Urban Design	CEO	Urban Planning and Landscape Architecture	501–1000	24	Guangzhou
IN23	Female	17	Bachelor's	Fashion (Jewellery) Design	CEO	Arts and Culture Education	11–50	14	Weifang
IN24	Female	16	Master's	Architecture	Vice General Manager	Urban Planning and Landscape Architecture	More than 1,000	24	Guangzhou
IN25	Female	5	Bachelor's	Product Design	CEO	Hotel and Tourism	51–250	10+	Weihai
IN26	Male	5	Bachelor's	Product Design	CEO	New Media Operations	11–50	5	Xuzhou

(*ECD: Executive Creative Director)

3.5.2.3 Document analysis of job descriptions

Document analysis can help researchers collect job descriptions from different sources and analyse them to find certain patterns and requirements for individuals in a target job (Bowen, 2009; Choi and Rasmussen, 2009). Because competencies are directly tied to a job, developing a comprehensive view of the competencies required of a design leader first necessitates a job analysis of that position to extract the relevant competency elements from its job description.

To build preliminary competency constructs for the DLCM, 50 job descriptions were collected between February and May 2024. This sample size was constrained by the seniority of the roles, as such positions are often filled privately (such as headhunters), limiting public posting. Furthermore, this data represents a single snapshot in time. The jobs market is dynamic – influenced by a rapidly changing economic climate, technological advancements and even seasonal variances. These shifts constantly redefine job descriptions and impose new requirements on design leaders at a strategic level. For this study, the data sources included three platforms:

- Zhaopin Limited (https://www.zhaopin.com/) – 18 posts
- 51 Job (https://www.51job.com/) – 13 posts
- Tongdao Liepin Group (https://www.liepin.com/zhaogongzuo/) – 19 posts

Three platforms were selected for their prominence in China's job market and their extensive listings of strategic and entrepreneurial roles. According to *Qianqi Consulting* [谦启咨询] (2024), 51job, Zhaopin and Liepin are the three of the main recruitment websites in China.

One of China's earliest recruitment platforms, *Zhaopin* lists more than 14 million vacancies nationwide. The breadth is a plus, but the sheer volume can be overwhelming, so candidates often spend extra time filtering suitable roles. *51job* ranks among the country's most influential HR service providers. Beyond recruitment, it offers training, assessment and HR outsourcing, making it a good fit for employers with more demanding HR requirements. *Liepin* focuses on high-end recruitment and excels at placing senior managers. Posting jobs is free, but a fee is

charged for access to premium CVs and higher visibility. Its large network of headhunters opens the door to a wide range of executive positions.

Selection process

The selection process was conducted in two steps as follows:

***Step 1**: Initial filtering by position type*

Setting the 'type of position' filter produced initial results on each website and can effectively screened for higher-level positions on websites in the design industry. For example, on the *Liepin* platform, the filter sequence was: Type of Position → Senior/Management Roles → Choose Industry (Figure 25, below).

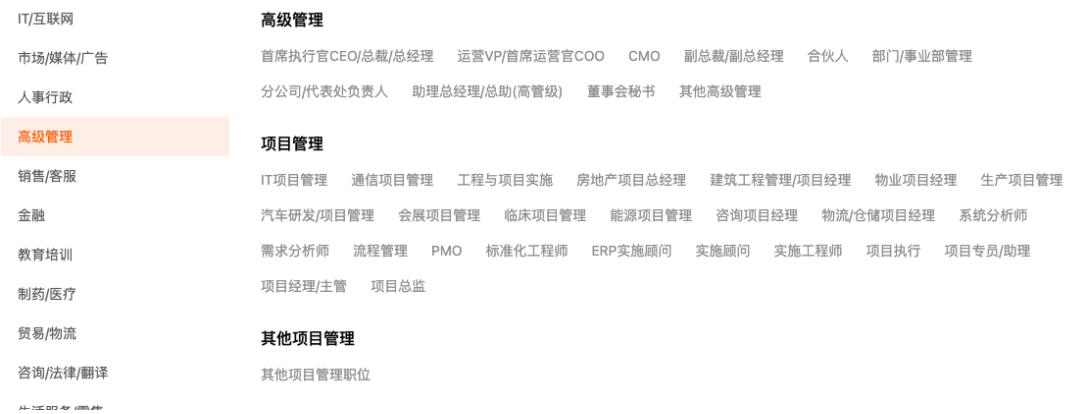


Figure 25: Example of the 'type of position' filter on Liepin

To screen the job postings, six criteria were applied to ensure each selection was valid:

- *Seniority*: The job position had to involve strategic-level responsibilities;
- *Background*: Candidates were required to have a design education or relevant design experience;
- *Location*: The position had to be based in China;
- *Industry*: Roles needed to span diverse sectors, not just companies whose primary business is selling design services;
- *Recency*: Job postings had to be recent (posted within the last 12 months);
- *Sufficient Detail*: Postings were excluded if they lacked adequate information. This applied to descriptions that only listed responsibilities

without explanation or were deemed too brief, as an example shown in Figure 26.

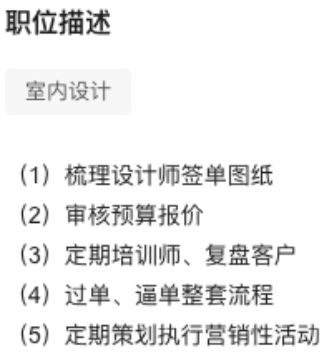


Figure 26: Example of a job description (In Chinese) to be eliminated (https://www.zhipin.com/web/geek/jobs?city=101270100&position=120401&query=%E5%AE%A4%E5%86%85%E8%AE%BE%E8%AE%A1)

***Step 2**: Targeted keyword search*

Searching for terms such as 'CEO', 'manager', 'general manager', 'VP', 'CDO' and 'design manager' revealed positions that were missed in the first round. Other keywords used for the search also included 'Design Leader', 'Design Director', 'VP of Design', 'Head of Design' or other similar titles shown in the results.

Following this two-step process, a final sample of 50 job descriptions was selected for analysis (Table 14). A manual thematic analysis was then conducted on this sample to identify recurring competencies, a process detailed in Section 4.1.1.3. As the result, themes and competencies were systematically organised in a table for future review (Appendix D).

Table 14: List of job positions

Liepin	Job position	Zhaopin	Job position	51job	Job position
JD1	CEO	**JD1**	Deputy Dean of Design Institute – multiple disciplines, entrepreneurial partner	**JD1**	Chief Executive Officer (CEO)
JD2	Reserve CEO (CEO-designate)	**JD2**	Executive President of the Design Institute	**JD2**	Chief Executive Officer (CEO) / President
JD3	Business-Unit General Manager	**JD3**	General Manager, Design Company	**JD3**	CEO
JD4	Chief Design Officer	**JD4**	General Manager / Operations Director / Partner	**JD4**	Chief Executive Officer (CEO) / President
JD5	Dean of Design Institute	**JD5**	General Manager (CEO)	**JD5**	Design Director
JD6	Brand-Design Director (new brand)	**JD6**	General Manager	**JD6**	Director, Design-Management Department
JD7	ID Design Director	**JD7**	Company General Manager	**JD7**	Design Manager
JD8	Product-Design Lead	**JD8**	General Manager, Industrial Park	**JD8**	Dean of Design Institute
JD9	Senior Design Expert, UX Platform	**JD9**	Subsidiary General Manager	**JD9**	General Manager
JD10	Design Vice President, Private Real-Estate Group	**JD10**	General Manager, Design Company	**JD10**	Deputy General Manager, Guangxi Branch
JD11	Vice President, Outdoor-Apparel Design	**JD11**	General Manager, Engineering-Design Company	**JD11**	Branch Deputy General Manager / Head
JD12	Executive Vice President, Design	**JD12**	Geotechnical Design Division Manager	**JD12**	Executive Dean of Design Institute
JD13	Design Director / VP	**JD13**	Architectural Design Division General Manager	**JD13**	Dean, New-Energy Design Institute
JD14	Design Director / Vice President / VP	**JD14**	Chief Structural Engineer		
JD15	Interior-Design Director / Vice President	**JD15**	Director of Intelligent Systems		
JD16	Design Director / VP	**JD16**	Marketing Director		
JD17	Assistant Vice President	**JD17**	Product Manager		
JD18	Group Vice President	**JD18**	Business Manager		
JD19	Vice President				

3.5.2.4 Grey literature

To gain additional insight into design leader competencies, some examples derived from grey literature, including industry reports, professional blogs and published interviews (e.g. Figure 27).

The selection of these grey literature was guided by four primary criteria:

- *Geographical relevance*: Cases were focused on design leaders in China;
- *Background*: Individuals were required to have a design education background, and over ten years of experience;
- *Seniority*: The leader had to hold a top-level, strategic position;
- *Industry diversity*: Cases were drawn from a variety of sectors, including technology, education and business services.

A total of 12 grey literature meeting these criteria were analysed, further informing the comprehensive competency framework (Table 15, below).

Figure 27: One of the main grey literature sources: the BDD Watch website

Table 15: Full list of case studies

Examples	Name	Major	Company & Job position
GL1	Yu Zheng	Industrial Design	Founder, Playhut Inc. (Tonglehe Co., Ltd.)
GL2	Xingbo Chen	Industrial Design	Director, Jialantu Product Design Research Institute; Huole Technology Development Co., Ltd.
GL3	Jie Tong	Product Design	Founder, Duozoulu ('Walk More')

GL4	Guohui Qian	Industrial Design	CEO, Shanghai Tujia Technology Co., Ltd.
CA5	Lidan Liu	Product Design	Founder, Xiao Hou Technology
GL6	Hua Hong	Industrial Design	Dean, Guchang Entrepreneurship Academy; Founder, Beijing Qinghe Guchang Technology Co., Ltd.
GL7	Jun Zhang	Industrial Design	Founder, Xiaobei Technology
GL8	Jun Su	Industrial Design	Founder & CEO, Zhimi Technology
GL9	Fei Wang	Industrial Design	Co-founder, Hangzhou Deep-Thinking Artificial Intelligence Co., Ltd.
GL10	Ning Xiao	Industrial Design	Founder & Chairman, Qiji Auto
GL11	Yue Yu	Industrial Design	Design Director & Co-founder, Shanghai Timemore Coffee Equipment Co., Ltd.
GL12	Hai Yan	Industrial Design	Founder, Chengtian Technology

3.5.3 Stage 2: validation of the DLCM

Although triangulation ensured the initial validity of the DLCM, additional validation was sought after constructing the preliminary DLCM, which initially included 16 competencies. The competencies were validated through feedback from three sources: expert surveys, interviews and a workshop with design management stakeholders, to confirm their definitions, relevance and appropriateness.

3.5.3.1 Expert survey

Stage 2 of the validation process involved an expert survey with open-ended questions designed to refine the DLCM (see Figure 22). The expert panel was composed of two groups: senior industry design leaders and experienced design academic staff.

Expert criteria were strictly defined. Industry leaders were required to have design education background and over 10 years of experience in a strategic leadership role (e.g. CEO, CDO) or more than five years as the founder of a start-up. Academic

staff were required to be professors or senior lecturers with over 10 years of experience in design or design management field.

The experience thresholds for the expert panel were established to ensure the selection of information-rich participants, a key principle for purposive sampling (Creswell, 2013; Patton, 2014). This experience requirement aligns with foundational research on expert performance, which indicates that approximately a decade of deliberate practice is necessary to develop a deep understanding within a complex domain (Ericsson *et al.*, 1993). This selection strategy therefore enhances the credibility and validity of the feedback received on the DLCM.

Part of participants were recruited using the snowball method, as this approach can find target participants more efficiently and effectively when they are not easily accessible (Naderifar *et al.*, 2017). The final panel consisted of 12 experts: seven design leaders (recruited from the Stage 1 interviews) and five academic staff.

The reason to recruit some group of design leaders is they already familiar with this research topic. As they contributed to the initial construction of the DLCM in Stage 1, they are uniquely positioned to provide a informed, high-quality feedback on the model in this validation process.

The feedback focused on two main aspects: an evaluation of each competency's importance, and suggestions regarding potential redundancies or absent competencies. Additionally, basic demographic information about the experts was collected. All responses were gathered through Qualtrics. To complement the written survey, panel members were also invited to provide additional comments via voice message, accommodating the preferences of some design leaders. Details are shown in Table 16, below.

Table 16: Expert participants

Interviewee	Working Years	Education	Job position/study level	Group
DL1	15	Bachelor's	Chief Design Officer (CDO) / VP of Design	*Design Leader*
DL2	17	Bachelor's	Chief Executive Officer (CEO)	

DL3	22	Bachelor's	Chairman & President of Design Institute	
DL4	23	Bachelor's	Vice President of Design	
DL5	38	Master's	VP & CMO, Executive creative director	
DL6	7	Bachelor's	Founder & CEO	
DL7	5	Master's	Design Director	
EDU1	20	PhD	Senior Lecturer	*Educator*
EDU2	16	Master's	Senior Lecturer	
EDU3	30	PhD	Professor	
EDU4	10	PhD	Senior Lecturer	
EDU5	12	PhD	Senior Lecturer, Director of Cultural Industry Management Programme	

3.5.3.2 Interview with the design management programme

The author chose the case study as it can help to gain a deeper understanding of the current status of design management and leadership competencies taught and to better prepare for the subsequent competency mapping process. A case study method is applicable in many situations, especially commonly used in education, and it can help to"investigate phenomena in-depth with the real-life context" (Yin 2009, p. 18). Shandong University of Art and Design (SUAD) was selected as a case study, given its relevance and historical significance to design management education (Figure 28, below). SUAD was one of the first universities in China to establish a design management programme in 2003. Its UG and PG programmes focus on integrating design with management and leadership, aligning closely with this research's aim. The comprehensive curriculum at both levels provides a broader understanding of and valuable insights into the development of design leadership competencies.

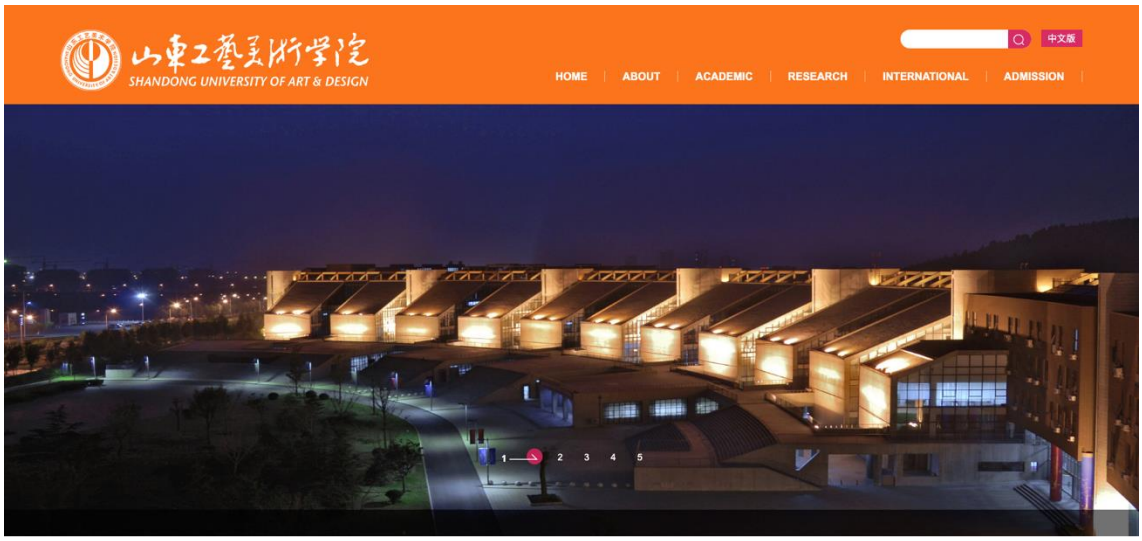


Figure 28: Official website of the case study

Interviews were conducted for two main purposes across both Stage 2 and Stage 3 and were divided into two parts: a validation of DLCM and an exploration of perceptions regarding design education. Participants from the design management programme consisted of three groups: educators, UG and PG students from the DM programme and alumni who had transitioned into a leadership or management roles in the industry.

Given that the DLCM is intended for application in design education, capturing not only educators' but also students' perspectives was essential to integrate their future aspirations. The *validation* part sought general feedback on the DLCM, specifically identifying missing competencies, highlighting important ones and suggesting competencies could be removed.

The validation interview focused on four aspects:

- The perceived importance of each competency;
- Identification of any missing competencies;
- Suggestions for removing redundant competencies;
- Overall feedback on the model.

The *exploration* part aimed to understand participants' perceptions of the competency-related aspects of the programme. This part corresponds to the exploration stage detailed later (Section 3.5.4) and is introduced here to ensure the

consistency and avoid repetition. Regarding design education, the interviews explored the relevance and current status of competencies taught within the programme, as well as potential improvements. The interview outline covered five key areas:

- Perceptions of core competencies taught;
- Gaps and areas for improvement in the curriculum;
- The degree of alignment between education and industry needs;
- Identification of absent or underemphasised competencies in current teaching;
- Challenges related to teaching and learning.

All interviews were conducted from December 2024 to January 2025 via online. Participants chose interview dates and times based on their availability, and each session lasted from 33 to 100 minutes. The interviews were conducted following similar guidelines and steps mentioned in Section 3.5.2.2. Finally, 14 semi-structured interviews were completed, including three educators, eight design-management students and three alumni. The interviewee list is shown in Table 17, below.

Table 17: Participants in the university case study (SUAD)

Interviewee	Working Years	Education	Job position/study level	Group
STU1	n/a	n/a	UG&PG	*Students from Design-management programme at SUAD*
STU2	n/a	n/a	UG&PG	
STU3	n/a	n/a	UG&PG	
STU4	n/a	n/a	UG	
STU5	n/a	n/a	UG	
STU6	n/a	n/a	PG	
STU7	n/a	n/a	UG&PG	
STU8	n/a	n/a	UG&PG	
ALU1	8	Bachelor's	UG	*Alumni from Design-management programme at SUAD*
ALU2	9	Bachelor's	UG	
ALU3	6	Bachelor's	UG	
EDU1	20	PhD	Senior Lecturer in UG Design management programme	*Educators*
EDU2	16	Master	Senior Lecturer in UG Design management programme	

EDU3	30	PhD	Professor in PG Design management programme	

3.5.3.3 Workshop validation

The DLCM was also validated through a workshop run in an undergraduate DM module at Lancaster University (UK). The purpose of the workshop was to validate the DLCM's transferability: although it was developed in a Chinese context, design leadership principles should transcend national boundaries. The workshops was planned with the module convenors as part of their teaching activities, and the participants were second-year students from different backgrounds, including marketing, design and a combination of design and marketing. Workshop tools were developed, including two templates and a set of competency cards (see Figure 29). The workshop took place in February 2025, lasted two hours, and involved nine students organised into four self-selecting groups.

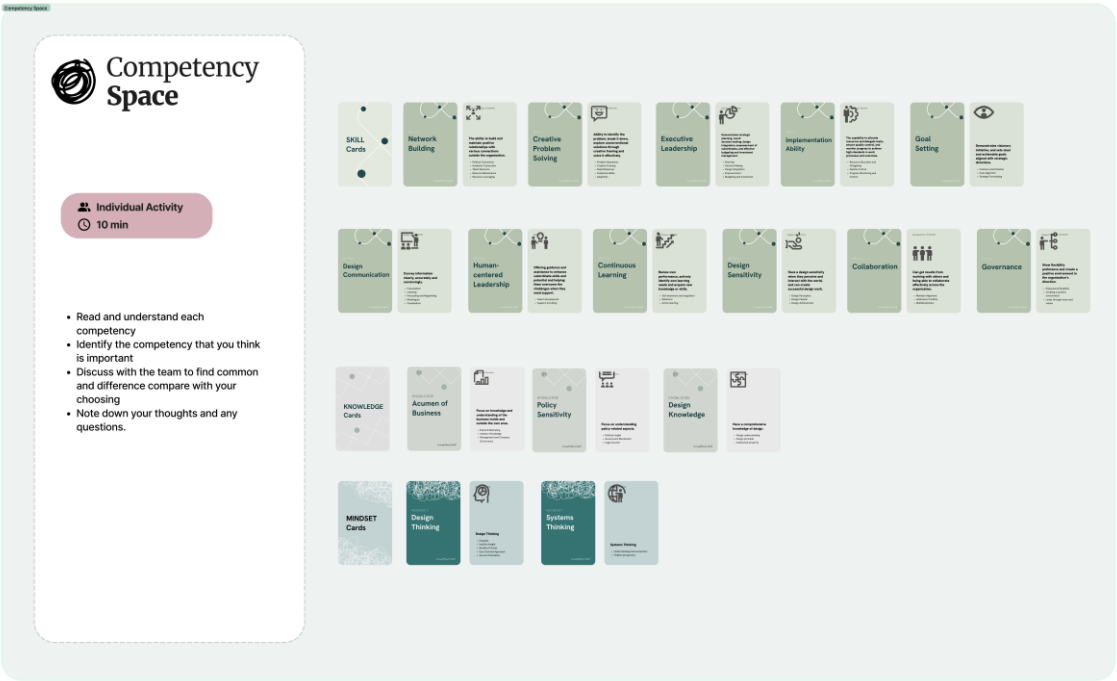


Figure 29: Part of the workshop tools and the competency cards

As mentioned previously, the main reason for conducting a DM workshop was to validate the cross-cultural aspects of the DLCM. Although the DLCM was originally developed from data gathered in a Chinese context, design leaders exhibit many

universal patterns. Validating it in the UK was intended to demonstrate that the model has broader applicability in other geographical contexts.

A second reason for this was its direct relevance to the target domain. By holding the workshop within a DM module, the author engaged students already being trained in related skills and knowledge areas, since the DM curriculum overlaps significantly with design leadership. Because they were learning similar concepts that the DLCM integrates, such as strategy, process and leadership, their feedback was especially valuable. Furthermore, as these undergraduates represent the next generation of design leaders, their insights also highlighted where the DLCM might need to evolve to remain relevant to emerging industry needs and cultural shifts.

The session was divided into two parts: a brief introduction to design leadership, which provided students with context and core concepts; following by a workshop exercise focused on identifying and discussing design leaders' competencies. The exercise consisted of four steps:

Step 1: Discover Competencies (Individual work)

Students were asked: *'Who is a design leader?'* and wrote down their thoughts about their ideal design leader's competencies on a worksheet. At this stage they engaged their imagination and quickly noted what competencies they would have if they themselves were design leaders. This step served as a brainstorming session.

Step 2: Understand Competencies (Individual work)

Using competency cards, students read and reflected on each competency, identified those they felt were most important and jotted any questions or observations.

Step 3: Categorise Competencies (Teamwork)

In small groups, students used a matrix to position each competency according to two questions: *'Is this competency important for a design leader?'* and *'Is it easy or hard to learn?'* They discussed their answers and agreed on each competency's placement in the matrix template.

Step 4: Discussion and Reflection

Finally, the whole class discussed the following questions:

- *How many of these competencies have you developed during your university studies?*
- *Which competencies are emphasised most in your programme?*
- *Are there any competencies you don't think you'll be able to acquire at university, and if so, why?*
- *How can you continue to develop these competencies?*

The detailed analysis process and results will be shown in Section 4.4.3.

3.5.4 Stage 3: implications of the DLCM

After the validation process, this research explored the implications of the DLCM for design education by mapping competencies from three perspectives: industry (design leaders' reflections); design education itself (DM and design programmes); and policy (a design policy reviews). For practical application, this model was transformed into a diagnostic and mapping tool, which grouped into three categories: skills, knowledge and mindset, totalling 16 competencies.

As mentioned in previously, the data for design leaders' reflections and partial data on design education were gathered from the interviews (Section 3.5.2.2) and the SUAD case study (Section 3.5.3.2), respectively. Since these two sources have already been introduced in detail, this section mainly introduces how two new data sources – DM and design management progammes, and the design policy review – were collected through desk research.

3.5.4.1 Desk research of design education

Desk research was conducted to assess how design leadership competencies are integrated into design education, particularly within DM programmes, across various universities in China. The DLCM tool was used to map competencies to desk research involving 21 universities, which aimed to explore the current state of design education and address the graduate employability agenda (i.e. alignment with industry requirements).

The target universities were chosen based on two criteria: (1) the educational backgrounds of design leaders from the interviews, and (2) the top 20 universities listed in the fourth nationwide evaluation of design disciplines conducted by China's Ministry of Education (CDGDC Ministry of Education, 2017), including 94 universities. Given the diverse educational backgrounds of design leaders, both undergraduate and postgraduate programmes were included in the following analysis.

Secondary data from design programmes at various universities were selected and collected from official university websites. This information, which included programme and course descriptions, syllabi, structures, objectives, learning outcomes and teaching methods, was analysed to identify the key competencies emphasised at both UG and PG levels.

Since design leadership is a topic that within design management that integrates design, business and management, the selected programmes needed to reflect this focus. For this reason, DM programmes were prioritised. In addition, programmes that featured aspects such as 'design entrepreneurship', 'design leadership', and 'design management', or included relevant 'business' or 'management' courses were also considered a priority. However, given the limited information available on specific DM programme and the diverse backgrounds of design leaders, other design programmes were also included in this research as complementary data.

Furthermore, to mitigate the risk of data limitations (e.g. inadequate details) affecting the results, generating bias, or failing to represent competencies properly, this research adopted a broader approach by selecting more than three design-related programmes from each university. If the data were still insufficient, the university was removed from the list. Finally, 80 programmes or modules from 21 universities were analysed, consisting of nine in DM and 71 in design. From this selection, nine DM programmes were chosen as key data sources (see Table 18 and Table 19). Figure 30 shows the geographical distribution of these universities. The analysis was based on the DLCM framework, with competencies identified using the following criteria:

- The competency was explicitly mentioned in the course title or as the main topic;
- Relevant aspects of the competency were reflected in course descriptions or content outlines (e.g. responsibilities or skills that cultivate the competency);
- The competency was identified as important in teaching objectives or learning outcomes.

The data analysis process will be introduced in Section 5.1.1.

Figure 30: Geographical distribution of selected universities

Table 18: List of design-management programmes

Number	University	Level	Programme or Module
DM1	Central Academy of Fine Arts	Undergraduate	Cultural Industry Management
		Undergraduate	Art History and Theory (Design Management, Sino-Foreign Programme)
DM2	Academy of Arts & Design, Tsinghua University	Undergraduate	Design Management
DM3	Dalian Polytechnic University	Postgraduate	Art Design (Design Management Direction)
DM4	Tongji University	Undergraduate	Cultural Industry Management
	Shanghai International College of Design and Innovation, Tongji University	Postgraduate	Design Strategy and Management
DM5	Nanjing University of the Arts	Undergraduate	Cultural Industry Management
DM6	Shanghai Jiao Tong University	Undergraduate	Cultural Industry Management (also available as a module)
DM7	Shandong University of Arts	Undergraduate	Cultural Industry Management
DM8	Guangzhou Academy of Fine Arts	Undergraduate	Design Strategy and Management (module)
CASE STUDY	Shandong University of Art & Design	Undergraduate	Cultural Industry Management
		Postgraduate	Art Design (Design Management Direction)

Table 19: List of design programmes

Number	University	Level	Programmes
UNI1	Tongji University (College of Design & Innovation)	UG	Industrial Design / Product Design; Environmental Design; Communication Design
		PG	Design Management; Industrial Design; Media and Communication Design; Environmental Design; Interaction Design; Design Strategy and Management; Innovation and Entrepreneurship
UNI2	Central Academy of Fine Arts (CAFA) (School of Design)	UG	Design Studies; Architecture; Landscape Architecture; Urban and Rural Planning
		PG	Visual Communication Design; Art Design Studies; Design Curation
UNI3	China Academy of Art	UG	Design Studies
UNI4	Xi'an Academy of Fine Arts	UG	Industrial Design; Art and Technology; Architectural Environment Art
UNI5	Sichuan Fine Arts Institute	UG	Architecture; Landscape Architecture

		PG	Product Design; Fashion Design; Art and Technology; Information and Interaction Design; Cultural Creative Design; Environmental Art Design; Architectural Art Design
UNI6	Guangzhou Academy of Fine Arts	UG	Visual Communication Design; Environmental Design; Product Design; Industrial Design
UNI7	School of Art, Soochow University	UG	Product Design; Apparel & Apparel Design; Visual Communication Design; Environment Design; Digital Media Art
		PG	Design Studies
UNI8	School of Design, Jiangnan University	UG	Industrial Design; Product Design; Environmental Design; Visual Communication Design
UNI9	Nanjing University of the Arts	UG	Visual Communication Design; Environmental Design; Fashion and Apparel Design
UNI10	Shandong University of the Arts	UG	Visual Communication Design; Environmental Design; Product Design
UNI11	Shandong University of Art & Design	UG	Visual Communication Design; Industrial Design; Urban & Rural Planning; Environmental Design
UNI12	Hefei University of Technology	UG	Architecture; Environmental Design; Industrial Design; Visual Communication Design
UNI13	Wuhan Textile University	UG	Environmental Design; Product Design; Arts & Crafts; Public Art Design; Visual Communication Design
		PG	Design Studies
UNI14	Northwest A&F University	UG	Architecture; Landscape Architecture
UNI15	Chinese National Academy of Arts	PG	Design Studies
UNI16	Wuhan University of Technology	UG	Art Design Studies; Visual Communication Design
UNI17	South China Agricultural University	UG	Visual Communication Design; Environmental Design; Product Design

3.5.4.2 Policy review

To understand the types of talent considered important at a national level, it is necessary to analyse government policy. All relevant policies were manually collected from two sources: the official website of the Chinese State Council (https://www.gov.cn/gwyzzjg/zuzhi/, accessed on 29 September 2025) and the China Legal Retrieval System database (https://www.pkulaw.com/, accessed on 29 September 2025).

The search process began with the term 'design' [设计], 'education' [教育] and 'entrepreneurship'[创业]. Additionally, terms related to current government priorities, and industries closely connected with design were also used, including 'creative industry' [创意产业], 'cultural industry' [文化产业], 'rural revitalisation' [乡村振兴], 'high quality' [高质量], 'tourism industry' [旅游业] and 'innovation'[创新].

Moreover, since important long-term policies known as the 'Five-Year Plan' are published every five years to guide national development, these and similar strategic documents were also reviewed. This included policies such as the 'Five-Year Plan' [五年规划] and 'Made in China 2025' [中国制造 2025].

Finally, a total of 52 policies have been reviewed (see Table 21 for details). This selection comprises 39 national-level policies and 13 at the provincial or local level. These policies were published from 2007 to 2025, with the majority (33) being released after 2020, as detailed in Table 20.

Table 20: Numbers of design policies from 2007 to 2025

Year	Number of Policies
2007	1
2010	1
2011	1
2012	1
2014	1
2015	3
2016	3
2017	4
2018	3
2019	1
2020	1
2021	10

2022	9
2023	5
2024	4
2025	4

Some policies involved multiple publishing authorities. The State Council was the most frequent publishing body, accounting for 20 policies. The other primary publishing authorities are:

- Provincial Governments/Departments: 13 policies;
- Ministry of Education: 8 policies (some co-authored);
- Ministry of Culture and Tourism or the Ministry of Culture: 5 policies (some co-authored);
- Ministry of Industry and Information Technology: 3 policies (some co-authored).

Based on the search term used, these design-related policies can be divided into six categories by their focus:

Education and talent development: These policies focus on the reform and improvement of higher education, talent cultivation and education employment. Aiming to enhance education quality, foster innovation in curricula, address the employability of graduates and respond to technological trends, such as AI talent, and integration of different disciplines.

Cultural and creative industries: These policies focus on development and innovation in the cultural industry, cultural and creative services, tourism and the integration of culture with technology or other sectors. The content is about integrating culture with technology, fostering digital culture and supporting regional creative industry clusters. Meanwhile, those policies emphasise tourism, rural revitalisation through cultural empowerment and cultural education reform.

Industrial design and manufacturing: These policies focus on promoting industrial design to enhance manufacturing quality and supporting the design industry as a driver of economic growth. Policies seek to position China as a leader in industrial

design and advanced manufacturing. And with a clear support for high-quality growth, support for SMEs and the creation of innovation ecosystems.

Digital economy and technology: These policies focus on the Digital China strategy, digital trade, technology innovation, artificial intelligence, data and the development of digital creative industries. These policies align with national strategies for promoting digital technologies, smart cities and the digital economy.

Innovation, entrepreneurship and quality enhancement: These policies focuses on mass entrepreneurship and improving product and service quality. Meanwhile, policies highlight innovation-driven strategies for broader societal and economic impacts.

Rural revitalisation and sustainable development: These policies focus on rural revitalisation strategies, emphasising design, culture and sustainable development; and the ecological, along with innovative development in rural regions. Those policies also emphasised the integration of creative/design industries into rural development and boosting service industries.

Table 21: List of design policies

Num	Year	Publishing Authority	Policy
POL1	2019	Ministry of Education	Opinions on Deepening Undergraduate Education and Teaching Reform to Improve the Quality of Talent Cultivation
POL2	2022	Ministry of Culture and Tourism; Ministry of Education	Guiding Opinions on Promoting High-Quality Development of Cultural and Artistic Vocational Education in the New Era
POL3	2018	Ministry of Education	Opinions on Accelerating the Construction of High-level Undergraduate Education and Improving Talent Training Capabilities
POL4	2018	State Council	Guiding Opinions on Promoting Classified Reform of Talent Evaluation Mechanisms
POL5	2012	Ministry of Education	Basic Requirements for Entrepreneurship Education and Teaching in Regular Undergraduate Schools (Trial)
POL6	2015	State Council	Implementation Opinions on Deepening Innovation and Entrepreneurship Education Reform in Higher Education Institutions
POL7	2010	State Intellectual Property Office	Guiding Opinions on Promoting the Development of Industrial Design
POL8	2011	Shanghai Municipal Commission of Economy and Informatisation	Opinions on Promoting the Development of Creative Design Industry in Shanghai
POL9	2016	Ministry of Human Resources and Social Security	Notice on Implementing the Employment and Entrepreneurship Promotion Plan for College Graduates
POL10	2007	State Council	Several Opinions of the State Council on Accelerating the Development of the Service Industry
POL11	2017	Ministry of Culture	13th Five-Year Plan for the Development of the Cultural Industries
POL12	2017	Ministry of Culture	Guiding Opinions on Promoting Innovation in Digital Cultural Industries
POL13	2021	Ministry of Culture and Tourism	14th Five-Year Plan for the Development of Cultural Industry
POL14	2021	State Council	The 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Long-term Goals for 2035
POL15	2021	Ministry of Culture and Tourism	14th Five-Year Plan for Cultural and Tourism Science and Technology Innovation
POL16	2016	State Council	Several Opinions on Further Strengthening Urban Planning, Construction and Management
POL17	2014	Ministry of Culture	Implementation Opinions on Implementing the 'Several Opinions of the State Council on Promoting the Integration and Development of Cultural Creativity and Design Services with Related Industries'
POL18	2015	Jiangsu Provincial Government	Opinions on Accelerating the Development Level of Cultural Creativity and the Design Service Industry
POL19	2016	State Council	13th Five-Year Plan for National Strategic Emerging Industries Development
POL20	2023	State Council	Outline for Building a Quality-Powerful Country
POL21	2017	State Council	Opinions on Strengthening the Implementation of the Innovation-driven Development Strategy and Further Promoting Mass Entrepreneurship and Innovation
POL22	2015	State Council	Made in China 2025
POL23	2017	State Council	Guiding Opinions on Carrying Out Quality Improvement Actions
POL24	2018	Ministry of Industry and Information Technology	Guidelines for the Establishment of the National Industrial Design Research Institute
POL25	2021	State Council	14th Five-Year Plan for Promoting the Development of Small and Medium-sized Enterprises
POL26	2022	Ministry of Industry and Information Technology; Ministry of Human Resources and Social Security; Ministry of Ecology and Environment; Ministry of Commerce; State Administration for Market Regulation	Guiding Opinions on Promoting the High-Quality Development of Light Industry
POL27	2022	Ministry of Culture and Tourism; Ministry of Education; Ministry of Natural Resources; Ministry of Agriculture and Rural Affairs; National Rural Revitalisation Administration	Opinions of China Development Bank on Promoting Cultural Industry Empowering Rural Revitalisation
POL28	2021	Ministry of Commerce	Notice on Promoting High-Quality Development of Foreign Design Consulting Work
POL29	2021	Zhejiang Provincial Commission of Economy and Informatisation	Notice on Printing and Distributing Several Measures to Enhance the Competitiveness of SMEs
POL30	2022	Henan Provincial Department of Education	Guiding Opinions of Henan Provincial Department of Education on Strengthening the Training of Design Talents in Regular Higher Education Institutions
POL31	2021	Shandong Provincial Department of Industry and Information Technology	14th Five-Year Development Plan for Shandong Industrial Design Industry
POL32	2021	Shandong Provincial Department of Industry and Information Technology	Guiding Opinions on Accelerating the High-Quality Development of Shandong Industrial Design Industry
POL33	2020	Guangdong Provincial Department of Industry and Information Technology; Guangdong Provincial Sports Bureau; Guangdong Provincial Department of Culture and Tourism; Publicity Department of the Guangdong Provincial Committee of the Communist Party of China	Guangdong Action Plan for Cultivating Digital Creative Strategic Emerging Industry Clusters (2021-2025)

Num	Year	Publishing Authority	Policy
POL34	2022	Shanghai Municipal Commission of Economy and Informatisation	Several Opinions on Building Shanghai into a World-Class 'City of Design'
POL35	2021	Hunan Provincial Department of Industry and Information Technology	Hunan Industrial Design '14th Five-Year' Development Plan (2021-2025)
POL36	2022	Heilongjiang Provincial People's Government	Special Plan for the Development of Creative Design Industry in Heilongjiang Province (2022-2030)
POL37	2022	Henan Provincial People's Government	Medium and Long-term Plan for Design Henan Construction (2022-2035) and Action Plan for Design Henan Construction (2022-2025)
POL38	2022	General Office of Hebei Provincial People's Government	Notice of the General Office of Hebei Provincial People's Government on Printing and Distributing the '14th Five-Year Plan for the High-Quality Development of the Manufacturing Industry in Hebei Province'
POL39	2025	National Data Bureau	Digital China Construction 2025 Action Plan
POL40	2024	State Council	Opinions on Accelerating the Construction of a High-Quality Employment Service System for Graduates of Regular Higher Education Institutions
POL41	2025	State Council	Opinions on Further Deepening Rural Reform and Promoting Comprehensive Rural Revitalisation
POL42	2025	State Council	Several Economic Policies for Promoting High-Quality Development of Culture
POL43	2025	State Council	Outline for Building an Education Powerhouse (2024-2035)
POL44	2024	State Council	Implementation Plan for the Comprehensive Reform Pilot of Pudong New Area (2023-2027)
POL45	2024	State Council	Opinions on the Reform and Innovative Development of Digital Trade
POL46	2024	State Council	Opinions on Promoting the Spirit of Educators and Strengthening the Construction of High-Quality Professional Teacher Teams in the New Era
POL47	2023	State Council	Several Measures to Release Tourism Consumption Potential and Promote the High-Quality Development of the Tourism Industry
POL48	2023	State Council	Several Measures for Further Strengthening the Training and Use of Young Scientific and Technological Talents
POL49	2023	State Council	Overall Layout Plan for Digital China Construction
POL50	2023	State Council	Opinions on Key Tasks in Comprehensively Promoting Rural Revitalisation in 2023
POL51	2021	National Forestry and Grassland Administration	Opinions on Accelerating the Innovative Development of the Bamboo Industry
POL52	2022	Guangdong Provincial Department of Industry and Information Technology	Guangdong Industrial Design Empowerment Action Plan (2022-2025)

3.6 Data Analysis

The data analysis primarily applied **thematic analysis**, complemented by **template analysis**. In Stage 1, the author utilised thematic analysis to identify competencies and initially construct the DLCM. In Stage 2, once the preliminary DLCM had been constructed as a framework, template analysis became the main method for matching validation feedback with each competency. Similarly, Stage 3 also employed template analysis, using the DLCM as a tool to map competencies and explore their potential in design education. The data analysis process is shown in Figure 31.

To clarify, **the case study data was analysed in both Stage 2 and Stage 3**. As explained in Section 3.5.3.2, the SUAD case study had two parts: validating the DLCM (Stage 2) and exploring perceptions of design education to identify currently taught competencies and those that are absent for subsequent mapping process (Stage 3). This means that during the interviews, the author simultaneously asked for validation feedback on the DLCM and gathered perceptions of design education. Therefore, some overlap occurs in the description of the data analysis process. Additionally, to mitigate potential bias, the DLCM validation was conducted at the end of each interview. This sequencing prevented the model from leading participants or influencing their earlier responses.

Similarly, **the interview data was analysed in both Stage 1 and Stage 3**. As was also explained in Section 3.5.2.2, during the last part of the interviews, design leaders were asked about their perceptions of competencies in design education. Therefore, the competencies listed under an industry perspective were derived from the data analysis of these interviews (Section 5.4).

	Desk Research					Primary Data		
Data Analysis	Systematic literature review	Job description	Case study (Grey literature)	Programmes choosing	Policy Review	Interview	Survey (Open question)	Workshop
Stage 1	★	★	★			★		
Stage 2						▲	▲	▲
Stage 3				▲	▲	▲		

▲ Template Analysis
★ Thematic Analysis

Figure 31: Data analysis in this research

Stage 1 applied thematic analysis across four data sources: (1) for the SLR, this method was used to extract explicit and implied statements about knowledge and skills from each article, followed by an iterative clustering of codes into themes (competencies); (2) for the semi-structured interviews, thematic analysis helped the author spot patterns across rich narrative data in participants' accounts; (3) for the job descriptions, the process started with open coding and collapsing synonymous codes, which clarified the focus of each competency and helped generate concise definitions or behavioural descriptions; (4) for the grey literature, thematic analysis was used to examine narratives and abstract relevant competencies in a process similar to that used for the semi-structured interviews.

During Stage 2, once the preliminary DLCM was developed, template analysis became the primary method for the validation stage. It was used to process data consisting of expert surveys, an interview-based case study and a workshop in the UK. The detailed data analysis process for Stages 1 and 2 is demonstrated in *Chapter 4* as part of the DLCM's overall construction.

Finally, Stage 3 employed template analysis to identify competencies from three perspectives: design education (design management and design programmes), industry (design leaders' interviews) and policy (policy document reviews). This data-analysis process is presented in detail in Chapter 5.

Replication and adaptation of this methodology

Although the results of this research are specific to the Chinese context, the research methodology was designed to be both replicable (used in the same way) and adaptable (modified for new contexts). The process for each stage and its potential for replication are detailed below:

In Stage 1, the search syntax (Table 12) and eligibility criteria for the SLR can be modified for other design leadership studies. The methods used to select participants and materials for the semi-structured interviews (Section 3.5.2.2), job descriptions (Section 3.5.2.3) and grey literature (Section **Error! Reference source not found.**) can also serve as references. In particular, the interview outlines for

the design leaders' interviews (Section 3.5.2.2) can be referenced for similar research.

In Stage 2, the overall workshop process (detailed in Section 3.5.3.3) can be referenced by other researchers for similar purposes. Furthermore, the workshop tools, including the template and DLCM cards, can be reused for competency-related projects. Additionally, the interview outline of SUAD case study (Section 3.5.3.2) can be referenced for similar research.

In Stage 3, the criteria for selecting educational programmes (Section 3.5.4.1) and policies (Section 3.5.4.2) can also be replicated, and the resulting lists can be referenced in education and policy-related research.

Therefore, this methodology is replicable, and all related materials have been provided in this chapter, Chapter 4, Chapter 5 and the appendices.

3.7 Summary

This chapter has outlined the research design and detailed the methodological approaches employed for data collection. Adopting a blend of *interpretivist* and *pragmatic* paradigms and an inductive, exploratory research approach, this research utilises a multi-stage qualitative methodology. It uses thorough *triangulation*, which integrating interviews, document analysis, open-ended survey, workshop and desk research includes policy review, to ensure comprehensive validity and depth of understanding.

Thematic analysis and, more specifically, a template analysis were conducted in this research. In Stage 1 (construction), data was gathered through the SLR, 26 semi-structured interviews, 12 grey literature and 50 job descriptions to establish a rigorous foundation for constructing the DLCM. For Stage 2 (validation), feedback was collected from 12 experts, complemented by 14 stakeholder interviews at SUAD and a student workshop at Lancaster University, UK. Consequently, **Chapter 4** will demonstrate how these two stages were implemented and how the resulting data were analysed.

Stage 3 explored the DLCM within design education through extensive desk research, analysing the topic from three perspectives: design education, policy and industry. The goal was to identify: (1) what competencies are currently taught and absent or underemphasised in design education; (2) what talent is demanded from a policy perspective; and (3) what competencies are needed in industry and real-world practice. The detailed data analysis and its findings will be further developed in **Chapter 5**.

Chapter 4: Design Leadership Competency Model

This chapter details the data analysis and findings for Stage 1 and Stage 2 of the research. Stage 1 covers the preliminary DLCM construction from four sources: the SLR, interviews with design leaders, job descriptions and grey literature. Stage 2 describes the validation process, where stakeholder feedback was used to create the finalised DLCM. By presenting these findings, this chapter addresses RQ1 and RQ2 and their objectives:

RQ1*: What key competencies are required for effective design leadership in the Chinese context, and how can they be synthesised into a preliminary framework?*

Objective 1.1: To identify and define the core competencies that reflect effective design leadership.

Objective 1.2: To synthesise competencies into a preliminary Design Leadership Competency Model (DLCM).

RQ2*: How can a preliminary framework be refined and validated with industry and academic stakeholders to ensure its relevance?*

Objective 2.1: To validate and refine the DLCM with industry and academic stakeholders.

Specifically, Section 4.1 outlines the data analysis process, explaining how competencies were abstracted, merged and categorised. Section 4.2 then introduces the competencies identified from four sources: a systematic literature review, 26 interviews with design leaders, 50 job descriptions and 12 grey literature. This section also presents the personalities of design leaders as a secondary finding (Section 4.2.22). Following this, Section 4.3 presents the preliminary DLCM.

The Stage 2 validation process is presented in Section 4.4. The validation involved three main parts:

- An expert survey with design leaders (Section 4.4.1) and academic staff (Section 4.4.1.2);

- Interviews with educators (Section 4.4.2.1), students (Section 4.4.2.2) and alumni (Section 4.4.2.3) from the case study;
- A workshop conducted at Lancaster University, UK (Section 4.4.3).

Based on this feedback, revisions were made to construct the final DLCM (Section 4.4.4). Finally, Section 4.5 illustrates the competencies in the finalised DLCM, organising them into three categories: knowledge (Section 4.5.1), skills (Section 4.5.2) and mindset (Section 4.5.3).

4.1 Stage 1 and Stage 2 Data Analysis

In this section, the data analysis processes for the Stage 1 construction and Stage 2 validation will be introduced and detailed.

4.1.1 Stage 1 data analysis

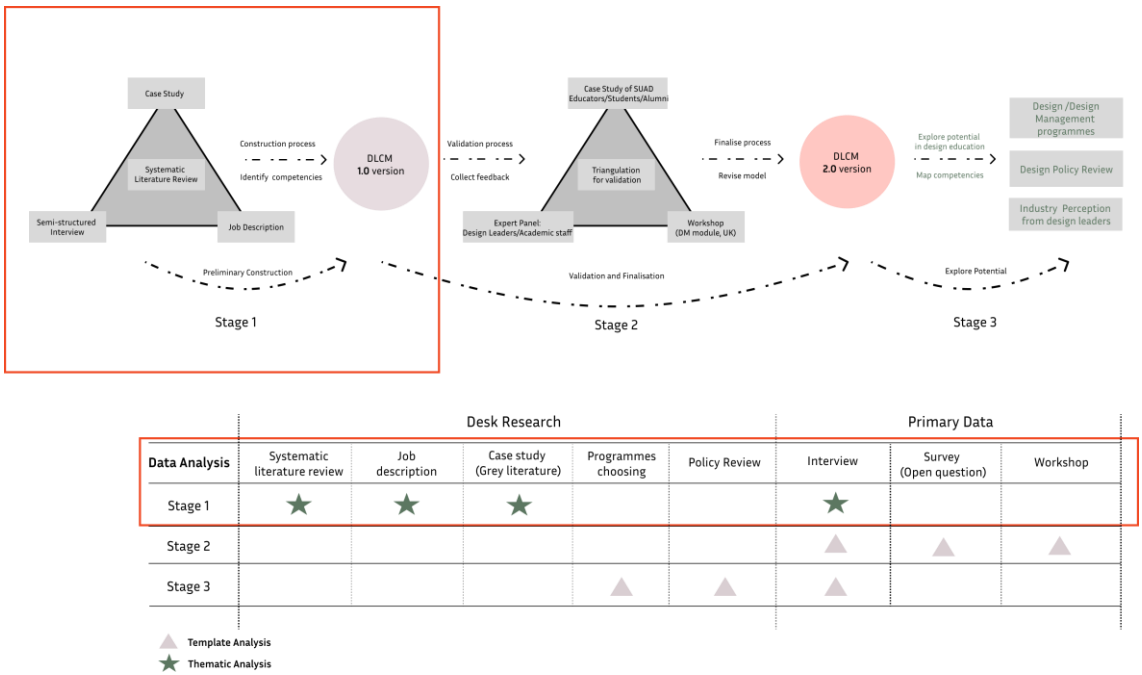


Figure 32: Stage 1 in this research

Stage 1 focused on the foundational process of constructing the preliminary DLCM. This represents a primary contribution of this thesis, as it systematically identifies and synthesises competencies from four perspectives to create a comprehensive framework (Figure 32, above). All four data sources were analysed using thematic analysis (Figure 33, below). This process yielded a unique set of competencies from each source (e.g. 17 competencies were identified from the

literature review, while 24 emerged from interviews). These individual sets of findings were then carefully compared and integrated. The result of this synthesis is the construction of the preliminary DLCM. The following sections will detail the specific process and findings from the analysis of each data source.

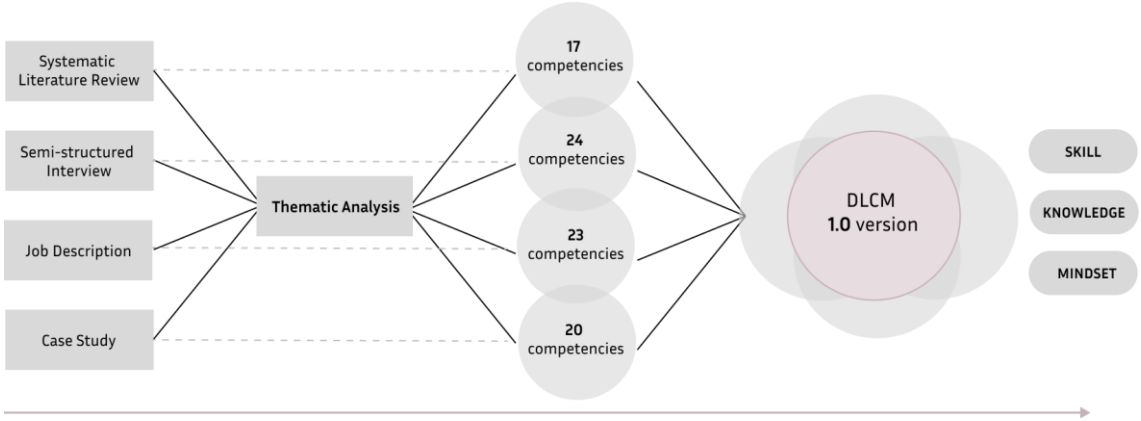


Figure 33: Stage 1 data analysis

4.1.1.1 Systematic Literature Review

After screening titles and abstracts according to the criteria in Section 3.5.2.1, 98 papers were selected for an in-depth review that focused primarily on identifying competencies. The data analysis followed a qualitative thematic approach, with manual coding performed both electronically and on paper (Figure 34, below).

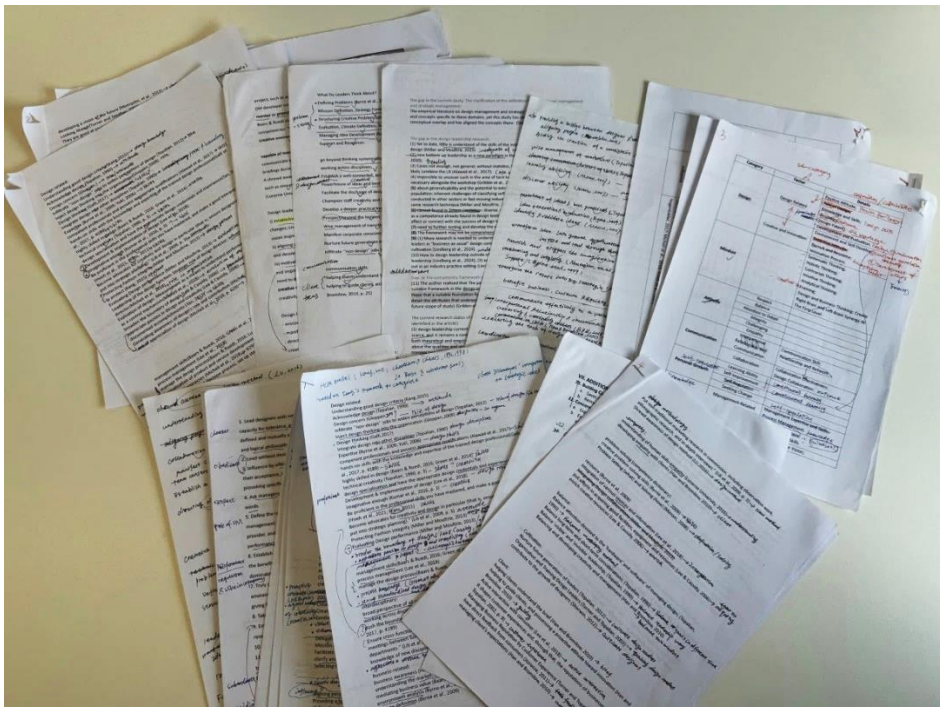


Figure 34: Manual process of the Systematic Literature Review on paper

The coding process involved three stages. During the first stage of open coding, 56 codes were identified, representing aspects such as skills and knowledge. In the second round, these codes were clustered into 32 sub-themes, with 36 codes remaining. Finally, in the third stage, after organising and merging similar aspects, three main themes and 17 sub-themes emerged, comprising 36 final codes (Table 22). The full details can be found in Appendix B.

Table 22: Changes in different stages of SLR coding

Stage	Themes	Sub-themes	Codes
1st open coding and merging	/	/	56
			36
2nd coding (Iteration)	/	32	36
3rd coding (Iteration)	**3**	**17**	**36**

To clarify, the initial themes were identified based on the previous review of competency components (Section 2.5.2) and a consideration of the nature of the identified competencies. These themes include skills, knowledge and mindset. Since the analysis for the other three data sources (interviews, grey literature and job descriptions) used the same logic, this process will not be explained again in the following sections to avoid repetition.

4.1.1.2 Semi-structured interviews

Twenty-six semi-structured interviews with design leaders were transcribed verbatim and initially coded originally in Chinese using Nvivo software. Because culturally specific expressions and folk terms (*Yanyu* [谚语]) emerged, translation was performed after this initial coding to preserve their authentic meaning.

The data was processed using a three-step thematic analysis: (1) screening and reformatting, where transcripts were cleaned to eliminate typographical errors and repetitive language; (2) initial coding, where the In Vivo method was applied (Saldaña, 2013). This inductive technique uses participants' own words or phrases as the codes to preserve authenticity and reduce researcher bias which is a good fit for this exploratory research. Moreover, the In Vivo method is essential when working with participants from a particular culture, as it prioritises the participants'

voices (Saldaña, 2013); and (3) interpretation, where sub-themes and themes were developed from the codes.

After the initial coding and merging processes, 104 codes remained. The list was refined through three iterations: the first (V1) resulted in four themes and 74 sub-themes; the second (V2) produced four themes and 50 sub-themes; and the final iteration (V3) comprised three themes and 24 sub-themes (see Table 23).

Table 23: Changes in different stages of Interview coding

Stage		Themes	Sub-themes	Codes
1st open coding and merging		/	/	196
				104
2nd coding	First Iteration (V1)	4	74	104
3rd coding	Second Iteration (V2)	4	50	104
	Final Iteration (V3)	**3**	**24**	

Initial coding

Referring to the interview outline (Section 3.5.2.2) and the explanation of the data analysis plan (Section 3.6), the interview coding results were divided into two parts. The first part aligns with Stage 1 (identifying competencies to construct the DLCM), and the second aligns with Stage 3 (gathering industry perceptions of design education). To avoid repetition, the Stage 1 analysis is introduced here, while the Stage 3 analysis will be briefly introduced in Section 5.1.1.

For Stage 1 analysis, the addition of the 'ideal design leader' question (Section 3.5.2.2) resulted in two coding sets. The author did this to differentiate between: (1) competencies reflected in the design leaders' own experiences; and (2) competencies that design leaders believe are important, even if they may not possess them themselves. However, it is important to clarify that this differentiation did not affect the final results of the current study. This step was taken solely to prepare the data for potential future research.

The first coding set, 'understanding of the design leader', captured the competencies of an ideal design leader as perceived by the interviewees. The second, provisionally entitled 'personal traits', comprised competencies distilled from the interview narratives, including the events the design leaders described.

All codes were named directly using the interviewees' own words, or short phrases that captured the meaning of those quotations.

Table 24: Examples of codes and quotes

Codes	Quotes from interview transcripts
Business Opportunity-spotting	A design leader works in the news industry. He is highly perceptive, as a natural design leader, and his experience has had a substantial impact. ***(INT1)***
	I think, first and foremost, they are highly attuned to the direction in which business is developing, to shifts in the prevailing winds, so to speak. In simple terms, they can spot business opportunities with ease, which is something many people just cannot manage. **(*INT4*)**
Design Passion	Secondly, I think you must have passion: genuine love for the work. ***(INT17)***
	As we've just said, a design-led company is inherently diverse, yet the very first requirement for a design leader or designer is a strong, passionate commitment to design. That is crucial: for a design firm to survive, it must keep delivering outstanding work: design outcomes that can stand up to scrutiny. So you must never abandon design itself, nor the pursuit of it. ***(INT22)***
	In my view, you have to keep sketching, and you must genuinely love this profession. If you do not love it, you will never do it well. In the past, this field was thought to offer relatively high salaries, so many people entered it for the money: they happened to choose the subject at university, landed a job after graduating, and that was that. But such people seldom last; they end up unemployed. Some of my classmates, for example, were swept away when the sector hit turbulent times because they had never mastered the core skills. Those of us who have stayed in the profession on the consultancy side did not give much thought to the future when we first started; we simply enjoyed design and wanted to do it well. So, if you are thinking long-term, you must learn to love the profession you practise. **(*INT24)***
Implementation ability	I tend to look at things from a macro perspective and see how everyone collaborates and connects. Acting as the overall coordinator, I can clearly work out what needs to happen at each stage, what the next step should be, whose issue it is in the middle, and who is best placed to resolve it. ***(INT7)***
	you have access to far more resources. When I come up with a great idea, I can marshal various means to make it happen. Back when I was designing myself, everything was on a much simpler level, right? But in a managerial role I lead several groups with different professions and functions, so I can coordinate them all to realise my idea. ***(INT19)***
	I have many things to consider, not just this project, but the whole site and the whole company, when reallocating staff. For instance, if I have ten projects running and three project managers, plus other team members, how many projects should each person take on? ***(INT23)***
	For example, in my current company, I oversee roughly thirty projects in total, with about five or six running at any one time. Those five or six projects each have their own team supporting me, so I effectively become the manager and coordinator of all of them**. *(INT15)***

Codes	Quotes from interview transcripts
	For implementation and coordination, as I just described, I need to take an idea through to implementation, decide who does what to achieve it as efficiently as possible, and at the same time communicate, pitch and secure all the resources and relationships to support me. ***(INT4)***

After this initial stage, 128 codes were identified under 'personal traits' and 66 under 'understanding of the design leader' for further analysis (examples shown in Table 24).

Themes searching

This step involved eliminating and merging repetitive codes, organising them and identifying recurring themes (competencies). Any irrelevant or unclear code was removed at this stage (Figure 35). Themes were generated by interpreting groups of codes and represent broader, more general meanings. The process of merging the two original code sets and removing redundant items resulted in four themes and 74 sub-themes, comprising 104 codes in total (Table 25).

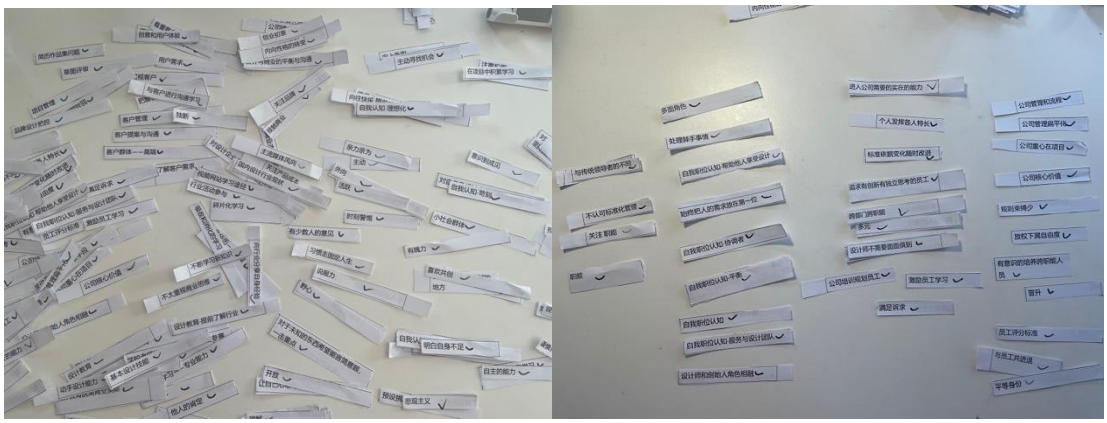


Figure 35: Manual process of emerging themes on paper

Table 25: Code lists at the initial stage (V1 version)

	Codes	In Chinese		Codes	In Chinese		Codes	In Chinese
1	Resource integration	整合资源	35	Communication and negotiation skills	沟通谈判能力	70	Aesthetic sensibility	审美能力
2	Cross-functional collaboration	跨部门协作	36	Smooth communication	沟通顺畅	71	Presentation skills	展示能力
3	Principles and philosophy	原则与哲学	37	Verbal expression ability	语言表达能力	72	Hand-drawn expression skills	手头表达能力
4	Pace management	把握节奏	38	Multidimensional thinking	思考维度多元	73	Ease of onboarding	更容易上手
5	Accurate decision-making	决策准确	39	Independent, problem-oriented thinking	独立思考/问题导向	74	Ability to execute details	更能落实具体
6	Effective execution	有效执行	40	Business acumen	了解业务	75	Industry judgement	行业判断
7	Decisive decision-making	果断决策	41	Contract and legal knowledge	了解合同法律	76	Client-relationship management	维护客户关系

	Codes	In Chinese		Codes	In Chinese		Codes	In Chinese
8	Foresight and sensitivity	前瞻性和敏感度	42	Understanding employee needs	了解员工需求	77	Team cohesion	团队凝聚力
9	Insight	洞察力	43	Market and industry awareness	了解市场和行业	78	Team egalitarianism	团队平等
10	Market expansion	开拓市场	44	Policy awareness	了解政策	79	People management	用人待人
11	Strategic deployment	战略部署	45	Understanding of industry status	了解行业现状	80	Broad-based support	群众基础
12	Seizing trends	抓住风口	46	Numerical sensitivity	对数字敏感	81	Market understanding	了解市场
13	Anticipation	预判	47	Broad perspective	眼界开阔	82	Market-oriented mindset	市场思维
14	Flexibility and nuance	不轴	48	Extensive experience	经验丰富	83	Own methodological framework	有自己的方法论
15	Social savvy	人情世故	49	Conceptual awareness	观念认知	84	Clarity on corporate structure	清楚公司管理结构
16	Relationship-building	善于建立关系	50	Management knowledge	管理知识	85	Minimising pointless tasks	减少无意义工作
17	Team leadership	带好团队	51	Flexible management style	管理风格自由	86	Minimising administrative duties	行政工作少
18	Continuous learning	不断学习	52	Coordinative ability	统筹能力	87	Delegation to subordinates	放权下属
19	Bouness learning capacity	无界的学习能力	53	Leadership ability	领导能力	88	Flexible working hours	灵活的上下班时间
20	Embracing new things	新事物	54	Self-awareness	自我认知	89	Effective communication and task delegation	沟通及任务分配容易
21	Self-directed learning awareness	自我学习意识	55	Brand literacy	懂品牌	90	Marketing capability	营销能力
22	Investing in knowledge	花钱买认知	56	Keen at spotting business opportunities	敏锐/发现商机	91	Proactive learning	主动学习
	IP brand awareness	IP 品牌意识	57	Industry insight	行业判断	92	Embracing trial and error	试错
23	Building cross-disciplinary teams	组建跨学科团队	58	Risk awareness	风险	93	Pursuit of excellence	精益求精
24	Seeking assistance	寻求帮助	59	Multifaceted thinking	多元思考	94	Stepping outside one's comfort zone	走出舒适圈
25	Seeking transformation	寻求转变	60	Passion for deep research	爱钻研	95	Attentiveness to feedback	关注评价
26	Offering support	帮助付出	61	Independent thinking	独立思考	96	User-centred mindset	用户思维
27	Understanding subordinates	了解下属	62	Industry-level thinking	行业思考	97	Implementation capability	落地能力
28	Human-centred policies	人性化制度	63	Understanding the rules	了解规则	98	Probing the essence	探究本质
29	Motivating subordinates	激励下属	64	Leveraging information asymmetry	掌握信息差	99	Identifying patterns	摸索规律
30	Caring for subordinates	照顾下属	65	Problem-spotting	发现问题	100	Targeted communication	针对性沟通
31	Analysing each issue on its own merits	具体问题具体分析	66	Identifying needs	发现需求	101	Social skills	社交能力
32	Divergent thinking and creativity	发散思维与创意	67	Seizing opportunities	抓住机会	102	Getting straight to the point	直击要害
33	Bringing in fresh talent	吸收新鲜血液	68	Professional acuity	职业敏锐	103	Proactive learning	主动学习
34	Independent judgement	自主判断	69	Timely feedback	及时反馈	104	Embracing trial and error	试错

Reviewing and refining

It is important to review and iterate the themes by checking and re-reading the codes several times. At this stage, any overlapping or redundant themes or sub-themes are removed through an iterative revision process. In the first iteration, the results were narrowed from four themes and 74 sub-themes to four themes and 50 sub-themes (V2 version in Table 26).

Table 26: Code list after first iteration (V2 version)

Themes	Sub-themes	In Chinese
Mindset [思维]	Empirical thinking	实证思维
	Systematic thinking	系统性思维
	Global perspective	全局观
	Business thinking	商业思维
	Client-centred	客户思维
	Cross-disciplinary collaboration	跨学科
	Logical thinking	逻辑思维
	Service orientation	服务意识
Knowledge [知识]	Knowledge	知识技能
	Design-business integration competency	设计和商业融汇贯通的素质
	Design background	设计背景
	Experience and background	经历与阅历
Skills [能力]	Proactiveness	主动
	Focus	专注力
	Values (or value orientation)	价值观
	Empathy	共情
	Big-picture oversight	全局把控能力
	Learning ability	学习能力
	Perceptiveness	感知力
	Communication skills	沟通能力
	Independent thinking	独立思考
	Management ability	管理能力
	Co-creation and collaboration	共创合作
	Analytical ability	分析能力
	Innovation and creativity	创新和创造力
	Decision-making	判断力
	Foresight	前瞻性
	Crisis awareness	危机意识
	Reflective learning	复盘总结
	Guidance	引导
	Execution capability	执行力
	Insight	洞察力
	Keen perception	敏锐
	Flexibility	灵活
	Goal clarity	目标明确
	Rapid response	迅速响应
	Adaptability	适应力
	Problem-oriented	问题导向
	Self-reflection and review	反省与自我审视
	Self-development awareness	自我发展意识
	Self-discipline	自我要求
	Self-awareness	自我认知
	Elevating design's status	提高设计地位
	Passion for design	热爱设计
Resources [资源]	Relationship management	关系处理
	Balancing capability	平衡力
	Strategic leverage	学会借势
	Leveraging people's strengths	人尽其才
	Empowerment	放权

Once the V2 list was finalised, a further round of iteration began, comprising three revisions. Several changes were made during this process: the themes were re-categorised, which included removing the ‘resources’ theme, and the sub-themes were consolidated, reducing their number from 50 to 24 (11 under Skills, six under Knowledge and seven under Mindset) (Figure 36).

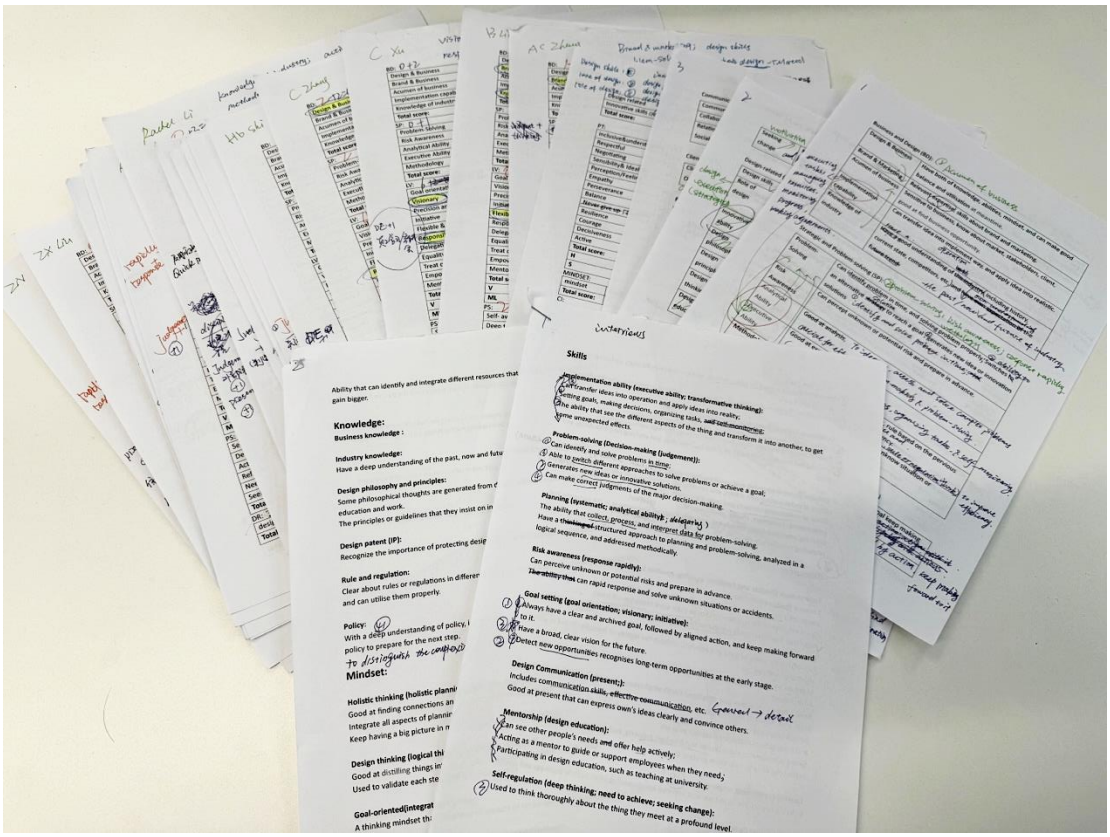


Figure 36: Interview codes iteration process on paper

It is important to clarify the reasoning for removing the ‘resources’ category. The initial two coding iterations included a ‘resource’ theme, which was added because design leaders frequently emphasised resource acquisition, which included reaching out for external resources (e.g. from government or academic partners) and managing internal resources (e.g. improving the workplace environment or providing support for employees).

However, after careful consideration, this theme was removed here in the final iteration for two main reasons. First, while access to resources is important, it was determined not to be a personal competency that an individual can cultivate. Second, related competencies such as ‘communication’, ‘mentorship’ and

‘relationship building’ already covered the skills needed to acquire resources. Therefore, in the final iteration the ‘resources’ theme was removed.

After this final iteration, the resulting list of competencies (V3) was generated, as shown in Table 27. Full details can be found in Appendix C.

Table 27: Code list after third iteration (final V3 version)

Themes	Num	Sub-themes
Mindset	1	Systems thinking (Holistic thinking)
	2	Design thinking
	3	Visionary
	4	Empiricism
	5	Service thinking
	6	Environment building
	7	Training
Knowledge	8	Business knowledge
	9	Industry knowledge
	10	Design philosophy and principles
	11	Design patents (IPs)
	12	Rules and regulations
	13	Policy
Skills	14	Political power
	15	Implementation ability
	16	Problem-solving
	17	Planning
	18	Risk awareness
	19	Goal-setting
	20	Design Communication
	21	Mentorship
	22	Self-regulation
	23	Continuous learning
	24	Collaboration

4.1.1.3 Documentary analysis of job descriptions

Fifity job descriptions were gathered from three well-established and widely used online platforms: *Zhaopin Limited*, *51job* and *Liepin Group*, to preserve data diversity and generalisability and to identify empirically the skills sought by industry. A two-step coding and data analysis procedure was employed (Figure 37). Before coding, each job description was assigned a unique number to ensure traceability and accuracy (Wang et al. 2021; Phommanee et al. 2024). The earlier data-collection procedure is detailed in Section 3.5.2.3.

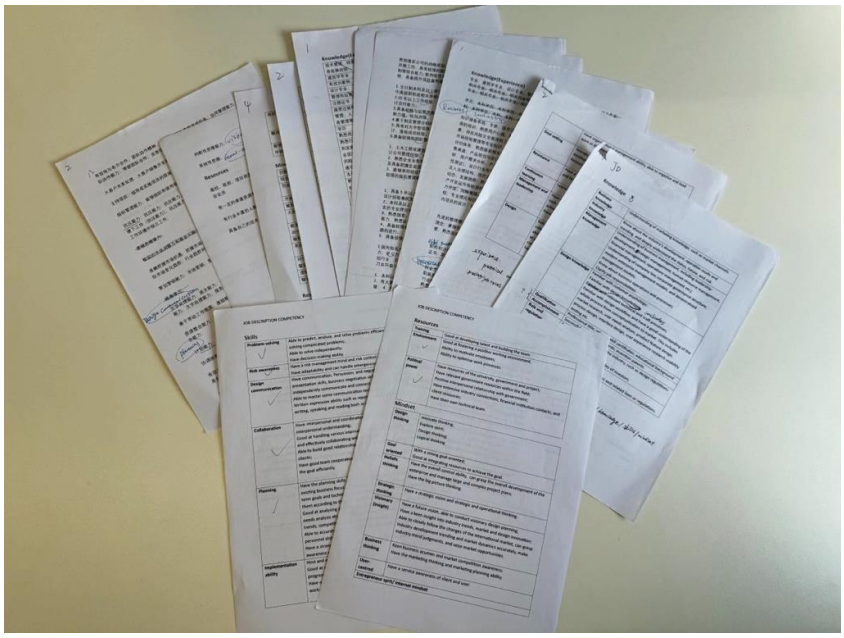


Figure 37: Manual process of job descriptions on paper

Thematic analysis of the 50 job descriptions identified 23 key competencies required of design leaders. Additionally, the frequency of job titles and sectors were also analysed to show the nature of data. The most frequently used job title was 'General Manager' (n = 12). The sectors for employment opportunities were primarily design consultancies and companies (n = 8) and design institutes (n = 6). Table 28 shows the frequency of listed competencies included in job descriptions.

Table 28: Frequencies of competencies in 50 job descriptions

Competency	Frequency	Percent
Problem-solving	20	40%
Risk awareness	7	14%
Design communication	30	60%
Collaboration	20	40%
Planning and implementation	22	44%
Goal-setting	20	40%
Visionary	16	32%
Continuous learning	5	10%
Management and leadership	46	92%
Design	32	64%
Training	12	24%
Political power	10	20%
Business knowledge	6	12%
Industry knowledge	21	42%
Management knowledge	8	16%
Design knowledge	8	16%
Qualification	37	74%
Accomplishment	11	22%

Competency	Frequency	Percent
Rule and regulation & Policy	12	24%
Design thinking	10	20%
Holistic thinking	2	4%
Business thinking	3	6%
Entrepreneur spirituality	1	2%
Digital mindset	1	2%

Collating

After the data collection process and the screening of job positions that matched the criteria (see Section 3.5.2.3), the next step was to copy the job descriptions directly from the job-seeking platforms to ensure completeness and accuracy. All 50 job descriptions were then organised in a Word document for subsequent manual coding. Finally, each description was screened again, the formatting was adjusted, and any irrelevant data, such as errors, typographical mistakes or images introduced during copying from the websites, were corrected.

Categorisation and coding

The categorisation process began in a Word document, in line with Saldaña's (2013) structural coding principle. Structural coding refers to a method that organises data into segments based on a very specific and targeted research question. At this stage, the aim of analysing this data is quite clear: to identify competencies. Therefore, based on this, two aspects were used to categorise all job descriptions: *Job title* and *Competency*.

Job titles are important in job descriptions because they signal variations in the role (Wang *et al.*, 2021). The competency categorisation is derived from two sources: (1) the content of the job requirements and responsibilities and (2) competencies explicitly mentioned in the job description. Identifying job responsibilities is critical as it is an important form of descriptive data for capturing job positions. Furthermore, this study aims to gather up-to-date data, as the rapid development of technology is affecting the design-related field, requiring responsibilities to be redefined (Guo and Volz, 2021).

As explained in Section 4.1.1.2, the competency framework initially consisted of three categories. However, a *Resources* set also emerged for the same reason it

did in the previous interview analysis (p. 153), as it appeared frequently in the data. Therefore, the initial coding comprised four categories here: knowledge, skills, resources and mindsets.

After the first coding process, 374 codes were identified (119 in knowledge, 210 in skills, 36 in mindset and 9 in resources). These codes included overlaps and repetitive terms, due to many similar expressions in the job descriptions. After the merging and synthesis process, 23 final competencies remained. This process is detailed below (Table 29).

Table 29: Changes in different stages of job-description coding

Stage	Themes				Codes
	Knowledge	Skills	Resources	Mindsets	
1st coding	119	210	36	9	374
2nd coding	8	15	3	9	35
3rd coding	**7**	**12**	****	**4**	**23**

The *Knowledge* set covers the related knowledge mentioned in job descriptions. The *Skills* set includes team management, problem analysis and solving, communication, negotiation and collaboration and learning ability. Specifically, writing, bilingual speaking, reading, stress resilience, design and creativity are also coded under this category. The *Mindset* set includes the specific ways of thinking mentioned in job descriptions. Finally, the *Resources* set includes requirements for resource integration, including government, universities, clients, or the talent resources needed to build one's own technical team.

As stated above, the *Resources* set emerged for the same reason it did in the interview analysis. Similarly, based on the same consideration (explained on p. 153), this theme was removed. To avoid repetition, this process will not be explained in detail here. The final results and findings can be found in Appendix D.

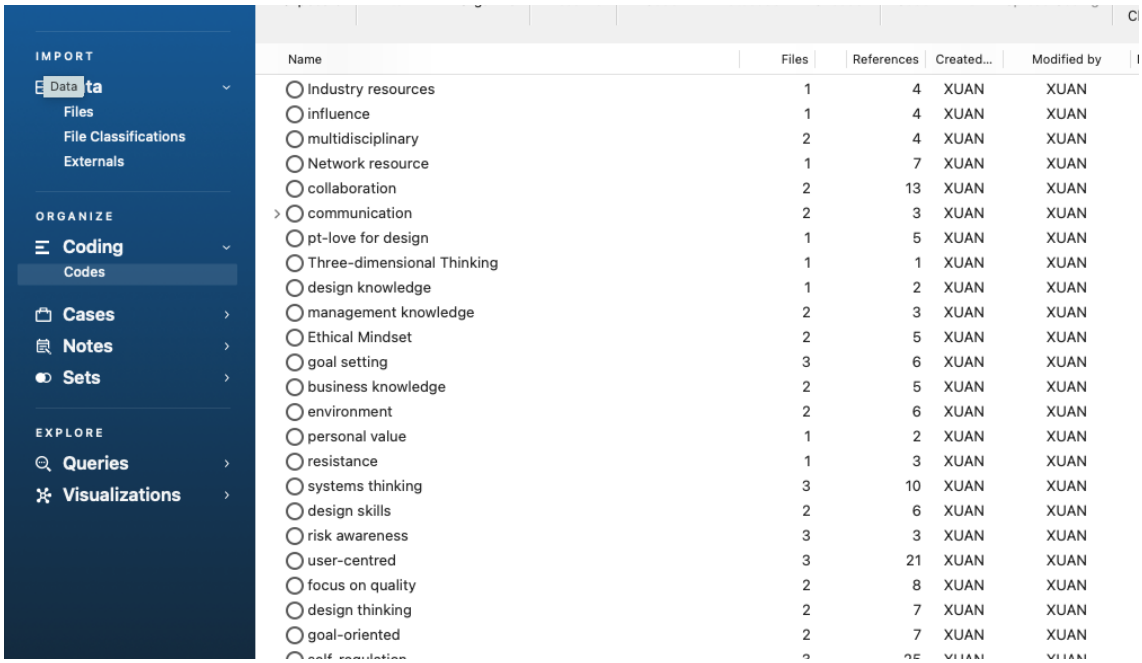
4.1.1.4 Grey literature

The analysis of 12 grey literature followed the same steps as the interview analysis (Section 4.1.1.2), using NVivo (Figure 38). In the initial coding process, 39 codes

were generated and organised into three themes and 31 sub-themes. The details are shown in Table 30.

Table 30: Coding results for grey literature data (Initial coding)

Themes	Num	Sub-themes
Mindset	1	Business thinking
	2	Design thinking
	3	Goal-oriented
	4	Holistic thinking
	5	User-centred
	6	Visionary
	7	Scientific and Engineering Thinking
	8	Three-dimensional Thinking
	9	Ethical Mindset (Social responsibility, commitment to community)
	10	Empirical thinking
Knowledge	11	Business knowledge
	12	Design knowledge
	13	Design principle
	14	Industry knowledge
	15	Design patent
	16	Multidisciplinary
	17	Management knowledge
Skills	18	Self-regulation
	19	Adaptivity
	20	Collaboration
	21	Communication and persuasion
	22	Continuous learning
	23	Design skills
	24	Quality Control: Focus on quality
	25	Goal-setting
	26	Implementation
	27	Innovative power (Design)
	28	Mentorship
	29	Planning
	30	Problem solving
	31	Risk awareness



Name	Files	References	Created...	Modified by
Industry resources	1	4	XUAN	XUAN
influence	1	4	XUAN	XUAN
multidisciplinary	2	4	XUAN	XUAN
Network resource	1	7	XUAN	XUAN
collaboration	2	13	XUAN	XUAN
communication	2	3	XUAN	XUAN
pt-love for design	1	5	XUAN	XUAN
Three-dimensional Thinking	1	1	XUAN	XUAN
design knowledge	1	2	XUAN	XUAN
management knowledge	2	3	XUAN	XUAN
Ethical Mindset	2	5	XUAN	XUAN
goal setting	3	6	XUAN	XUAN
business knowledge	2	5	XUAN	XUAN
environment	2	6	XUAN	XUAN
personal value	1	2	XUAN	XUAN
resistance	1	3	XUAN	XUAN
systems thinking	3	10	XUAN	XUAN
design skills	2	6	XUAN	XUAN
risk awareness	3	3	XUAN	XUAN
user-centred	3	21	XUAN	XUAN
focus on quality	2	8	XUAN	XUAN
design thinking	2	7	XUAN	XUAN
goal-oriented	2	7	XUAN	XUAN

Figure 38: Grey literature code list in NVivo

After eliminating overlaps and developing the sub-themes (Table 31), the final list consists of 20 sub-themes, which are explained in the following section (Section 4.2). Detailed results can be found in Appendix E.

Table 31: Changes in different stages of grey literature coding

Stage	Themes	Sub-themes	Codes
1st coding and merging	/	/	39
2nd coding (Iteration)	/	31	39
3rd coding (Iteration)	**3**	**20**	**39**

4.1.2 Stage 2 data analysis

Once the preliminary DLCM was constructed in Stage 1, it was validated through qualitative template analysis in this stage (Figure 39, below).

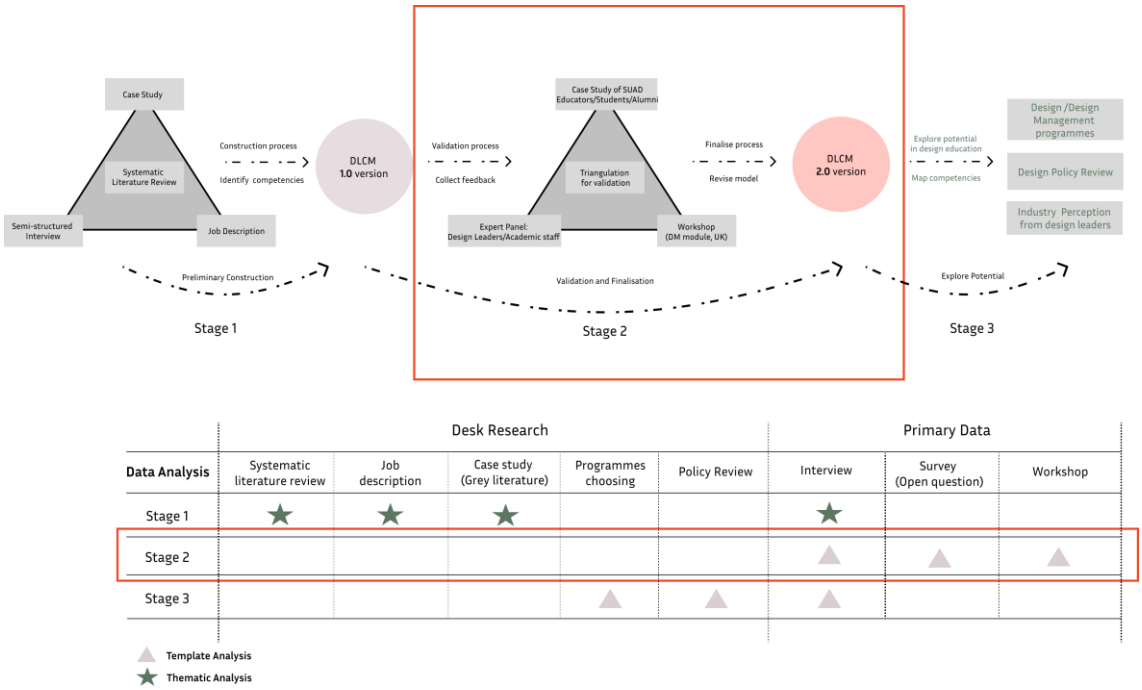


Figure 39: Stage 2 in this research

As shown in Figure 40, the validation process comprised three parts: an expert survey, interviews with case-study university stakeholders (educators, students and alumni) and a student workshop in the design management module, a course taught at Lancaster University, UK, during the Lent term of 2024.

As introduced in Section 3.5.1, this process employed both methodological and data triangulation to ensure the collection of robust and valid feedback. This multi-source approach provided a comprehensive validation.

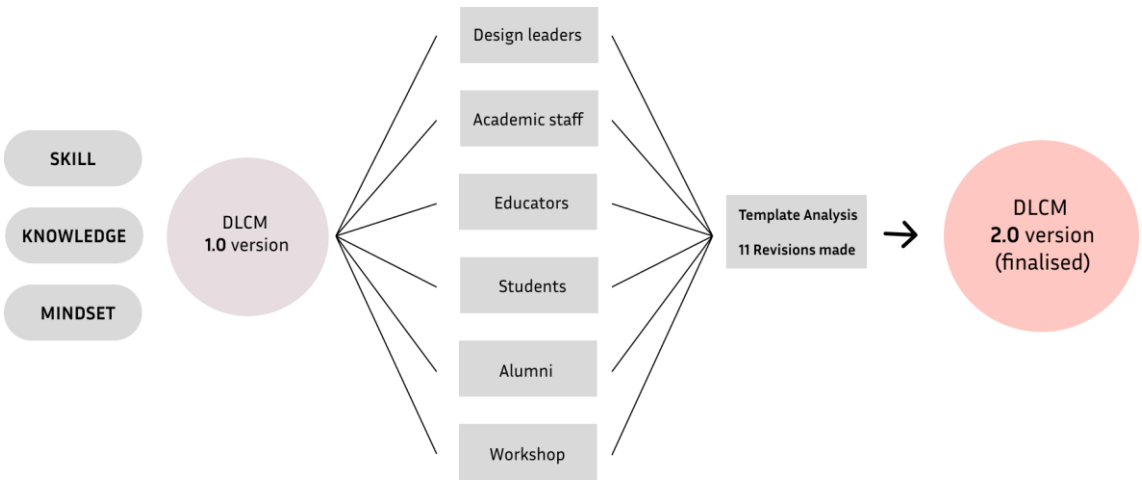


Figure 40: Stage 2 data analysis

In detail, feedback was gathered from three groups involving six types of stakeholders:

1. *An Expert Panel*, consisting of:
    - Seven design leaders
    - Five design education academic staff
2. *Stakeholders from SUAD*, including:
    - Three design management educators
    - Eight design management students
    - Three design management alumni
3. *A student workshop*:
    - Nine students from an in-class workshop

As introduced previously, these groups fall into two main categories: experts (design leaders and academic staff), and programme stakeholders (educators, students and alumni from the SUAD case study; and the in-class student workshop). Feedback from these groups enabled an assessment of general perceptions and a thorough examination of each competency in the DLCM. For instance, experts offered insights on the model's conceptual clarity and industry relevance, while programme stakeholders assessed its practical applicability within design education, and the workshop demonstrated the DLCM's level of transferability from a geographical perspective. The detailed results will be introduced in Section 4.4.

4.2 Identified Competencies for Building a Design Leadership Competency Model

After the data analysis process, the following competencies were identified from each source: 17 from the systematic literature review, 24 from interviews, 23 from job descriptions and 20 from case studies. This section presents each competency. Full details for each source can be found in Appendices B, C, D and E.

4.2.1 Design sensitivity

Design sensitivity consisted of four core dimensions: design expertise, design philosophy and principles, design integration and design attitude. This competency helps design leaders better interpret design (Hsieh *et al.*, 2021b; Joziasse, 2011b), and is connected to the *Design Communication* competency (see Section 4.2.2). Moreover, it can help to ensure a certain level of quality in the design outcome (Kang *et al.*, 2015).

4.2.1.1 Design expertise

As one of the core dimensions of design sensitivity, design expertise was emphasised across all four data sources. Critically, all data sources emphasised the necessity of design leaders' design expertise, a finding that supports this research's position in the debate over design leaders' background and expertise, as discussed in Section 2.5.5.

From this perspective, the job descriptions provided the most comprehensive aspects of design expertise, including: (1) a solid design foundation with good perception and control of form, colour and craftsmanship; (2) strong aesthetic discrimination and a keen sense for capturing details (aesthetic judgement); (3) creative and innovative thinking with a full imagination; (4) design review and delivery ability; and (5) an effective design methodology.

The SLR not only emphasises design expertise but also highlights the need to possess appropriate qualifications and experience (Alawad *et al.*, 2017; Hung *et al.*, 2016; Tan and Chapman, 2017). Additionally, it emphasises the requirement for design expertise is derived from the needs of future professional design training (Galli *et al.*, 2017, p. 4189).This aspect is also supported by job descriptions, which provide further details on qualifications and accomplishments. For instance, qualifications include a professional title [高级职称], relevant skill certificates and an educational background. Accomplishments include previous successful cases, the ability to build one's own team, independent project leadership experience at a provincial or national level, and design awards or invention patents.

Furthermore, examples from the grey literature also support this, as design expertise can help design leaders gain an advantage. For instance, Zheng (GL 1) creatively used waste cardboard boxes to make a portable portfolio case, demonstrating strong fundamentals and craftsmanship that helped him secure a scholarship. Further details of grey literature can be found in Appendix E.

4.2.1.2 Design philosophy and principles

Design principles play a crucial role in formulating a vision and delivering outcomes, as they connect to a brand's identity and values (Turner, 2013). Building on this foundation, design leaders can develop and apply their own principles and demonstrate a practical knowledge of materials (e.g. understanding fabrication processes and production constraints, as evidenced in grey literature 2, 7 and 8).

During the interviews, design leaders discussed two aspects of their design philosophies: (1) the philosophical thoughts derived from their design-relevant experience and (2) the practical guidelines they adhere to in their design process. For example, INT3 highlighted the importance of "guards the product's guiding principles", adding that when unlimited feature stacking is possible, real design value lies in "insisting on the features that must not be added". This view reveals the philosophical trade-offs in product design and shows how experience can inform a decision-making method linked to a company's strategy and culture.

4.2.1.3 Design integration

Supported by SLR, grey literature and interviews, design leaders tend to push the boundaries of design and integrate it within organisations. This 'design boundary blurring' involves more than just infiltrating 'non-design' jobs to widen perceptions; it is also involves integrating design and design thinking into other disciplines and departments (Gloppen 2009; Topalian 1990; 2010; 2012). These actions, according to the SLR, originate from a deep understanding of design (Lee and Cassidy, 2007).

In detail, design leaders always ensure designers are involved in strategic planning (Lili *et al.*, 2009, p. 3) and expand design's influence when they are in a strategic position (Micheli *et al.*, 2018). This is supported by the grey literature; for example, Zheng (GL 1) noted that if it weren't for the sunshade's product design, there would

be no company, no large orders and no precedent for a high-priced product capturing a low-end market segment.

Moreover, design leaders tend to build a design-centric culture (GL 1, 3, 4, 5, 7, 8, 9, 10 and 11). Tong (GL 3) stated that he placed design at the heart of the company: his very first hire was an industrial designer, and designers now make up as much as 60% of the workforce. From this perspective, design leaders build design-led organisations where designers influence demonstrates a strong tendency to expand the boundaries of design and place it at the core of the organisation.

4.2.1.4 Design attitude

The SLR highlights the necessity for design leaders to have a positive attitude toward design as a foundation. This includes acknowledging and showing concern for design, and being a design advocate (Gloppen, 2009a; Lee and Cassidy, 2007; Lili *et al.*, 2009; Topalian, 1990). This was also evident in the interviews, as design leaders highlighted their passion and love for design, especially when they answered questions about their experiences and how they overcame obstacles.

4.2.2 Design communication

Design communication was widely discussed from all data sources as a competency that enables leaders to effectively communicate, persuade and negotiate. This involves presentation skills, business negotiation skills and the ability to independently communicate and connect with others. The job descriptions also highlights the importance of written expression, including proficiency in writing and bilingual skills in Chinese and English.

Effective communication has a critical influence on strategies, processes and organisational structures (Hussain *et al.*, 2018), and a lack of it can lead to the failure of organisational transformation (Musaigwa, 2023). During the interviews, design leaders emphasised this competency by illustrating their personal experiences. For example, INT20 noticed how often designers struggle to express ideas and explain their work to others: "All designers have trouble making themselves clear… but I think I can be sharp and to the point".

The grey literature emphasised the interpretive aspect of effective communication, which involves comprehending and interpreting the meaning of a message (N.A. 2020). For example, the leader in GL 12 realised that their most important task as CEO was to understand external information, interpret it and translate it, turn it into a feasible plan and convey this plan to the rest of the organisation to formulate strategies accordingly. This emphasises communication as a critical link between the external environment and internal operations. Design leaders act as mediators who collect, interpret and convey external information to internal stakeholders, including employees. Effective managerial communication involves more than simply transmitting facts: it requires turning external data into actionable insights. This highlights a crucial communication skill for design leaders: making complex information understandable and meaningful.

The effective communication is always connected with *persuasion*. Effective design communication involves using tactics to persuade, build backing and get the best results from meetings where interests may clash (Spencer and Spencer, 1993). This aligns with findings from the SLR, which indicate that communication is not only a competency to effectively convey a vision and agenda to various individuals, but also one that emphasises convincing others (Baars and Rüedi, 2016; Lee and Cassidy, 2007; Miller and Moultrie, 2013a).

The persuasive effect comes from adjusting one's stance when communicating. During the interviews, when design leaders described the shift from a hands-on designer to a leadership role, they noted that no matter how expert they are, they must speak in a way that everyone accepts. By adjusting their stance and delivery, they can win support, speak from a listener's perspective and balance differing views.

Grey literature 2, 4, 7 and 12 reinforce this point by illustrating the communication strategies, including persuasive skills. For example, in GL 2, Chen employed different communication strategies to persuade and recruit a CEO, as Chen understood what would impress Ji and knew Ji's 'painpoint', and he impressed Ji with his visionary communication of "striving together for 100 billion" (GL2, 2024). This demonstrates how the effective, visionary communication of a vision can

motivate and encourage people to work together (Yousef Farhan, 2024). Furthermore, this grey literature shows how communication can intervene and make an impact on success, and how they operationalised this beyond traditional limits.

Additionally, the grey literature also mentioned impact of organisational structure on the efficiency of communication, noting that a flatter one usually enables quicker responses and decision-making. In GL 4, for example, Qian could report directly to the company president, indicating a streamlined and highly efficient communication path. This direct line reduces barriers and speeds up the flow of crucial information. However, while this is an important factor impacting communication, it is considered a complementary point, as this research focuses on individual competency rather than other factors.

4.2.3 Collaboration

Collaboration is important especially in a design context, as collaborative work contributes to an enhanced customer experience (Barker Scott and Manning, 2024). This importance was also reflected across all four data sources in this research, as design leaders believe that organisational growth must be based on a shared vision and teamwork, not on the drive of a single leader. Generally, the job descriptions amplify collaboration in two ways: (1) interpersonal and coordination skills, with a certain level of interpersonal understanding; and (2) the ability to handle various complex internal and external relationships and collaborating effectively with all parties.

Based on these two aspects, it is clear that collaboration and relationship building are closely intertwined. To clarify, as this close connection can sometimes make it difficult to differentiate between them, this section on collaboration will be introduced with some overlap from external relationships. In the following section on ‘relationship building’ (Section 4.2.11), the main focus will be on the importance of building relationships and on demonstrating how design leaders build and utilise them.

Therefore, in the following analysis, collaboration will be divided into three parts: (1) internal alignment, (2) external collaboration and (3) promoting interdisciplinarity. These three aspects are aligned with the findings from SLR, interviews and grey literature.

Firstly, *internal alignment* is about aligning people within the organisation (Baars and Rüedi 2016; Muenjohn et al. 2013), promoting inter-functional coordination of positive relations among specialists (Micheli *et al.*, 2018) and providing a bridge between designers and non-designers (Gloppen, 2009a). Specifically, this type of collaboration also demonstrates corporate conscience through design (Topalian, 2012) by coordinating collections of products or company outcomes (Miller and Moultrie, 2013a).

In this sense, a good design leader can, by aligning employees, motivate them to work hard to realise the organisation's vision. As INT2 stated, "On top of finishing our current tasks, everyone has to invest extra effort so we can build this together", which demonstrates the importance of building internal alliances. In this process, design leaders foster a collaborative culture and wide-ranging partnerships to avoid authoritarian leadership and move the organisation forward. This characteristic demonstrates a similarity to the shared leadership previously discussed in Section 2.1.1, and a strong 'stay behind' style of Chinese leadership will be introduced in the discussion chapter (Section 6.3.1).

Secondly, from an *external* perspective, the SLR highlights the importance of a broad design network to organise group work and collaboration effectively (Tan and Chapman, 2017; Muenjohn *et al.*, 2013), especially when integrating design collaborations such as in a co-design process (Miller and Moultrie, 2013a). Similarly, the interviews also emphasise this aspect. For example, INT 11 explained that when resources are tight or challenges arise, they actively seek joint efforts to create win-win outcomes. This demonstrates that in uncertain or tricky situations, they search for partnerships to advance tasks or tackle difficulties, choosing an open, cooperative way forward.

Finally, to promote positive and effective collaborations, *interdisciplinarity* is important. Design leaders typically appreciate a mixture of talents and backgrounds to better promote interdisciplinary collaboration within an organisation (Lee and Cassidy, 2007). However, a concern about collaboration misalignment emerged from the grey literature. They believed this was caused by unclear communication when working with employees from different backgrounds (GL 12), which emphasises the importance of the interdisciplinary competency of design leaders.

From this perspective, design leaders need to ensure cross-functional integration through cross-disciplinary project teams and regular meetings between function heads and design champions, even within non-design departments (Lili *et al.*, 2009). To address the concern mentioned above, design leaders from the grey literature proposed that a design leader needs to assess the structure of a multidisciplinary collaboration team, understand how different professionals work within it, and adjust team members appropriately (GL 9). In this regard, it requires design leaders to have a broad perspective on most related disciplines (Baars and Rüedi, 2016; Green *et al.*, 2010; Topalian, 2012), and possess contextual knowledge (Kang *et al.*, 2015). Similarly, in the interviews, design leaders mentioned interdisciplinary learning, specifically reflected in learning interdisciplinary knowledge, creating such an environment within the company, and recruiting relevant talent, which is consistent with the Philp case study of Pinheiro and Franqueira (2024).

4.2.4 Mentorship

Mentorship was highlighted across all four data sources, as leaders can make a positive impact on employees by building their confidence, motivating them and improving employee trust (Ghavifekr and Adewale, 2019). Generally, based on the SLR, mentorship includes inspiring, motivating and supporting an employee's development, as well as cultivating other design leaders or managers (Baars and Rüedi, 2016; Brown, 2008; Byrne *et al.*, 2009; Lee and Cassidy, 2007; Muenjohn *et al.*, 2013; Topalian, 1990), which aligns with the emphasis from the job descriptions (Appendix D). In a specific design context, mentorship is about

empowering employees and inspiring their design confidence (Hsieh *et al.*, 2021b; Joziasse, 2011b; Miller and Moultrie, 2013b). This includes guiding both non-design and design colleagues through the design process, conveying design thinking and helping them take pride in what they have designed and accomplished.

During the interviews, design leaders highlighted mentorship, with a focus on *offering help and training opportunities* to employees. One observation is that design leaders can see other people's needs, offer help actively and act as mentors to guide or support employees when they need it. For example, INT16 recalled a senior colleague who revised everyone's reports and actively learned about their interests and work status. This experience inspired them to become a supportive leader, as they believe trust starts with giving. Specifically, they support employees through conversation and care to encourage their self-expression and growth by prompting them to speak and reflect. All these actions demonstrate mentor-like behaviours.

Beyond offering personal support, design leaders in the interviews focused on providing training events aimed at improving employees' abilities in both design and business fields. This requires design leaders to review and analyse employees' strengths and weaknesses and find ways to align their development needs with the organisation's strategy. For example, INT 20 guides staff to focus on their weak areas and learn proactively by flexibly adjusting review criteria and holding regular team-sharing sessions. They added that the review criteria "are adjusted according to the company's current situation" to keep employees' growth in step with the organisation's stage of development.

In addition, design leaders from the interviews and grey literature also *participate in design education* (Interviewees 5, 9 and 18; GL 5, 6). They deliver lectures and act as bridges between education and industry, maintaining a long-term commitment to teaching and training. From this perspective, they demonstrate that mentorship is not limited to the workplace, but extends to other areas.

4.2.5 Problem-solving

Problem-solving is a crucial competency that was highlighted across all four data sources. However, different sources demonstrate a distinct focus. The SLR emphasises the creative framing of the problem (Kang *et al.*, 2015) and the process of identifying problem setting (*what*) and the problem-solving method (*how*) (Meroni *et al.*, 2018). According to the job descriptions, problem-solving refers to the ability to foresee potential issues, analyse situations accurately and address problems efficiently, highlighting the importance of foresight and timeliness.

Both the interviews and grey literature focus on the entire problem-solving process. The grey literature demonstrated a process moving from initial discovery (e.g. identifying the root cause) to an iterative refinement and then a final, decisive action (e.g. GL 1). Furthermore, the interviews demonstrated the most comprehensive view of problem-solving, outlining a process that can be broadly divided into three stages: (1) identifying and defining problems, (2) exploring and generating solutions and (3) decision-making.

4.2.5.1 Identifying and defining problem

As mentioned in the SLR, a design leader should have the ability to set and identify problems and know how to solve them (Byrne *et al.*, 2009). From the interviews, design leaders reflected that problem-solving is not always at the macro or strategic level; it can also appear in everyday matters. INT24 noted, "As small problems arise at work... I tackle the small issues in my own tasks". By using methods such as "setting alarms to check work progress on schedule", they adjust their work pace and strategy in a timely manner. Additionally, design leaders in the interviews placed more emphasis on timely problem-solving, aligning with the job descriptions, which demonstrates a difference between theory and practice. For example, INT5 said, "I can make decisions very quickly... we can solve problems very fast". This shows that he can promptly detect issues from multiple angles.

4.2.5.2 Exploring and generation ideas

Design leaders explore and switch between different approaches to solve problems or achieve a goal and generate new ideas or innovative solutions

(Spencer and Spencer, 1993). INT5 stated that in the two very different realms of brand marketing and creative development, they can flexibly switch mindsets and strategies according to the problem. This shows that design leaders can move effectively among different contexts.

INT3 illustrates how challenging assumptions can spark new solutions: "People assume plastic pollutes while paper is eco-friendly, yet if the package is reusable, paper may cause more waste than plastic". His view breaks the stereotype about materials by reframing the usual logic around plastic and paper in environmental and sustainability terms. They use plastic so that users can keep it as a storage box, turning packaging from a single-use shell into a long-term, value-adding add-on. Furthermore, laser-etched scales on a metal backplate also give it the function of a small ruler, turning what seems like a mere structural part into a tool the user can keep. He added, "both the usage scenario and even the discarded scenario are designed", making the product's endpoint the starting point of the design. This demonstrates the approach of 'creative problem-solving', which can help design leaders break cognitive fixedness and established norms (Cote, 2023).

Regarding why design leaders generate innovative solutions, the words of INT17 offer a perspective that goes beyond a sole dependence on design thinking. They stated that, compared with traditional managers, designers who move into management and leadership retain strong professionalism and creativity. This blended experience offers deeper and more varied project perspectives, creating the conditions for innovative solutions.

Additionally, during this generation stage, design leaders demonstrate the ability to collect, process and interpret data. For example, INT4 continuously building and strengthening their data-gathering skills, especially when conducting industry analysis. This shows they not only gather information effectively but also use data in specific analytical settings to understand problems and develop strategies. Moreover, the digital era now also demands new data analysis competencies from leaders (Schmidt *et al.*, 2023).

Furthermore, design leaders show a structured approach to problem-solving, where issues are analysed in a logical sequence and addressed methodically. INT6, INT17 and INT24 stressed that forming a personal 'problem-solving methodology' in work and life is essential. INT17 said, "Even if you enter another industry, if you've developed a set of problem-solving methods, you can still perform well". This highlights the importance of structured problem-solving and its transferability across different fields.

4.2.5.3 Decision making

Design leaders should be able to make confident and correct judgements on major decisions. It is important to make the right decisions, as these have a significant impact on the company's development and direction. Furthermore, the changing business context is shaping the different status of various components (Valtonen, 2020), which requires design leaders to possess advanced decision-making abilities. During the interviews, design leaders highlighted the importance of making the right decisions and emphasised that this ability relies on an understanding of business reality and front-line operations. INT14 believes that leaders who rarely have front-line experience, or what they called "parachuted-in leaders", often make the wrong calls and that decisions made far from the front line can have a negative impact on the team.

Furthermore, effective decision-making is also based on the ability to see different aspects of a situation and transform them to create unexpected effects. This aspect is essential in transformational leadership (introduced in Section 2.1.1), which emphasises not only the changing internal and external environment but also the transformational ability of leaders themselves (Musaigwa, 2023). Similarly, this transformational ability overlaps with one of the characteristics of design thinking (e.g. creative framing mentioned in this section) (Gaynor *et al.*, 2018; Manu, 2006), emphasising its important position.

4.2.6 Continuous learning

In the SLR, interviews and job descriptions, continuous learning is highlighted with three aspects: (1) *self-improvement* which refers to a lifelong learning awareness;

(2) *learning ability*, which includes acquiring, retaining and applying new knowledge and techniques; specifically, they can actively improve themselves through various methods (Spencer and Spencer, 1993); and (3) *reflection*, which refers to developing one's own methodology based on past experience. For example, design leaders in the interviews routinely reflect on past experiences or mistakes and excel at drawing conclusions from them. Similarly, *self-regulation* has also been mentioned in the SLR (Lee and Cassidy, 2007), grey literature and interviews, demonstrated by leaders who set high standards for their own performance and working hard to meet them.

Additionally, in the interviews, all the design leaders displayed continuous learning and kept studying even after graduating from university. This shows that continuous learning plays a critical role for design leaders, especially in enhancing the skills they possess through experience. This aligns with the research on design leader coaching by Galli et al. (2017, p. 4193), which concluded that "design leadership capabilities are mainly activated by the ongoing learning process".

In the grey literature, design leaders demonstrate this competency through self-improvement, showing an eagerness and intention to acquire new knowledge and learn from their peers. As Liu emphasised, "In many constrained propositions, there are numerous open possibilities and an infinite amount of things to learn" (GL 5, 2024).

Aligning with 'interdisciplinary collaboration', which was introduced previously in Section 4.2.3, design leaders also showed the ability to study across disciplines as part of their continuous learning. For example, GL 4 shows how a design leaders educated themselves in a new discipline. They studied hard, and seldom got home before midnight, and this self-cultivation and continuous learning enabled them to acquire a range of skills and knowledge from various fields, including supply management and reliable design in engineering and R&D. Similarly, Hong (GL 6) actively studied books on education and psychology, going beyond their core discipline of design to broaden their knowledge base. Therefore, from this perspective, continuous learning helps design leaders to develop themselves into a 'T-shaped' talent – professionals with both specialist and generalist qualities:

deeply specialised in their professional skills and broadly equipped with comprehensive qualities, emotional intelligence and learning abilities.

4.2.7 Goal-setting

Goal-setting is important, as young designers often struggle in their first leadership roles because they have yet to develop this goal-setting competency, which is a foundational and important skill for a leader (Joziasse 2011).

In the SLR, goal-setting can be identified from two aspects: *being visionary* and *strategy formulation*. Being visionary represents the design leaders' broader and future-oriented vision (Galli *et al.*, 2017; Han and Bromilow, 2010; Hsieh *et al.*, 2021b; Kumar *et al.*, 2016; Joziasse, 2011b; Muenjohn *et al.*, 2013; Topalian, 1990, 2012; Turner and Topalian, 2002). It is also the ability to set a big picture, establish clear objectives and seek out opportunities (Best, 2006b; Han and Bromilow, 2010; Joziasse, 2011b; Lee and Cassidy, 2007; Miller and Moultrie, 2013b; Turner and Topalian, 2002). Moreover, job descriptions also mentioned that a keen insight and deep understanding of the industry, market and design are important prerequisites of being visionary.

Similarly, in the interviews, design leaders emphasised the *visionary* aspect through two more practical points: setting a clear and achievable goal, and detecting new opportunities in the early stages. On the one hand, design leaders should always have a *clear and achievable goal*. This goal should be followed by aligned action, with continuous forward movement toward it. INT17 emphasised that a design leader must set clear goals and be able to make decisions: "You have to see the whole picture… lay out a clear direction so the team can rally around a shared target and move forward". They then illustrated this with a practical example, which starting an internship early and even 'tricking' the company to get the chance, to show proactive steps toward a goal. In this sense, *strategy formulation* is intertwined with being visionary, as setting an achievable and consistent goal influences strategy formulation by showing a specific level of direction that team members can follow (Byrne *et al.*, 2009; Gemser *et al.*, 2023; Gloppen, 2009a; Hsieh *et al.*, 2021b; Joziasse, 2011b; Miller and Moultrie, 2013b,

2013a; Muenjohn *et al.*, 2013; Turner and Topalian, 2002). This is also supported by the job descriptions, as they emphasise goal-setting from a strategy-making perspective: it is about formulating corporate development strategies, having a strategic vision and integrating resources to achieve goals.

On the other hand, design leaders can *detect new opportunities, recognising long-term potential at an early stage* (Spencer and Spencer, 1993). This is also evident in the grey literature, which mainly emphasised goal-setting at the preliminary stage of venture creation. As goal-setting is not isolated, it should be based on considerations of strategic positioning and leveraging the company's advantages within a broader context. Before founding his company, Tong (GL 3) articulated a definitive goal: he envisioned a shopping experience where an entire family could visit the store to buy walking shoes all at once, seeing the future opportunity. In addition, since defining a goal at this preliminary stage is difficult, design leaders emphasised the importance of deep reflection before taking action (GL 11 and 12), which shows a connection with the *Continuous Learning* (Section 4.2.6). Moreover, the SLR also supports this by mentioning *chance seeking* (Lee and Cassidy, 2007; Joziasse, 2011b; Miller and Moultrie, 2013b; Hsieh *et al.*, 2021b), which represents the need for design leaders to find new business and design opportunities.

4.2.8 Risk awareness

Venture creation involves risks and challenges, as risk exists in uncertainty and influences entrepreneurial intention (Ardi *et al.*, 2024). Therefore, for a design leader, foreseeing and controlling risk is crucial. It not only helps in predicting the future impact on the business, allowing it to enhance its longevity, but also helps the design leader develop a proactive awareness to avoid obstacles, especially at the start-up stage. In the job descriptions and interviews, risk awareness is referred to as sensing potential risks, preparing for them and responding quickly when unexpected events occur.

Supporting this, risk awareness frequently appeared in the interviews. INT18 talked about the external uncertainties a company may face (e.g. market changes, viral outbreaks, etc) and emphasised the importance of risk awareness, stating they

must keep questioning themselves about it. On a daily basis, they think through contingency plans and get ready to act fast. For example, they stated, "don't put all your eggs in one basket"[不要把鸡蛋都放在一个篮子里]. This example reflects a classic diversification strategy to offset the systemic risks of relying on a single market or channel and shows both abilities: *spotting risks early and reacting quickly when trouble arises*.

Complementing this strategic view, the grey literature focus on the experienced-based aspect of risk awareness, which refers to the competency to identify emerging threats early and design flexible responses that protect the organisation. Design leaders show this awareness by reflecting on previous setbacks and preparing for uncertainty (GL 1, 9, 10 and 12). Before taking action, they stress the need to acknowledge a looming crisis. Instead of denying or avoiding problems, design leaders face them directly and develop contingencies to lessen their negative impacts.

Design leaders learn from past crises and prepare for uncertainty through this risk awareness. The design leader in GL 1, for example, notes how they identified risk from the recurring threat of economic disruptions and, through this, came to understand industry vulnerabilities. This experience reveals an acute awareness of how external factors can directly harm the business. Drawing on this insight, they demonstrate foresight and emphasise the importance of preparing more robust defensive measures for the next downturn. Similarly, other design leaders take steps that include monitoring the market, staying alert to changes in supply-chain dynamics, retailer strategies and consumer behaviour, or shifting toward other products or services and building self-disruption strategies (GL 1 and 10).

4.2.9 Implementation

Although design leaders are positioned at a strategic level, they frequently discussed their leadership and management experience drawn from design projects, and this feature was demonstrated in all four sources. The SLR discussed implementation based on the project process: (1) before a project starts, design leaders must define the mission clearly, create an overall plan and handle

delegation and resource distribution (Byrne *et al.*, 2009; Lee and Cassidy, 2007; Lee *et al.*, 2018; Miller and Moultrie, 2013b; Topalian, 1990, 2012); (2) during the project, they need to ensure progress while optimising design and commercial opportunities (Miller and Moultrie, 2013a); furthermore, the grey literature also focus on hands-on implementation, including proactive prototyping and testing (GL 1, 3, 12); (3) finally, at the project's end, they can ensure the outcome is integrated into strategic capital, turning innovations into benefits for the business, culture and society, and plan for continuous development (Hsieh *et al.*, 2021b; Manu, 2006).

This focus on project process aligns with the interviews and job descriptions. Specifically, INT24 stated that: "The more things and people you oversee, the more complicated the work becomes… without firm execution, the job quickly turns painful".

Beyond this process-oriented perspective, the interviews also reflected a more general, transformative feature of implementation, which involves transferring ideas into operation and applying them to reality; this was also mentioned in Manu (2006) and Hsieh *et al.* (2021b). From this perspective, INT16 believed, "It is obvious: design leader's product and implementation abilities are stronger. What they put into concrete form is stronger", stating that a design leader's strength lies in truly 'turning ideas into tangible form'. Furthermore, INT20 described their shift from a pure design perspective toward commercial reality, showing their ability to translate design concepts into actionable plans and judge their real-world value. This aligns with a perspective from the grey literature, as it suggests that implementation also needs to balance vision with feasibility (GL 2, 4).

Drawing on this rich data, the following sub-sections will discuss this specifically from two aspects: planning, which is start stage of project, and overall project management which draws upon the entire project process.

4.2.9.1 Planning

At the start of a project, planning is important and widely mentioned in the SLR, interviews and job descriptions. In this regard, planning includes *recruitment* and

delegation. From a recruitment perspective, a design leader must be able to recognise talent and recruit designers with a high capacity for creativity (Lee and Cassidy, 2007; Miller and Moultrie, 2013b).

Specifically, delegation is about identifying the mission clearly and fairly allocating it to the right people. INT13 described using a "horse-race system" [赛马制] to pick a project lead, showing sound judgement in matching tasks with talent, noting that the process "keeps others from feeling slighted". This example shows clarity in setting task goals and openness and fairness in allocation. INT2 added that when assigning roles, the team weighs each employee's career aspirations and ability assessments (e.g. logical tests). This reflects an awareness of arranging duties reasonably based on individual capabilities, which constitutes proper delegation. Furthermore, proper delegation can improve information gathering for decision-making (Sloof and Von Siemens, 2021).

4.2.9.2 Project management

In the job descriptions, project management involves three aspects: *analysis and judgement, resource control* and *cost management*. Specifically, this requires leaders to be skilled at (1) analysing business trends, competitors and data; (2) accurately controlling targets, time and personnel; and (3) possessing a strong ability to estimate and control costs with an awareness of efficiency. Moreover, the SLR highlights the importance of *directing investment*, referring to the need to "direct corporate investment and maximise the return on such investment" (Turner and Topalian 2002, p. 9), especially regarding design investment (Muenjohn *et al.*, 2013) and the ability to "sustain a positive investment" (Micheli et al., 2018, p. 629).

Furthermore, *quality control* also emerged as another aspect of the project management process and was demonstrated in both the grey literature and interviews. The design leaders demonstrate how they ensure that all aspects of their work meet high standards and are free of errors, and they show a strong attention to detail. This characteristic aligns with the research of Han and

Bromilow (2010), which found that attention to detail, especially on quality of the outcome, is one of an essential skill for effective leadership.

In this sense, design leaders show rigorous *attention to detail*. However, a focus on detail does not limit design leaders to a narrow vision; on the contrary, it can help them grasp the overall situation and expand their horizons (Hsieh *et al.*, 2021a). Multiple examples demonstrate their emphasis on fine details, from toothbrush surface smoothness to exoskeleton joint design (GL 7). Their focus on small but critical improvements (e.g. adding a curve for better usability) shows a proactive approach to enhancing user experience and product durability.

Moreover, design leaders adopt *a hands-on approach* to quality control. Leaders like Su (GL 8), who personally oversees every stage of design, development and supplier selection, ensure that quality is not compromised at any step. Similarly, Liu (GL 5) maintains a demanding work schedule (e.g. 7 × 12 hours per week) to accelerate development without sacrificing quality standards.

4.2.10 Environment-building

As mentioned in the section on the *Collaboration* (Section 4.2.3), building a collaborative environment is important for promoting and developing teamwork (Turner, 2013). The SLR emphasised building a creative environment and encouraging informal interactions (Baars and Rüedi, 2016; Miller and Moultrie, 2013b; Lee and Cassidy, 2007). In this sense, the interviews showed that design leaders tend to foster a flexible, high-quality workplace, as the work environment can be one of the key drivers of experience in design (Press and Cooper, 2003).

The rich data reveals eight specific aspects of this approach:

(1) Creating a flexible environment;
(2) Constructing a flat company structure to gain more flexibility;
(3) Applying regulations flexibly to accommodate individual work performance and needs, such as granting employees the freedom to choose their work hours (on-off time);
(4) Fostering a sense of ease and comfort, without the rigidity or formality found in more structured settings;

(5) Maintaining an equal relationship with subordinates and making an effort to create an egalitarian environment;
(6) Building a deep connection and attachment with employees, making them feel valued, trusted and respected;
(7) Recruiting individuals who share the organisation's values, goals and perspectives;
(8) Giving employees more power and freedom, such as decision-making authority and autonomy, to empower them in their work.

4.2.11 Relationship-building

Turner (2013) illustrated the Eurotunnel as an example to emphasise the impact of policy, highlighting the necessity of considering legal and political constraints. However, this constraint is not just at the project level, but beyond. In this regard, external relationships and resources are important. In job descriptions, relationship building is referred to as the ability to *secure resources* from universities and governments, *maintain positive relationships* with government bodies, possess extensive industry and financial connections, and *build one's own technical team*.

The grey literature further support this, as design leaders reflected that they gain resources from collaborative experiences and by building connections within their industry. For example, GL 4 demonstrates how the design leader depended on Huawei's external collaboration platform to help them secure the resources needed to make their business grow.

Specifically, in the interviews, design leaders show a *keen insight into politics*. An interviewee from the fast fashion industry (INT 5) clearly understands how policy orientations shape social trends, consumer preferences and company strategies: "The government doesn't like these young idol [小鲜肉] anymore ... I actually agree with this policy". They not only recognise the huge impact that policy changes have on the industry but also voice their approval, showing comprehension and of the values behind the policy. However, design leaders do not passively accept policy influence; they also reflect on policy's variability and its double-edged-sword

effect. This reflects a dynamic and complex relationship between politics and business.

Conversely, politics can also bring resources that benefit business development. As INT17 stated, "If you can obtain first-hand information ... with an information gap over others, you may not need to do some of the low-level work". This reveals that understanding policy can help design leaders improve their chances of success. If a design leader can *identify and integrate beneficial resources*, they can use smaller efforts to achieve bigger gains. The importance of resources was also highlighted by Lockwood (2009). INT18 described this as "leveraging momentum to get things done [借势做事]", emphasising the need to identify advantageous resources at the social or industry level and using that leverage to achieve "twice the result with half the effort [事半功倍]". This strategic use of external trends and resources reflects a keen sensitivity to identifying political and social opportunities.

4.2.12 Adaptivity

In the grey literature, adaptivity is identified from two aspects. First, design leaders demonstrate the ability to *switch between different approaches* to solve problems. This aligns with the research of Gaglione and Gaziulusoy (2019), who found that designers adopt approaches that allow them to adapt to the challenges they encounter, especially when designing for business. Second, design leaders can *adjust to new conditions* and manage change effectively in evolving circumstances, a tendency strongly demonstrated in GL 5.

4.2.13 Business knowledge

As Miller and Moultrie (2013b) stated, design leaders should not only possess design expertise but also integrate business skills and knowledge, as they work in a commercial context. Business knowledge was mentioned across all sources. Supported by the job descriptions and the SLR, this business knowledge includes understanding the market, stakeholders, system and context (Kang *et al.*, 2015; Miller and Moultrie, 2013b).

In the interviews, design leaders also highlighted business understanding. For example, INT14 demonstrated an understanding of business operations. While they stressed that frontline experience gave them a rich, practical sense of how the company works, this practical sense is actually underpinned by business knowledge that builds a fundamental understanding. Their comment, "understand why we do something", shows how this perspective lets them place each task in a broader business context, moving from an operational view to a systemic commercial one. The grey literature also focus on business knowledge, including consumer behaviour, branding and product positioning, investment priorities and competitive positioning across (or even beyond) specific markets.

4.2.14 Industry knowledge

As found in Miller and Moultrie's (2013b) research, design leaders spend considerable time casting a future that aligns with the changing fashion industry, showing that an understanding of the industry strongly impacts their ability to envision what is next. Likewise, both the interviews and job descriptions highlighted industry knowledge, referring to a deep understanding of the industry's past, present and future.

During the interviews, design leaders showed an understanding of structural shifts in China's design sector, the effects of the economy and potential future paths. INT17 noted that this industry understanding must be based on a vision that not only addresses current challenges but also foresees their long-term impact on industry structure, talent and career paths, enabling leaders to anticipate cascading effects across the sector. In this sense, design leaders understand what is happening now, why the industry evolved as it did, and where it might go.

4.2.15 Management knowledge

Management knowledge is a necessary competency for a design leader (Green *et al.*, 2010; Baars and Rüedi, 2016; Lee and Cassidy, 2007). Based on the SLR, this knowledge includes process management, which is knowing how to manage the design process. This involves formalising product and service development processes and incorporating design in structured processes (Baars and Rüedi,

2016; Green *et al.*, 2010; Lee and Cassidy, 2007; Lee *et al.*, 2018; Micheli *et al.*, 2018).

Furthermore, findings from the interviews, grey literature and job descriptions focus more on a broader understanding of business. For example, Qian (GL 4) stated that they acquired knowledge of economics, finance, organisational behaviour and strategic management, demonstrating a comprehensive grasp of various business functions. In this sense, the job descriptions provide a more comprehensive list of required management knowledge, including:

(1) An understanding of business management, including leadership development, strategic management, human resource management, financial management and operations management;
(2) An understanding of company law, corporate governance structure, modern enterprise management models and decentralised management models;
(3) Knowledge of business operations and processes.

4.2.16 Design knowledge

Design knowledge is crucial because it lays the foundation for all design-related work through academic and practical training. The importance of this knowledge is evidenced in the SLR (Yukl, 2013; Byrne *et al.*, 2009; Joziasse, 2011b; Miller and Moultrie, 2013b; Green *et al.*, 2010; Kang *et al.*, 2015; Baars and Rüedi, 2016; Kumar *et al.*, 2016; Alawad *et al.*, 2017; Galli *et al.*, 2017; Tan and Chapman, 2017; Hsieh *et al.*, 2021b).

Specifically, a list of requirements for design knowledge emerged from the job descriptions, including: (1) familiarity with design knowledge, including relevant technical and craft processes; (2) familiarity with customer psychology; and (3) familiarity with the design workflow, and a good understanding of the entire process from conceptualisation to market. In this aspect, there is an overlap between design knowledge and business knowledge, which includes market research, user needs analysis, product feature design and user experience research.

Moreover, as an important issue in design, the protection of design patents was also frequently emphasised by design leaders in both the interviews and grey literature. Therefore, understanding design patent knowledge is also important for design leaders (GL 1; Kang *et al.*, 2015). The following subsection will introduce this in detail.

Design patents

Intellectual property includes four components: patents, copyright, trade secrets and trademarks (World Intellectual Property Organisation 2021, p. 8-10). Compared with other leaders, design leaders often face a higher risk of their intellectual property rights being copied, as they more frequently provide bespoke services (Hillner, 2021). In the interviews, design leaders recognised the importance of protecting design patents and safeguarding their creations.

The importance of design patent knowledge stems from a series of issues, dominated by the difficulties, highlighted by design leaders, in protecting their Intellectual Property Rights (IPRs). IPRs are "specific formal or informal rights that are articulated as part of a country's legislation" (Hillner 2021, p.2). During the interviews, design leaders described the situation, shared first-hand experiences of infringement by copying, criticised the system's weaknesses and explained how they cope. INT3 and INT5 noted that "intellectual property protection for domestic furniture is weak" and that "as soon as you launch a product, someone copies it". More importantly, INT3 said, "I've applied for patents, it's useless. Once it reaches the legal stage, problems arise".

Furthermore, design leaders believe the problem is structural rather than anecdotal, and they treat design patent issues as daily challenges that demand practical action. INT3 added, "There are many knock-offs now, we fight counterfeits every day. It's extremely hard". They understand that "the cost of defending rights is high [维权成本高]" and "results are unsatisfactory", yet they refuse to give up on safeguarding their creations. Therefore, design leaders must be equipped with design patent knowledge, grasping this issue to better prepare and protect their design outcomes effectively.

4.2.17 Policies, rules and regulations

In addition to the competencies of *Collaboration* (Section 4.2.3) and *Relationship Building* (Section 4.2.11), knowledge of policies, rules and regulations has also emerged as a critical area. This knowledge provides the foundation that helps design leaders understand the broader context when building and maintaining relationships. In job descriptions, knowledge of this area includes familiarity with: (1) industry-relevant policy; (2) government functions and related laws; (3) industry regulations and standards; and (4) the operational rules of investors.

During the interviews, design leaders expressed the importance of rules and regulations, including contract clauses and legal knowledge. They understand regulations in different situations, recognise unspoken norms and know how to use both to their advantage. INT24 observed, "you must be familiar with the traps hidden in contract clauses", adding that clauses safeguarding their side's interests should be inserted and unsuitable ones removed. This shows that they not only know a contract's basic structure but can also spot details that might disadvantage either party. Moreover, design leaders noted that a legal department only checks illegality, while the clauses that truly protect the design side must come from a leader who understands the industry, project risks and cooperation details. This also demonstrates the connection with *Risk Awareness* (Section 4.2.8), *Industry Knowledge* (Section 4.2.14) and *Management Knowledge* (Section 4.2.15).

Based on the data, policy emerged as a core theme frequently discussed by design leaders, demonstrating the critical role it plays in the Chinese context. Therefore, the following subsection will explain policy knowledge in detail.

Policy knowledge

Policy knowledge means a design leader grasps how policy shapes the present and future, allowing them to plan their next steps. In China, business growth depends heavily on policy direction; thus, understanding policy and anticipating where it will head next is essential for a design leader.

Understanding policy can bring new chances and opportunities. Design leaders believe that policy 'windfalls' often create explosive growth opportunities. "Choice outweighs effort"[选择大于努力], as INT17 stated, is not only an slogan: when an industry receives strong national support, a once-struggling company can see its market value soar. These opportunities, or 'windfalls' [风口], often arise from top-down policy shifts rather than market forces. "Whether you run a company or pursue a venture in China, it is largely policy-driven" (INT 17). For instance, Alibaba's rise during the mobile-internet era, boosted by governments' and regulators' encouragement of e-commerce and payment systems, is a case in point.

However, if a design leader lacks policy understanding, it will be difficult to for them to perceive policy changes. A sharp policy turning point signals that the 'dividend' is fading and that risk may surface. INT17 noted that real-estate and infrastructure investment drove design-industry prosperity for more than a decade; once that model tightened, "80 percent of design institutes and designers had to rethink their careers and business models". The tutoring crackdown that forced New Oriental to pivot to e-commerce livestreaming shows that ignoring policy currents can upend even the strongest business model at any moment.

In this situation, design leaders must understand trends, prepare backup plans and be aware of uncertainty. This is also intertwined with *Risk Awareness* (Section 4.2.8) and *Industry Knowledge* (Section 4.2.14). As INT17 said, "If you aren't forced to the edge, you won't head in that direction, circumstances create heroes [时势造英雄]". Only by planning ahead can a leader 'ride the coming policy wind'.

4.2.18 Systems thinking

There are three related but distinct terms for the 'thinking as whole' mindset: *holistic thinking*, *systems thinking* and *systematic thinking*. It is crucial to distinguish among them before employing the terminology with precision. Despite their similar sound, systems thinking and systematic thinking are not synonymous. *Systems thinking* is useful for investigating complex situations, involving a holistic approach, and interconnections between components. *Systematic thinking* is

about "reductionist thinking where situations are broken down into parts and mostly simple, linear cause and effect relationships examined" (The Open University 2021, p. 28). *Holistic thinking* is an orientation that "deals with wholes rather than parts" (The Open University 2021, p. 14). Joziasse (2023, p. 33) describes holistic thinking is design leadership as a mindset for driving holistic experience and linking business design to organisational strategies.

In this sense, *systems thinking* relates to problem-solving by understanding the interrelationships of the whole; systematic thinking focuses on a 'reductionist' mindset used to break down the whole into small parts; and holistic thinking represents thinking in a 'whole' way. From this perspective, *Systems Thinking* seems to be a combination of the other two, as it can show characteristics of both.

Although systems thinking and holistic thinking are different concepts in English, they share the same expression in Chinese [整体思维]. Therefore, while many design leaders use the term 'holistic thinking' (the direct translation of 整体思维) in interviews, they were, in fact, referring to systems thinking.

After this clarification, the SLR explicitly mentioned systematic thinking and also discussed a holistic view (Kang *et al.*, 2015; Lee *et al.*, 2018; Hsieh *et al.*, 2021b; Topalian, 2012). The interviews, job descriptions and grey literature highlight a *holistic view* of interrelated components, integrating design, manufacturing and strategy into a single ecosystem rather than treating these aspects separately. Design leaders keep the big picture and its dependence in mind as they act. This 'big picture' thinking is related to *Goal-setting* (Section 4.2.7).

Specifically, systems thinking is demonstrated in three ways: (1) finding connections and integrating different aspects; (2) planning in advance by integrating all aspects; and (3) maintaining a global perspective that considers collaborative ecosystems.

First, design leaders demonstrated an awareness to *find connections and integrate different aspects*. They position design as part of the system. Instead of focusing on design in isolation, they emphasise how design decisions link to product strategy, supply chain, user needs and business goals. As INT3 stated,

> Within a company, industrial design is only one small segment … I can view design across the entire chain; it runs through every stage from the very beginning to the very end.

From this perspective, a design leader shifts from implementing a single task to coordinating and driving the whole process. Moreover, the grey literature further reflect that systems thinking involves engaging all stakeholders and functional areas to ensure alignment. As a design leader (GL 4) noted, systems thinking helps designers understand design and their work more deeply:

> By examining industrial design from a higher-level perspective, I can better understand the relationship between design objectives and the entire system. This, in turn, gives me more confidence in how to maximise the overall value of a product's design.

Second, design leaders integrate *every aspect of planning in advance*. As stated by INT 3,

> At the very beginning, you need to frame the whole picture … only then do you decide what kind of procurement is required and what kind of engineers are needed.

This shows that by planning key roles, resources and responsibilities before any action starts, design leaders avoid the inefficiencies of fixing problems on the fly and give each team member a clear direction and goal. This also aligns with *Goal-setting* (Section 4.2.7).

Finally, the grey literature mentioned a *global perspective* and the importance of a collaborative ecosystem, which shows a connection with the *Relationship Building* (Section 4.2.11). GL 4 shows systems thinking by recognising global interdependencies and understanding how different regional strengths can integrate to support a unified brand strategy.

4.2.19 Design thinking

Design thinking can be described as key activities that include:

> Thinking about design (reflecting on who can design and what can be designed), thinking of design (imagining new applications for design) and thinking through design (shaping the future and discourse of design). (Cooper *et al.*, 2009, pp. 47–48)

Specifically, design thinking is also defined as "user-centredness, iterative working, prototyping, focusing on having fun and learning from failure" (Carlgren et al., 2014, p. 405) and as a problem-solving process (Hernández et al., 2018).

While the definition from Cooper et al. is philosophical, it is put into practice through the more process-oriented view of Carlgren et al. For the design leaders in this study, '*thinking about design'* was demonstrated through user-centredness (Turner and Topalian, 2002; Han and Bromilow, 2010; Joziasse, 2011b; Lee *et al.*, 2018); and '*thinking of design*' was demonstrated by iterative working. Together, these practical approaches are how leaders '*think through design*' to create value and shape the future. Moreover, the SLR and interviews also highlighted intuitive thinking (Kang *et al.*, 2015), and job descriptions mentioned design thinking by focusing on innovative thinking [创新思维].

On the one hand, a *user-centred perspective* was highlighted. In practice, the core challenge for designers is not just the originality of an idea but how to turn that idea into a return that genuinely increases client value. The design leader is not content to judge a design only by how attractive or innovative it is; instead, they measure success by the client's return on investment. INT 18 noted that clients keep investing only when the perceived value matches the actual return. From this perspective, beyond a deep understanding of clients, maintaining a close dialogue and collaboration with clients is also one of the approaches to focusing on the user or clients. For example, adopting a co-creation method strengthens trust and coordination on both the user and designer sides.

Based on above discussion, service awareness was frequently mentioned by design leaders when they talked about a user-centred or client focus. Design leaders highlighted a service focus when they talked about their core product or offerings. They treat service as their core competitive strength and build customer-

centred service designs that aim to meet and exceed client expectations. INT11 stated: "Our advantage is service ... let me give the simplest example". By ranking service first among company strengths, they show that their strategy starts with keeping clients satisfied, not merely perfecting design technique. They added, "If a problem comes up and the other side promises to be on site in ten hours, I'll write eight ... I'll even base myself on site". This promise tackles one of the client's top concerns, which is response speed, and creates a clear service edge over competitors. Furthermore, they design the service process to cut client costs: "For the client, it lowers their time cost". By starting from the client's pain points and streamlining internal procedures, design leaders ensure that when an issue arises the client gets a solution as quickly as possible, greatly improving the overall experience.

On the other hand, design leaders practise *iterative working*, validating each step until the project ends. INT16 stated that when they discussed a design solution or decision with colleagues or managers, they never claim "my plan is 100 percent correct". Instead, design leaders assume their ideas must be tested. For example, GL 4 noted that their team always went through multiple rounds of product iteration, continually upgrading their supply chain. Sometimes they 'iterated many times' but chose not to launch until they were confident, they could deliver a satisfactory result. This repeated prototyping process exemplifies the key characteristic of design thinking: learning from testing and iteration before finalising a product.

In this sense, validation covers every milestone of the entire process (e.g. requirement confirmation, design reviews, prototype testing, user feedback, management decisions and final delivery). INT16 believed that this "validate every step" approach, the team can identify risks early, find opportunities to improve, and turn scattered fixes into systematic iteration. They added that this iteration is more than tool-level; it also happens in multiple rounds of talks with employees, clients and cross-functional partners. With clear benchmarks, such as usability metrics, experience thresholds and business KPIs, the team can weed out

deviations early, adjust plans mid-stream and make sure the final result matches the original goal.

4.2.20 Business thinking

The concept of business thinking emerged from both job descriptions and grey literature, which showed that design leaders display commercial and market awareness, signalling a business-oriented mindset. In job descriptions, business thinking was highlighted by a keen business acumen and an awareness of market competition.

In the grey literature, design leaders demonstrate their business thinking by identifying opportunities and spotting market potential. For example, the design leader in GL 3 identified opportunities arising from shifts in fashion and distribution channels. This illustrates the market opportunity aspect of business thinking: they excel at spotting profitable gaps and moving quickly to capitalise on them.

Moreover, design leaders demonstrate an advantage in integrating design into business. For example, by partnering with brands such as Disney, Barbie and Marvel, the leader in GL 1 broadened the market through a 'design + patents + licensing' model. Although they understood that licensing fees were rising, they maintained these deep collaborations because they provided a significant boost in brand recognition and market influence. This demonstrates the business strategy of design leaders: sometimes accepting stringent licensing terms if they create a competitive moat and substantial market share. Based on this success, they broadened their business blueprint by establishing a patent-holding company to manage patent rights, license them to other firms and protect their intellectual property. This reflects a long-term business thinking of design leaders, ensuring legal defensibility and multiple revenue streams.

4.2.21 Other mindsets

Other mindsets also emerged from the data sources, but they were less prominent (e.g. mentioned only a few times or in a single source). This section will briefly

introduce these mindsets, including empiricism, entrepreneurial spirit, a digital mindset and an ethical mindset.

4.2.21.1 Empiricism

Empiricism in design can foster an environment that encourages changes and innovation from both the designer and the design process (Wszołek, 2022). In the interview, one of design leaders (INT16) especially highlighted on 'empirical thinking' [实证主义], which means empiricism or empirical evidence. INT16 noted, "A design leader should be an empiricist... When the evidence is abundant, it doesn't stifle creativity, it inspires it". By 'evidence', this leader meant facts and data from previous projects and user feedback. They added that while "empirical work takes more time and the process is tedious", this "rigorous cycle of gathering more evidence and verifying it repeatedly" ensures that every design change builds on the previous round of experience, making project decisions ever more aligned with user needs and business goals.

From this perspective, this evidence-based approach shows a clear overlap with the iteration and validation aspects of *Design Thinking* (Section 4.2.19). Furthermore, while other design leaders did not explicitly use the term 'empiricism', they described similar practices, focusing on learning from past experiences to guide future movements. However, because this mindset was not frequently mentioned across other data sources, it was classified as an aspect of the broader theme of *Continuous Learning* (Section 4.2.6) rather than a distinct category.

4.2.21.2 Entrepreneurial spirituality

In the job description, entrepreneurial spirituality [企业家精神] refers to the ability of entrepreneurs to integrate and balance economic and social value in business opportunity exploration and implementation process , and is characterised by innovation, adventure, initiative and responsibility (Lin *et al.*, 2022). This term is commonly used in China, but only one job description mentioned it.

4.2.21.3 Digital mindset

Digital mindset [互联网思维] was mentioned in job descriptions, which refer to:

> A set of attitudes and behaviours that enable people and organisations to see how data, algorithms and AI open up new possibilities and to chart a path for success in a business landscape increasingly dominated by data-intensive and intelligent technologies. (Neeley and Leonardi 2022, p. 51)

Generally, a digital mindset is a way of thinking shaped by the internet era. In the design domain, it emphasises openness, user-centredness, data-driven decision-making, fast iteration, connectivity, sharing and innovation. It often involves using digital tools and platforms to create value, improve efficiency and respond quickly to market needs. Meanwhile, China's '*14th Five-Year Plan*' is highlighting on construction of a 'digital China', which presents the importance of a digital mindset, as the digital mindset has a big impact on digitisation (Wang *et al.*, 2024a).

4.2.21.4 Ethical mindset

In the grey literature, an ethical mindset refers to a design leader's sense of social responsibility. Design leaders demonstrate this mindset through environmental stewardship and social-impact initiatives.

From an environmental sustainability perspective, the design leader in GL 3 optimised shoe packaging by eliminating boxes and launched a closed-loop recycling programme. This programme collects used footwear, processes the materials, and manufactures new shoes from them. Although the initiative initially met with customer resistance, it significantly reduces waste over time. Moreover, this end-to-end recycling strategy lowers the consumption of earth's resources and sets a precedent for more eco-friendly manufacturing.

This mindset also extends to social impact. Rather than viewing business purely as a way to generate profit, the design leader stresses the importance of improving people's lives and creating community value. For example, in GL 3, with customer

support, they launched a programme to provide shoes to children in rural areas, sending seasonal new footwear. This initiative fosters a direct community connection and ensures children in remote regions have comfortable shoes. These efforts go beyond profit-making, aiming for a tangible, positive impact demonstrating a strong ethical mindset.

4.2.22 Personalities of design leaders

Competency models can be applied in several areas, including recruitment, promotion and education (Spencer and Spencer, 1993). In education, as discussed in the Section 2.6, they can be used to facilitate mastery learning (Spencer and Spencer, 1993). This research uses the DLCM to explore its potential in design education. One of the objectives is to identify the current status of competencies – which are taught and which are absent or underemphasised – and to note several personality traits revealed across all four data sources. The emergence of these personalities raises a key question*: Can personality be taught in higher design education?*

Many studies acknowledge that personality can change over the lifespan and can be altered by interventions (Jach *et al.*, 2023). Some research supports the idea that personality can be taught in school, as education has a significant impact on its shaping and development (Komariah and Nihayah, 2023). Jach et al. (2023) further state that education can not only shape personality but also set personality development as an explicit outcome.

However, the effectiveness of such interventions is highly influenced by age. Bleidorn et al. (2018) found that personality can change significantly during adolescence before stabilising in adulthood. This suggests that the adolescent period is an optimal window for intervention (Jach *et al.*, 2023). From this perspective, personality shaping may be more effective in the early stages of education, making universities less suitable for cultivating core personality traits.

Additionally, although personality is malleable, it tends to remain relatively stable across the lifespan (Damian *et al.*, 2019), and the tools available to measure personality change are still limited (Jach *et al.*, 2023). These factors pose

challenges both to teaching personality in a higher-educational setting and to quantifying any resulting changes.

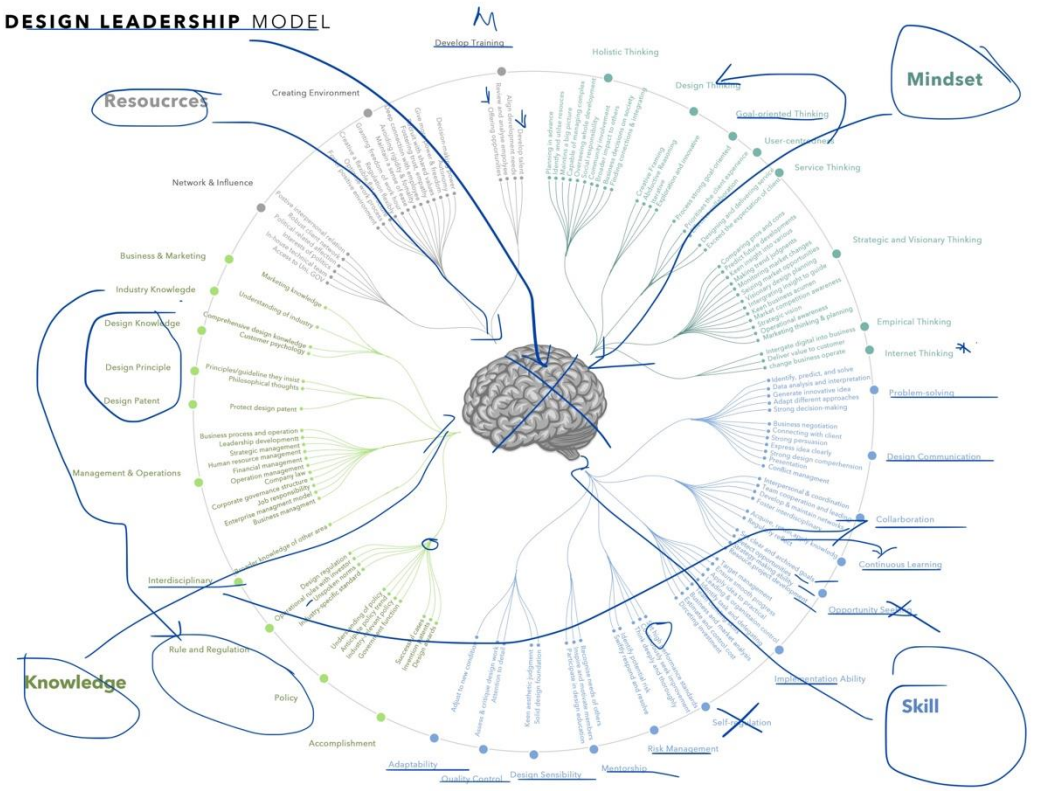
Based on these considerations, this research positions the identified personality traits as a complementary reference, rather than a core, teachable component of the DLCM. While their relevance is acknowledged, the model's focus remains on competencies, as they are considered fundamentally teachable, which aligns with the purpose of this research. The list of personality traits that emerged from the data is shown in Table 32.

Table 32: List of personalities from four sources

Number	Systematic literature review	Interview with design leaders	Job description	Grey literature
1	Respect	Considerate	Sense of Responsibility	Resistance
2	Integrity	Respectful	Diligent and Dedicated	Perseverance
3	Open-minded	Perseverance	Integrity and Probity	Productive
4	Tolerance	Resilience	Good Moral Character	
5	Generous	Courage	Law-abiding	
6	Enthusiastic	Integrity	Down-to-earth	
7	Reliable	Modesty	Ambition	
8	Considerate	Sense of responsibility	Cheerful/Outgoing Personality	
9			Optimistic and Proactive	
10			Self-confident	

4.3 **Finding 1**: Design Leadership Competency Model Competency Identification

After identifying the competencies, this study conducted a comparative review of the four data sources to find overlaps, note discrepancies and select the final competencies for the DLCM. The model was iteratively refined until its final version was determined (Figure 41).



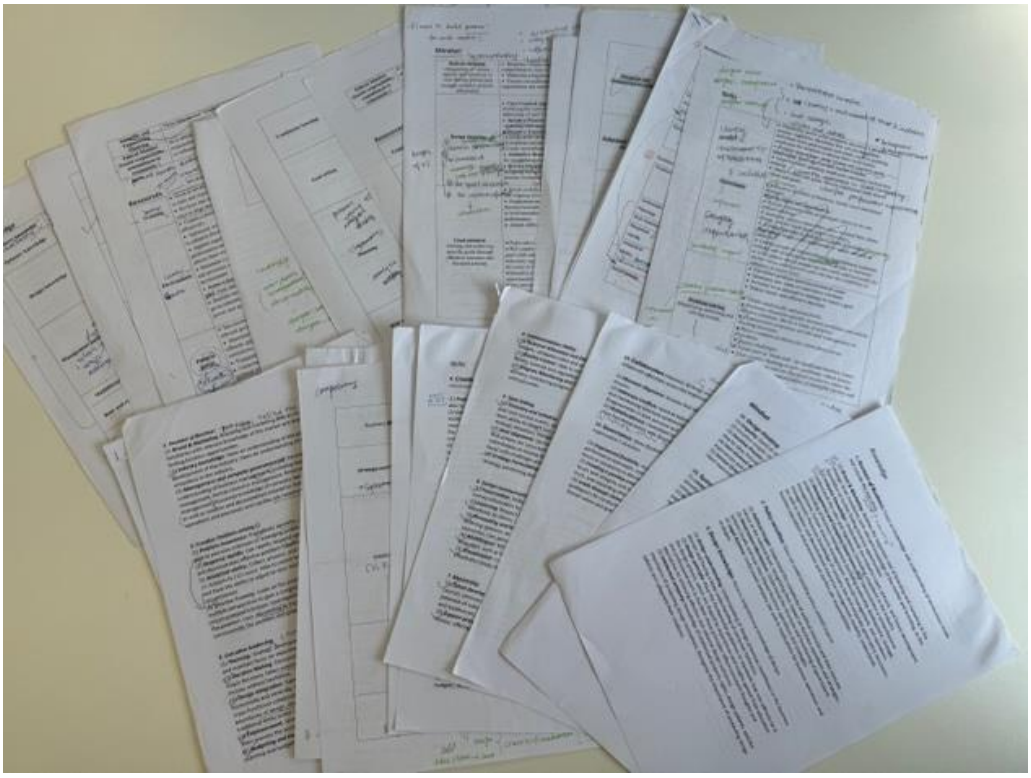


Figure 41: Iteration process of DLCM

To further refine the transition from raw data to the final model, the physical papers (lower figure) and the electronic mapping version (upper figure) serve as a primary

record of the paper-based iteration phase. This tangible mapping process allowed for both the textual and visual synthesis of complex DLCM themes. By physically categorising these themes through an important iterative process, it ensured that final framework was grounded in the most frequent and generalisable themes identified during the manual coding stage across four different data sets.

As introduced previously (Section 4.2.21), a broad category of mindsets emerged from the data during the initial stage. To refine this category, the codes were reviewed to identify the most significant and frequently occurring concepts across all data sets. This process revealed that while several mindsets were present, two were consistently described as central to effective design leadership: *Design Thinking* and *Systems Thinking*. These two mindsets were selected for the final model as they demonstrated the most generalisability across the different data sets in the initial coding phase.

Finally, a total of 16 competencies with 55 sub-competencies were identified and categorised into three dimensions: *Skills, Knowledge* and *Mindset*. Each competency comprises several sub-competencies to ensure comprehensive coverage and clarify definitions. These competencies are:

(1) **Skills***: Creative Problem-solving, Executive Leadership, Implementation Ability, Goal-setting, Design Communication, Human-centred Leadership, Continuous Learning, Design Sensitivity, Network Building (External), Collaboration (Internal)* and *Governance;*
(2) **Knowledge:** *Business Acumen, Policy Sensitivity* and *Design Knowledge;*
(3) **Mindset:** *Design Thinking* and *Systems Thinking*.

The differences in competencies and sub-competencies among the four data sources are summarised in Table 33.

Table 33: Comparison of competencies across different groups

Competency	LITERATURE REVIEW	GREY LITERATURE	INTERVIEW	JOB DESCRIPTION
KNOWLEDGE:				
1. Business Acumen				
(1) Brand & Marketing	✓	✓	✓	✓
(2) Industry Knowledge		✓	✓	✓
(3) Management and Company Governance	✓	✓		✓
2. Policy Sensitivity				
(1) Political Insight			✓	✓
(2) Government Mechanism			✓	✓

Competency	LITERATURE REVIEW	GREY LITERATURE	INTERVIEW	JOB DESCRIPTION
(3) Legal Acumen			✓	✓
3. Design Knowledge				
(1) Design Understanding	✓	✓	✓	✓
(2) Design Principle		✓	✓	
(3) Intellectual Property	✓	✓	✓	
SKILLS:				
4. Creative Problem-solving				
(1) Problem Awareness	✓	✓	✓	✓
(2) Creative Framing	✓		✓	✓
(3) Rapid Response			✓	✓
(4) Analytical Ability	✓		✓	✓
(5) Adaptivity		✓		
5. Executive leadership				
(1) Planning	✓	✓	✓	✓
(2) Decision Making			✓	✓
(3) Design Integration			✓	
(4) Empowerment			✓	✓
(5) Budgeting and Investment			✓	✓
6. Implementation Ability				
(1) Resource Allocation and Delegating	✓		✓	✓
(2) Quality Control		✓	✓	
(3) Progress Monitoring and Control			✓	✓
7. Goal-setting				
(1) Visionary and Initiative	✓	✓	✓	✓
(2) Goal Alignment	✓	✓	✓	✓
(3) Strategy Formulating	✓			✓
8. Design Communication				
(1) Presentation	✓	✓	✓	✓
(2) Listening			✓	
(3) Persuading and Negotiating	✓	✓	✓	✓
(4) Multilingual				✓
(5) Visualisation			✓	
9. Human-centred Leadership				
(1) Talent Development	✓	✓	✓	✓
(2) Support Providing	✓	✓	✓	✓
10. Continuous Learning				
(1) Self-awareness and Regulation	✓	✓	✓	
(2) Reflective			✓	✓
(3) Active learning	✓		✓	✓
11. Design Sensitivity				
(1) Design Perception	✓	✓	✓	✓
(2) Design Passion		✓	✓	
(3) Design Achievement				✓
12. Network Building (External)				
(1) Political Connection			✓	✓
(2) Academic Connection			✓	✓
(3) Talent Resource				✓
(4) Network Maintenance	✓	✓	✓	✓
(5) Resource Leveraging			✓	
13. Collaboration (Internal)				
(1) Maintain Alignment	✓		✓	✓
(2) Addresses Conflicts			✓	
(3) Multidisciplinary	✓	✓	✓	
14. Governance				
(1) Empowered Flexibility		✓	✓	✓
(2) Creating a positive environment			✓	
(3) Leads through vision and values			✓	
MINDSET:				
15. Design Thinking				
(1) Empathy			✓	
(2) Intuitive Insight	✓		✓	
(3) Iterative Process			✓	
(4) User-Centred Approach	✓	✓	✓	✓
(5) Service Orientation			✓	
16. Systems Thinking				
(1) Understanding Interconnection			✓	✓
(2) Holistic Perspective	✓	✓	✓	✓

4.4 Validation of Design Leadership Competency Model

This section presents the validation results for the DLCM. As introduced previously in both Section 3.5.3 and Section 4.1.2, validation feedback was gathered from

three groups: (1) an expert feedback survey (with design leaders and academic staff), (2) interviews with stakeholders (educators, students and alumni) from SUAD's DM programme, and (3) a student workshop. The detailed feedback from each group is introduced in the following sections.

4.4.1 An expert panel

4.4.1.1 Design leaders

According to the current DLCM, feedback from design leaders focused on three competencies: *Business Acumen*, *Creative Problem-solving* and *Executive Leadership*. Additionally, feedback also indicated a need to add an emphasis on *Risk Anticipation*.

Regarding *Business Acumen*, DL7 highlighted the need to include 'consumer trends and shifting user groups', while DL2 defined it as "the ability to forecast and strategically plan for the industry's future, as well as to extract and evaluate the strengths of one's operating environment". Since *Business Acumen* in the DLCM is categorised under *Knowledge*, this definition is both concise and multidimensional, already including competencies and sub-competencies, including *Industry Knowledge*, *Goal-setting* and the sub-competency '*Planning*'. Therefore, only one change was made: under the 'Brand & Marketing' sub-competency, the author added '*understand and grasp consumer trends and shifting user groups'*.

In *Creative Problem-solving*, DL2 gave a new perspective which is to promote 'creative framing' by innovating the business model; furthermore, DL7 emphasised the importance of identifying the ground reason of the problem, distinguishing the 'true' problem from a 'fake' one, before attempting to solve it.

For *Executive Leadership*, DL2 provided additional detail, focusing "the judgement of a comprehensive layout of industry, especially value chain, and to the ability to assess the distinctive features of the industry". This detail overlaps with 'Decision Making' under *Executive Leadership*; therefore, the author has revised its explanation to include an industry-focused decision-making aspect.

From the **missing competency**, DL3 proposed an emphasis on *Risk Anticipation* (DL3), with a further explanation and components that include contract risk management, process risk management, delivery and follow-up risk management, business cooperation risk management and financial risk management. Because this overlaps somewhat with the 'rapid response' sub-competency of *Creative Problem-Solving* and the 'problem awareness' element of *Design Thinking*, the author have revised *Creative Problem-Solving* to incorporate *Risk Anticipation* as a new sub-competency, accompanied by a behaviour note.

4.4.1.2 Academic staff in design education

The results show that all design academic staff acknowledged most competencies, except for one staff member (ACA 3), who doubted the relevance of *Design Knowledge* and *Design Sensitivity* – arguing that a design leader does not need specific design expertise. This view reflects the debate about a design leader's background and expertise, which was discussed in Section 2.5.5. This research sides with the view that a design leader needs a design background.

Furthermore, given that most participants agreed on the importance of these two competencies and that they were significant in the primary identification stage (Section 4.2), the author has decided to keep them in the DLCM.

Regarding the **missing competencies**, three academic staff suggested additions to the DLCM:

- ACA 1: Design legal knowledge
- ACA 2: Corporate ethics
- ACA 5: Design audit, project management and cost accounting

This feedback highlighted areas needing further elaboration. A comparison with the existing model revealed that these points could all be integrated into current competencies, either as new sub-competencies or as specific explanations to existing ones. Accordingly, four updates were made:

1. The 'Legal Acumen' sub-competency (under *Policy Sensitivity*) was expanded to include 'understanding of other design-related legal knowledge', encompassing broader IP and regulatory concerns.
2. A 'design audit' element was introduced within 'Quality Control' sub-competency (under *Implementation Ability*). A design audit is a usability evaluation that assesses and structures design elements to generate actionable business insights (Gurova, 2024).
3. To address 'Corporate ethics', a new sub-competency, 'Cultivating Ethical Stance', was added under *Human-Centred Leadership*, with an explanation of how leaders can foster ethical awareness and decision-making within their teams.
4. The concept of 'Project Management' and 'Cost Accounting' were confirmed to be covered under the existing competencies of *Implementation Ability* and 'Budgeting and Investment' within *Executive Leadership*, respectively.

4.4.2 Stakeholders from the case study

4.4.2.1 Educators

Educators emphasised two key competencies: decision-making and a human-centred management. Specifically, EDU 1 emphasised the importance of human-centred management, explaining that design leaders should act with empathy and genuine consideration for their employees' needs. Additionally, Educator 3 pointed to a particular decision-making sensitivity of design leaders:

> A design leader possesses an exceptional level of acuity that enables him to initiate change. His decision-making ability, the one that not everyone has, is marked by a keen sensitivity: he notices details and is able to make prompt, decisive decisions. This decisive capability is a crucial management skill and is highly important.

Educators also emphasise that the DLCM must remain flexible to adapt to changing environments. For instance, Educator 3 noted that the rise of the gig

economy in China is replacing traditional full-time roles with flexible, platform-based work, which is a trend now spanning a broader spectrum of employment beyond just delivery or ride-sharing.

Furthermore, it was argued that the leadership framework must also account for rapidly evolving technologies, like the disruptive impact of AI, to remain adaptable (EDU 3). In this regard, EDU 3 recommended that the DLCM incorporate flexibility. This would ensure the model reflects current trends and avoids a rigid definition of leadership that fails to address the dynamic and uncertain nature of the current environment.

From a perspective of **missing** competency, there was a suggestion of adding 'charisma'. EDU 3 stated,

> ... an individual possesses a magnetic personal charm, which is a quality that naturally attracts and inspires others to follow their lead and contribute willingly. This element of emotional intelligence, though soft in nature, is crucial, and I feel it's often missing. Consider Chairman Mao, for example, he had that undeniable personal charm. Instead of merely calling it 'charm', you might describe it as a form of character cultivation or personal refinement. It is the result of comprehensive development, a quality that can indeed be nurtured through education.

However, as noted in Section 4.2.22, despite charisma's importance, the lack of robust evidence that it can be cultivated in higher education led to its exclusion from the DLCM. Consequently, this feedback did not lead to any revisions.

Similarly, both EDU 1 and 3 (and echoed by both expert group and students) recommended adding social responsibility:

> ... your social responsibility is very important. I think this aspect should be added on its own since the other elements don't encompass these qualities. He couldn't explain it clearly; while you mention continuous learning, which in my view, also covers

> societal aspects, it isn't specific enough. Social responsibility, on the other hand, is very clear and should be considered quite important. For any entrepreneur, steering the enterprise in this direction means it's not solely about making a profit, but also about increasing social responsibility. (EDU 3)

Finally, EDU 2 emphasised the role of creativity:

> creativity, along with innovation ability, is very important. It's not just about effectively solving problems; it also encompasses various other creative and innovative skills, such as divergent thinking and innovative skills...

Although the DLCM does not explicitly use the term 'creativity', it is embedded within several competencies and descriptions. Therefore, it was not added as a separate competency or sub-competency.

4.4.2.2 Students

Students (STU1, STU2, STU3, STU5 and STU6) identified design-related competencies, such as *Design Thinking*, *Design Communication* and *Design Sensitivity*, as important. This finding contradicts the educators' interviews, during which EDU 3 questioned whether design-related competencies are necessary for a design leader (Section 4.4.2.1).

Regarding *Design Communication*, STU2 highlighted,

> Since a design leader is naturally assumed to be an excellent design manager, they definitely need to possess outstanding design communication skills to enable designers from various design fields to work together effectively.

On *Design Sensitivity*, students emphasised its connection to *Goal-setting*. They stated that *Design Sensitivity* is a prerequisite for perceiving design opportunities, setting clear goals and establishing a vision. In terms of craftsmanship, design leaders must quickly discern societal needs. Moreover, STU1, STU2, STU3 and

STU5 highlighted the importance of *Design Thinking* throughout the design process:

> Every step in the process, from summarising, categorising and organising problems, to developing preliminary plans, then moving on to implementation, time management and the evaluation and feedback of results, must employ design thinking. I believe design thinking is crucial because it runs through the entire process. (STU3)

4.4.2.3 Alumni

All alumni emphasised the importance of *Policy Sensitivity* in the DLCM. Alumnus 2 particularly highlighted its critical role in the Chinese market, noting its impact at both the industry level and in one's own career. They cited the sudden policy that devastated the education and training sector as a stark example, and this illustrates why the ability to interpret and anticipate policy changes is indispensable for design leaders working in dynamic regulatory environments:

> I think if we take the current Chinese market and business environment as an example, the most important thing is policy sensitivities: the overall market environment and the direction the government is taking. It was because a policy was suddenly introduced and just wiped it out. I'm truly in awe, look at how huge New Oriental is. Right? Just imagine how terrifying this can be. No matter how strong your business acumen is or how many ideas you have, they're useless if the government doesn't allow you to operate in that way, you simply can't do it. That's why so many companies are surviving in the gaps; if you can interpret the policies well, you might just see an opportunity. If you can spot these things, you'll be very valuable, it's critical. (Alumnus 2)

4.4.3 A student workshop

From the workshop, the author collected qualitative data across three exercises: Discover Competencies, Understand Competencies and Categorise

Competencies (Figure 42, below). Based on the workshop results, the competencies they generated can be grouped into four categories: *Knowledge, Skills, Mindset* and *Personality*. As shown in Table 34, the numbers represent the frequency of each competency.

Table 34: Students' workshop results

Num	Knowledge	Skills		Mindset	Personality
1	Politics knowledge (1)	Operational	Commercial awareness (2)	Critical thinking	Level headed (2)
2	Design knowledge (4)	Driving progress	Self-awareness (2)	Design thinking	Discipline
3		Delegating (2)	Self-motivation		Proactive
4		Driving proactive team	Attention to detail (4)		Patience (5)
5		Set budget	Problem-solving (2)		Confidence (2)
6		Interpersonal skill (people skills)	Empathy (4)		Consideration and care (2)
7		Communication (9)	Flexibility (4)		Integrity
8		Well-spoken	Experience		Passion
9		Collaboration (2)	Mentorship		Positive outlook
10		Active learning	Converge		Resilience
11		Organisation skills (7)	Innovate (5)		
12		Team player	Creativity (7)		
13		Time management (4)	Design attitude		
14		Multi-tasking	Design skills		
15		Productive and efficiency (4)	Leadership skills (5)		
16		Strategic (3)	Decision-making (3)		
17		Initiative (2) and Vision (3)			

Regarding the **knowledge**, students most frequently mentioned *political knowledge*, which shows a similarity with feedback from earlier Chinese participants (design leaders, educators, students and alumni in design management). They also highlighted *design knowledge*. Both align directly with the *Knowledge* category in the DLCM.

Students mentioned several **skills** that design leaders need. All of the competencies they identified are included in the DLCM. However, their work revealed several tendencies across four aspects: *communication and interpersonal* skills, *creativity and innovation* skills, *execution and implementation* skills and *strategic and decision-making* skills.

First, students emphasised *communication and interpersonal skills*: all of them cited ‘communication’, and students mentioned ‘collaboration’ and ‘well-spoken’. They view design leaders as bridges, as translators and conveners who keep employees aligned with organisational goals and connect different stakeholders. This strongly aligns with the *Design Communication* dimension in the DLCM, which includes ‘Presentation’, ‘Listening’ and ‘Persuasion’.

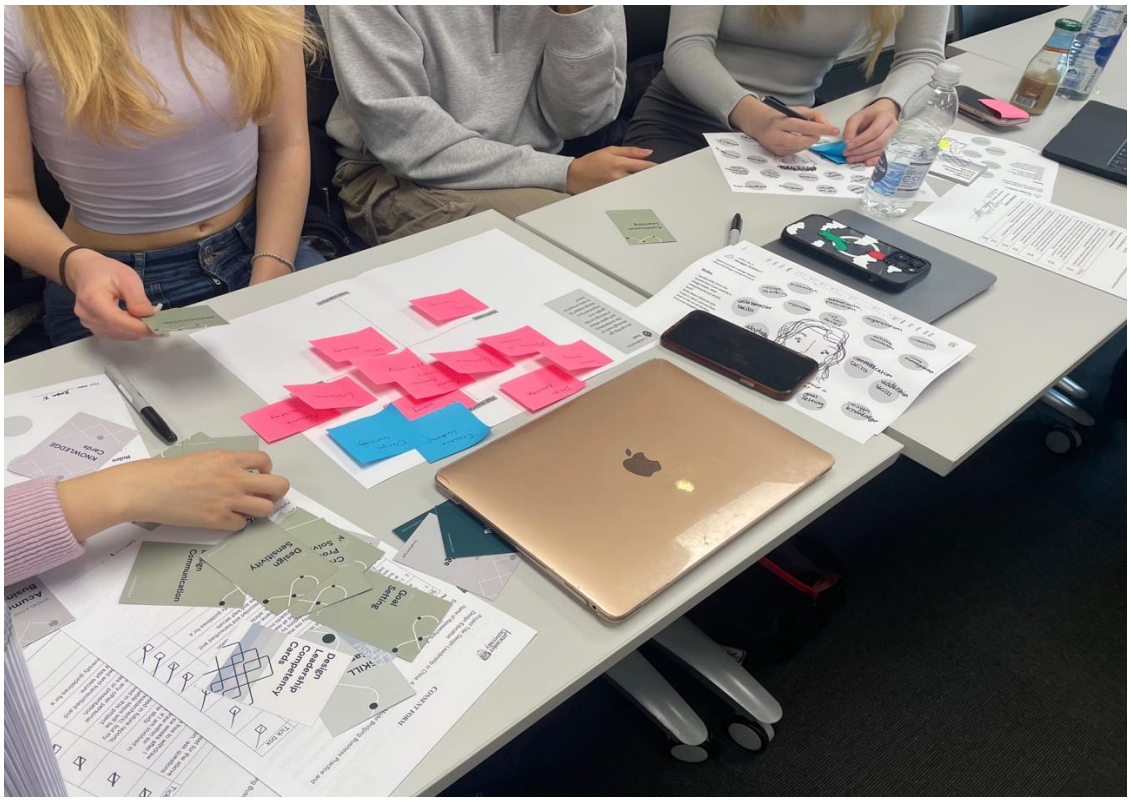


Figure 42: Workshop exercises

The second finding is that students highlighted *creativity and innovation*: seven students mentioned ‘creativity’ and five mentioned ‘innovation’. In addition, ‘design attitude’ and ‘design skills’ show that students focus on hands-on design ability. Even in strategic roles, design leaders are expected to remain creative and able to generate fresh ideas, to understand what design is and how to represent it. This emphasis also appears in the DLCM’s *Creative Problem-Solving* and *Design Thinking* competencies, directly matching sub-competencies such as ‘iterative ideation’ and ‘creative framing’. The students thereby reinforced its importance.

Third, students highlighted design leaders’ *execution and implementation skills*. Most mentioned ‘organisational skills’, ‘delegation’, ‘driving progress’, ‘set budget’,

‘time management’, ‘attention to detail’ and ‘productivity and efficiency’. These map strongly to the DLCM’s *Implementation Ability* and *Executive Leadership* dimensions.

Fourth, they emphasised *strategic and decision-making skills*. Students mentioned strategy, initiative, vision, leadership skills and decision-making, indicating that they believe big-picture thinking is a required competency for design leaders. This is reflected in the *Goal-setting* dimension of the DLCM.

From the mindset category, students mentioned two competencies: *critical thinking* and *design thinking*. This shows they recognise the importance of critical thinking, which includes questioning assumptions, exploring evidence and reasoning as key leadership mindsets. These overlap strongly with the DLCM’s *Creative Problem-Solving* dimension, especially the ‘Analytical Ability’ sub-competency, and with *Goal-setting*. *Design Thinking* is also explicitly present in the DLCM as a mindset that integrates empathy, iteration and a user-centred approach.

In addition, students identified several **personality** traits, including level-headedness, discipline, proactivity, patience, confidence, consideration and care, integrity, passion, a positive outlook and resilience.

All the competencies proposed by the students are represented in the DLCM. Compared with Chinese participants, UK students sometimes place different emphases on certain competencies. The workshop demonstrates that the DLCM has a strong level of generalisability in the UK context, despite having been developed in a Chinese context. This indicates that design leaders share common competencies, even when they come from different cultural backgrounds with distinct characteristics.

4.4.4 Summary of validation and revision

This section summarises the validation feedback for the DLCM from three sources: an expert survey (design leaders and academic staff), stakeholders from the case study (educators, students and alumni) and a UK-based student workshop designed to test the DLCM’s generalisability. Overall, all respondents agreed that

the DLCM is comprehensive and that its generalisability was demonstrated in the workshop. Based on feedback from this stage, the following revisions were made:

In response to the **expert survey** (design leaders and academic staff):

1. *Business Acumen*: Added '*understand and grasp consumer trends and shifting user groups*' under the 'Brand & Marketing' sub-competency.
2. *Creative Problem-Solving*: Revised the 'Analytical Ability' sub-competency to include '*the ability to identify the root cause of a problem, distinguishing the 'true' problem from a 'false' one, before attempting to solve it*'.
3. *Executive Leadership*: Revised the 'Decision Making' explanation to include the '*ability to make judgements based on a comprehensive understanding of the industry's layout, especially its value chain, and to assess its distinctive features'*.
4. *Creative Problem-Solving*: Added a new sub-competency, 'Risk Anticipation', with the explanation: '*Have risk awareness, including design contract risk management, process risk management, delivery and follow-up risk management, business cooperation risk management and financial risk management*'.
5. *Policy Sensitivity*: Expanded the 'Legal Acumen' sub-competency, to include '*understanding of design-related legal knowledge*' to cover broader IP and regulatory concerns.
6. *Implementation Ability*: Revised the 'Quality Control' sub-competency to include, added a 'design audit' element, with the description '*champion regular design audits, ensure the team understands audit objectives and scope'*.
7. *Human-Centred Leadership*: Added a new sub-competency 'Cultivating an Ethical Stance', with the explanation: '*Foster ethical awareness, cultivate an ethical environment, practice ethical design and resolve ethical dilemmas*'.
8. *Executive Leadership*: Revised the 'Budgeting and Investment' explanation: '*Demonstrate cost accounting awareness, can direct investment and drafts budget, oversees financial planning and budgeting based on projects*'.

In response to feedback from the **case study** (educators, students and alumni):

1. *Creative Problem-Solving*: Revised the 'Adaptivity' sub-competency explanation: '*Able to switch between different approaches to solve problems, adjust to new conditions and manage change effectively in evolving circumstances, thereby avoiding failures in dynamic and uncertain situations*'.
2. *Human-Centred Leadership*: Added '*Actively take social responsibility*' to the 'Cultivating an Ethical Stance' sub-competency.

Finally, the **student workshop** demonstrated the potential transferability of the DLCM, showing that although the model was developed in a Chinese context, it is also applicable in the UK.

4.5 **Finding 2**: Finalised Design Leadership Competency Model

In the finalised DLCM (Figure 43, below), the competencies are categorised into three domains: skills, knowledge and mindset. As introduced in Section 2.5.2, skill can be seen as the ability to retrieve knowledge and apply it (Lamri and Lubart, 2023).

The *Skills* category refers to the practical abilities required for design leaders to navigate complex professional environments. These include *Creative Problem-Solving, Executive Leadership, Implementation Ability, Goal-setting, Design Communication, Human-centred Leadership, Continuous Learning, Design Sensitivity, Network Building (External), Collaboration (Internal) and Governance*. These skills are essential for design leaders to remain adaptable and effective in an evolving industry landscape.

Knowledge, mainly a cognitive attributes, serves as the foundation for skills (Hlavac, 2023; Lauby, 2013; Vitello *et al.*, 2021b). The Knowledge category is foundational to the DLCM, including *Business Acumen*, *Policy Sensitivity* and *Design Knowledge*. As the basis for executing skills, knowledge plays a critical role in the DLCM. This category can be emphasised in entry-level design education, particularly in DM programmes that are closely related to design leadership. This

model providing students with a strong knowledge base at an early stage helps shape their fundamental understanding of design management.

Mindset can be shaped by skills and knowledge, developing knowledge and skill can cultivate mindset (Bereczki and Nagy, 2023; Xu *et al.*, 2021). The Mindset category includes *Design Thinking* and *Systems Thinking*. These mindsets are built upon both knowledge and skills and interact dynamically with them. A strong mindset enables design leaders to approach problems holistically, balancing creativity, strategy and execution.

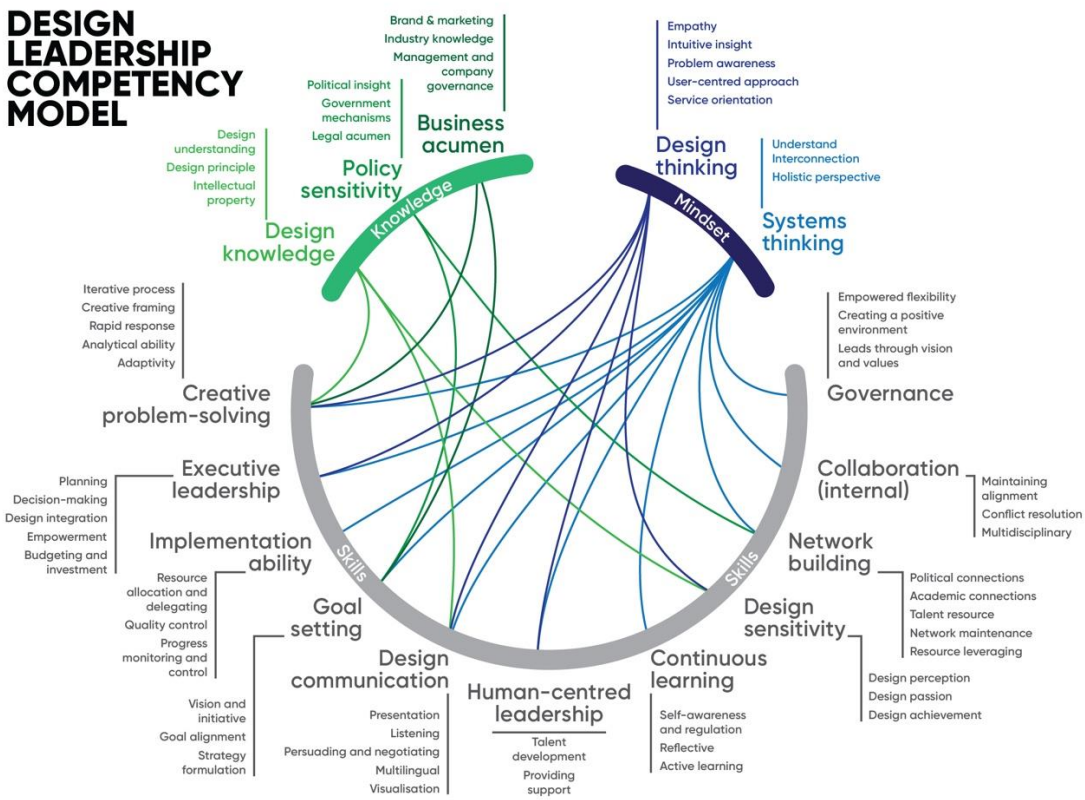


Figure 43: Design Leadership Competency Model

A comprehensive summary of the DLCM is provided below. The explanations are based on the *Bloom's Taxonomy Verb lists* (Bloom and Krathwohl, 1954; TIPS, University of Arkansas, 2014; Utica University, n.d.). The Bloom's Taxonomy is a classification of measurable action verbs that includes six levels: knowledge, comprehension, application, analysis, synthesis and evaluation (Ching and Da Silva, 2017; Utica University, n.d.). These levels were later revised as: remember,

understand, apply, analyse, evaluate and create (TIPS, University of Arkansas, 2014).

Bloom's Taxonomy was selected for three main reasons. Firstly, as a widely established and validated framework, it provides a robust and credible basis for the DLCM. Secondly, its hierarchical structure, which progresses from foundational knowledge to higher-order skills include synthesis and evaluation, aligns perfectly with the three progressive categories of the DLCM. Finally, its use of measurable action verbs is essential for defining competencies in a way that is both observable and concise. Moreover, the taxonomy's relevance is further strengthened by its established use in continuing education and business education (Ching and Da Silva, 2017), making it a highly appropriate choice for the DLCM, which is designed for a professional design education context. This foundation ensures the behavioural verbs in the model are meaningfully structured and fit for purpose.

As discussed in Section 6.1, based on the hierarchy relationship across Skill, Knowledge and Mindset, and in consideration of the different levels of Bloom's Taxonomy, the *Knowledge* category verbs were chosen from two fundamental levels: the knowledge and comprehension (or remember and understand) levels. The *Skill* explanations were chosen from the other levels. And, as *Mindset* involves both knowledge and skills, therefore, the behavioural verbs were chosen from across all levels. The details of the DLCM are shown in the following sections.

4.5.1 Knowledge

4.5.1.1 Business Acumen

Business Acumen focuses on knowledge and understanding of the business inside and outside the own sector or industry.

1. **Brand & Marketing**: Locate the role of branding and marketing at the strategic level; extend relevant knowledge of the market and branding, as the foundation for finding business opportunities; identify consumer behaviour and shifting user groups.

2. **Industry Knowledge**: Distinguish and predict the industry's past, present and future development; identify the rules and regulations (including unspoken) in the industry.
3. **Management and Company Governance**: Express a comprehensive understanding of business management (including leadership, strategic, HR, financial and operations); review knowledge of corporate governance structures; review business operations and processes.

4.5.1.2 Policy Sensitivity

Policy Sensitivity focuses on understanding policy-related aspects.

1. **Political Insight**: Outline and classify the complexity of national-level political interests and intricate nature; recognise their impact on business operations and strategies.
2. **Government Mechanism**: Identify the structure and functioning of local government systems.
3. **Legal Acumen**: Review company law and identify its implications for business operations and strategies; review other design-related legal knowledge.

4.5.1.3 Design Knowledge

Design Knowledge is about having a comprehensive knowledge of design.

1. **Design Understanding**: Interpret design knowledge, including technical and craft aspects; generalise design processes (workflows) in the business domain.
2. **Design Principle**: Identify the fundamental guidelines or standards that one adheres to in the design process, which are shaped by experiences and insights gained from education and professional work in the field.
3. **Intellectual Property**: Recognise intellectual property rights and the importance of protecting design innovations.

4.5.2 Skills

4.5.2.1 Creative Problem-solving

Creative Problem-solving is the ability to identify a problem, break it down, explore unconventional solutions and solve it effectively.

1. **Creative Framing**: Analyses the issue from multiple perspectives to gain a comprehensive understanding; creates innovative and non-traditional approaches to solving the problem; combine design-related narrative techniques (e.g. storytelling) to contextualise and frame a problem.
2. **Iterative Process**: Breaking down problems into simpler parts; plan step by step; test and validate each step until ends.
3. **Analytical Ability**: Identify the root cause of a problem, distinguishing a 'true' problem from a 'fake' one before attempting to solve it; collect, process and interpret data for solutions.
4. **Adaptivity**: Adapt to new conditions and rearrange changes effectively in dynamic and uncertain situations.
5. **Rapid Response**: Rapidly recognise and rearrange unknown situations or accidents in time.
6. **Risk Anticipation**: Develop a risk awareness that can anticipate potential risk from various aspects, such as risk in design contract, design process, or business cooperation and financial risk.

4.5.2.2 Executive Leadership

Executive Leadership focuses on demonstrating strategic planning, sound decision-making, design integration, empowerment of subordinates, and effective budgeting and investment management.

1. **Planning**: Develop annual and backup strategic plans to identify and prepare potential issues; align specific objectives with actions throughout all levels of the organisation.
2. **Decision Making**: Judge correctly and decisively in major decisions and take responsibility for the outcomes of decisions; judge based on the appraise of industry understanding.

3. **Design Integration**: Extend and reinforce the role of design within the organisation on both horizontal and vertical levels (e.g. integrating design at the strategic level; fostering cross-functional collaboration among different departments).
4. **Empowerment**: Handle and allocate the power and flexibility toward employees, such as decision-making power and autonomy.
5. **Budgeting and Investment**: Direct investment and estimate budget on a strategic level.

4.5.2.3 Implementation Ability

Implementation Ability is the ability to allocate resources and delegate tasks, ensure quality control and monitor progress to achieve high standards in work processes and outcomes.

1. **Resource Allocation and Delegation**: Manage the human resources (people) and physical assets (e.g. equipment, inventory, offices etc); oversee and evaluate project budget; delegates tasks and responsibilities to the appropriate individual.
2. **Quality Control**: Evaluate and measure design works with high-quality controls to maintain high standards in processes and outcomes; operate regular design audits, enhance the team understanding of audit objectives and scope.
3. **Progress Monitoring and Control**: Monitor progress, track results and measure progress and outcomes, ensure successful delivery.

4.5.2.4 Goal-setting

Goal-setting focuses on demonstrating visionary initiative, and setting clear and achievable goals aligned with strategic directions.

1. **Visionary and Initiative**: Predict future trends and develop a clear vision; detect new opportunities.
2. **Goal Alignment**: Develop clear and achievable goals from both long-term and short-term aspects; align the organisation moving towards the common goals.

3. **Strategy Formulating**: Formulate strategy at both corporate and business levels.

4.5.2.5 Design Communication

Design Communication focuses on conveying information clearly, accurately and convincingly.

1. **Listening**: Respect individuals and listen attentively to others, valuing their perspectives and contributions.
2. **Persuading and Negotiating**: Identify different opinions and explore a middle ground which can facilitate both compromise and consensus; generate support through persuasion and negotiation.
3. **Multilingual**: Convey ideas in multiple languages, including English and Chinese.
4. **Presentation**: Deliver presentations that clearly express ideas and effectively convey information to the audience.
5. **Visualisation**: Apply 2D or 3D techniques (sketches, 3D Models etc.) to convey design ideas, concepts and plans.

4.5.2.6 Human-centred Leadership

Human-Centred Leadership focuses on offering guidance and assistance to enhance subordinate skills and potential and helping them overcome the challenges when they need support.

1. **Talent Development**: Provide opportunities for employees' growth and skill enhancement through courses, seminars and other educational resources; identify and analyse employees' strengths and weaknesses, combining their development needs with the organisation's goals.
2. **Providing Support**: Identify and address the needs of employees, prepare and provide guidance and assistance when they need support.
3. **Cultivating Ethical Stance**: Develop ethical awareness in the workplace; practice ethical design; cope with ethical dilemmas during the process; and actively take social responsibility.

4.5.2.7 Continuous Learning

Continuous Learning focuses on reviewing own performance, actively identifying own learning needs and acquiring new knowledge or skills.

1. **Self-Awareness and Regulation**: Clarify one's own behaviours and capability, and identify strengths and limitations; demonstrate self-regulation with upholding high personal requirements and maintaining self-discipline.
2. **Reflective**: Regularly review on past experiences (e.g. mistakes), summarise and develop methodologies (e.g, guidebook) from it, to prepare the next movement and improve working efficiency.
3. **Active Learning**: Acquire and apply new knowledge and skills, engaging in diverse learning methods and events, complemented by deep thinking.

4.5.2.8 Design Sensitivity

Design Sensitivity is about having a design sensitivity when they perceive and interact with the world and being able to create successful design work.

1. **Design Perception**: Demonstrate a keen sensitivity to aesthetics (such as form, colour etc) and portray inspiration through intuitive and perceptual design methods.
2. **Design Passion**: Demonstrates a deep passion for the design process, reflecting a love and enthusiasm for the field.
3. **Design Achievement**: Show experience and ability to deliver successful projects, as evidenced by case studies, design awards, or invention patents.

4.5.2.9 Network Building (External)

Network Building (External) focuses on building and maintaining positive relationships with various connections outside the organisation.

1. **Political Connection**: Develop positive relationships with government, industry bodies and professional associations, and financial institutions; and clarify how to find the right people who want to push their ideas.

2. **Academic Connection**: Incorporate with universities or other academic institutions, such as by teaching in design education.
3. **Talent Resource**: Develop an in-house technical team.
4. **Network Maintenance**: Develop and enhance different networks outside the organisation.
5. **Resource Leveraging**: Identify and integrate various external resources that benefit the development of the company, and allocate minimal effort to achieve significant results.

4.5.2.10 Collaboration (Internal)

Collaboration (Internal) focuses on getting results from working with others and being able to collaborate effectively across the organisation.

1. **Maintain Alignment**: Maximise that employees clarify and move toward the corporate goals, agendas and mission, and a positive relationship within the organisation.
2. **Addresses Conflicts**: Manage disputes and disagreements, and cope with contradicted benefits to maintain balanced relationships within the organisation.
3. **Multidisciplinarity**: Develop cross-functional teams with diverse expertise, and cultivate multidisciplinary collaboration.

4.5.2.11 Governance

Governance focuses on demonstrating a preference for flexibility and creating a positive environment.

1. **Empowered Flexibility**: Integrate flexible regulations that accommodate individual performance and needs, such as granting employees the freedom to choose their work hours or autonomy in decision-making.
2. **Creating a Positive Environment**: Cultivate a work environment that encourages people to act with integrity and treat each other and their ideas with respect; diminish barriers to trust (e.g. reward others for demonstrating trust behaviours).

3. **Leads Through Vision and Values**: Integrate the organisation's visions and values as guideposts for conducting day-to-day activities in the company; recruits employees with shared values and goals.

4.5.3 Mindset

4.5.3.1 Design Thinking

Design Thinking is a mindset of proactively spotting challenges, empathising with users, intuitively generating hypotheses, and collaboratively creating human-centred solutions.

1. **Problem Awareness**: Identify and prepare for potential problems, and outline emerging problems in advance.
2. **Empathy**: Observe other's feelings and stances.
3. **Intuitive Insight**: Apply intuition to generate hypotheses about what might be true.
4. **User-Centred Approach**: Prioritise clients and customers at the forefront, emphasising their experiences and needs, and fostering collaboration with stakeholders (e.g. co-design, participatory design).
5. **Service Orientation**: Integrate and prioritise service to meet and exceed client expectations.

4.5.3.2 Systems Thinking

Systems Thinking is a mindset of mapping interconnections, and maintaining a holistic perspective to navigate complexity and solve the right problem.

1. **Understanding Interconnection**: Clarify interactions across root causes and relevant interrelated factors; articulate the complexities of a system and clarify what problem trying to solve.
2. **Holistic Perspective**: Apply 'zooming out' to see the entire system and the relationships within it.

4.6 Summary

This chapter illustrates the process of the DLCM's construction, from initial competency identification (Stage 1, addressing RQ1) to model validation and revision (Stage 2, addressing RQ2), culminating in the final version of the model.

At the initial identification stage, competencies were identified from four sources: 17 from a systematic literature review, 24 from interviews with design leaders, 23 from job descriptions and 20 from grey literature. Following this, a round of competency synthesis was conducted to remove overlaps, which led to the creation of the preliminary DLCM.

In the validation stage, this model was presented to two main categories of stakeholders (design leaders and stakeholders in design education) across three groups: (1) an expert panel of design leaders and academic staff; (2) stakeholders from the case study, including educators, students and alumni of the Design Management programme; and (3) a student workshop in the UK. Based on the feedback, 10 revisions were made: eight from the expert panel and two from the SUAD case study, which included the addition of three sub-competencies to the model. Furthermore, the workshop results evidenced a convergence of competency understanding between UK and Chinese contexts, which demonstrated the potential transferability and applicability of the DLCM.

Finally, the DLCM was finalised with 16 competencies and 58 sub-competencies organised into three categories: skills, knowledge and mindset. Further details are provided below (Table 35), and information on the sub-competencies can be found in Section 4.5.

Table 35: Competencies in the DLCM

Category	Competency
Skills	Creative Problem-solving
	Executive Leadership
	Implementation Ability
	Goal-setting
	Design Communication
	Human-centred Leadership
	Continuous Learning
	Design Sensitivity

	Network Building (External)
	Collaboration (Internal)
	Governance
Knowledge	Business Acumen
	Policy Sensitivity
	Design Knowledge
Mindset	Design Thinking
	Systems Thinking

Now that the DLCM was constructed, Chapter 5 will move to Stage 3 to explore the model's potential in design education by mapping competencies. Data will be gathered from three perspectives on design education: (1) education itself, (2) industry perception; and (3) policy. The analysis will then reveal the current status of each competency through a two-part analysis, which consists of a horizontal review and a vertical analysis benchmarked against the DLCM, to understand competency coverage and identify opportunities for design education improvement.

Chapter 5: Implications of the Design Leadership Competency Model for Design Education

Chapter 4 has addressed both RQ1 and RQ2, resulting in the DLCM consisting of 16 competencies and 58 sub-competencies. Building on this finding, this chapter aims to address RQ3:

To what extent does current Chinese design education reflect validated competencies, and what are the key areas for development?

As introduced in the research context (Section 1.1), the development of design leadership is impacted by policy support, industry demand and shifts in education. In detail, policy provides direction and support for talent development; industry outlines and clarifies the kind of talent needed in real-world practice; and education helps to understand what students are currently learning, and which competencies are being taught. Therefore, identifying competencies from these different perspectives not only creates a comprehensive picture but also enables a comparative analysis, revealing key alignments and gaps.

In this sense, this chapter draws on three different perspectives to address RQ3. The corresponding objectives are:

Objective 3.1: To map the competencies from design education, policy and industry against the validated DLCM.

Objective 3.2: To identify competency gaps and determine the key areas for development in current design education.

To achieve these objectives, template analysis, as a form of thematic analysis, was the main method deployed at this stage. This involved a two-step process (**Section 5.1**): first, identifying both taught and absent or underemphasised competencies, using a template based on the DLCM, and second, performing data normalisation based on frequency to determine their coverage. The data was gathered from three sources: (1) university course documents and the SUAD case study interview transcripts; (2) policy documents and (3) interview transcripts with design leaders.

The findings are presented in the following sections:

- **Section 5.2** details the taught and absent or underemphasised competencies from design education detailed and provides a comparative analysis across the groups;
- **Section 5.3** shows the required competencies identified in policy documents;
- **Section 5.4** presents the taught and absent or underemphasised competencies from an industry perspective.

Then, **Section 5.5** presents the detailed data normalisation findings, consisting of two parts: a horizontal review and a vertical analysis, which compares competencies from all sources against the DLCM. Finally, **Section 5.6** provides a brief summary to conclude the findings of this chapter.

5.1 Stage 3 Data Analysis

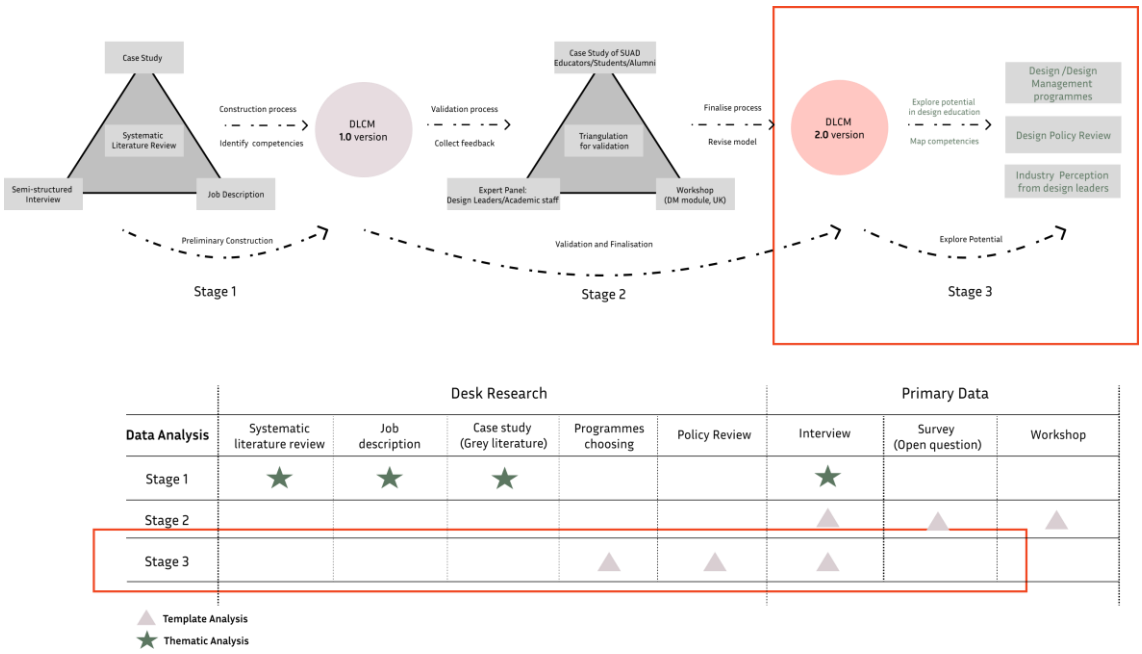


Figure 44: Stage 3 in this research

At this stage, template analysis was the primary method utilised (Figure 44, above). Template analysis can be seen as a type of thematic analysis, and it is often considered a more flexible form of it (Brooks and King, 2014; Brooks *et al.*, 2015).

As the DLCM itself can be viewed as the initial template, the process at this stage followed the procedural steps outlined by Brooks and King's (2014).

As introduced in the methodology (Section 3.5.4; 3.5.2.2 and 3.5.3.2), the data were threefold:

- *Design Education*: 79 programme documents consisting of eight DM programmes and 71 design programmes from 21 universities (including course introduction, structure and syllabi), plus 14 interview transcripts from a DM programme in the SUAD case study;
- *Policy*: 52 policy documents used to identify talent needs from government and national perspectives;
- *Industry*: 26 interview transcripts with design leaders, providing insight into the industry's perception of design education.

These three perspectives reveal different views on the competencies taught in design education, providing a comprehensive picture.

5.1.1 Template analysis

The template analysis process followed the steps proposed by Brooks and King (2014) but also combined these open-coding, a similar analytical step used in Stage 1 (Section 4.1.1). This hybrid approach was chosen so that the analysis could also capture competencies that might not appear in the DLCM. The template analysis, based on the DLCM (Section 4.3), allowed for a deductive comparison between the competencies identified in the data and those included in the model. In this regard, the approach enabled both an inductive exploration of new content and a deductive mapping to an established framework. Therefore, the analysis involved a two-part qualitative coding process, which open-coding and a template analysis, happening simultaneously.

In the initial stage, all data were systematically reviewed to identify content relating to competencies (skills, knowledge and mindset). A paper-based manual coding was primarily employed for document data (Figure 45), while all interview transcripts were coded in NVivo.

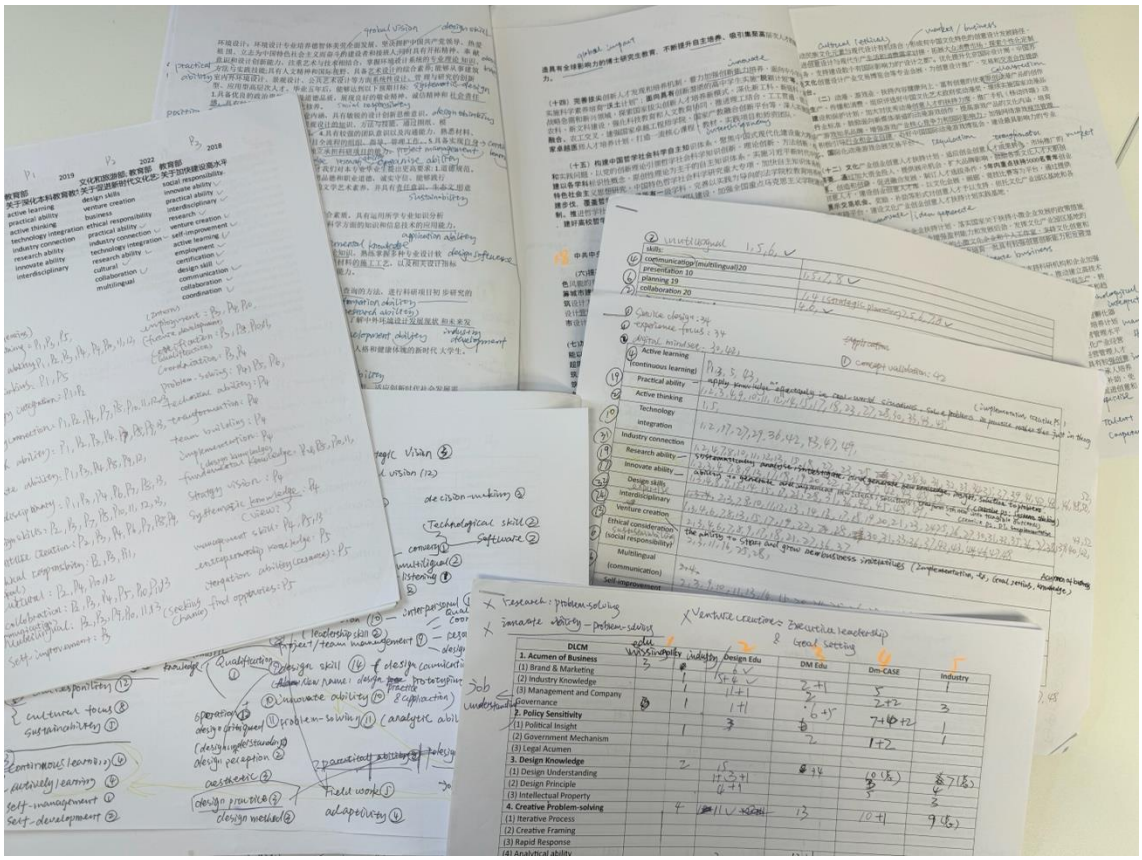


Figure 45: Stage 3 manual process on paper

During the process, competencies that emerged from the data but were absent from the model (and vice versa) were identified. The identified codes and competencies are shown in Table 36, below. and a detailed list for each source can be found in Appendices G and H (design education), I (policy) and J and K (industry).

Table 36: Results of data-analysis process

Data Sources			Initial Codes	Final Competencies
Design Education	Design programme		73	**18**
	Design management programme		47	**19**
	Case study	Syllabi	56	**18**
		Taught competencies (Interview)	45	**15**
		Absent competencies (Interview)	23	**9**
Policy	Design policy		64	**16**
Industry	Design leaders	Taught competencies	34	**16**
		Absent competencies	34	**15**

Then, based on these findings, the frequency of each competency was also counted to prepare for the normalisation process, which was used to determine their coverage across three perspectives. The normalisation process will be detailed in the following section.

5.1.2 Data normalisation

As mentioned, the frequency of each competency was recorded during the template analysis. Each mention of a competency was counted once, and all occurrences were totalled.

To ensure meaningful comparisons between columns and avoid situations where some values are disproportionately large due to differing sample sizes (e.g. 52 policy documents compared to nine DM programmes), all numerical data were normalised within each column using the min-max normalisation method, as this is an effective and most common method for normalisation (Aksu *et al.*, 2019; Loukas, 2020; Mazziotta and Pareto, 2022). The data normalisation process, more commonly called 'Min-Max Scaling', is considered a fundamental and mathematical technique that has been a standard tool in data analysis (Ozsahin *et al.*, 2022). This approach re-scales each value to a range between 0.1 and 1.0, which represent the lowest value becomes 0.1, the highest becomes 1.0, and intermediate values are distributed proportionally. This ensures that no non-zero value is mapped to zero, which could otherwise be misinterpreted as an absence. Moreover, blank or missing values (NaN) were left blank in the normalised dataset and marked as unmentioned. The original formula is shown as follows:

$$Normalised\ value = \frac{X - min}{max - min}$$

And the *modified formula* used in this research is:

$$Normalised\ value = 0.1 + 0.9 \times \frac{X - min}{max - min}$$

Where:

- $X =$ original value

- $min, max =$ minimum and maximum values in that column

As mentioned above, it is necessary to differentiate true minimum values from blank or missing entries. If data are normalised to a standard [0,1], the minimum value becomes 0, which can cause confusion with zeros used to represent data that were not mentioned in the interview. Therefore, **0.1** is added to this formula to deliberately avoid that range and ensure all data are valid. Consequently, 0.9 is used as a multiplier to correctly scale the data to this new range. This calculation can be performed in Excel, which research has shown that Excel is a suitable software program for normalisation (Aksu *et al.*, 2019; Sinsomboonthong, 2022). In this regard, all data for this study were grouped and calculated in Excel.

After the calculations, to facilitate interpretation and a visual comparison, normalised values in each column were grouped into three levels: **High**, **Medium** and **Low**. Dividing the data into three levels provides a basis that is easy to understand and interpret, as it clearly shows distinctions and contrasts across different datasets. These levels were assigned using the percentile method within each column, as the percentile method is a standard and highly recommended method in statistics for creating meaningful groups (Schoonjans *et al.*, 2011). Therefore, the following list shows how the data were divided into three levels:

- *Low:* Values at or below the 33rd percentile (bottom third)
- *Medium:* Values between the 34th and 66th percentiles (middle third)
- *High:* Values above the 66th percentile (top third)

As previously mentioned, two categories of competencies were identified: taught competencies and absent or underemphasised competencies. In this research, absent competencies have been identified and grouped into a separate '**Absent**' category. This includes competencies that need to be emphasised more or have not been taught in design education. This 'absent' category data follows an inverse logic compared to the others. While a 'high' coverage in other datasets represents a positive outcome, a 'high' coverage in this dataset demonstrates a significant lack, which is a negative outcome. In this sense, a 'low' coverage in 'absent'

category represents a positive outcome. Explanations of three levels are shown below, and their visualisation is presented in Table 37:

- *High coverage/needed* (marked in green): Indicates a competency that is *highly emphasised* and *well covered* in design education, *highly required* by design policy, or most *frequently lacking* in the 'Absent' columns;
- *Medium* (marked in yellow): Indicates a competency that is *moderately emphasised* and covered in design education, *moderately required* by design policy, or *moderately lacking* in the 'Absent' columns;
- *Low* (marked in red): Indicates a competency with *lower emphasis* and coverage in design programmes and industry perspectives, and a *lower priority* in policy, as it is not considered important at this time. In the 'Absent' columns, a low rating represents a *positive* sign, suggesting that design education is generally able to meet current needs and that there is a small gap.

Additionally, because the design education data comes from three sources, the occurrence and normalisation are calculated separately for each source initially. After this, the level of each competency is determined according to a rule: the most frequent level among the three sources is assigned as the final level. For example, if a competency is rated as 'high' by two sources and 'medium' by one, it will be labelled as 'high'. If all three sources assign different levels, a new category called '**Difference**' will be created (marked in blue in Table 37), and the competency will be classified under this category and discussed separately.

Moreover, as previous stated, any competencies not mentioned during the interviews were labelled as '**Unmentioned**', which corresponds to the blank value on p. 211. The normalisation results are in Appendix F, and the visualisation is shown below.

Table 37: Results of visualisation

	Stakeholder Alignment			Gap Identification	
Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in	Absent in Industry
Business Acumen	High	Medium	High	Medium	High
Policy Sensitivity	High	Low	Low	N/A	Low
Design Knowledge	Medium	High	High	N/A	Medium
Creative Problem-solving	High	High	High	N/A	High
Executive Leadership	High	N/A	High	N/A	N/A
Implementation	High	Medium	High	High	High
Goal-setting	High	Medium	Low	N/A	Low
Design Communication	Medium	Medium	High	Medium	Low
Human-centred Leadership	High	N/A	Low	N/A	Medium
Continuous Learning	Medium	High	Medium	N/A	High
Design Sensitivity	High	High	High	High	High
Network Building	High	N/A	Low	N/A	N/A
Collaboration	High	Medium	High	High	Low
Governance	Low	N/A	N/A	N/A	N/A
Design Thinking	High	High	Difference	N/A	Medium
Systems Thinking	Medium	Low	Medium	N/A	N/A

N/A = Not Applicable or data unavailable
Difference = Discrepancy in coverage levels

5.2 Competencies in Design Education

This section identifies taught and absent competencies in design education, based on the two data sources: (1) a desk research of university programmes; an analysis of 79 programmes from 21 universities, consisting of eight DM programmes and 71 from design programmes and (2) the case study: 14 interviews from the stakeholders (educators, students and alumni) from DM programme SUAD case study. The findings are presented in two parts: taught competencies (Section 5.2.1) and absent competencies (Section 5.2.2).

5.2.1 Taught competencies in design programmes

While specific competencies may vary slightly across programmes and data sources, a total of 21 taught competencies were identified from design programmes, grouped into three categories consisting of skills, knowledge and mindset:

- Skills: *Goal-setting, Communication, Collaboration, Research Ability, Implementation, Problem-solving, Project or Team Management, Design Sensitivity, Self-development* and *Ethical Awareness*;
- Knowledge: *Design Knowledge, Design-management Knowledge, Business Knowledge, Industry Knowledge, Management Knowledge, Policy Knowledge, Research Knowledge* and *Interdisciplinary Knowledge*;
- Mindset: *Design Thinking, Critical Thinking* and *Systems Thinking*.

Full details can be found in Appendix G.

5.2.1.1 Skills

Goal-setting

Goal-setting is recognised across all design education sources. Design programmes emphasise cultivating both strategic and global vision, encouraging students to integrate design strategy with an international perspective and to develop innovative solutions. The DM programme further extends this focus by emphasising its connections with planning skills, relating to resource development, strategic management and enterprise development, once again underscoring the importance of a global outlook.

Interview data further show how students experience and interpret visionary competencies in practice. For example, one student described the need to "look beyond the immediate and anticipate where things are headed" (STU 6), reflecting an emphasis on future insight. Across all sources, *Goal-setting* is thus conceptualised as a broad vision that relates to a blend of strategic planning and the ability to anticipate and shape future trends.

Communication

Communication is identified as a core competency across all design-education sources. Both DM and design programmes emphasise the development of clear expression and multilingual proficiency. These programmes also reveal a close connection with collaboration, as they highlight activities such as teamwork, project presentations and coordination as essential for building effective communication. Additionally, *Communication* skills are referenced frequently in the case-study syllabi, with a particular focus on both verbal and presentation abilities.

Interview data reinforce this emphasis. EDU 3 regards communication as a foundational and "transferable skill", noting its centrality at the undergraduate level, but also expressing concern about its recent "decline" among students due to changing social habits, as many young people now "dislike socialising and try to minimise it". Yet design, especially in the future, requires teamwork, integration and communication. With this in mind, EDU 3 further highlighted the necessity of "strengthening students' overall transferable abilities, particularly in communication".

Furthermore, from the alumni's perspective, they highlighted the importance of communication in professional contexts for tasks such as delivering presentations and coordinating communication within a team. As ALU 2 reflected on the value of practice:

> Some people had never spoken up and were extremely nervous, but after doing it a few times, they became completely different. You really need those opportunities to push you to grow.

For students, communication is seen as both a fundamental and a practical skill, supporting design collaboration and storytelling within and beyond disciplinary boundaries. Students described communication ability as generally a 'very straightforward skill' and referred to it as 'verbal communication' (STU 8). Specifically, they mentioned design-communication ability, which refers to the ability to clearly express and convey their design ideas to other students, within

both design-related subjects and other disciplines, for project outcomes (STU 3). Moreover, Student 5 believed that this ability involves telling a story effectively to different audiences, including "...communicating with designers or professional practitioners, as well as with the client and project stakeholder".

Implementation ability

Implementation is consistently identified as a key competency in both DM and design programmes. It is framed as the ability to plan, organise and execute design projects, encompassing design process, quality control and resource integration. DM programmes demonstrate a specific focus on the management of project operations and the effective delegation of tasks to team members. Moreover, the case study syllabi provide a more comprehensive perspective by mentioning project accounting ability and project dynamic control, although they lack a detailed explanation of these two aspects.

Interviews emphasise its practical and application-focused aspect, as educators believed this "helps students transfer their creative ideas and plans into the market and is a way to turn designers' good ideas into reality" (EDU 2). Specifically, alumni highlight the importance of delegation, claiming that it is important to identify which tasks are best suited to each team member and to assign responsibilities where individuals can make the most of their strengths: "someone who isn't suited to calculations shouldn't be handling data, that's asking for trouble" (ALU 2).

Reflecting on implementation, students described how they learned this competency through project work, which involved activities such as leading a project and developing and presenting solutions or proposals. As one student noted, "... [working on projects] was reinforced through in-class exercises or simulations that allowed us to apply what we had learned" (STU 7). Moreover, they mentioned seeking resources and support beyond the classroom to further develop the manual and practical skills essential for their future careers.

Research ability

Research ability was highlighted across the groups. Design programmes referred to it as a set of skills including: (1) conducting literature searches to collect information; (2) carrying out design investigations (e.g. fieldwork and market research); (3) analysing research data; and (4) writing research reports and academic papers.

In the interviews, educators, students and alumni also highlighted this ability. Educators and students believe it is one of the core competencies cultivated in design education. EDU 2 and 3 emphasised the importance of grounding students in theoretical research methods and investigative techniques to prepare them as future graduate researchers. Moreover, there is a focus on applied rather than purely theoretical research, with EDU 3 noting that it is a skill that "engages with current, real-world issues unfolding in China and explores how to address them through our discipline". To align with this context, educators provide academic opportunities with a focus on contemporary, practice-oriented topics.

This perspective aligns with alumni feedback. As mentioned in Section 4.4.2.1, the context of design is constantly changing due to the gig economy and technology developments. Alumni emphasised the practical applicability of research skills in this environment, referring to them as a key factor in securing a job (Appendix G).

In contrast to this focus on practical application, students placed more emphasis on report writing. This may be influenced by the dissertation being a significant challenge and a requirement for graduation. STU 1 shared their approach to developing research skills:

> What counts most is the skill of familiarising yourself with cutting-edge theories and then extracting and distilling their essence. Typically, a supervisor will give you a topic; you'll search for relevant sources and, when they fit, synthesise them into a concise summary.

Collaboration

Collaboration was mentioned frequently across different groups. DM and design programmes defined collaboration as working with people from diverse backgrounds and roles, with a specific focus on engaging with international partners and participating in global projects.

During the interviews, both educators and students emphasised team collaboration, with EDU 1 stating that collaboration is integrated into almost all modules within the DM programme. Students noted that its cultivation is mainly focused on the UG level. Furthermore, the development of collaboration often connects with other competencies. For example, STU 2 provided their insight into these related skills, including leadership, communication and the ability to seek external resources:

> ...Within that team environment, I got to experience leadership in design first hand. ...a practice-oriented form of collaboration that really boosts both leadership and teamwork skills. In the process, you inevitably have to communicate with your teammates, and often you need to go beyond the group, such as sourcing relevant external resources, to make sure your project or competition entry actually comes together. I feel that this experience cultivates a lot of valuable abilities, especially leadership and collaboration.

Project and team management

The *Project and Team Management* skill is a critical competency that is featured in both DM and design programmes. From this perspective, students are expected to be able to take on organisational management roles within design, production, or research teams, managing and leading teams or projects. However, it was not explicitly mentioned in the interviews.

While project and team management has significance overlaps with other competencies (for instance, implementation and collaboration), it frequently emerged as a theme in DM programmes and also appeared in the desk research. However, despite this consistent emphasis in the programme data, there is often a

lack of detailed explanation. Considering its significant emergence in the desk research, the author decided to retain this competency in the analysis to accurately reflect the data, rather than remove it due to its absence from the interviews.

Design Sensitivity

Given the context of design education, the importance of design-related competencies is repeatedly emphasised across different groups. Design perception serves as the foundation for design sensitivity and is cultivated through aesthetic education. This includes the development of practical design skills, encompassing creative expression through hands-on abilities such as drawing, data visualisation and prototyping. Moreover, design qualifications are also specifically highlighted in programme descriptions. Additionally, design critique and evaluation are emphasised, relating to the ability to assess design outcomes, recognise good design and provide constructive feedback.

Regarding these skills, alumni shared that the *Design Sensitivity* developed during their studies is useful in their work, especially when working with colleagues who are not familiar with design. They explained that this sensitivity allows them to stand out and achieve better results: "when we produce cultural-creative items or handle publicity for our department, those aesthetic and design sensibilities really come into play" (ALU 3).

Problem-solving

All groups highlight *Problem-solving* as a key competency, which is cultivated by integrating theory and practice. Specifically, this requires students to identify, define and analyse problems, and to find appropriate and innovative solutions. Additionally, adaptability is emphasised as a component of this competency, focusing on the ability to proactively adapt to changing situations in order to solve problems effectively.

In the interviews, students and alumni highlighted problem-solving; however, educators did not mention it. ALU 2 recalled a project-based class to illustrate how they develop these skills, with a focus on the exploration and identification phase:

"We ran the numbers to see exactly how many residents had to move in before the entire operation could get off the ground". This example demonstrates the use of numerical scenarios to determine viability thresholds during the problem-solving process.

Ethical awareness

All groups demonstrated a clear focus on cultivating *Ethical Awareness* and social responsibility, with an expectation that design students will develop a strong sense of professional ethics. From this perspective, particular emphasis is placed on social and environmental issues (e.g. sustainability and the promotion of traditional Chinese cultural revival). Students stated that they are encouraged to develop an 'ethical mindset'. STU 6 shared details about their course content, demonstrating a growing awareness of ethics:

> For example, entrepreneurs need to reflect on issues like community development and an aging population, as well as consider vulnerable groups, children with autism, people with disabilities and so on. As design leaders or designers, they must think through how to respond to these challenges and provide practical solutions. This, in fact, is part of what my senior just referred to as design leadership, and it's something courses stress heavily: the sense of responsibility that both entrepreneurs and designers must uphold.

Self-development

Self-development is discussed across all groups and includes active learning and self-management skills. Both the student and alumni groups emphasised self-development from two perspectives, including active and adaptive learning. ALU 1 demonstrates this through the lens of active learning:

> What I feel has been strengthened is your cross-industry, interdisciplinary knowledge and your ability to learn on your own, both are solid. Honestly, I think our programme trains us so

> broadly that we can handle anything; we really can do any kind of work.

Moreover, alumni highlighted their cross-disciplinary abilities, explaining that they can adapt better than others in such contexts. This demonstrates the flexibility to work beyond a single domain and even adapt to new jobs quickly.

In addition, career planning is also taught in the programmes and is closely connected to *Self-development*. During the interviews, students expressed concern about this, citing uncertainty about the future. In this sense, career readiness, as emphasised by educators, can help students navigate this uncertainty. Educators noted that job-market pressure is increasing, with fewer positions on offering and declining salaries.

To help students against this background, EDU 3 described how a course has been updated to respond to the current employment environment:

> For example, I recently launched a new graduate seminar titled 'Gig-Economy Design Management and Socio-Economic Resilience'. The course tackles very real issues: students' job prospects and the hurdles designers face when entering a workforce shaped not only by AI but also by broader economic headwinds. We explore how designers can use gig work to raise the calibre of their intellectual output, and, in turn, boost their income flexibly and repeatedly.

5.2.1.2 Knowledge

Business knowledge

Business knowledge is widely taught in both DM and design programmes. This competency includes branding and market knowledge, encompassing topics such as brand strategy and planning, design strategy, marketing planning and business copywriting. From this perspective, students are expected to understand customer needs and the business environment, and to use this knowledge to engage with cultural trends and contribute to brand building.

Design knowledge

Design knowledge forms the core content of design education, encompassing a variety of focus areas. These include: (1) design theories, concepts and functions, such as design thinking and principles (e.g. planar colour and spatial composition); (2) methods for specific design research, including secondary research, interviews and questionnaires; (3) an understanding of design and innovation tools; (4) design processes and service design; and (5) design-related subjects, such as design psychology.

Industry knowledge

Industry knowledge is a key focus of the design programme. This competency centres on developing students' understanding of industry development, including both the design industry and the cultural and creative industries. Additionally, the economic knowledge is mentioned alongside industry knowledge, as an understanding of the economic environment helps students comprehend job responsibilities and supports their future career development.

Interdisciplinary knowledge

Both DM and design programmes require students not only to master knowledge within the design field, but also to acquire interdisciplinary knowledge. For example, students are expected to have a basic understanding of relevant natural sciences, engineering technologies, and social sciences and humanities. This knowledge is closely aligned with the competency of *Collaboration* mentioned previously (p. 235).

Policy knowledge

Understanding policy is crucial for identifying opportunities for the next stage of design in the Chinese context. As EDU 3 explained:

> When we tackle policy and strategic questions today, we must pay even greater attention to national strategy. In China, a new five-year development strategy is issued every five years, and each one drives the growth of fresh industries. Ignoring these is not an option: once a strategy is set, the government rolls out

> numerous concrete policies to ensure its execution. For businesses, and for designers in particular, this calls for keen sensitivity: the ability to turn those policies into new lines of business.

Policy-related knowledge was highlighted across all data. For example, architectural design programmes require students to have a solid understanding of the guidelines, policies and regulations related to architectural and planning design. However, compared to DM programmes, this knowledge is not as heavily emphasised in most design programmes. This may be due to two reasons: firstly, the limited descriptions and data available in this research; and secondly, an overall under-emphasis on policy and regulation within design programmes.

Students understanding its importance, stating that this knowledge was cultivated during their studies and referring to it as "the ability to grasp macro-level policies" (STU 1). In the case study, the policy knowledge taught focuses on the design industry and national innovation policies, with a dedicated module addressing this topic. This module helps students understand the context in which Chinese design policies are formulated, as well as the opportunities for design driven by such policies. During the interviews, both educators and students highlighted policy knowledge. For example, EDU 3 described how they deliver related content from two perspectives: (1) the relationship between design and policy, and (2) design as a component of soft power as it relates to discipline at a national level.

Design management knowledge

Design management knowledge was strongly emphasised in the DM programme, as it forms its core. Its content is broad, spanning subjects across both design and management disciplines and including such as its evolution, characteristics and research scope (details see Appendix G). During the interviews, educators stated that the core of cultivating design managers is preparing undergraduates to understand both design and management-related knowledge.

While students, educators and alumni all highlighted the importance of this foundational knowledge, they also felt that it should be further developed by

students themselves through real-world practice. Students acknowledged they learn foundational DM knowledge that can be applied to solving simple and common problems, which STU 3 referred to as "systematic knowledge".

However, while students emphasised the importance of DM knowledge, they also noted that it needs to be structured as a whole system, with each component interconnected, rather than being taught as isolated subjects. As STU 3 reflected:

> In undergraduate stage, and back then I didn't really understand what 'design management' meant, because the courses I took felt somewhat disconnected from it... It should build out the discipline's framework, from the basic concepts through research projects, and it encompass the current hot topics in design management in a very comprehensive way.

Management knowledge

Management knowledge includes several key areas. These are: (1) concepts, principles and methods; (2) various types of management, such as goal management and human resource management (HRM); and (3) management within a specific design context. The third area, which includes design organisation and design team management, design quality management and design project management, significantly overlaps with DM knowledge.

Research knowledge

Research knowledge includes research methods such as surveys, interviews and questionnaires, as well as academic writing requirements. Further details can be found in Appendix G.

5.2.1.3 Mindset

Systems thinking

During the interviews, educators, students and alumni highlighted *Systems Thinking*. The educators' cultivation of this mindset focuses on developing the awareness to view design not just as an isolated creative act but as the 'master switch' that drives every subsequent phase in the production chain. EDU 3

emphasised the impact of AI on designers and the design industry, stating that students are now required to think from a broader and more holistic perspective:

> One key aim is to cultivate students' systematic thinking, even though AI may streamline or diminish the designer's role in the early ideation phase, designers still must anticipate and coordinate across all downstream processes, including materials sourcing, production logistics, sales channels, product lifecycle management, and environmental considerations.

Systems thinking is cultivated in two main ways at the case-study university. First, the curriculum incorporates content related to the cultural and creative industries from perspectives such as economics and marketing to develop students' systems thinking. Second, through the study of service design, students learn to use systematic methods to identify problems and apply systematic design approaches to solve them, further enhancing this awareness.

From this perspective, ALU 2 reflected on how they developed systems thinking through project work, noting that they learned to identify underlying stages and key points rather than focusing only on surface-level components. As they explained, "You need not only a big-picture perspective but also an awareness of the finer, detailed steps in order to tie everything together" (ALU 2).

Students emphasised the necessity of systems thinking, especially in the DM programme at both UG and PG levels. STU 3 shared their experience:

> No matter what I'm about to do, I tend to proceed in an orderly, methodical way. I might jot the plan down step by step, and I'll usually know which stage in the process is the most critical. Having that system in my mind, and that's really important.

STU 6 provided a more practical example of using systems thinking in their future career by considering how a designer's role fits within the wider industry context, such as positioning their job within the supply and production chain (details in Appendix G).

Design thinking

Design Thinking is central to both DM and design programmes, though each places emphasis on different aspects. In DM programmes, design thinking is discussed as a means to strengthen designers' cognitive approaches and develop effective models through targeted study. In design programmes, the focus is often on service, experience and user-centred approaches.

In the interviews, both educators and students acknowledged the importance of design thinking. Educators teach *Design Thinking* as both a fundamental ability and a mindset that underpins other competencies, enabling students to develop skills more effectively. Specifically, they highlighted that *Design Thinking* is problem-solving tool that helps students overcome challenges and enhances their future aspirations.

Similarly, students highlighted its importance from a user-centred perspective, which they identified as a central component of *Design Thinking*. According to the students, this approach enables them to step outside their own viewpoints and better understand users' needs by adopting a customer's perspective.

Critical thinking

Critical Thinking is frequently emphasised in both DM and design programmes, to cultivate students' ability to analyse academic perspectives and emerging issues in the design field.

During the interviews, students reflected on how they were taught this mindset. On the one hand, they were trained to question surface appearances, which this is what educators constantly emphasised in class, "the phenomena you observe may be only superficial, and you must look beyond the surface to grasp their true essence" (STU 3). This shows that students are encouraged to look beyond obvious data and to probe underlying causes. The student also talked about the awareness of in-depth analysis, explaining that they are encouraged to think critically about design problems rather than accept them at face value.

5.2.2 Absent competencies in design programmes

The data analysis also identified nine absent or underdeveloped competencies. These fall into two main categories: eight skills and one knowledge.

- Skills: *Aesthetic sensibility, Implementation ability, Active Thinking ability, Communication, Reflective ability, Project Management (leadership skills), Interdisciplinary collaboration* and *Academic Writing Skills*;
- Knowledge: A lack of *foundational knowledge*, with a focus on understanding design management and management principles.

5.2.2.1 Skills

Implementation ability

During the interviews, all three stakeholder groups mentioned *Implementation Ability*. Although they recognised it as a core competency taught in the programme, they felt it did not receive enough emphasis. STU 1 shared an internship experience to highlight this gap:

> ...[HR] hit me with a key question: 'Which of your project planning have actually been implemented? No matter how good your plans are, there's still no real execution point'. I realised that this was a gap in my preparation.

EDU 1 and 3 acknowledged this, stating that practical skills should be emphasised more in future courses:

> In the future, many tasks may become so automated that you'll simply speak commands and never need to use your hands, but we still need to encourage students to do things with their own hands rather than rely on robotic arms. (EDU 3)

ALU 1 expressed concern that a lack of implementation training could lead to problems in the workplace. They highlighted the need for students to learn how to anticipate potential pitfalls in simulated scenarios, identify failure points and develop strategies to overcome them. This, the alumnus suggested, would reduce the chances of students being caught off-guard by real-world obstacles.

Students noted that this lack of emphasis on implementation might stem from "a lack of genuine university-industry collaboration' and therefore 'a shortage of hands-on practice" (STU 1). This suggests that few practical opportunities were provided, which contradicts students' growing needs in this area. Student 7 expressed similar concerns, stating that the curriculum's practical component is limited by time and resources, preventing students from gaining necessary hands-on experience.

However, as EDU 1 reflected, some project opportunities were available. But according to student feedback, these projects fell short of their needs as they were not connected to industry, making it hard to get a real understanding of customer needs. Alumni reflected that even provincial-level competition had limited with opportunities to connect with external stakeholders, leading to "superficial" research:

> We didn't have in-depth conversations with the companies or stakeholders; instead, we just relied on our own imaginations to draft solutions. (ALU 3)

Active Thinking ability

Only the alumni group emphasised *Active Thinking*, an ability they defined by two aspects: problem discovery and independent analysis. They stressed that many students default to rote learning rather than questioning. Additionally, they noted that students often lack cognitive initiative, waiting to be told what to do instead of driving their own learning, as ALU 2 noted:

> You must learn to take the initiative to ponder these questions yourself, rather than simply applying the solution the teacher gives you. Otherwise, I feel there's little point in your existence.

Communication

Both students and alumni believed that *Communication Skills* training is lacking. Students acknowledged this shortfall, noting the need to master various types of communication, as they must not only to collaborate with peers but also engage constructively with colleagues across different departments and disciplines. This

perception aligns with the experiences of alumni. ALU 3, for example, shared their experience of developing different communication strategies in the workplace to target various groups. This presents a challenge for new graduates, who must adapt their communication style for supervisors, clients and subordinates, each requiring a distinct mode of interaction.

However, Students claimed that developing these communication strategies at universities is difficult, as project groups are typically formed by peers who are already familiar with one another. Students emphasised that there is no dedicated course teaching communication techniques "these communication skills are definitely under-developed during our studies" (STU 8).

Reflective ability

Students highlighted the need for more emphasis on *Reflective Ability*. They believed that universities should teach them how to rethink and summarise after completing a project or overcoming a challenge. As Student 5 explained, this skill is crucial for learning from both successes and failures: "with positive experiences, you absorb the lessons; with negative ones, you consider exactly where things went wrong".

Aesthetic sensibility

While EDU 1 stated that students' *Aesthetic Sensibility* is insufficient, they did not elaborate on this point.

Project and team management

Students emphasised the need for better *Team Management* skills, noting that current project practices offer limited practice. As students points out, the same few people often dominate leadership roles:

> I think it comes down to management ability. In a class this large, with group projects, it's always the same few students taking the lead, and they don't get much real practice in managing. (STU 5)

Building on this point, Student 6 identified core management tasks like delegation and coordination. Using the fashion industry as an example, the student explained

that these skills involve deciding which teammate handles which task and how to supervise their work effectively.

Interdisciplinary collaboration

Both educators and students emphasised the lack of *Interdisciplinary Collaboration*. Students reflected that the curriculum focuses mainly on theoretical instruction within their own majors. Even in project-based courses, collaboration is typically organised within a single field, offering few opportunities to work across disciplines. As one student pointed out:

> I felt the level of integration with other majors was fairly low. I didn't have many chances to work with students from other fields to solve problems or develop solutions together. (STU 2)

To address this, STU 6 suggested structural changes, such as elective or cross-listed courses should be added to allow non-specialists (e.g. those without a design management background) to acquire interdisciplinary skills and collaborate with peers from different backgrounds.

Educators also identified this as a key area for future improvement. EDU 3 suggested fostering projects that span different domains, building on what they referred to in the Chinese context as "the fusion of the new liberal arts and new engineering". The goal is to encourage students to collaborate with peers from diverse knowledge backgrounds.

Academic Writing

Students mentioned the need for *Academic Writing* skills, stating that these are often ignored or barely covered in current courses:

> I'd love a course that clearly lays out what sections a paper should include, how to choose a topic, how to structure it so that it clearly has scholarly value and is fully readable. (STU 6)

5.2.2.2 Knowledge

Understanding of DM/Management knowledge

Students stated that there is insufficient foundational knowledge, including *understanding of design management* and *management theory*. From their perspectives, design management is inherently interdisciplinary, requiring students to comprehend the development of the design industry while simultaneously grasping management theory and economics.

In addition, students seem to find it difficult to grasp design management concepts, highlighting the need to strengthen the teaching of this subject. As STU 3 stated, "As an undergrad, I didn't understand design management well. Indeed, I even had some misconceptions". Moreover, STU 6 emphasised this confusion, noting the lack of a clear boundary distinguishing their major from similar programmes.

Therefore, STU 6 believed that concrete, knowledge-based instruction on what design management involves, through clear explanations and illustrative examples, should be incorporated into the curriculum so that students can clearly understand what the field entails.

5.2.3 Comparative analysis across different sources

Table 38 presents a comparative analysis of competencies across design-education programmes, including DM programmes and design programmes, complemented by a case study of SUAD that includes programme syllabi and interviews with educators, students and alumni. Through this analysis, trends emerge regarding: (1) which competencies are widely recognised (consensus), (2) which are absent or underemphasised; and (3) the differences among perspectives of various stakeholders.

First, the analysis reveals a **consensus** on eight core competencies, including *Goal-setting, Communication, Implementation Ability, Problem-solving, Self-development, Research Ability, Ethical Awareness* and *Policy Knowledge*. These competencies are consistently identified across both programmes and all stakeholder groups. They are not only present in programme descriptions and

syllabi but are also reflected in perspectives of interviewees (educators, students and alumni). This demonstrates that these competencies are emphasised across all groups and highlights their important role in design education.

Second, some competencies are **specifically emphasised by each programme**. For example, *Management Knowledge* and *Design Management Knowledge* are particularly highlighted within DM programmes but receive less focus in other design programmes. Conversely, competencies such as *Design Sensitivity* and *Industry Knowledge* are more prominent in design programmes. These differences reflect the distinct teaching aims and objectives of each programme, resulting in slightly different tendencies that may influence students' future career paths.

Finally, the comparative analysis also demonstrates the specific competencies that are currently seen as **absent or underemphasised**, as identified through interviews. These gaps highlight aspects for improvement in current design education. For example, although *Communication* and *Implementation Ability* are recognised as core competencies, stakeholders report insufficient practical project experience and limited real-world or industry-related training in these areas. Similar concerns are raised regarding *Collaboration* and *Project/Team Management*, where students and educators note a lack of hands-on opportunities for teamwork and cross-disciplinary experiences. These findings point to a gap between stakeholder needs and current design educational provision.

Moreover, competencies such as *Aesthetic Sensitivity, Active Thinking, Reflective Ability* and *Academic Writing*, which are **explicitly mentioned** in documents from the desk research, were cited as **absent** in stakeholder interviews, demonstrating a misalignment between stated learning objectives and in-real practice. These competencies can be linked to broader identified categories, such as *Design Sensitivity, Self-development* and *Research Ability*, suggesting a need for a clearer focus on these specific aspects within the programmes.

In summary, except for *Research Ability* and *Research Knowledge*, most of the identified competencies can be mapped to the DLCM, supporting the relevance

and comprehensiveness of this reference framework. These two research-focused competencies serve a specific function in achieving a key learning outcome of higher education: to cultivate not only professionals for industry but also researchers for academia.

This comparative analysis reveals both strengths and areas for improvement in current design-education programmes. The findings suggest a need for greater emphasis on practical, workplace-oriented skill development, as well as leadership and management training. Addressing these gaps will help design-education programmes better meet the changing needs of the design industry.

Table 38: Comparative Summary

Competency	Design Prog.	DM Prog.	Syllabi[1]	Educators[1]	Students[1]	Alumni[1]	Lacking Competencies[1]	Lacking Aspects	Connect with DLCM
Goal-setting	✓	✓	-	-	✓	-	-		Visionary and Initiative (Section 4.5.2.4)
Communication	✓	✓	✓	✓	✓	✓	X (Students and alumni)	Limited development of practical, workplace-relevant communication skills; no dedicated training in communication strategies.	Presentation, Listening, Persuading and Negotiating, Multilingual, Visualisation (Section 4.5.2.5)
Implementation Ability	✓	✓	✓	✓	✓	✓	X (All groups)	Insufficient practical project and implementation training; limited real-world or industry-linked experience	Resource Allocation and Delegating, Quality Control, Progress Monitoring and Control (Section 4.5.2.3)
Research Ability	✓	✓	✓	✓	✓	✓	-		-
Collaboration	✓	✓	✓	-	✓	-	X (Educators and students)	Few practical opportunities for cross-disciplinary collaboration and problem-solving.	Collaboration (Internal) (Section 4.5.2.10)
Project/Team Management	✓	✓	✓	-	-	-	X (Only students)	Lack of practical training in team leadership, delegation and project management.	Planning, Decision Making (Section 4.5.2.2)
Design Sensitivity	✓	✓	✓	-	-	✓	-		Design Perception, Design Achievement (Section 4.5.2.8)
Problem-solving	✓	✓	✓	-	✓	✓	-		Creative Problem-solving (Section 4.5.2.1)
Self-development	✓	✓	✓	✓	✓	✓	-		Active Learning; Reflective (Section 4.5.2.7)
Ethical Awareness	✓	✓	✓	✓	✓	✓	-		Cultivating an Ethical Stance (Section 4.5.2.6)
Design Management Knowledge	✓	✓	✓	✓	✓	-	X (Only students)	Insufficient foundational knowledge in design management and management theory; Lack of clarity distinguishing the programme from similar subjects (e.g. advertising).	Design Knowledge; Management and Company Governance (Section 4.5.1.1; 4.5.1.3)
Management Knowledge	-	✓	✓	-	-	-			
Business Knowledge	✓	✓	✓	-	-	-	-		Business Acumen (Section 4.5.1.1)
Design Knowledge	✓	✓	✓	-	-	-	-		Design Knowledge (Section 4.5.1.3)
Industry Knowledge	✓	✓	✓	-	-	-	-		Industry Knowledge (Section 4.5.1.1)
Interdisciplinary Knowledge	✓	✓	✓	-	-	-	-		* Active Learning (Section 4.5.1.3)
Policy Knowledge	✓	✓	✓	✓	✓	✓	-		Policy Sensitivity (Section 4.5.1.2)
Research Knowledge	-	-	✓	-	-	-	-		-
Systems Thinking	✓	-	✓	✓	✓	✓	-		Systems Thinking (Section 4.5.3.2)
Design Thinking	✓	✓	✓	✓	✓		-		Design Thinking (Section 4.5.3.1)
Critical Thinking	✓	✓	✓		✓		-		* Continuous Learning (Section 4.5.1.3)

Aesthetic Sensitivity[2]	-	-	-	-	-	-	X (Educator only)	Limited emphasis on reflective practice; need for structured support in learning from experience.	Design Perception (Section 4.5.2.8)
Active Thinking[3]	-	-	-	-	-	-	X (Alumni only)	Lack of independent, critical and initiative-driven thinking; over-reliance on rote methods.	Active Learning (Section 4.5.2.7)
Reflective Ability[3]	-	-	-	-	-	-	X (Student only)	Limited emphasis on reflective practice; need for structured support in learning from experience.	Reflective (Section 4.5.2.7)
Academic Writing[4]	-	-	-	-	-	-	X (Student only)	Limited training in academic writing, paper structure and research communication.	-

Notes:

- ‘ – ’: Indicates the competency was not identified in the corresponding source or was not explicitly shown in the DLCM.
- * : An asterisk indicates that this competency is not a standalone category in the DLCM, but its content is represented under the referenced section.
- [1] : Data from the case study of SUAD (Educators, Students, Alumni, Syllabi).

[2-4] : Competencies marked as lacking by stakeholders, such as *Aesthetic Sensitivity* (part of *Design Sensitivity*), *Active Thinking* and *Reflective Ability* (parts of *Self-development*) are conceptually included within these broader competencies in the list of taught competencies (

- Appendix G: Teaching competencies identified).

5.3 Competencies Required by Design Policy

Sixteen competencies were identified from policies and grouped into three categories: eight in skills, three in knowledge and five in mindset.

- Skills: *Design and Innovative Ability, Practical and Problem-solving skills, Management skills, Entrepreneurial skills, Self-development, Digital Integration ability, Ethical Awareness* and *Communication and Collaboration ability*;
- Knowledge: *Design Knowledge, Entrepreneurship Knowledge* and *Interdisciplinary Knowledge*;
- Mindset: *Critical Thinking*, *STEM Thinking*, *Systems Thinking, Digital Mindset* and *Creative and Design Thinking*.

Full details can be found in Appendix I.

5.3.1 Skills

Design and innovative ability

Policies highlighted a range of design-related competencies, such as design skills and innovative ability. In 32 of the policy documents, design skills were referred to as a type of 'practice ability'. Additionally, related qualifications and certifications are referenced seven times to support individuals in obtaining relevant skills and technical certificates.

Moreover, the policies emphasised design quality, aligning with the goal of 'improving the quality of development'. They specifically mentioned enhancing product quality through design due to its relevance to economic improvement and industry transformation. Innovative ability and creativity were also frequently cited and were categorised within this group as they were closely linked to design.

Practical and problem-solving

While rarely described in detail, this competency was frequently mentioned in policies. Generally, practical ability can be seen as the effective application of knowledge in real-world situations and the ability to solve problems in practice, rather than relying solely on theory (Cambridge Dictionary, 2025c). Although it

overlaps with the *design and innovative ability* mentioned above, the practical ability referred to here focuses mainly on problem-solving and implementation within projects. Specifically, problem-solving includes research ability, analytical ability, idea generation, concept validation, decision-making and judgement.

Implementation, on the other hand, requires application, transformation and operational ability to ensure that ideas can be turned into tangible outcomes.

Management skills

To cultivate talent that aligns with current policy directions and industry needs, *Management Skill* was highlighted in the policies. This includes two aspects: firstly, based on management types, it involves various abilities such as organisational, process, branding and product management. Secondly, regarding management tasks, the policies emphasise coordination ability and team-building ability.

Entrepreneurial skill

Venture creation is a core focus of policies, which provide a range of related competencies with detailed descriptions and guidelines for talent cultivation. This skill can be divided into three main aspects. Firstly, it involves building industry connections and developing business awareness. Secondly, the policies highlighted the importance of vision and initiative at the initial stage of a venture, including opportunity-seeking ability, being visionary and having a global vision. Thirdly, they stressed that entrepreneurs must possess risk awareness to create a successful business.

Self-development

Self-development was mentioned from two aspects: (1) the encouragement of active learning and thinking; and (2) a focus on future development, which relates to students' employment and career prospects post-graduation.

Digital integration

Amid its rapid development, technology has become a key area of government focus and support. Consequently, current policies highlight the importance of *integrating technology* across various sectors, particularly in education and business.

Ethical awareness

The *ethical awareness* is an important aspect emphasised in policies. The policies state that all individuals, whether entrepreneurs or students, should demonstrate social responsibility. This includes a commitment to sustainability and the responsibility to revitalise traditional Chinese culture.

Findings from both the desk research and case study interviews (p. 237) show that an ethical focus within design-education programmes perfectly aligns with this policy emphasis. To achieve these aims, decision-making must consider relevant policies, regulations and laws to ensure alignment with these core values.

Communication and Collaboration

The policies emphasise both *communication* and *collaboration*, with a specific focus on multilingual ability and global collaboration, respectively.

5.3.2 Knowledge

Policies highlighted three types of knowledge: design knowledge, entrepreneurship knowledge and interdisciplinary knowledge. *Design knowledge*, also referred to as 'fundamental knowledge', is mentioned in 11 policies, although without further explanations.

Entrepreneurship knowledge is composed of two areas: (1) business knowledge, which includes an understanding of business models and marketing; and (2) industry knowledge, which relates to understanding industry trends, supply chains and product chains in order to build a businesses that is responsive to the current market.

Finally, linking to the *Collaboration* competency, policies also highlighted the need for *Interdisciplinary knowledge* to broaden the range of expertise individuals can draw upon.

5.3.3 Mindset

The policies mentioned five mindsets, including: (1) *STEM Thinking*, a mindset and approach to problem-solving that draws from the fields of science, technology, engineering and mathematics (STEM); (2) *Creative and Design Thinking*, which

encompasses service design, user-centred approaches and a focus on user experience. In addition, the policies also highlight the cultivation of students' (3) *Digital Mindsets, (4) Critical Thinking* and (5) *Systems Thinking*.

5.4 Competencies Needed from Industry

Design leaders shared their perceptions of design education from two perspectives: the competencies taught at university and those they developed post-graduation. When discussing their post-graduation development, leaders often connected it to suggestions for improving design education. This highlights that the competencies cultivated after leaving university typically represent areas that were underemphasised or absent in their formal studies. In total, design leaders identified 16 competencies acquired at university and 15 developed post-graduation, which they felt were absent or underemphasised from their education.

5.4.1 Taught competencies perceived by design leaders

Sixteen competencies were identified from design leaders. These were grouped into three categories:

- Skills: *Collaboration, Communication, Design Sensitivity, Implementation, Open Vision, Problem-solving, Research Ability* and *Self-Development*;
- Knowledge: *Design Knowledge, Industry Knowledge, Interdisciplinary Knowledge, Management Knowledge, Branding Knowledge,* and *Policy*;
- Mindset: *Design Thinking* and *Systems Thinking*.

Further details can be found in Appendix J.

5.4.1.1 Skills

Collaboration

Design leaders highlighted the importance of *Collaboration* skills gained through teamwork and project experience at university. They discussed the value of role division within teams; as DL1 noted, "different people take on different roles, including video editing, scripting, planning, team leader, editing". DL7 stated that one of the most valuable abilities acquired during their studies was learning team-based thinking. This helped them understand not only individual effort but also the

importance of working as a team and negotiating across departments to solve problems. This emphasis on both internal and cross-departmental collaboration, was also shared by DL6.

Communication skills

Design leaders identified *Communication* skills from three aspects: (1) information conveyance and negotiation, (2) presentation and (3) storytelling. DL1 recalled that their studies required a complex communication process. They had to not only engage with educators and external project stakeholders but also strategically identify what to communicate and how to adapt the message. On the topic of negotiation, DL1 described using professional language to express and "press" by their ideas [去压一压别人], a tactic sometimes used to gain an advantage or persuade others.

The importance of presentation skills was a key theme. DL4 and DL7 highlighted the ability to "explain clearly what you've done" as a core skill valuable for entering the industry. Similarly, DL13 emphasised storytelling, stating that "telling stories is quite useful". They recalled using this skill at university to create "a logical storyline" [逻辑线] and present ideas "from start to finish" [从零到一去讲], which made their concepts more convincing and impressive.

Design sensitivity

Most design leaders reflected how they developed their *Design Sensitivity* at university across three aspects: (1) aesthetic ability and design perceptions, (2) hands-on and software skills and (3) design methods. First, regarding aesthetics DL5 emphasised that the skills learned at university enabled them to evaluate design outcomes and provide detailed feedback to employees. Building on this, DL3 reflected on how their studies enhanced their overall design sense and perception. Second, design leaders mentioned developing a range of hands-on and software skills, including proficiency in Photoshop, drawing, modelling and rendering. Finally, DL6 discussed design methods, giving examples such as brainstorming and user research.

Implementation

Some design leaders highlighted *Implementation* ability and specifically mentioned delegation. For example, DL24 explained that their university experience was highly valuable because it provided them with proficient master planning skills. This advanced preparation meant that they could meet the requirements of a junior planner immediately after graduation. As DL24 stated, "you could directly go to work after graduation, already meeting the requirements of a junior planner".

Open vision

Design leaders identified *Open Vision* as a key competency, explaining that their design education provided them with a broader perspective than their peers upon entering the workforce. They noted that this wider viewpoint was a key factor that distinguished them from others.

Problem-solving

Design leaders discussed *Problem-solving* with an emphasis on analytical ability. DL25 described this as the process of repeatedly considering and comparing different options before making a decision, highlighting the importance of careful comparison and analysis.

Research ability

Design leaders discussed the development of *Research Ability*, noting that graduate school helped them acquire this skill, which in turn enables them to think more deeply in their work. Furthermore, methodology was identified as key to applying a set of methods in daily work and putting them into practice. As DL4 remarked, "It's also about certain methodologies: how to make your work or design more systematic. These kinds of methods are often taught in school as well."

Self-development

Design leaders also emphasised *Self-development*, including learning ability and learning from experience. As DL6 noted:

> It really feels like I can now learn any kind of knowledge. They asked me to help with auditing, and now I can understand contracts and such as well. I learn new things quite quickly.

5.4.1.2 Knowledge

During the interviews, design leaders emphasised six types of knowledge, including: *Design Knowledge, Industry Knowledge, Interdisciplinary Knowledge, Management Knowledge, Branding Knowledge* and *Policy Knowledge*.

Design Knowledge was described as fundamental. This includes design concepts, principles, historical knowledge from art and design, and a specific mention of service design knowledge.

Industry Knowledge involves a fundamental understanding of industry, gained through case studies and information about relevant companies.

Interdisciplinary Knowledge was highlighted because the design discipline is broad and offers significant potential for cross-disciplinary collaboration. The leaders noted that this requires knowledge from multiple domains and reflected that it was an important aspect of their university development.

Additionally, design leader mentioned the *Management Knowledge*, noting that this was not taught directly through specialised courses, but was gradually developed through group collaboration and practical project experience.

Regarding *Branding Knowledge*, design leaders shared their experience of applying it in venture creation.

Finally, *Policy Knowledge* gained during their studies helped them maintain a sensitivity to society. This social sensitivity is not limited to social trends, but also encompasses awareness of government decisions and anticipate policies implementation in advance.

5.4.1.3 Mindset

Design leaders emphasised *Design Thinking* from two perspectives: user-centred approaches and intuition. As DL16 noted,

> I think designers have always been trained to figure out what kind of approach can be used to achieve a certain goal for people, this is something every designer should have. It's not about whether you studied graphic design, interior design, or something else.

Additionally, *Systems Thinking* is another important competency that design leaders learned and applied in their work. As DL7 explained,

> When I do this job, I feel very fortunate that I learned this way of thinking, not just to focus on being a small cog in the machine or working on a minor aspect, but to look at the entire project from a broader, more macro perspective.

5.4.2 Absent competencies perceived by design leaders

Design leaders revealed 15 competencies that they felt were currently absent or underemphasised in design education. These fall into three categories:

- Skills: *Communication Ability*, *Visionary, Design Sensitivity, Implementation and Management Skills, Patent Protection, Problem-Solving, Self-Development* and *Social Responsibility*;
- Knowledge: *Business Knowledge, Design Knowledge, Interdisciplinary Knowledge, Policy and Regulation* and *Job Understanding*;
- Mindset: *Design Thinking*.

Further details are available in Appendix K.

5.4.2.1 Skills

Communication

Although some design leaders mentioned that they had developed *Communication* skills during their studies, one design leader (DL10) believed that this was still insufficient taught, particularly regarding the ability to communicate effectively with clients.

Visionary

One design leader (DL25) identified *Visionary* ability as a competency that was absent or underemphasised competency from their education. drawing on their professional experience, they emphasised its importance, noting that when leading a large team of hundreds, having insight and vision are essential for effective leadership and goal-setting.

Design sensitivity

Design leaders reflected that *Design Sensitivity* is underemphasised in design education. This involves two key areas: nurturing a passion for design and developing practical design skills. Three design leaders highlighted the importance of passion, noting that some new designers lack enthusiasm. This results in insufficient motivation for continuously, in depth design learning, leading to a poor performance at work. As DL22 shared:

> I noticed that there are some students who are academically excellent. But the issue is that, among this group, some are actually not passionate about design, nor do they plan to pursue design as a career, they're simply top students, really good at studying and taking exams, but that's it. They finish their major requirements, but what we really hope for is to see people who will continue to develop and contribute within the design industry.

In addition, design leaders argued that design skills should receive greater emphasis, as some reported learning these skills primarily in the workplace. They recalled that while their studies included design practice, the focus was often on basic and isolated concepts like graphic composition. Therefore, design leaders believed students should acquire more 'comprehensive' design skills during their education.

Implementation and Management skills

Design leaders discussed *Management* skills related to implementation, noting that they were underemphasised during their studies. These skills include

coordination, meeting management, providing support and time management. For example, DL 6 expressed concerns about team building and talent development:

> How to develop people and lead a team. I never really had any formal training in this; another important thing is building your own talent pipeline, how to develop your first, second and third tiers of team members. That's also crucial.

Patent protection

One design leader shared their view on patent protection, noting that they did not receive any training or knowledge in this area during their design education. They emphasised that this is particularly important when dealing with issues of plagiarism. As DL4 shared:

> Back when I was a student, I made a lot of things, but sometimes they could be copied or even used by some teachers at school. So, if students can obtain some patents of their own during their studies, building up a reserve of intellectual property, like patents or awards from competitions, these things could later serve as a form of personal credentials.

Problem-solving

In contrast to the findings on taught competencies in design-education programmes (Section 5.2.1.1, p. 236), some design leaders believed that there was an insufficient emphasis on *Problem-solving*, including analytical skills and problem orientation. One design leader observed that new entrants often lack analytical ability and an awareness of problem orientation, stating that students should know "how to ask questions and then provide a solution, and how to convince people your solution is the right one" (DL5).

Self-development

Design leaders highlighted the absence of *Self-development* in three key areas: active learning, closed-loop ability and self-awareness. First, active learning involves encouraging students to take greater initiative and explore topics independently, rather than passively absorbing information from textbooks.

Second, closed-loop ability refers to systematically completing tasks, checking progress, following up and ensuring the entire process is covered. Third, self-awareness focuses on helping students understand changes in their personal roles and adapt to these transitions.

Social responsibility

A design leader (DL9) suggested that design education should place greater emphasis on social responsibility:

> Apart from design itself, research on materials might go deeper, but research on the environment or social welfare is often lacking. In these aspects, we might need to learn from other countries, how to use design to guide the industry toward positive or beneficial development.

5.4.2.2 Knowledge

Design leaders identified five areas of knowledge that they believe are underemphasised in design education, includes:

(1) *Business Knowledge*: This was seen as underemphasised particularly in areas like market understanding and economic knowledge.

(2) *Design Knowledge*: Leaders noted that this area often lacks updates on evolving user insights and contains insufficient material knowledge, especially for product and industrial design.

(3) *Interdisciplinary Knowledge*: Design leaders suggested that design education should place greater emphasis on this. As DL4 stated,

> I’ve been watching a show and noticed that in the US, many students start their own businesses at a young age. I think this is closely related to their early education. They tend to acquire a variety of skills, such as programming or hands-on abilities, which helps them better develop and realise their ideas.

(4) *Policy, Law and Regulation Knowledge*: One design leader highlighted the importance of this knowledge, citing a lack of government oversight in fields like architecture as the key reason for this need.

(5) *Job understanding*: This was also mentioned as a key deficiency. Design leaders emphasised the importance of cultivating students' understanding of the workplace, as graduates often lack the practical skills to be work-ready immediately. As DL 6 stated:

> What students need to really understand is the abilities the job position requires. The employer won't have to spend extra time teaching you, because students already know what's needed.

5.4.2.3 Mindset

Design Thinking was the only mindset identified as being underemphasised during the interviews. Although some design leaders acknowledged this as a taught competency, others believed it should receive greater emphasis, with a focus on both intuition and a user-centred approach. As DL 15 stated, regarding intuition:

> A designer is someone who doesn't always follow conventional rules and stays true to their instincts. Education should encourage people to think creatively and to create things, rather than just teaching them rigid theories.

Regarding the user-centred approach, another design leader observed that although it is taught, there remains a gap in its practical application:

> I need to step outside of my own perspective and really try to understand things from the user's point of view, rather than just my own. This should be emphasised more. However, I'm not entirely sure how this user-centred approach can be better incorporated or optimised in our current design education system.

5.5 **Finding 3**: Design Leadership Competency Model in a Design Education Context

This section presents the findings addressing RQ3. The previous sections identified both taught and absent competencies in design education from three perspectives: design education itself, policy and industry. This section conducts an analysis based on the data normalisation results (details in Section 5.1.2) to explore competency coverage from two dimensions: horizontal and vertical. The aim is to provide a reference for enhancing the competencies taught in design education.

The analysis is twofold (Figure 46, below):

- A **horizontal review** identifies the competency coverage within each perspective (design education, industry and policy).
- A **vertical analysis** compares a single competency across all three perspectives to understand their alignment and comparison.

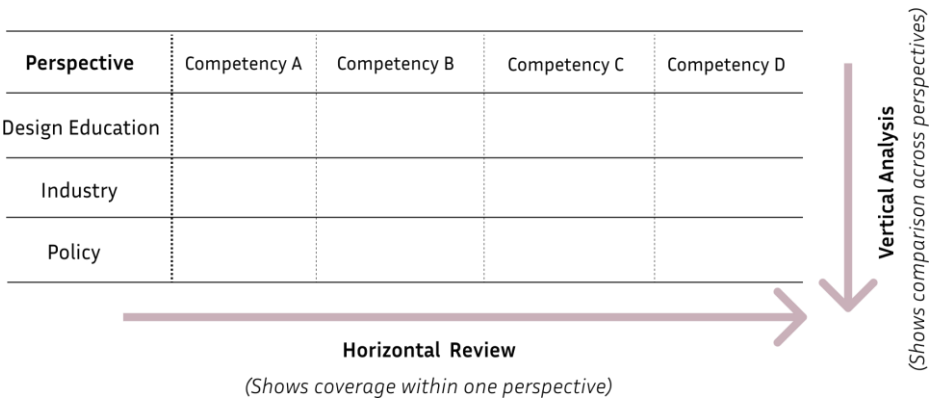


Figure 46: Comparison of two-part analyses

5.5.1 Horizontal review: competency coverage within each perspective

This section mainly explores the competency coverage in design education from three perspectives: DM and design programmes, industry perception and policy. Three levels of coverage are identified: **high, medium and low**. Additionally, if no data are available for a particular competency, it is categorised as '**unmentioned**'. Within the design education perspective, the data were drawn from three different sources, which can lead to variation in the coverage level for a single competency.

Therefore, a fifth category, '**difference**', is introduced to capture these variations. The following sections will introduce the competency coverage of design education, policy and industry, respectively.

5.5.1.1 Competency coverage in design education

This educational categorisation reflects the overall status of competency coverage in design-education programmes. Table 39 identifies five levels: high, medium, low, difference and unmentioned. A high level indicates that a competency is well covered and represents a strength in design education. Medium level signifies moderate coverage, while a low level indicates insufficient coverage and can be considered a weakness.

Furthermore, this categorisation is based on a synthesis of three sources: eight DM programmes or modules from desk research, the DM case study from SUAD and 71 design programmes totalling from 21 universities. If these three sources indicate different levels of coverage for the same competency, it is marked as 'difference', since a single rating would not capture the inconsistency. The 'unmentioned' category, marked in white, refers to competencies for which no relevant rating data were available.

Table 39: Competencies with different levels from design education perception

Level	*Competency*
High	1. Business Acumen
	3. Design Knowledge
	4. Creative Problem-solving
	5. Executive Leadership
	6. Implementation Ability
	8. Design Communication
	11. Design Sensitivity
	13. Collaboration (Internal)
Medium	10. Continuous Learning
	16. Systems Thinking
Low	2. Policy Sensitivity
	7. Goal-setting
	9. Human-centred Leadership
	12. Network Building (External)
Difference	15. Design Thinking
Unmentioned	14. Governance

High-coverage competencies in design education

Eight competencies that show high levels of coverage in both design and DM programmes: *Business Acumen*, *Design Knowledge*, *Creative Problem-solving*, *Executive Leadership, Implementation Ability, Design Communication, Design Sensitivity* and *Collaboration (Internal)*. The results indicate that these competencies are perceived as well covered from a perspective of design education, particularly across the case study and various programmes, which demonstrates their consistent emphasis and consistency in current teaching and learning.

Although these competencies are broadly covered, a significant challenge remains. For some, including *Creative Problem-solving, Implementation Ability* and *Business Acumen*, high coverage is reported, yet they are also identified as areas with significant gaps by stakeholders from the case study and design leaders. This suggests that current coverage does not necessarily translate into effective learning or skills development. While design education may ensure a certain quantity of teaching, the quality is often insufficient, particularly in terms of practical application aligned with industry needs.

Medium-coverage competencies in design education

At the medium level, two competencies are identified: *Continuous Learning* and *Systems Thinking*. These demonstrate moderate coverage in design education, indicating that there is some focus on their development. However, this coverage remains limited and is not yet comprehensive. Targeted enhancements could help elevate these competencies to a higher level of coverage.

Low-coverage competencies in design education

Four competencies fall into the low-level category: *Policy Sensitivity, Goal-setting, Human-centred Leadership* and *Network Building (External)*. These are less well covered in design education, and identifiable gaps suggest they should receive greater emphasis in future curricula. In particular, *Policy Sensitivity, Human-centred Leadership* and *Network Building (External)* pose specific concerns, as they are highly prioritised by policy but receive little attention in education that

reflected from an industry perspective. This highlights a gap where policy priorities are not being addressed within the educational context.

Difference and unmentioned categories of competencies

The 'difference' category reflects strong variation in competencies across two groups (DM and design programmes) from both desk research and the case study. *Design Thinking* illustrates this inconsistency: while design programmes reported high coverage, data from DM programmes and the SUAD case study indicated only low and medium levels. This suggests a lack of consistency in how *Design Thinking* is taught across different programmes or universities, where the depth and emphasis of instruction can vary significantly.

The fragmentation is a concern. While policy highly prioritised *Design Thinking* and industry perceived it as well covered, the variation in educational approaches can make it difficult for graduates to apply *Design Thinking* effectively in the workplace. This highlights the need to clarify and build a common consensus regarding *Design Thinking* and to establish clear learning outcomes across all design-education programmes.

The 'unmentioned' category refers to a blank in the data collection, as either competencies were unmentioned or no data was available. *Governance* is the only competency included here, which may be for two reasons.

On the one hand, this competency is not typically taught in design education. Governance, in the DLCM, involves high-level skills such as building a workplace environment, empowering employees and recruiting based on shared outlook and values. It can therefore be seen as a 'superior' and strategic competency that facilitates an entire organisation. Educators confirmed that their programmes focus on a more fundamental level, as stated by EDU 2:

> They'll need to build up their experience slowly on the job, since certain market instincts just can't be conveyed in the classroom. What we must do is make sure they firmly grasp the fundamentals, which gives them solid basics and raises their

awareness of methods, so that once they're out in practice, they can accelerate their own growth.

Therefore, a primary reason this competency was unmentioned is likely that it does not align with the fundamental objectives of current design education.

On the other hand, the omission may simply derive from an information gap, resulting from limited data collection.

5.5.1.2 Competency coverage of policies

This section provides an overview of the desired state for talent development from a policy perspective, which is essential for identifying areas where current educational efforts may need adjustment or greater emphasis. Competencies marked in green indicate those highly prioritised by policy; yellow represents competencies for which policy has a medium level of desire; and red shows competencies that are of low priority (Table 40, below).

Table 40: Competencies with different levels from policy perception

Level	*Competency*
High	1. Business Acumen
	2. Policy Sensitivity
	4. Creative Problem-solving
	5. Executive Leadership
	6. Implementation Ability
	7. Goal-setting
	9. Human-centred Leadership
	11. Design Sensitivity
	12. Network Building (External)
	13. Collaboration (Internal)
	15. Design Thinking
Medium	8. Design Communication
	10. Continuous Learning
	16. Systems Thinking
	3. Design Knowledge
Low	14. Governance

Highly desired competencies in policy

A large majority (11 out of 16) of the DLCM competencies are highly prioritised by policy. These include: *Business Acumen, Policy Sensitivity, Creative Problem-*

solving, Executive Leadership, Implementation Ability, Goal-setting, Human-centred Leadership, Design Sensitivity, Network Building (External), Collaboration (Internal) and *Design Thinking*. This demonstrates a strong policy emphasis on developing a broad range of competencies and the high-priority competencies reflect a clear strategic focus. Moreover, it also reflects the consistency between the DLCM and a policy perspective, demonstrating a validity of the framework.

However, comparing policy priorities with industry reveals a mismatch. Several competencies that are highly valued by policy, such as *Policy Sensitivity, Creative Problem-solving, Implementation Ability, Human-centred Leadership* and *Network Building (External)*, show low coverage in industry and highlight gaps in education. While policy requires these skills, they are not being adequately addressed in current learning or are lacking in graduates. This indicates that design education should place greater emphasis on teaching these competencies.

Medium-desired competencies in policy

Four competencies are assigned a medium level of policy priority: *Design Communication*, *Continuous Learning, Systems Thinking* and *Design Knowledge*. While these competencies are still regarded as important, they do not occupy the highest position within policy focus compared to those in the high-priority category.

Low-desired competencies in policy

Only one competency, *Governance*, is identified as having a low level of policy priority. This suggests that governance is not a major focus for policy in terms of talent development.

5.5.1.3 Competency coverage for industry needs

This categorisation reflects the teaching and learning of competencies as perceived by industry, helping to identify strengths, gaps and areas for curricular development. There are four groups within the industry categorisation: high, medium, low and unmentioned competencies (Table 41). High-level competencies are those that industry perceives as well covered in design education. Medium-level competencies are viewed as moderately covered. Low-level competencies

indicate areas that are insufficiently addressed. The ‘unmentioned’ category refers to competencies for which no specific data were available or identified from an industry perspective.

Table 41: Competencies with different levels from industry perception

Level	*Competency*
High	3. Design Knowledge
	4. Creative Problem-solving
	10. Continuous Learning
	11. Design Sensitivity
	15. Design Thinking
Medium	1. Business Acumen
	6. Implementation Ability
	7. Goal-setting
	8. Design Communication
	13. Collaboration (Internal)
Low	2. Policy Sensitivity
	16. Systems Thinking
Unmentioned	5. Executive Leadership
	9. Human-centred Leadership
	12. Network Building (External)
	14. Governance

High-coverage competencies from an industry perspective

Five competencies are perceived as being effectively taught: *Design Knowledge, Creative Problem-solving, Continuous Learning, Design Sensitivity* and *Design Think*ng. These competencies represent strengths in design education, as they are well regarded by design leaders based on their experience, and highlight positive aspects of existing design programmes and curricula.

Medium-coverage competencies from an industry perspective

Five competencies have medium coverage: *Business Acumen, Implementation Ability, Goal-setting, Design Communication* and *Collaboration (Internal)*. These areas highlight opportunities for improvement in design education, as further development is needed to elevate these competencies to a high level.

Low coverage competencies from an industry perspective

Two competencies are identified as having low coverage: *Policy Sensitivity* and *Systems Thinking*. This highlights a gap and targeted efforts are needed to improve their coverage.

Unmentioned competencies from an industry perspective

Four competencies, *Executive Leadership, Human-centred Leadership, Network Building (External)* and *Governance*, no related data were provided or mentioned by design leaders, and therefore, these competencies were not explicitly evaluated for coverage.

5.5.2 Vertical analysis: a comparison of each competency across perspectives

This section conducts a vertical analysis by comparing the alignment of competencies across different perspectives. This section comprises two parts: the first part presents a cross-group analysis of each competency, and the second highlights key conclusions drawn from these results.

5.5.2.1 Analysis of individual competencies

Business Acumen

Table 42: Perceptions of Business Acumen in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in educatio n	Absent in industry
Business Acumen	High	Medium	High	Medium	High

From a policy perspective, there is a strong emphasis on *Business Acumen* (Table 42, above). Design-education programmes claim to have high coverage in this area, but industry perceives only medium coverage. Meanwhile, some design leaders feel there is a major gap in cultivation. Therefore, based on this comparison, a disconnection is evident: design education believes it is adequately covering *Business Acumen*, but design leaders feel it is still insufficient for their needs. This misalignment requires design education to place more focus on the depth and industry alignment of this competency in future.

Policy Sensitivity

Table 43: Perceptions of Policy Sensitivity in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Policy Sensitivity	High	Low	Low	N/A	Low

As shown in Table 43, policy places a strong emphasis on this competency, yet both industry and design-education programmes demonstrate only low levels of coverage. This suggests that, while policy sensitivity is highly valued at the policy level, it remains underserved in current teaching and learning practices. There is, therefore, a clear need for new curriculum development and integration, with a particular focus on aligning with the needs of both policy and industry.

Additionally, it was found that design leaders do not appear to perceive *Policy Sensitivity* as a significant gap. This likely not due to a failure to recognise its importance, as venture creation in a Chinese context is highly connected with policy. Instead, a more plausible explanation is that, as experienced professionals, design leaders likely view this as an advanced competency that is developed on the job rather than in the classroom. From their perspectives, although *Policy Sensitivity* is categorised as knowledge in the DLCM, it also requires high-level skills to interpret and navigate national policies. Furthermore, they may understand it as a relational skill, as it is deeply intertwined with relationships *(guanxi)*, a point which will be further discussed in Section 6.3.3.

Design Knowledge

Table 44: Perceptions of Design Knowledge in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Design Knowledge	Medium	High	High	N/A	Medium

Both industry and design-education programmes demonstrate high coverage of *Design Knowledge*, although policy only expresses a moderate level of emphasis (Table 44). This indicates that this competency is generally well addressed. However, design leaders have identified some underemphasised aspects within

this area, suggesting that a moderate gap still exists. This highlights the need for further refinement, such as integrating knowledge with practical application.

Creative Problem-solving

Table 45: Perceptions of Creative Problem-solving in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Creative Problem-solving	High	High	High	N/A	High

As shown in Table 45, *Creative Problem-solving* is highly prioritised in policy, and both industry and design-education programmes report high levels of coverage. However, gaps identified by both design education and design leaders indicate a clear discrepancy. Although current teaching is perceived as sufficient, it does not appear to result in effective skills development. Based on this, there is a need to review and revise teaching methods for this competency, with a particular focus on enhancing its practical application.

Executive Leadership

Table 46: Perceptions of Executive Leadership in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Executive Leadership	High	N/A	High	N/A	N/A

Executive Leadership is highly desired from a policy perspective, and design-education programmes also report high coverage in this area (Table 46). Overall, *Executive Leadership* appears to be well addressed in design education, in line with policy priorities. However, there are no corresponding data from the industry, as design leaders did not mention this competency when discussing skills developed in design education. The absence of industry data may suggest that this competency is less formally covered or assessed by industry compared to other skills.

Implementation Ability

Table 47: Perceptions of Implementation Ability in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Implementation	High	Medium	High	High	High

Implementation Ability is highly needed in policy, and design-education programmes show high coverage (Table 47). However, the industry perceives only a medium level of coverage. More importantly, significant gaps were identified by both design-education programmes and design leaders. As with *Creative Problem-solving*, the contradiction between perceived coverage and existing gaps suggests that current teaching methods are insufficient for developing strong implementation skills and addressing real-world challenges.

Goal-setting

Table 48: Perceptions of Goal-setting in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Goal-setting	High	Medium	Low	N/A	Low

The results show that policy places a strong emphasis on *Goal-setting*. However, coverage within design-education programmes is generally low, and industry perceives only a medium level of coverage (Table 48). Although design leaders do not report major gaps in this area, the limited coverage in design education suggests that Goal-setting is likely acquired outside the classroom and in informal ways.

Design Communication

Table 49: Perceptions of Design Communication in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Design Communication	Medium	Medium	High	Medium	Low

Both policy and industry perspectives indicate a medium level of desire and coverage for *Design Communication*, while design-education programmes report high coverage, and design leaders perceive only minor gaps (Table 49). This suggests that the cultivation of *Design Communication* is generally well addressed within current design education. Therefore, any issues at the medium level could likely be resolved with minor curriculum adjustments.

Human-centred Leadership

Table 50: Perceptions of Human-centred Leadership in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Human-centred Leadership	High	N/A	Low	N/A	Medium

Human-centred Leadership is one of the competencies that policy strongly emphasises. However, it receives low coverage in design-education programmes (Table 50). In addition, while some design leaders did not mention this competency during the interviews, others identified *Human-centred Leadership* as missing and perceived its absence at a moderate level within education. This is a critical area of concern, as the high priority assigned by policy is not being met by current design-education provision. It is therefore important to develop and integrate programmes that focus on *Human-centred Leadership*.

Continuous Learning

Table 51: Perceptions of Continuous Learning in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Continuous Learning	Medium	High	Medium	N/A	High

Although the industry perceives high coverage of *Continuous Learning*, design-education programmes reflect only a medium level of coverage, and policy demonstrates a medium level of emphasis (Table 51). However, an important gap was identified by design leaders. While design leaders perceive that design education provides high coverage in this area, the actual learning and development of this competency may be limited. This suggests that, although courses and resources are available, their effectiveness in fostering *Continuous Learning* is low. Therefore, design education should place greater emphasis on motivating and enabling students' *Continuous Learning* awareness, rather than simply providing materials.

Design Sensitivity

Table 52: Perceptions of Design Sensitivity in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Design Sensitivity	High	High	High	High	High

Design Sensitivity is highly prioritised by policy and is generally well covered by both industry and design-education programmes (Table 52). However, design

leaders perceive a significant gap in this competency. Similar to *Business Acumen*, this suggests that while design sensitivity is addressed in education, it may not be taught with the depth or practical focus required by design leaders.

Network Building (External)

Table 53: Perceptions of Network Building (External) in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Network Building	High	N/A	Low	N/A	N/A

As shown in Table 53, policy places strong emphasis on the *Network Building* competency. However, coverage in design-education programmes appears to be insufficient, highlighting a gap in educational development. Educators in the DM programme at the case-study university noted that it is often difficult to access resources and establish long-term connections with external stakeholders, as industry partners typically participate only in short-term classes. Additionally, there are no data available from industry, as design leaders did not mention this competency.

Collaboration (Internal)

Table 54: Perceptions of Collaboration (Internal) in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Collaboration	High	Medium	High	High	Low

Policy places strong emphasis on *Collaboration*, and design-education programmes report high coverage in this area, while design leaders perceive a low gap in *Collaboration* (Table 54). However, the case study reveals a significant gap from a perspective of design-management education, highlighting a paradox within the same educational context and indicating slight differences between programmes. Overall, this comparison suggests that design education delivers collaboration skills effectively, with these skills being successfully developed through practical experience and recognised by design leaders.

Governance

Table 55: Perceptions of Governance in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Governance	Low	N/A	N/A	N/A	N/A

Governance shows a low level of policy emphasis, and data are lacking from both industry and design education (Table 55). This suggests that *Governance* is a low priority within this research, receiving minimal attention and focus (as discussed in detail on p. 268).

Design Thinking

Table 56: Perceptions of Design Thinking in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Design Thinking	High	High	*Difference*	N/A	Medium

Policy places a high priority on *Design Thinking*, and industry perceives a high level of coverage. However, from an industry perspective, design leaders have identified a medium-level gap, noting that this competency is not mentioned in design education (Table 56). Additionally, there are differences across design-education programmes, which reveal inconsistencies among the three groups studied (DM programmes or modules, a DM case study and design programmes), as these groups report low, medium and high levels of *Design Thinking* being taught. Although *Design Thinking* is widely taught and highly desired, the quality and depth of its delivery vary significantly. This inconsistency may contribute to the medium gap perceived by design leaders.

Systems Thinking

Table 57: Perceptions of Systems Thinking in design education

Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in education	Absent in industry
Systems Thinking	Medium	Low	Medium	N/A	N/A

Both policy and design education demonstrate a medium level of emphasis on *Systems Thinking*, but it is not strongly recognised by industry (Table 57). This could become an area for future development if its importance increases or if policy places greater emphasis on it. Furthermore, there is no significant gaps were explicitly identified, due to a lack of data from the absent groups.

5.5.2.2 Conclusion of vertical analysis

Based on the vertical analysis, a key **paradox emerges between perceived coverage and gaps** for some competencies. For example, with regard to *Creative Problem-solving*, *Implementation Ability* and *Continuous Learning*, a clear **discrepancy exists**: both industry and design-education programmes report high or medium levels of coverage; however, significant gaps remain, particularly those identified in the case study of the DM programme and by design leaders. Moreover, *Design Thinking* can be perceived as a significant competency that demonstrates inconsistency across different perspectives. Although it is widely cultivated in design education, the varied coverage of *Design Thinking* indicates that not all *Design Thinkers* and programmes develop this competency in the same way. This highlights an issue with the effectiveness of current teaching and learning approaches, rather than simply a lack of provision.

Similarly, *Collaboration (Internal)* supports this issue of learning approach. It also demonstrates a high perceived gap in design-education programmes but a low gap according to design leaders, suggesting the effectiveness of informal or experiential learning. This indicates a need to rethink pedagogical approaches in design education in order to fill similar gaps for other competencies.

Additionally, there is a **misalignment between policy objectives and the practical coverage**. Competencies such as *Policy Sensitivity*, *Human-centred Leadership* and *Network Building (External)* are highly prioritised in policy, but lack sufficient coverage in both design education and industry. This highlights a gap where policy aspirations are not being met by current educational practices. There is therefore a need to develop targeted curricula in these areas, fostering strong collaboration between policymakers, educators and industry.

Design leaders also highlight a significant gap in **balancing between business and design expertise**, particularly in the competencies of *Business Acumen* and *Design Sensitivity*. This is revealing because coverage in these areas in design-education programmes is often considered sufficient. This indicates a need for

leadership and industry-aligned training that delves deeper into the strategic and real-world application of these competencies.

5.6 Summary

This chapter has primarily explored the current state of competencies taught in design education, aligning and mapping them with the DLCM to identify which competencies are well covered and which are absent or insufficient. Three data sources were used: design and DM programmes (including an in-depth case study), design leaders' perceptions from industry and a review of design policy to understand talent needs from a government's perspective. A template analysis was primarily used in this chapter and competencies were identified separately from each source. Based on the findings, a two-part analysis consisting of a horizontal review and a vertical analysis demonstrated the coverage, consistency and alignment of competencies across three perspectives in design education.

The ***horizontal review***, on the one hand, reveals the key competencies taught or required by each perspective:

From a perspective of **design education**, high coverage includes eight competencies: *Business Acumen, Design Knowledge, Creative Problem-solving, Executive Leadership, Implementation Ability, Design Communication, Design Sensitivity and Collaboration (Internal*). These competencies reflect strong teaching performance in design education. Medium coverage *includes Continuous Learning* and *Systems Thinking*.

Low coverage includes *Policy Sensitivity, Goal-setting, Human-centred Leadership* and *Network Building (External)*. This category highlights gaps in the competencies taught in design education. Moreover, since there are three datasets, there is variation among the groups regarding the teaching of *Design Thinking*. This variation is marked as the 'difference' category. The 'unmentioned' category includes *Governance*, as there are no data reflected or collected on this competency in the research.

From a **policy perspective**, design policy strongly requires the following competencies: *Business Acumen, Policy Sensitivity, Creative Problem-solving, Executive Leadership, Implementation Ability, Goal-setting, Human-centred Leadership, Design Sensitivity, Network Building (External), Collaboration (Internal)* and *Design Thinking*. These competencies should be emphasised in design education, as they reflect the requirements and needs from government and societal perspectives and indicate the correct direction for talent cultivation. Competencies required at the medium level include *Design Communication*, *Continuous Learning*, *Systems Thinking* and *Design Knowledge*. Only one competency, *Governance*, is included in the low-required category.

From an **industry perspective**, design leaders identified five competencies with high coverage in design education: *Design Knowledge, Creative Problem-solving, Continuous Learning, Design Sensitivity* and *Design Thinking*.

Competencies with medium-level coverage *include Business Acumen, Implementation Ability, Goal-setting, Design Communication* and *Collaboration (Internal)*. Low coverage, which is a category that requires particular attention, includes two competencies: *Policy Sensitivity* and *Systems Thinking*. For the 'unmentioned' category, no data were collected from an industry perspective for *Executive Leadership, Human-centred Leadership, Network Building (External) or Governance*.

On the other hand, the ***vertical analysis*** reveals the alignment of each competency, leading to three main conclusions: (1) a paradox between stated coverage and existing gaps; (2) strong policy objectives despite a lack of coverage; (3) a significant gap between business and design expertise perceived by design leaders.

The following chapter presents a discussion of the DLCM based on the findings of Chapters 4 and 5. Since the DLCM is primarily constructed based on industry reflections, the discussion will first address (1) the interconnection of competencies, as well as (2) the different types and characteristics of design leaders identified in this research. Furthermore, given that this study is deeply

rooted in the Chinese context, particular attention will be paid to (3) insights into Chinese design leadership. Meanwhile, from a design education perspective, (4) an apparent competency paradox emerges, the underlying reasons for which will also be discussed in the next chapter.

Chapter 6: Discussion

Based on the gaps and research questions identified from the literature review (*Chapter 2*), this research aims to develop a competency model that identifies the key competencies of Chinese design leaders and to evaluate its relevance to Chinese design education. To achieve this, this research focuses on exploring the common competencies to construct a model for Chinese design leaders. It further investigates the potential for competency mapping within design education, with the goal of exploring both the competencies that are currently taught and those that are absent or underemphasised in the preparation of future design leaders. This research constructs the competency model by deploying a four-source triangulated qualitative approach, complemented by a validation process that includes a workshop and feedback collection from experts and education stakeholders (*Chapter 3*). This method facilitates an in-depth understanding and enhances the validity of the findings. Following data collection, the thematic analysis and the DLCM construction processes were shown in *Chapter 4*. Finally, at the competency mapping stage (*Chapter 5*), this research adopts a second-round triangulation approach involving three perspectives, which are industry, design education and design-related policy, aiming to provide a comprehensive view of the competencies currently taught in design education.

Based on the work conducted, this chapter primarily discusses the DLCM and the implications of the competency-mapping findings for design education. It is organised in four sections: (1) an exploration of the dynamic interactions between categories and competencies within the DLCM; (2) a typology of design leaders; (3) the characteristics of Chinese design leadership; and (4) a discussion of the competency paradox observed during the design-education mapping process.

6.1 Dynamic Interactions within the Design Leadership Competency Model

Specifically, interconnections between different competencies can also be identified within the DLCM. The following sections will discuss both the

interactions between these categories and the interconnection between the competencies.

6.1.1 Interactions between categories

Across different categories, there is an interrelated and mutually reinforcing relationship between Knowledge, Skills and Mindset within the DLCM. *Knowledge* provides the conceptual foundation of both skills and mindsets; *Mindset* shapes one's approach and perspective, and affects knowledge and skills; and *Skills* translate both knowledge and mindset into actions.

Knowledge is essential foundation for both skills and mindset, providing the facts and procedures that underpin performance (Emami *et al.*, 2023). Skills, for instance, cannot function independently and must be grounded in knowledge to be effective (Evans and Donnelly, 2006). Similarly, mindset is shaped by knowledge, which research identifies as a key factor in guiding innovation, strategic action and leadership decisions (Kruke and Olsen, 2012; Rogers, 1983). Knowledge is especially crucial in the early stages of innovation, where leaders must recognise needs and decide whether to adopt new approaches (Imran and Gregor, 2019). Therefore, to make impactful decisions and develop their mindset, design leaders must not only understand design processes but also grasp industry dynamics, market trends and management principles.

Skills, in turn, reflect information-processing abilities developed through learning by doing (Katz, 1980; Levitt and March, 1988; Lamri and Lubart, 2023), and this information can be regarded as knowledge (El Asame and Wakrim, 2018). The interaction between knowledge and skills is evident in professional practice, where knowledge underpins the application and development of skills.

Knowledge and skills influence an individual's mindset over time and can interact dynamically with it (Ade *et al.*,2018; Imran and Gregor, 2019; Kedia and Mukherji, 1999; Ryan, 2024). *Mindset* is a higher-order construct shaped by and has an impact on both knowledge and skills (Scott and Ghinea, 2014); furthermore, Gupta and Govindarajan (2002) highlight the entrepreneurial mindset as a guiding

framework for addressing challenges, reinforcing the idea that mindset is built upon knowledge and skills.

Therefore, within the DLCM, various interconnections exist between each category, with the various competencies influencing one another. For example, *Design Thinking* and *Systems Thinking*, as aspects of mindset, have a broad impact on all competencies. To illustrate, *Design Thinking* can influence *Creative Problem-solving*, shaping how design leaders think, make decisions and address challenges in their work (Zheng, 2018; Frisk and Bannister, 2022). *Design Thinking* can also encourage design leaders to emphasise *Collaboration* (Gao and Yu, 2023); for instance, IDEO identifies 'creative collaboration' as a competency that addresses complex issues and harnesses the power of diverse perspectives and creativity to generate innovative ideas and solutions (Anon, 2019). Moreover, competencies such as *Design Communication* and *Human-centred Leadership* are also influenced by *Design Thinking*.

Similarly, *Systems Thinkin*g is important in enabling design leaders to discover interconnections among various elements and aspects within and around an organisation, guiding them to lead at a broader level. Buchanan (2019) states that *Systems Thinking* is useful for understanding the nature and relevant components of a system, as it allows for a better comprehension of changes and outcomes, particularly within dynamic systems. From design leaders' perspective, *Systems Thinking* helps them grasp a comprehensive picture at both macro and micro levels, significantly impacting network-building: specifically, whom they connect with and how they maintain these relationships. Furthermore, *Systems Think*ng influences *Goal-setting* and *Strategy Formulation* (see Section 4.2.7); when design leaders perceive environmental changes, even in a small part of the system, it can trigger a 'butterfly effect' and have a substantial impact on the company or organisation. Design leaders with a comprehensive and holistic view are able to situate micro-level details within the broader context, enabling them to respond swiftly and effectively to change.

It is important to clarify the relationship between knowledge, skills and mindset within the DLCM, as this helps to explain the dynamic nature of competencies. To

summarise, *Knowledge* provides the foundation for *Skills* and *Mindset* to develop. *Knowledge* and *Skills* shape and formalise a *Mindset*, that mindset, in turn, significantly impacts them. This relationship highlights how learning and practical experience contribute to competency growth, emphasising the importance of continuous improvement in both corporate training and design education.

6.1.2 Interconnections between competencies

Based on the previous discussion (Section 6.1.1), some interactions between different categories can be identified. Similarly, various relationships also exist within the DLCM between different competencies. In this section, three different connections are discussed as examples: (1) *Business Acumen* and *Goal-setting*; (2) *Policy Sensitivity* and *Goal-setting* and *Network Building*; and (3) *Creative Problem-solving* and *Design Thinking*.

6.1.2.1 Business Acumen and Goal-setting

Goal-setting is an important skill that helps individuals maintain a future-oriented awareness, enabling design leaders to anticipate and respond to opportunities with greater insight and agility (Bird *et al.*, 2024). However, successful *Goal-setting* depends not only on vision but also on a realistic understanding of business conditions. Without *Business Acumen*, leaders may set vague, unrealistic, or unmeasurable goals, which can ultimately lead to failure (Trimi and Berbegal-Mirabent, 2012).

From a business perspective, its environments are inherently uncertain, requiring entrepreneurs to assess risks across multiple dimensions (Dvorsky *et al.*, 2021; Iriani *et al.*, 2024; Lumpkin and Dess, 1996). *Business Acumen* enhances *Goal-setting* by ensuring that leaders recognise risks, understand market trends and set achievable objectives based on industry realities. Design leaders must comprehend historical and emerging market trends, industry shifts and branding strategies in order to develop strategically sound and attainable goals, thus avoiding excessive optimism and overcommitment (Gagan, 2023). Therefore, *Goal-setting* and *Business Acumen* are interdependent. While *Goal-setting* provides

direction and motivation, *Business Acumen* ensures that goals are realistic, strategically aligned and grounded in market insights.

6.1.2.2 Policy Sensitivity and Goal-setting, Network Building

Policy plays an important role in shaping business environments, influencing organisational behaviour and strategic decisions by establishing regulatory frameworks (Boddewyn, 2016; Shinkle *et al.*, 2021). Some policies impact an organisation's overall goals, while others may affect only specific objectives or operational areas (Shinkle *et al.*, 2021). For instance, the well-known Chinese educational group New Oriental faced significant challenges after the government introduced new educational policies, commonly referred to as the 'Double Reduction' policy (Xue and Li, 2023), which aimed to limit for-profit tutoring. This policy had a profound impact on the company's survival. Therefore, understanding these dynamics is essential for design leaders, as policy changes can create opportunities or impose constraints on business operations, and directly influence the feasibility of organisational goals.

Strong *Policy Sensitivity* enhances *Goal-setting* by providing regulatory foresight. Design leaders who understand policy implications are able to set realistic, strategic and legally compliant goals, ensuring that their objectives align with external regulations, policies and industry standards. For example, if a design leader is aware that a policy change is forthcoming, they may adjust timelines or resources in advance to ensure compliance, rather than having to react later.

Beyond *Goal-setting*, *Policy Sensitivity* and *Network Building* influence each other. In this research, design leaders highlighted the importance of external network building, particularly with regard to policy and resources such as design resources (Lockwood, 2009). Engaging with policymakers, industry stakeholders and legal experts enables leaders to remain informed about regulatory changes, advocate for favourable policies and establish strategic partnerships. Specifically, well-connected leaders are able to leverage these relationships to navigate uncertainty, align business strategies with policy trends, and create long-term value.

6.1.2.3 Creative Problem-solving and Design Thinking

Design Thinking is particularly valuable for addressing ill-defined problems and for helping individuals and organisations define challenges (Dam and Siang, 2018; Foster, 2021; Von Thienen *et al.*, 2018; Roth *et al.*, 2023). A key aspect of *Design Thinking* is its user-centred approach, which focuses on user needs and iterative problem-solving. Various tools, such as the Double Diamond framework (Design Council, 2005), support this process by providing structured methodologies for exploring problems and generating solutions. At its core, *Design Thinking* is closely linked to four key competencies: *Design Knowledge, Design Communication, Design Sensitivity* and *Creative Problem-solving*. Beyond individual competencies, *Design Thinking* also plays a strategic role in achieving organisational goals (Daymond and Knight, 2023; Foster, 2021). When applied effectively, it not only generates solutions, but also helps organisations identify opportunities, assess impact and drive innovation (Garbuio *et al.*, 2018; Kurtmollaiev *et al.*, 2018). The interplay between *Design Thinking* and other competencies strengthens the design leaders' capability to solve complex problems, enhance collaboration and create user-centred innovations.

6.2 Four Roles of Design Leaders

In this research, four leadership roles emerged among design leaders. Although each leader described their approach differently, clear patterns became evident, highlighting four primary types of leadership: the *Navigator,* the *Strategic Orchestrator*, the *Bridge Builder* and the *Hybrid Designer*. Each role reflects a different emphasis: visionary direction, operational execution, facilitation and expertise-driven leadership.

6.2.1 The Navigator: visionary and strategic

The 'Navigator' operates at the highest strategic level, focusing on determining a long-term vision and building organisational direction. Design leaders in this category demonstrate various competencies, including *Goal-setting* (Section 4.5.2.4), *Executive Leadership* (Section 4.5.2.2)*, Business Acumen* (Section 4.5.1.1)*, Policy Sensitivity* (Section 4.5.1.2) and *Systems Thinking* (Section 4.5.3.2).

Rather than managing day-to-day design projects, this type of design leaders defines the broader strategic trajectory, integrates design at the strategic level, ensures that design contributes to organisational growth. In this sense, the INT3 believes that its important to differentiate between "pushing" (management) and "pulling" (leadership and navigation). They stated that "design management… is more of a traction and pulling role from the front, a role of an inspirer…", which support the navigator's role in setting a visionary direction (*Goal-setting*).

One significant characteristic of 'Navigators' is a *Systems Thinking* mindset, which enables them to map different components from the strategic to the operational level and align design with business objectives, market trends and industry shifts. For example, INT 22 said that "I am the architect of this department… I need to carry out the overall system value, including the structural framework of the personnel", which validates the *Systems Thinking* of the Navigator. He is building the machine, not just operating it. Moreover, 'Navigators' also tend to prioritise flexibility and adaptability, particularly in an SME context, where agility is essential for survival in a competitive and rapidly changing business environment.

6.2.2 The Strategic Orchestrator: execution

While 'Navigators' focus on a holistic, future visionary aspect that represents the 'why' and 'where', the 'Strategic Orchestrator' is focused on the 'how' and 'what' of making that vision a reality, ensuring that strategy is executed efficiently and effectively. From this perspective, this aligns with the 'business enabler', which is the first maturity level of design leadership proposed by Joziasse (2023) (Section 2.3.4), and also mentioned as a 'community leader'(Dalrymple *et al.*, 2020).

'Strategic Orchestrators' require more comprehensive competencies, as they need to solve operational-level problems. For example, INT24 provides the strongest evidence here with '*Project Mother'*, as stated: "This kind of project manager is a 'Project Mother'… everything is your business… I check on them every two hours… all things are funnelled to me." Moreover, INT15 uses a metaphor if a machine to describe keeping the project moving: "You just need to balance these aspects and let the project spin like a washing machine… as a manager, you just need to let it

make money, the faster the better." This also aligns with the Orchestrator's focus on *Business Acumen* and operational workflow.

These design leaders are responsible for project and process management, which includes maintaining project alignment with both organisational and business objectives and ensuring smooth progress and high-quality outcomes. In detail, they emphasise workflow optimisation, anticipate potential risks and proactively address inefficiencies. To ensure smooth progress and keep projects on track, they have the ability to balance the needs of multiple stakeholders (e, g., clients, employees, other external collaborators). Based on these tasks, 'Strategic Orchestrators' exhibit competencies in *Implementation Ability* (Section 4.5.2.3) and *Creative Problem-solving* (Section 4.5.2.1), complemented by an operational level of *Systems Thinking* (Section 4.5.3.2) and *Business Acumen* (Section 4.5.1.1). At times, they are also required to demonstrate strengths in *Design Communication* (Section 4.5.2.5) and *Collaboration* (Section 4.5.2.10).

6.2.3 The Bridge-builder: people-centred

Positive interpersonal relationships are among the key factors influencing design-thinking practice (Primus and Sonnenburg, 2024). In this context, the 'Bridge Builder' is primarily concerned with people and collaboration. Their role is to facilitate communication, bridge gaps between different levels of leadership and employees and foster an inclusive work culture.

For example, INT24 explicitly uses the word 'bridge', as they stated: "I am more of a bridge, a communication bridge between the people below and the instructions from the high-level leaders". This validates the *Design Communication* aspect of bridging the gap between hierarchy levels. Similarly, INT22 described management as a 'service': "design does not have management, only guidance… We are both designers and service providers, serving other designers to help them succeed." This statement supports the role's focus on team advocacy.

This type of design leader demonstrates strong competencies in *Design Communication* (Section 4.5.2.5), *Network Building* (Section 4.5.2.9), *Human-centred Leadership* (Section 4.5.2.6), *Systems Thinking* (Section 4.5.3.2) and

Policy Sensitivity (Section 4.5.1.2), especially prioritising the maintenance of both internal and external relationships.

In detail, 'Bridge Builders' excel at cross-functional collaboration, fostering a team-first environment in which designers and stakeholders work cohesively. They prioritise interpersonal conflict resolution, team advocacy and mentorship, ensuring that employees feel supported and empowered. Unlike 'Strategic Orchestrators', 'Bridge Builders' emphasise culture building, ensuring that trust, diversity and inclusivity define the organisation's work environment. For example, INT9 rejects the title of 'leader', preferring a flat, democratic structure: "there is no saying of 'leader' in design companies… we are all equal… communication is actually like friends, I think this is better." This perspective demonstrates the emphasis on *Human-centred Leadership* and creating a democratic environment. They strive to create a democratic workplace where team-driven decision-making replaces rigid hierarchies, thereby fostering creativity and open dialogue.

6.2.4 The Hybrid Designer: a practitioner leader

The 'Hybrid Designer' demonstrates a dual role by balancing strategic leadership with active participation in design work. Unlike other types, they remain engaged in hands-on design and maintain their design passion. In this research, 'Hybrid Designers' operate at a higher strategic level while still seeking opportunities to participate in projects, sometimes regarding hands-on design as a leisurely pursuit rather than a daily responsibility. These design leaders share similarities with 'Artisan' proposed by Valencia *et al.*(2021) in Section 2.3.2. These design leaders demonstrate strong competencies in *Design Knowledge* (Section 4.5.1.3), *Design Sensitivity* (Section 4.5.2.8) and *Design Thinking* (Section 4.5.3.1) and also possess a deep understanding of *Business Acumen* (Section 4.5.1.1).

'Hybrid Designers' are driven by their expertise, often relying on their own design experiences to make final decisions that ensure both aesthetic quality and feasibility. For instance, INT13 argues that being a designer makes them a better leader because they give specific direction rather than abstract one. As they stated: "I will give them more detailed design directions… I will set the references

first… because I am a designer myself… this makes them feel at ease." This statement directly shapes the definition of the 'Hybrid Designer' – they lead via *Design Knowledge* and *Design Sensitivity,* reducing ambiguity for the team.

Their unique value lies in bridging creative intuition with business strategy, making design decisions that align with both brand identity and market demands. Moreover, they possess the ability to balance artistic ambition with practical constraints. While they advocate for design, they also understand business and operational realities, ensuring that creative work remains both innovative and commercially viable. As INT19 stated, their authority comes from professional understanding: "I understand this thing [design], so I can… grasp the people below… I can explain from a professional angle why it is bad and how to do it best." This confirms that for the 'Hybrid Designer', authority is derived from craft expertise rather than just job titles, this aligns with the characteristic of Chinese design leadership being rooted in design expertise (Section 6.3.2). In this sense, their leadership is not about displaying aesthetic ideals, but rather about balancing design with business needs to achieve positive outcomes.

6.2.5 Distinction between Design Leaders, Design Managers and General Managers

While the literature often creates a binary distinction between design leadership (vision-oriented) and design management (execution-oriented) (Turner and Topalian, 2002; Zaleznik, 1981), which discussed in detail in Section 2.4.1, this research suggests these distinctions are not mutually exclusive but rather represented by different *weightings* of competences across the four identified roles.

The distinction between Design Leaders and Design Managers, is mainly demonstrated through 'the Navigator' and 'Strategic Orchestrator' roles: (1) 'the Navigator' aligns most closely with the theoretical definition of a design leader. By relying on *Goal-setting* (Section 4.5.2.4) and *System Thinking* (Section 4.5.3.2), they focus on the 'pulling' aspect of leadership mentioned in both the literature and interview data, prioritising long-term organisational direction over daily

operations; And (2) from the 'Strategic Orchestrator' perspective, conversely, it demonstrates the functions of a Design Manager. As discussed previously, this role relies heavily on *Implementation Ability* (Section 4.5.2.3) and *Business Acumen* (Section 4.5.1.1) aligning with the literature definition of management: ensuring tasks are completed and workflows are optimised (Galli *et al.*, 2017; Han and Bromilow, 2010; Joziasse, 2011b; Kumar *et al.*, 2016; Lee and Cassidy, 2007; Miller and Moultrie, 2013a; Turner and Topalian, 2002).

Furthermore, the 'Bridge Builder' and 'Hybrid Designer' demonstrate the distinction between Design Leaders and General Managers: (1) the 'Bridge Builder' shares similarities with general management roles (e.g., HR or general operations) because of their focus on *Human-centred Leadership* (Section 4.5.2.6) and *Network Building* (Section 4.5.2.9). However, they differ from general managers by using these soft skills specifically to bridge the gap between creative teams and business hierarchies; (2) the 'Hybrid Designer' provides the clearest distinction between a Design Leader and a generic General Manager. Their authority is rooted in *Design Knowledge* (Section 4.5.1.3) and *Design Sensitivity* (Section 4.5.2.8). Unlike a General Manager who manages resources, the 'Hybrid Designer' leads through a 'craft authority', creating a unique leadership style that a non-designer could not replicate.

6.3 Prominent Features of Chinese Design Leadership

Design leaders demonstrate different tendencies, even though they share some common ground. In this research, four characteristics are observed: (1) a strong preference for remaining behind the scenes, seeking to exert power and influence over employees indirectly; (2) the central position of design; (3) sensitivity to policy and the critical role of *guanxi* (personal connections) in shaping their business trajectories; and (4) women design leaders portrayed as having a '*caretaker*' role, displaying greater attentiveness not only to projects but also to the broader context and people involved.

6.3.1 '*Stay behind*': a strong preference for invisible leadership over hierarchy

Many Chinese design leaders prefer to lead 'from behind', influencing their teams subtly rather than explicitly asserting control. They often set the 'why' and 'what', allowing their teams to determine the 'how', thus ensuring autonomy in problem-solving. As INT7 explained, this requires a shift in mindset for the leader to accommodate the creative process: "they prefer flexible working methods… as a leader, I should give more freedom… rather than stipulating they must sit there from 9 am to 6 pm." This preference for flexible, invisible leadership is not only a stylistic choice; it is strongly tied to the educational background of these leaders (as discussed in Section 1.1.3). As many emerged from traditional fine-art based programmes that prioritise craft over management and business training, Chinese design leaders naturally tend to a collaborative and employee centred approach rather than a top-down style.

These characteristics are also visible in the competencies across different data sets (e.g. *Creative Problem-solving* in Section 4.2.5, and *Goal-setting* in Section 4.2.7). In this sense, a design leader's influence is generated from collaboration and demonstrated through collective decision-making (Sections 4.2.3 and 4.2.10), collaborative working patterns (Section 4.2.10) and mentorship (Section 4.2.4). This is also evident in the 'Bridge Builder' type discussed in Section 6.2.3. The 'Bridge Builder' emphasises supporting employees by providing mentorship, aiming to foster a democratic environment and ensuring team success rather than simply enforcing their authority.

Moreover, this approach also closely aligns with different leadership styles, including servant, transformational and shared leadership, identified in the literature review (Section 2.1.1) and the DLCM competencies (Section 4.5). In the context of China's rapid industrial upgrading (Section 1.1.1), where design is increasingly relied on driving high-quality innovation, these empowering leadership styles are important. For example, servant leadership is reflected in the focus on serving followers' needs through empathy and support (Chen *et al.*, 2013; Graham,

1991; Hunter *et al.*, 2013; Luthans and Avolio, 2003; Yigit and Bozkurt, 2017); transformational leadership is evident in how design leaders empower team members to build motivation, a finding consistent with research by Lee and Joo (2015) in Korea; and shared leadership is reflected in the emphasis on collaboration and collective governance. In the DLCM, these principles are captured by specific competencies. The first two styles connect to *Human-centred Leadership* (Section 4.5.2.6) and *Goal-setting* (Section 4.2.7); while shared leadership connects to *Collaboration* (Section 4.5.2.10) and *Governance* (Section 4.5.2.11).

In this research, many design leaders avoided expressing the idea of being a 'boss' or a 'manager', even though they actually have decision-making power within the organisation. They emphasised 'guiding' or 'serving' rather than 'managing' design or people. For instance, one interviewee, INT20, explicitly reflected on this limitation, stating that, "I feel I don't have much management talent". He further noted that even his own advocacy might be based on personal "prejudice" and is "not necessarily correct", demonstrating a hesitation to view his leadership as absolute authority. This statement directly reflects the competency gap identified in Section 1.1.1. Having been pushed into leadership roles by a developing market without formal business or management training (Section 1.1.3), these design leaders often feel unequipped for traditional authoritative management. Furthermore, they prefer to make decisions collectively rather than through a singular authority. Design leaders define themselves as facilitators of progress rather than leaders or managers, believing that leadership is about enabling others to succeed rather than controlling them directly.

This preference may be influenced by the unique Chinese cultural context, particularly Confucian values of *ren* [仁] (benevolence and compassion), *yi* [义] (conferring unity on virtues), *li* [礼] (ritual propriety), *zhi* [智] (wisdom) and *xin* [信] (trustworthiness), which emphasise group harmony and collectivism (Yuan *et al.*, 2023). In China, there is often a deep respect for collective decision-making and maintaining social harmony, which is also referred to as benevolent leadership (Ren and Bao, 2014; Yuan *et al.*, 2023). As mentioned previously, the structural

reality of Chinese design education reinforces this 'stay behind' preference; because design leaders lack management and business training, they are often uncertain about how to become a leader.

Another reason lies in design leaders' perception of 'power', as they often perceive authority as carrying negative connotations (Ziemianski, 2022). This leads many professionals to avoid explicitly claiming authority, as doing so could be regarded as arrogant or overly hierarchical, especially raising obstacles in a design context that requires creativity. Moreover, in this research, design leaders demonstrated a marked sense of humility, particularly when speaking in public or interacting with unfamiliar individuals. This also reflected by INT1, stated that "I still need to improve, because after all, I have seen very powerful people, and I feel I still need to make progress." Similarly, INT23 expressed a sense of humility, stating that, "the older I get, the more I feel my own ignorance, and the more I feel I lack so many things." This finding both supports and challenges the argument of De Bont and Wrigley (2023), discussed in Section 2.5.5. While humility is a vital factor in effective leadership, it also shows that effective design leaders with a design-education background possess this trait, contrary to their suggestion that it is rare among designers. This humble behaviour also aligns with the Confucian value of [*li*] (Yuan *et al.*, 2023), which influences how leaders position themselves. From this perspective, a paradox emerges: there is a need for paternalistic oversight combined with a desire to appear non-controlling, which finally manifests as the 'Strategic Orchestrator' style (Section 6.2.2). As INT19 described, this role involves "consolidating resources" to "realise a good idea", moving beyond simple design to a higher level of orchestration.

Moreover, a paradox emerges in a practical way: implementing collaborative working is not always straightforward, as there is often a contradiction between structured, hierarchical decision-making and more participatory, democratic approaches. Traditional hierarchical organisations provide clear and comprehensive systems, but they can be less responsive and sometimes overly authoritative. As INT16 observed regarding the difficulty of adapting to rigid workplaces, simply 'adapting' to the structure is not always the solution; they

noted that while they could adapt, the personal cost meant "it's not worth it", suggesting a preference for environments where one's value is not lost to the system. This friction is often felt in administrative task; INT13 stated that while leaders with design experience "manage loosely", those without it "particularly love making you do reports and write documents" which feel like "wasting time" to design team. In contrast, flat organisational structures facilitate rapid response and immediate action, ensuring that everyone has a voice and making collaboration easier.

However, such a structure is not always suitable for larger organisations. Design leaders working in large companies and design institutions expressed a desire to transform their current organisational structures. While they acknowledged that fundamentally changing an established structure is challenging, flat structures are more commonly applied in small organisations, leaving design organisations caught between the need for clear leadership and the desire to avoid rigid hierarchies. This also demonstrates the same context as design management, which is rooted in the shift from a hierarchical model of management to a flat and flexible one to encourage employees (Borja de Mozota, as cited in Best, 2006, p. 14) This tension suggests that design teams may function best under a hybrid leadership developed for a specific context, where a degree of structure co-exists with a culture of shared ownership and collaboration.

6.3.2 *Design is the key:* leadership rooted in design expertise, not titles

Chinese design leaders prioritise design-related competencies and credibility over formal leadership authority. They view mastery of design skills as the essential foundation for building leadership trust, positioning themselves as experts first and leaders second. This design expertise focus, reflect a direct response to Chinese industrial transition (Section 1.1.1). as the manufacturing section shifts from low-end production towards high-quality, design driven innovation, design has become an important business differentiator rather than an aesthetic addition. This characteristic aligns with French and Raven's five sources of power, which state that expert power arises from a leader's knowledge or expertise (French and Raven, 1959; Kovach, 2020). As INT16 stated, establishing this professional

credibility is “the premise” of design leadership; without it, influencing the team becomes difficult. In many workplaces, respect is earned through demonstrated competencies rather than official titles. This is also strongly reflected in job descriptions (Section 4.2.1.1; details in Appendix D), as they require a design leader to have certifications, qualifications and relevant design-related experience.

Conversely, the lack of this expertise can reduce trust. INT13 highlighted the conflict that arises when leaders lack a design background, noting that they often prioritise features that are “aesthetically unpleasing”, leaving the design team to “carry the blame [背锅] for the poor outcome.” They described such leaders as feeling like they “turn their elbows outward [胳膊肘往外拐]”, which means favouring outsiders over the team, whereas a leader with design expertise understands the importance of design and protects design quality and outcomes.

Furthermore, beyond gaining a reputation and respect during their hands-on design experience, design leaders also learn management skills through practice rather than relying on formal management education, which aligns with Oakley’s opinion that design managers learn management knowledge through experience (2017, pp. 115–116). This practical approach is a necessary adaptation to the educational context (Section 1.1.3). Because Chinese design programmes have been rooted in fine arts, they rarely equip graduates with strategic or business management skills. Therefore, design leaders lead not because they were trained to manage, but because they are often the most skilled individuals in the room. This practical experience serves as a complement to formal design programmes, filling the gaps often left by a lack of practical management training.

Compared to traditional leadership, although some overlaps exist, there remains a distinction in how guidance is provided versus how commands are issued. This characteristic also reflects transformational leadership (Section 2.1.1), which aims to enhance leadership effectiveness by adopting a people-centric approach that incentivises followers’ motivation. This overlaps with the core of design thinking, which is a mindset that can cultivate and be grounded in design expertise

such as hands-on skills (Gwangwava, 2021). INT 6 supported this view, suggesting that "design thinking might be more empathetic", enabling leaders to better understand user needs. In this research, design leadership guidance emerges from the requirements of design and creative tasks, which demand a flexible atmosphere to foster new ideas. As shown in the DLCM, design leaders lead through their *Design Expertise* (Section 4.2.1.1; Section 4.5.2.8) and a *Design Thinking* mindset (Section 4.2.19; Section 4.5.3.1). They treat employees as clients and users, seeking to solve their problems and provide support tailored to their needs – a practice that often develops naturally through their previous design experience. This shift in mindset was supported by INT11, who argued that design companies must view themselves as part of the "service industry" rather than just "creating art", emphasising that leaders must align their "operating thinking" with client needs rather than relying solely on subjective aesthetics. This manifests as a strong 'Hybrid Designer' (Section 6.2.4).

Moreover, design expertise enables design leaders to focus on influencing and guiding others, rather than exerting direct control, which also connects to the 'Stay Behind' characteristic (Section 6.3.1). As previously discussed, instead of 'controlling' their employees, they prioritise enabling others and rely on collective intelligence rather than hierarchical power, allowing designers to thrive without rigid oversight. INT22 emphasised that without this background, a leader "cannot empathise with designers" and risks treating the company just as a "financial investment" rather than a creative company. From this perspective, design leaders must create the right conditions for design and creativity to flourish. Their design expertise demonstrates a deep understanding of design and its methods, enabling them to effectively motivate and support employees and designers.

Furthermore, this characteristic also demonstrates the duality of design leadership, as shown by the focus on both visionary and practical execution in the 'Strategic Orchestrator' (Section 6.2.2) and the focus on both design and business in the 'Hybrid Designer' (Section 6.2.4). This is also discussed by Jacobs and Cambré (2020) in terms of exploration (artistic consideration) and exploitation (economic consideration); and by Nielsen *et al.* (2018) as a contradiction between

designers and entrepreneurs. Balancing these aspects can be challenging, as they are sometimes contradictory. INT16 discussed this tension, stating that while business-focused leaders focus on "commercial models and cost", they often lack the ability to judge feasibility. They noted that designers, by contrast, excel at the "landing stage (implementation)", ensuring that ideas are not just commercially viable but practically executable.

For example, from a visionary perspective, design leaders operate at a macro level, setting strategic direction, defining the 'why' and 'where' of both design and the organisation and inspiring their teams. In contrast, the execution aspect demands structuring workflows, ensuring design quality and effectively managing processes, timelines and team-coordination. Notably, many design leaders consistently participate in design projects because they remain passionate about design. This was identified as an important reason for their ongoing involvement in practical execution in this research. INT22 stated that a leader must have a "strong persistence for design", while INT24 added that one must truly "love this industry and respect it", otherwise, it is impossible to sustain the effort required to succeed.

A balance between vision and execution is essential for design leaders to achieve success. Relying too heavily on visionary ideals risks becoming disconnected from real-world challenges, while focusing solely on execution may hinder innovation. Maintaining this balance is crucial for achieving long-term success in design leadership.

6.3.3 *'Guanxi'* and policy sensitivity: balancing stakeholders instead of just leading teams

Chinese design leaders view their role as one of balancing multiple forces, including the team, clients, business, government and the market. Rather than focusing solely on internal team management, they prioritise connecting and aligning diverse stakeholders. As INT1 described, this requires "a specific aptitude for interpersonal finesse, or the ability to *huo xini* [和稀泥]". They believed that a leader "cannot have too many sharp edges" in human relationship but must

instead be a "social butterfly", capable of navigating between various parties with flexibility. This need for stakeholder alignment is impacted by Chinese government-directed context (Section 1.1.2). In this sense, Chinese design leaders operate in an environment that aligning organisational goals with state-sponsored initiatives. Consequently, they emphasise the importance of policy, which includes understanding governmental hierarchies, contexts and future policy directions. Alongside this, design leaders highlight the significance of *'guanxi'*. In the Chinese context, '*guanxi*' refers to certain qualities of personal contacts or relationships. And Zhang and Hong (2017) define *'guanxi'* as a personal relationship and social connection. INT23 reinforced this by defining "*Renqing Shigu* [human sophistication]", which not just as a social habit, but as a critical capability for design leadership.

However, in a business context, *'guanxi'* can serve as an institutional force and governance structure (Zhang and Hong, 2017), and may be considered a form of social capital – a resource that provides advantages such as broadening market channels and enhancing financial performance (Cao *et al.*, 2014; Gu *et al.*, 2012). INT18 highlighted the necessity of this transition for survival, noting that a successful founder must spend time and money to "huan quanzi [change circles]". They argued that if a leader remains only in the designer circle, "they basically can't make it", and must instead integrate into "client or capital circles" to develop business. This strong tendency is evident in both the 'Navigator' (Section 6.2.1) and the 'Bridge Builder' types (Section 6.2.3), and it highlights the connection between *Policy Sensitivity* (Section 4.5.1.2; details in 4.2.17) and *Network Building* (Section 4.5.2.9; details in 4.2.11) in the DLCM. In this research, most design leaders leveraged '*guanxi'* to mobilise resources and secure stakeholder support. As INT25 stated, "hard relationships [with government and stakeholders] are often the primary advantage." However, some were reluctant to discuss it, viewing it as a private matter or addressing it only vaguely despite its significant impact on their success.

In this research, *'guanxi'* refers to personal relationships with government personnel or stakeholders that can benefit design leaders. These relationships

may develop in various ways, most commonly through introductions or shared meals arranged by a mutual acquaintance; they may also stem from long-term familiarity. From this perspective, INT16 noted that these bonds are often solidified through "private activities", such as traveling together or holding privates' events, which helps "close the distance" between parties more effectively that purely professional interactions. Typically, such relationships are built on mutual benefits, where both parties can achieve their respective goals, whether urgent or long-term. In some cases, agreements are made informally, by 'word of mouth', without formal signatures or official procedures. By leveraging these connections, design leaders can gain early access to policy updates, enhancing their *Policy Sensitivity*. INT17 highlighted the critical advantage of this "information asymmetry", stating that those with access to "first-hand information" become "rule makers" rather than just "executors", thereby enjoying more resources and avoiding the need to compete at the "bottom layer". In China, it is important to understand and anticipate national policies at an early stage. For example, when dealing with policies that offer targeted funding for design-driven venture creations, such as the *Guiding opinions* (Section 1.1.2), having this first-hand information is critical for securing funding and early market advantages ahead of peers. Additionally, they can secure further resources and clients, leading to more projects and easier market entry, although such arrangements are often short-lived.

While *'guanxi'* can help to reduce risks and support goal achievement, it is also a double-edged sword. Design leaders can face challenges in balancing personal *'guanxi'* relationships with professional objectivity. When disputes arise, they may find it difficult to control the direction, often having to negotiate and follow instructions contrary to their own preferences. Furthermore, *'guanxi'* can negatively affect a company's reputation. In China, although *'guanxi'* offers certain advantages, it is often viewed negatively. Many people feel disdain towards companies that rely on it to achieve prominent market positions, unconsciously diminishing their assessment of the company's actual capabilities, even if the company is objectively strong.

6.3.4 The *caretaker*: characteristics of women design leaders

The women design leaders in this research show a tendency to adopt caretaker roles, which aligns with findings from previous studies on female leadership (Eagly and Carli, 2003; Ely *et al.*, 2011; Mousavi *et al.*, 2022). One design leader, INT24, described herself not as a manager but as a 'project mother', stating that "everything is your business" and that she would "check their work every two hours", responsible for attending to every detail and taking care of employees' emotions to ensure smooth progress and a high-quality outcomes. Women design leaders often maintain a hands-on role in the implementation, even in senior positions. Therefore, two key characteristics were identified among them: attention to detail and emotional involvement.

Attention to detail refers to their vigilant oversight of project elements to prevent potentially negative issues arising and to ensure high-quality outcomes, as stated by INT24. Similarly, women design leaders show hands-on leadership, demonstrated through active engagement in implementation. This shows a preference for balancing strategic leadership with practical execution, which overlaps with the design leadership type of 'Strategic Orchestrator' (Section 6.2.2).

Emotional involvement is particularly notable among Chinese women design leaders. While most design leaders in the research demonstrated empathy, which is an essential element of design thinking, it was more often demonstrated from a client or user engagement perspective. Women design leaders, however, exhibited a stronger tendency to build a more emotional connection with employees. They not only satisfy the needs of clients but also sensitise themselves to personal feelings and needs of their employees, supporting them in a considerate and supportive manner. For instance, both INT 19 and INT 23 demonstrated this deep personal care. INT 23 stating that she offers help whenever possible, whether it is for "a headache or fever or even financial difficulties", ensuring she does her "utmost to help them". This individualised care is also reflected in professional development; INT19 highlighted the importance of understanding each individual's specific desires, whether for "positional breakthroughs or skill improvements", and adjusting communication styles to fit their personalities.

This characteristic is consistent with the opinion of Chamorro-Premuzic and Gallop (2020). It also strongly aligns with the *Human-centred Leadership* competency (Section 4.5.2.6) and the 'Bridge Builder' design leadership style (Section 6.2.3). INT 23 further argued that while management systems have benefits, "a lack of human touch [人情味] weakens team cohesion". She noted that for smaller design organisations, "blindly copying" rigid management systems is ineffective without this emotional bond. This reliance on emotional approaches reflects the educational gap identified in Section 1.1.3. Because traditional design curricula lack formal business and organisational management training, these leaders frequently utilise a deep emotional bond to build team loyalty. However, INT23 stated that her management style is often "soft-hearted", comparing it to "a loving mother spoils the child [慈母多败儿]." She admitted that while this approach fosters emotional bonds, it can create a dilemma where she is reluctant to be strict even when employees are "taking advantage" of her kindness, leading her to use "clumsy methods" like waiting for them to leave voluntarily rather than firing them directly.

6.4 The Competency Paradox: A Design Education Implication

In the mapping process between the DLCM and perceptions of design-education competencies (Chapter 5), a significant paradox emerges, appearing both across and within different perception groups. For example, certain competencies such as *Communication, Implementation* and *Self-development* are reported as being well-covered in education, yet still described as lacking. Specifically, these competencies are both identified as teachable and emphasised from perspectives of industry, policy and design education; however, stakeholders from the case study and industry, described these same competencies as absent and in need of further emphasis in teaching practice. Thus, a paradox arises: although these competencies are supposedly taught, they are still perceived as absent or underemphasised in this research.

In comparison to competencies that are entirely absent from design education, this paradox suggests that these areas are particularly difficult to address in a way

that fulfils the needs of different stakeholders, especially those from industry. This represents a critical issue that justifies greater attention in the future development of design education. Three reasons for this phenomenon can be identified: (1) a mismatch between surface learning and the need for deep learning; (2) differences between classroom contexts and real-world practice; and (3) individual variation in students' experiences, which affects their performance and outcomes.

6.4.1 Learning approaches: Surface learning and deep learning

A clear mismatch exists between industry expectations and real-world practices within design education, particularly regarding the development of competencies. There is a significant gap between the level at which competencies are taught and the extent to which students actually achieve mastery: simply including a competency in the curriculum hardly guarantees that students have truly learned or mastered it.

This issue was particularly evident from an industry perspective when design leaders recalled their experiences with new employees and talked about their own teaching. They noted that recent graduates often rely heavily on rote memorisation. According to these leaders, such an approach not only limits students' ability to think independently but also deepens their disconnection from commercial realities. Therefore, design leaders' perspectives demonstrate that surface learning is happening in Chinese design education, aligning with four characteristics identified in both the academic literature and by relevant educators: rote memorisation, a focus on performance, a lack of critical thinking and minimal engagement (Distance Learning Institute, 2024; Lindblom-Ylänne *et al.*, 2019).

Reflections from both industry and design education perspectives (Section 5.2), suggest three possible reasons for this surface learning: (1) the curriculum structure and assessment methods, (2) limited teaching resources and (3) a lack of educators with industry experience.

Assessment in design education varies but is usually project-based, with evaluations sometimes based on essays and project outcomes. In design

management education, however, assessment tends to focus on essays as this research shows. In fact, educators recognise the importance of fostering deep learning; however, the essay, as a traditional assessment method, sometimes limits their ambitions and intentions in teaching practice (Usman, 2023). On the one hand, this provides an efficient and standardised method of assessing students' learning outcomes in a straightforward manner, particularly within short courses or terms (Meylani, 2024); and essays can offer greater flexibility and better reflect students' understanding of course content. On the other hand, exams and essays can encourage surface learning (Lindblom-Ylänne *et al.*, 2019), and their quality can vary significantly depending on students' writing skills rather than their actual comprehension or depth of engagement. These assessment methods may lead educators to focus excessively on results, providing instruction that is narrowly aligned with essay topics.

Similarly, regarding **curriculum structure**, this research found that some competencies are primarily based on textbook knowledge. For example, design leaders identified management as an area that is insufficiently addressed, often describing related courses as unengaging. Additionally, they pointed to 'fragmented course design', with course structures poorly integrated with practical contexts, which is consistent with the surface learning approach described by Lindblom-Ylänne *et al*'s. (2019). Also, limited time further constrains the development of these competencies through in-depth practical projects. Even when projects are included, competencies may only be acquired at a surface level if students lack opportunities for reflective study and critical thinking (Lindblom-Ylänne *et al.*, 2019).

This situation is also directly related to educators' **qualifications and industry experience**. In the interviews, design leaders emphasised a noticeable shortage of qualified educators, noting that many educators lack industry experience or have never worked in the field. Given these constraints, along with the nature of assessment methods, teaching approaches often prioritise results over process. As a result, educators may favour more straightforward and efficient methods

such as rote learning or spoon-fed content delivery, rather than emphasising practical application.

Another limitation, highlighted by students and educators from SUAD, is the lack of sufficient teaching resources and industry connections. On the one hand, the availability of resources varies, with some institutions possessing more advanced equipment than others. A lack of specialised equipment can restrict practical learning, forcing educators and students to rely more heavily on theoretical approaches. On the other hand, industry connections remain limited. Reaching out to professionals is sometimes difficult due to their limited availability or salary expectations. Moreover, some professionals may only participate through a one- or two-hour lecture. Although this can broaden students' perspectives, it hardly touches on the core concepts needed for a deep understanding, especially when not complemented by practical work. This issue, which can create a disparity between classroom learning and real-world practice, it also discussed in detail in Section 6.4.2.

Therefore, the primary reasons for surface learning appear to be the curriculum and assessment methods, limited teaching resources and a lack of industry experience among educators. Although students may be introduced to key competencies, opportunities to practise and thoroughly develop these skills remain limited. This has led to dissatisfaction within the industry, with concerns that graduates have limited familiarity with real-world practices and place too much emphasis on aesthetics or isolated design concepts.

6.4.2 Different contexts of the classroom and the real-world

Another misalignment identified by design leaders is the gap between academic content and real-world industry needs, an issue linked to a discussion of industry connections and deep learning in Section 6.4.1. Previous research indicates a significant disparity between the competencies taught in the classroom and those required in practice (Tavitiyaman *et al.*, 2025). In this research, this gap is also evident in the limited availability of practical project opportunities, weak industry partnerships and students' difficulties in applying textbook knowledge to real

situations. Design, as a subject, places considerable emphasis on practical application and cannot rely solely on classroom-based instruction. Nevertheless, multiple groups – including design leaders, students and alumni from the design-management programme – reported that teaching predominantly takes place in the classroom, which differs greatly from the complex reality of the workplace.

For example, regarding *Design Communication*, classroom projects or team assignments often do not translate directly into effective communication with diverse stakeholders. In real-world practice, design leaders encounter a wide variety of communication scenarios, and learning communication solely from textbooks or classroom activities is insufficient. Communication takes place both within and outside the organisation (Offermann *et al.*, 2024). Students need to understand not only how to convey their ideas clearly and effectively to colleagues in the same or different departments, but also how to communicate with supervisors or managers within the organisation. Externally, they must develop the ability to express needs and negotiate with clients or other stakeholders.

Thus, communication skills are far more complex than what is typically encountered in classroom settings, where collaboration usually occurs among classmates who are already familiar with one another and where there is little conflict of interest. As a result, it is difficult for classroom-based learning to be directly applied to managing real teams and dealing with ambiguity in industry settings.

Therefore, what is taught in education does not always align with what industry actually needs or expects. This does not necessarily mean that certain competencies are absent or underemphasised or ignored in design education; rather, there is often a difference in emphasis. For example, project management or other management skills taught in schools may focus primarily on timelines and teamwork, whereas in industry, the emphasis is on budgeting and stakeholder management. This gap can be addressed by developing competencies through real-world experience, such as internships (Nogueira *et al.*, 2021). Applying classroom knowledge in practical settings allows for the development of both

technical and non-technical competencies, which are highly relevant to preparing students for entry into industry (Luk and Chan, 2020).

6.4.3 Diversity in student experiences and perceptions

This paradox can be explained by two aspects of individual experiences and perceptions: variations in students' attitudes toward design and differences in their capacity for self-learning.

On one hand, each student has unique strengths, needs, backgrounds and interests (Gunawardena *et al.*, 2024). This variation affects how competencies are perceived and acquired, making personal development difficult to measure; especially when students learn competencies that require time to manifest (Golden, 2023). In this research, design leaders consistently highlighted variations in students' enthusiasm and motivation, often shaped by their initial goals or reasons for entering the field. This suggests that the level of passion has a significant impact on students' learning. For instance, many design leaders observed that students frequently exhibit low enthusiasm, sometimes choosing this subject merely because it is easier route to pass the *Gaokao* (the Chinese higher education entrance exam).

On the other hand, differences in students' self-learning abilities influence their engagement and the perceived relevance of educational experiences. Students' experiences also vary within team projects, where delegation differs: not all students participate equally and levels of involvement may differ due to personality traits, with some avoiding roles they feel less competent in (e.g. leadership). Furthermore, group collaboration can sometimes result in dominant individuals monopolising communication, leading to uneven development among team members. This can lead to some students rarely using or developing certain skills and consequently graduating without proficiency in those competencies.

6.5 Summary

This chapter has discussed the primary findings related to the DLCM construction (Chapter 4) and secondary findings concerning the alignment of the DLCM competencies with those taught and those absent in design education (Chapter 5).

Based on the DLCM itself, this research identifies the **relationships between categories** and the **interconnections among competencies**: *Knowledge* provides the foundation upon which *Skills* and *Mindset* develop. In turn, *Knowledge* and *Skills* shape a *Mindset*, and this mindset then significantly impacts them. Specifically, three examples of competencies are used to illustrate the interconnections between them. Additionally, **four types of design leaders** emerged from the data, demonstrating different distinctions: the 'Navigator', the 'Strategic Orchestrator', the 'Bridge Builder' and the 'Hybrid Designer'.

As this research is primarily situated in the Chinese context, several **prominent features of Chinese design leadership** were also identified. These include (1) a strong 'stay-behind' tendency associated with invisible leadership; (2) a pronounced emphasis on design expertise; and (3) the critical roles of *'guanxi'* and *Policy Sensitivity* in shaping career paths. Specifically, a characteristic of women design leaders identified, (4) as a '*caretaker*' role, which differs slightly from that of male design leaders and aligns with theories and its findings from previous research on women's leadership characteristics.

In terms of mapping design-education competencies, the discussion also identified the **competency paradox**, wherein certain competencies are perceived differently depending on a perspective. For example, while some competencies are regarded as being taught, other viewpoints suggest that these competencies are absent or not sufficiently addressed. To explore the reasons behind this paradox, three aspects were discussed: (1) learning approaches, particularly the distinction between deep and surface learning; (2) the differing contexts of the classroom and the real world, which contributes to the mismatch between design education and industry needs; and (3) the diversity of students' experiences and

perceptions, which demonstrates how individual differences can affect competency learning outcomes.

Chapter 7: Conclusions

The context of this research emerged from three interconnected perspectives (Section 1.1):

- *Industry*: The professional environment is evolving, leading to a transition in designers' roles and the rise of a distinct design leaders group;
- *Policy*: The government is actively supporting designers in venture creation and has published policies to promote this;
- *Education*: There is a pressing need to update design curricula to cultivate the talent required by both industry and government.

A comprehensive literature review (Section 2.7) revealed a significant gap: a lack of research on design leadership that focuses on the Chinese context, and the absence of a comprehensive competency framework to guide design education. Based on these, three research questions were proposed:

RQ1*: What key competencies are required for effective design leadership in the Chinese context, and how can they be synthesised into a preliminary framework?*

RQ2*: How can a preliminary framework be refined and validated with industry and academic stakeholders to ensure its relevance?*

RQ3*: To what extent does current Chinese design education reflect validated competencies, and what are the key areas for development?*

To address these research questions, the main aim of this research is to develop a design leadership competency model for Chinese design leaders and explore its implications for design education. Specifically, the following **objectives** were set to guide the research step-by-step:

To answer **RQ1**:

Objective 1.1: To identify and define the core competencies that reflect effective design leadership.

Objective 1.2: To synthesise competencies into a preliminary Design Leadership Competency Model (DLCM).

To answer **RQ2**:

Objective 2.1: To validate and refine the DLCM with industry and academic stakeholders.

To answer **RQ3**:

Objective 3.1: To map the competencies from design education, policy and industry against the validated the DLCM.

Objective 3.2: To identify competency gaps and determine the key areas for development in current design education.

The following sections will revisit each research question to illustrate how it was addressed (Section 7.1); and then conclude by outlining this research's contributions (Section 7.2), limitations and opportunities for future work (Section 7.3).

7.1 Revisiting the Research Questions

This section will reflect on how this research addressed its three research questions. It is divided into two parts: the first part addresses RQ1 and RQ2 by discussing the construction of the DLCM; and the second addresses RQ3 by exploring the model's potential for design education.

7.1.1 Construction of the DLCM: for RQ1 and RQ2

The construction and validation of the DLCM (Chapter 4) answered both RQ1 and RQ2. This process involved two key stages: constructing the preliminary model (*Stage 1*) and then validating it (*Stage 2*).

To answer **RQ1: '***What key competencies are required for effective design leadership in the Chinese context, and how can they be synthesised into a preliminary framework?'*, this research involved the construction of the preliminary DLCM (*Stage 1*).

Data were collected and analysed from four triangulated sources: 98 papers from SLR (Section 3.5.2.1); 26 interviews with design leaders (Section 3.5.2.2); 50 job descriptions (Section 3.5.2.3); and 12 grey literature (Section **Error! Reference**

source not found.). Through thematic analysis, an initial pool of competencies was identified from each source (Table 58):17 competencies were drawn from a SLR (Appendix B), 24 from interviews (Appendix C), 23 from job descriptions (Appendix D) and 20 from grey literature (Appendix E).

Table 58: Different amounts of each data source (Stage 1)

Data source	Number of competencies
Systematic Literature Review	17
Interviews with design leaders	24
Job descriptions	23
Grey literature	20

Afterwards, these lists were consolidated by identifying overlaps across the different datasets. A synthesis process was conducted that involved a comparative analysis and iteration (Section 4.3). This process resulted in the preliminary DLCM, which comprises 16 core competencies organised into three categories: skills, knowledge and mindset.

Based on the preliminary DLCM, Section 4.4 validated the model to address **RQ2** (*Stage 2*): **'***How can a preliminary framework be refined and validated with industry and academic stakeholders to ensure its relevance?'* To achieve this, validation feedback was collected from three groups: (1) an expert panel of design leaders and academic staff (Section 3.5.3.1); (2) stakeholders (educators, students and alumni) from the case-study university (Section 3.5.3.2); and (3) a student workshop in the UK (Section 3.5.3.3).

Feedback from these groups led to 10 revisions (Section 4.4, details in Table 59, below). Furthermore, the workshop demonstrated a significant convergence between the competencies identified by UK students and those in the DCLM, revealing the model's transferability, Moreover, this workshop also produced a set of competency cards and exercise templates based on the DLCM, further evidencing its potential as an educational tool.

Table 59: Revision details based on the validation feedback

Participant Group	Revision details
	Business Acumen: Added 'understand and grasp consumer trends and shifting user groups' under the 'Brand & Marketing' sub-competency.

Participant Group	Revision details
Expert survey (design leaders and academic staff)	Creative Problem-Solving: Revised the 'Analytical Ability' sub-competency to include 'the ability to identify the root cause of a problem, distinguishing the 'true' problem from a 'false' one, before attempting to solve it'.
	Executive Leadership: Revised the 'Decision Making' explanation to include the 'ability to make judgements based on a comprehensive understanding of the industry's layout, especially its value chain, and to assess its distinctive features'.
	Creative Problem-Solving: Added a new sub-competency, 'Risk Anticipation', with the explanation: 'Have risk awareness, including design contract risk management, process risk management, delivery and follow-up risk management, business cooperation risk management and financial risk management'.
	Policy Sensitivity: Expanded the 'Legal Acumen' sub-competency, to include 'understanding of design-related legal knowledge' to cover broader IP and regulatory concerns.
	Implementation Ability: Revised the 'Quality Control' sub-competency to include, added a 'design audit' element, with the description 'champion regular design audits, ensure the team understands audit objectives and scope'.
	Human-Centred Leadership: Added a new sub-competency 'Cultivating an Ethical Stance', with the explanation: 'Foster ethical awareness, cultivate an ethical environment, practice ethical design and resolve ethical dilemmas'.
	Executive Leadership: Revised the 'Budgeting and Investment' explanation: 'Demonstrate cost accounting awareness, can direct investment and drafts budget, oversees financial planning and budgeting based on projects'.
Design-management programme (educators, students and alumni)	Creative Problem-Solving: Revised the 'Adaptivity' sub-competency explanation: 'Able to switch between different approaches to solve problems, adjust to new conditions and manage change effectively in evolving circumstances, thereby avoiding failures in dynamic and uncertain situations'.
	Human-Centred Leadership: Added 'Actively take social responsibility' to the 'Cultivating an Ethical Stance' sub-competency.

Therefore, this model was refined and validated by these three groups, thereby answering RQ2. Following validation and revision, the finalised DLCM was structured, consisting of 16 competencies and 58 sub-competencies under three categories (see Figure 47, below):

(1) **Skills**: *Creative Problem-solving, Executive Leadership, Implementation Ability, Goal-setting, Design Communication, Human-centred Leadership, Continuous Learning, Design Sensitivity, Network Building (external), Collaboration (internal)* and *Governance*;

(2) **Knowledge**: *Business Acumen, Policy Sensitivity* and *Design Knowledge*;

(3) **Mindset**: *Design Thinking* and *Systems Thinking*.

A comprehensive summary with detailed explanations for each competency is provided in Section 4.5.

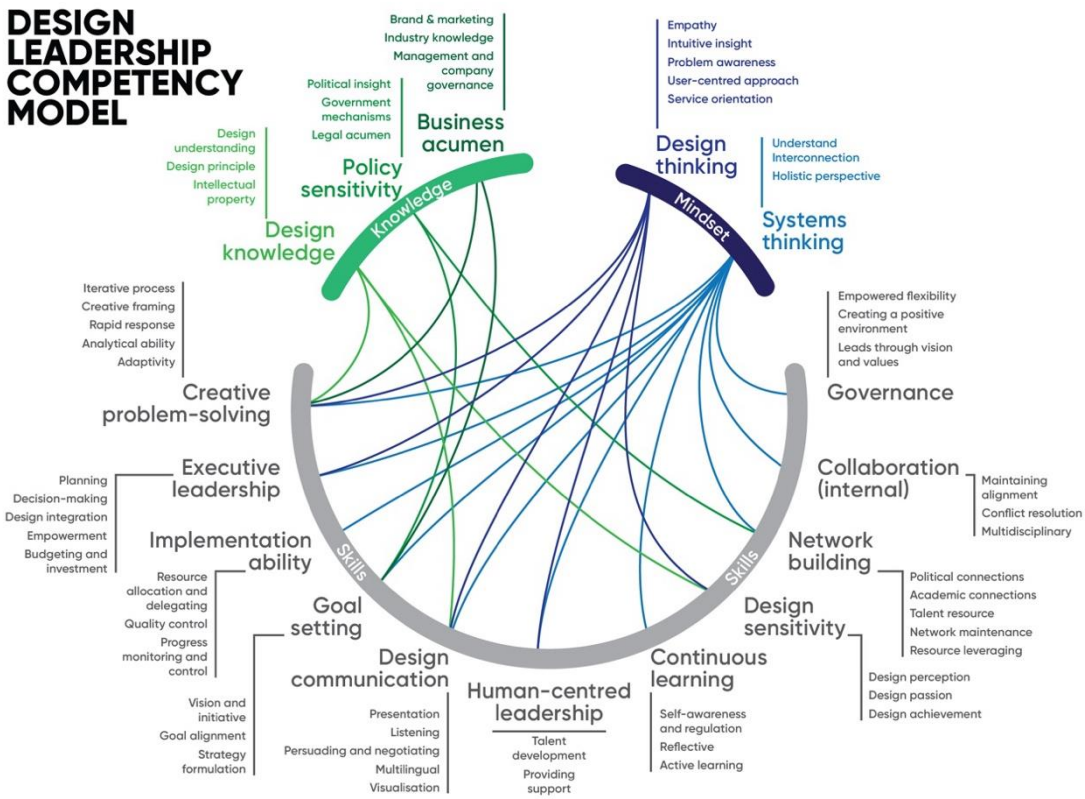


Figure 47: Design Leadership Competency Model

With the construction and validation of the DLCM complete, both RQ1 and RQ2 were resolved. This finalised DLCM provides a foundation for the discussion in Chapter 6, which explored the interconnections within this model, four distinct roles of design leaders and four key features of Chinese design leadership.

The interconnections within the model were discussed from both category level (knowledge, skills and mindsets) and competency level (e.g. *Business Acumen* and *Goal-setting*). For example, *Knowledge* provides the foundation upon which *Skills* and *Mindset* develop. In turn, *Knowledge* and *Skills* shape a *Mindset*, and this mindset then significantly impacts them (Section 6.1).

Four distinct roles of design leaders were identified: the 'Navigator', the 'Strategic Orchestrator', the 'Bridge Builder' and the 'Hybrid Designer' (Section 6.2). Each

role reflects a different emphasis: visionary direction, operational execution, facilitation and expertise-driven leadership. Moreover, four features of Chinese design leadership also emerged with cultural characteristics: (1) a strong preference for invisible leadership; (2) the centrality of design in leadership; (3) the importance of policy and *'guanxi'*; and (4) the *'caretaker'* characteristic of women's design leadership (Section 6.3).

7.1.2 The DLCM in design education: for RQ 3

Chapter 5 addressed **RQ3**: '*To what extent does current Chinese design education reflect validated competencies, and what are the key areas for development?*' This chapter explored which the DLCM competencies are present in design education and which should be enhanced in future.

To answer this question, data were collected from three triangulated sources: desk research of nine DM programmes and 71 design programmes totalling from 21 universities (Section 3.5.4.1), complemented by a case study of a DM programme (Section 3.5.3.2); 52 policy documents (Section 3.5.4.2); and 26 interview transcripts from design leaders (Section 3.5.2.2).

After a template analysis and an open-coding process as a complement, the competencies taught and those absent or underemphasised were identified from three perspectives: selected DM and design programmes (Section 5.2; Appendix G and H), policies (Section 5.3; Appendix I) and industry (Section 5.4; Appendix J and K). A summary of these findings is listed in Table 60.

Table 60: Different amounts of each data source (Stage 3)

Data source	Number of taught competencies	Number of absent or underemphasised competencies
DM and design programmes	21	9
Policies	16	\
Industry	16	15

Based on the identified competencies, a two-part analysis consisting of a horizontal review and a vertical analysis was adopted (Section 5.5). First, Section 5.5.1 explored competency mapping horizontally, identifying the coverage within each of three perspectives (design education, design policy and industry). Second,

Section 5.5.2 performed a vertical, comparative analysis across these perspectives.

At this stage, data normalisation was employed based on the frequency of each competency from three perspectives (details in Section 5.1.2). Based on the results, competencies were classified into three levels of coverage: 'high', 'medium' and 'low'. Furthermore, an 'unmentioned' category was noted from an industry perspective, representing competencies that design leaders did not mention during the interview. Additionally, a 'difference' category was also identified in the design education data, representing cases where a single competency showed varying levels of coverage across different data sources. For example, while design programmes reported high coverage for *Design Thinking*, data from DM programmes and the case study indicated only low and medium levels.

To answer RQ3, the findings of a *horizontal review* (Table 61) showed the coverage of each competency within design education. While high and medium coverage indicated that some competencies are well-addressed, the findings also highlighted areas for future enhancement. Competencies with low coverage, including *Policy Sensitivity, Goal-setting, Human-centred Leadership, Governance, Systems Thinking* and *Network Building (External)*, should be emphasised more in future design education.

Table 61: Findings for competency coverage (to aid horizontal review)

Data source	Level of coverage	Competencies
Design Education	High	*Business Acumen* *Design Knowledge* *Creative Problem-solving* *Executive Leadership* *Implementation Ability* *Design Communication* *Design Sensitivity* *Collaboration (internal)*
	Medium	*Continuous Learning* *Systems Thinking*
	Low	*Policy Sensitivity* *Goal-setting* *Human-centred Leadership* *Network Building (external)*
Policy	High	*Business Acumen* *Policy Sensitivity* *Creative Problem-solving*

Data source	Level of coverage	Competencies
		Executive Leadership *Implementation Ability* *Goal-setting* *Human-centred Leadership* *Design Sensitivity* *Network Building (external)* *Collaboration (internal)* *Design Thinking*
	Medium	*Design Communication* *Continuous Learning* *Systems Thinking* *Design Knowledge*
	Low	*Governance*
Industry	High	*Design Knowledge* *Creative Problem-solving* *Continuous Learning* *Design Sensitivity* *Design Thinking*
	Medium	*Business Acumen* *Implementation Ability* *Goal-setting* *Design Communication* *Collaboration (internal)*
	Low	*Policy Sensitivity* *Systems Thinking*

On the other hand, the *vertical analysis* revealed the alignment of each competency across different perspectives (Table 62 below). For example, the different perceptions of *Business Acumen* demonstrated a key misalignment: while both policy and design-education programmes reported high coverage, industry perceived only medium coverage, and design leaders identified a major gap in its cultivation. This showed that design education believed it was adequately covering *Business Acumen*, while industry felt it was still insufficient. This misalignment requires design education to place more focus on the depth and industry alignment of this competency in the future.

Generally, this vertical analysis leads to three main conclusions: (1) a paradox exists between stated coverage and existing gaps; (2) policy objectives are strong despite a lack of educational coverage; and (3) design leaders perceive a significant gap between business and design expertise (Section 5.5.2.2).

Table 62: Visualisation of the findings (to aid vertical analysis)

	Stakeholder Alignment			Gap Identification	
Competency	Policy Requirement	Industry Perception	Education Coverage	Absent in	Absent in Industry
Business Acumen	High	Medium	High	Medium	High
Policy Sensitivity	High	Low	Low	N/A	Low
Design Knowledge	Medium	High	High	N/A	Medium
Creative Problem-solving	High	High	High	N/A	High
Executive Leadership	High	N/A	High	N/A	N/A
Implementation	High	Medium	High	High	High
Goal-setting	High	Medium	Low	N/A	Low
Design Communication	Medium	Medium	High	Medium	Low
Human-centred Leadership	High	N/A	Low	N/A	Medium
Continuous Learning	Medium	High	Medium	N/A	High
Design Sensitivity	High	High	High	High	High
Network Building	High	N/A	Low	N/A	N/A
Collaboration	High	Medium	High	High	Low
Governance	Low	N/A	N/A	N/A	N/A
Design Thinking	High	High	Difference	N/A	Medium
Systems Thinking	Medium	Low	Medium	N/A	N/A

N/A = Not Applicable or data unavailable
Difference = Discrepancy in coverage levels

7.2 Contribution to New Knowledge

The DLCM offers both theoretical and practical contributions. Theoretically, it advances the academic understanding of design leadership and provides a new framework for future research. Practically, this model can be used in both industry and academic contexts. For companies, it can showcase the attributes of successful design leaders or be developed as an evaluation tool for human resources. In design education, it can be developed into a teaching tool or used to create a competency-based curriculum.

7.2.1 Contribution to theoretical knowledge

This research provides an in-depth understanding of design leadership in the Chinese context by developing the DLCM. The literature review revealed that research focusing on the intersection of design leadership and competency

models is rarely (Section 2.7.1) and that very little work has focused on China (Section 2.7.2).

The DLCM enriches understanding of the characteristics of Chinese design leadership and identifies four types of design leadership, further advancing scholarship in this area. By bridging leadership studies and design research, the work contributes to both literatures, particularly the literature on competency models.

7.2.1.1 Positioning the DLCM in the literature

The significant contribution of the DLCM is its position at the intersection of different literary fields. This research reveals interconnections with both management and design literatures in four key ways: (1) it converges with generic, entrepreneur-related competency models; (2) it overlaps with established leadership styles, such as transformational, shared and servant leadership; (3) it is firmly rooted in design leadership and design management research, a foundation established through its SLR-based construction; and (4) it demonstrates a uniqueness specific to design, categorising competencies as either 'design-core' (focus on design expertise) or 'design-tendency' (behavioural competencies guided by *Design Thinking*).

Convergence with generic frameworks

The DLCM shows significant convergence when compared with other generic frameworks. This comparison considers five key models from the literature (Section 2.5.3): the Iceberg Model, the HCM, the GECM, EntreComp and the Korn Ferry Leadership Framework.

Structurally, the Iceberg Model serves as a foundation for the DLCM, as its division of competencies aligns with the DLCM's categories of skills, knowledge and mindset. In terms of content, the DLCM's competencies overlap with the core elements of the other frameworks. For example, it incorporates key GECM competencies such as *vision*, *opportunity seeking*, *concern for high quality of work*, *systematic planning*, *problem-solving*, *influence (including persuasion)* and *implementation* skills. Similarly, the DLCM includes the majority of core

competencies from the EntreComp across all three clusters (*into action, resources* and *idea or opportunities*). it also aligns with the Korn Ferry Leadership Framework, incorporating competencies, such as *building collaborative relationship*, *understanding the business* and *manging execution*.

However, the DLCM also diverges from these frameworks in a key way. Unlike GECM and other that position personality and attitude as core components, which is a view also found in design management research (Kang *et al.*, 2015), the DLCM does not include *personal qualities* like personality and personal maturity. This decision was made because the model is intended for both design education and human-resources, where such abstract competencies are difficult to cultivate and assess (explained in Section 4.2.22). Although not included in the DLCM, these identified personality traits were listed in the aforementioned section for reference.

Alignment with established leadership theories

The DLCM's competencies reveal significant overlaps with established leadership theories, suggesting that effective design leadership is a synthesis of various styles. For example, the DLCM competency of *Human-centred Leadership*, which focuses on offering guidance to enhance employee skills and helping them overcome challenges, shares core characteristics with servant, transformational and shared leadership (Section 2.1.1).

These connections are particularly relevant because these leadership styles are already studied within the design field for fostering the kind of collaborative and empowering environment that innovation requires (Golden, 2016; Hoch, 2013; Lehtonen, 2024; Mokhber *et al.*, 2018; Wang *et al.*, 2019). The DLCM, therefore, provides a specific competency-based view of how these broader leadership principles are applied in a design context.

While design leadership can be seen as a distinct practice, this model demonstrates that it is consistent with, and largely involves, a broader synthesis of other well-established leadership approaches.

Grounded in a systematic review of design research

Most competencies in the DLCM are strongly supported by existing research in the design leadership and management, as the model was constructed from a comprehensive SLR (Appendix B). Several key examples illustrate this alignment.

The DLCM's emphasis on *Human-centred Leadership* was identified by in numerous studies (e.g. Alawad *et al.*, 2017; Gemser *et al.*, 2022; Kang *et al.*, 2015; Lee *et al.*, 2022 etc.). Lee *et al.* (2022), for instance, found that design leadership involves strong employee-centred operations, while Joziasse (2023) describes the design leaders as a 'capability developer' – both core aspects of this competency. Similarly, the importance of *Systems Thinking* is strongly supported by Gemser et al. (2023) and Joziasse (2023), who argue it is crucial navigating complexity and functioning as a 'Bridge Builder' (Section 6.2.3). The *Governance* competency, also reinforces findings from Choudhary and Shahid (2025) and Pinheiro and Franqueira's (2024) on the link between design leadership and organisational innovation.

However, the DLCM also contributes a *Policy Sensitivity* competency that appears to be uniquely critical to the Chinese context. This competency was absent from the body of literature in SLR for this research. Most studies focus on how design leaders participate and behave within an organisation or design project, with little consideration for relationship building or policy related concerns.

This gap highlights a key finding: while *Policy Sensitivity* is universally important, its significance is amplified in China, where the business environment and company operations are highly connected with government policy, a point supported by Hu *et al* (2024). This sensitivity is also intrinsically linked to *'guanxi'* – a cultural characteristic impacting venture creation (as discussed in Section 6.3.3). Consequently, the DLCM's inclusion of both *Policy Sensitivity* and *Network Building* highlighting their critical importance within Chinese design leadership.

The 'design-core' and 'design-tendency' distinction

Unlike other generic models, the DLCM demonstrates its unique design-specific characteristics. As discussed in Section 6.1, the relationship between knowledge,

skills and mindset within the DLCM follows a deep interrelation: *Knowledge* provides the foundation upon which *Skills* and *Mindset* develop. In turn, *Knowledge* and *Skills* shape a *Mindset*, and this mindset then significantly impacts them.

While the framework of skills, knowledge and mindset is well-established, the unique contribution of the DLCM is its holistic integration of competencies derived from a design leadership context. Its novelty lies not in the categories themselves, but in competencies with distinct design characteristics. For instance, design leaders show a strong tendency towards *Design Thinking*, which guides and impacts the other two dimensions. Consequently, while some generic competencies like *Business Acumen* are applied traditionally, many others within the DLCM are expressed in a uniquely design oriented way.

In this sense, the model provides a division between two distinct types of competencies: **'design core'** and '**design tendency'**. This division helps to differentiate what a design leader knows and what they instinctively do. In detail, 'design-core' competencies focused on design expertise, represent the competencies that a professional has to be considered an expert in the design field (e.g. *Design Sensitivity, Design Knowledge, Design Thinking*). In contrast, 'design-tendency' competencies are behavioural and application oriented. They are guided by *Design Thinking*, which influences daily actions and leads to different tendencies compared with other business managers and leaders (e.g. *Design Communication* and *Creative Problem-solving*). For example, a general competency like '*Communication*' is adapted to includes design skills such as storytelling. This design-oriented adaptation of leadership behaviours can be seen as an important novel finding of this research.

These two categories are supported by existing literature. The 'design-tendency' competencies align with the research of Miller and Moultrie (2013a, 2013b), who identified design leader roles that exhibit these tendencies, such as providing holistic design direction and fostering design collaboration. Similarly, the 'design-core' competencies, including *Design Sensitivity, Design Knowledge* and *Design Thinking*, have been proposed in other key research (e.g. Carneiro *et al.*, 2021;

Tompkins, 2024; Valencia *et al.*, 2021). For example, Joziasse (2023) argues that a deep understanding of customer behaviour, which is a sub-competency of *Design Knowledge*, is a critical opportunity for future leaders. This emphasis was evident across all data sources in this study, confirming the foundational importance of these core skills.

7.2.1.2 Scientific rigour

This research used triangulation to ensure the robustness of its findings (Section 3.5.1). During the model construction, data were triangulated from an SLR, interviews, grey literature and job descriptions. For the model validation stage, feedback was gathered from an expert panel, stakeholders (educators, students and alumni) from the case study and a workshop in UK. Finally, to map the competencies to education, data were collected from three perspectives: design education, policy and industry. This multi-source approach ensures the DLCM goes beyond a singular dimension, unlike research that relies on a single method. For example, the construction stage integrates job roles and other contextual factors, therefore keeping a comprehensive vision of the model. Furthermore, the DLCM's comprehensiveness is enhanced by its inclusion of skills, knowledge and the often-intangible category of mindset.

While subjectivity is unavoidable when abstracting competencies, this research implemented steps to mitigate bias. Although experts feedback provides a certain level of professionalism, it can carry potential biases. Therefore, during the validation stage, the DLCM was validated using feedback from a range of stakeholders, including design leaders, academic staff, educators, students and alumni. This use of triangulation during validation ensured that each competency achieved a high degree of validity.

7.2.2 Practical contribution

The practical contribution of the DLCM can be found in three aspects: (1) the corporate applications, (2) educational applications and (3) its replicability and transferability.

On the one hand, given the diverse characteristics and strategies of companies, the model can be applied to **human resources** and **talent development**, especially for companies at different stages of growth. From an HR perspective, it can be used to define recruitment frameworks, that helping organisations identify and select candidates with the potential on design leadership. It also provides a clear structure for creating long-term leadership development strategies and mapping out career pathways for employees. Moreover, this model can be used in commercial training and talent development. The DLCM can directly inform the design of commercial Continuing Professional Development (CPD) courses and internal training programmes. By focusing on the core competencies identified in this research, companies can create more targeted and effective training that addresses specific skills gaps in their design and leadership teams.

On the other hand, the DLCM can also be applied in **design education** in three ways: (1) it can be used as an evaluation tool to identify competency gaps in current curricula, as was explored in this research (Chapter 5); (2) it can be developed as a classroom teaching tool to foster student self-awareness and clarify career paths or aspirations, a potential that was demonstrated in Section 4.4.3; and (3) it can inform the development of a new, competency-based curriculum for design leadership, updating its learning objectives and guiding the creation of specific modules.

Finally, a key strength of the DLCM also lies in its replicability and transferability. While this model is constructed from a perspective of design leaders in China, it is also founded on core leadership principles that are broadly applicable. Its adaptivity is derived from its focus on competencies rather than rigid processes. For application in different cultural contexts or in other industries, practitioners can use the model's core framework as a foundation and customise specific competencies within the model to align with their business situations and sector-specific demands. This ensures that the model remains a relevant and dynamic tool, not a static one. Therefore, from these dual perspectives of corporate and educational application, this model demonstrates a strong and critical pragmatic contribution.

7.3 Limitations and Future Research

Although this research used a triangulated, qualitative analysis and sought to proceed in a comprehensive and scientific way, it has limitations. Aligning with these limitations, future research directions also can be identified in four aspects.

Regarding the **validation** of the DLCM, this research collected feedback from three main groups: (1) an expert panel, including design leaders and academic staff, (2) stakeholders (educators, students and alumni) from the case study and (3) a student workshop in UK. While this covers a relatively comprehensive range of perspectives, feedback from the employees of those design leaders should also be considered. Therefore, in future research, employees could be another group included to revise and improve the DCLM.

Methodologically, this research primarily employed qualitative methods, which were important for constructing the necessary depth of the DLCM. Acknowledging the limitations of this approach in terms of population research, a quantitative approach could be the next step for two key reasons: (1) Validation: it would test and validate the DLCM with a larger, more diverse sample of stakeholders; moreover, gathering broader perceptions and feedback would improve the model's concreteness and practicality; (2) Application: it would enable the calculation of weights for different competencies, making the DLCM more readily usable as a practical tool in both design-education and human-resource contexts, for example, a competency-based curriculum, a formal evaluation framework or a strategic human-resources instrument for companies.

Moreover, in terms of **transferability**, this research only validated the DLCM at one workshop in UK university, which indicates its applicability in a UK context. The workshop provided preliminary cross-context evidence of this transferability. Furthermore, as no related Chinese research was found during the SLR stage, its results were primarily generated from international studies. As a result, the DLCM reveals a strong convergence with the SLR findings (and other generic competency models discussed in Section 7.2.1.1), which also indicates the potential transferability of this model. Therefore, the author views the DLCM as a contextual

model with potential for transferability. However, this is not to claim that the DLCM has full transferability or generalisability, as its application remains limited in other contexts and situations. From this perspective, more practical work needs to be done in future research, which includes considering validation in different contexts, such as different institutions and countries. The model would need to be revised for application elsewhere, as different contexts have their own unique characteristics. As it is difficult for this model to cover all these detailed characteristics, future research could investigate the DLCM within different categories and in more specific ways to allow for specialised application.

Finally, the DLCM is intended to be a **dynamic and evolving model**. While this research includes an analysis of successful grey literature and the latest job description requirements (its limitation was clarified in Section 3.5.2.3), the model should be updated with continuous research to better reflect the future changes in design leadership. With technological development and the evolution of society, there will be new impacts on any design leadership model. As one educator noted, the DLCM must maintain its flexibility and adaptability (Section 4.4.2.1). Therefore, to maintain the dynamic characteristic of the DLCM, future research should focus on its ongoing changes and adjustments in relation to design leadership, integrating it into HR and design education practices. To this end, organisations can use technological tools to develop and update the DLCM, as this can facilitate the process.

In conclusion, the significance of this thesis lies in its potential to shape the future of both industry and education. The proposed DLCM translates a complex and abstract concept into a tangible framework, outlining the competencies needed for effective design leadership. Moreover, this model can serve as both a contribution to academic theory and a practical tool for educators, managers and leaders.

Appendix A: List of research methodology

Methodology	Number	Example research	Detail	Number	Example research	Detail
Qualitative	1	Goto (2024)	Exploratory case study; interviews	17	Koomans & Hilders (2016)	interviews
	2	Valentino et al. (2023)	Multiple case study, Semi-structured interviews	18	Nam and Jung (2010)	Case study
	3	Magistretti et al. (2023)	Exploratory multiple-case study, interviews	19	Riedel et al. (2009)	Multiple-case study, Semi-structured interviews
	4	Tung (2022)	Longitudinal, multiple-case study, Interviews	20	Nielsen et al. (2018)	Phenomenological observation study, Interviews
	5	Ouano & Mazzarella (2021)	Comparative case study; Semi-structured interviews	21	Valencia et al. (2021, 2023)	Constructivist Grounded Theory (CGT), Interviews
	6	Qonatirila et al. (2020)	Semi-structured interviews	22	Maciver (2012, 2016)	Multiple case study, Interviews
	7	Cautela et al. (2017)	Multiple case study; interviews	23	Miller & Moultrie (2013a)	Semi-structured Interviews
	8	Miller & Moultrie (2013b)	Semi-structured interviews	24	Gemser et al. (2023)	Interviews
	9	Attia (2019)	Grounded theory, Interviews	25	Crilly (2018)	Interviews
	10	Tan and Chapman (2017)	Grounded theory; interviews	26	Kaygan et al. (2023)	Semi-structured interviews
	11	Hung et al. (2016)	Case study; interviews	27	Lindberg et al. (2024)	Co-design workshop
	12	Galli et al. (2017)	Workshop	28	Seidelin & Sivertsen (2022)	Three-year action research
	13	Pinheiro & Franqueira (2022)	Case study and Systematic literature review (SLR)	29	Gaglione & Gaziulusoy (2019)	Interview, Observation
	14	Møller Nielsen et al. (2013)	Case study and interview	30	Cheng & Wang (2017)	Literature review and Interviews
	15	Klenner et al. (2022)	Interviews	31	Han and Bromilow (2010)	interviews
	16	Ariffin et al. (2019)	Interviews			
Quantitative	1	Choudhary & Shahid (2025)	Cross-sectional survey	8	Kasapoğlu (2011)	Survey
	2	Christensen et al. (2023)	Survey (Structural Equation Modelling: SEM)	9	Rajabalinejad & Spitas (2012)	Survey
	3	Waqas et al. (2022)	Survey	10	Cheung et al. (2001)	Survey
	4	Liu et al. (2022)	Survey	11	Muenjohn and McMurray (2017)	Survey
	5	Muenjohn et al. (2021)	Cross-country survey	12	Vogel et al. (2023)	Two-phase experimental design, survey
	6	Tcheparova & Doychinov (2024)	Survey (includes online Interview survey)	13	Rodriguez-Martinez et al. (2013)	Survey
	7	Ip and Liang (2021)	Survey			
Mixed-methods	1	Lee and Cassidy (2007)	Structured Semantic Analysis (SSA) and grounded theory (Interviews, Survey)			
	2	Lee et al. (2022)	Survey and Interviews			
	3	Liang et al. (2022)	Focus groups, Survey			
Conceptual	1	Ng (2022)	Literature review	16	Fixson & Read (2012)	Conceptual paper
	2	Topalian (1984)	Conceptual paper	17	Turner (2013)	Reflective
	3	Lili et al. (2009)	Conceptual paper	18	Cooper (2012)	Conceptual and reflective editorial
	4	Gronn (2002)	Conceptual paper	19	O'Grady (2012)	Conceptual paper
	5	Zheng (2022)	Literature review	20	Topalian (2012)	Conceptual paper
	6	Zheng and Liu (2022)	Systematic literature review (SLR)	21	Hargadon (2005)	Conceptual paper
	7	Telalbasic (2021)	Conceptual review paper	22	Topalian (2010)	Conceptual paper
	8	Hsieh et al. (2021)	Literature review	23	Bianchini & Maffei (2012)	Conceptual paper
	9	Ren and Bao (2014)	Literature review	24	Gloppen (2009)	Conceptual paper with literature
	10	Gunes (2012)	Literature review	25	McLoone (2009)	Reflective
	11	Lin and Cheng (2013)	Literature review	26	Walton (2008)	Conceptual editorial
	12	Joziasse (2023)	Conceptual abd Reflective	27	Topalian (1990)	Conceptual paper
	13	Joziasse (2011)	Literature review	28	Turner and Topalian (2002)	Conceptual paper
	14	Yuille et al. (2014)	Conceptual	29	Topalian (1986)	Conceptual paper
	15	Joziasse (2023)	Reflective, conceptual	30	Frishberg & Convertino (2020)	Reflective

Appendix B: Competencies identified from the Systematic Literature Review

Themes	Sub-themes	Codes	References	Connect with the DLCM
Skills	**Design Sensitivity**	Design skills	(Alawad *et al.*, 2017; Byrne *et al.*, 2009; Cabral *et al.*, 2020; Goldsby *et al.*, 2017; Galli *et al.*, 2017; Gray, 2014; Green *et al.*, 2010; Miller and Moultrie, 2013a; Joziasse, 2011b; Miller and Moultrie, 2013b; Koomans and Hilders, 2016; Kumar *et al.*, 2016; Kang *et al.*, 2015; Tan and Chapman, 2017; Hsieh *et al.*, 2021a; Valencia *et al.*, 2021; Magistretti *et al.*, 2023; Petrakis *et al.*, 2021; Troxler and Wolf, 2017; Tompkins, 2024; Berglund *et al.*, 2020; Kiernan *et al.*, 2022; Møller Nielsen *et al.*, 2013; Lamba and Jain, 2022; Qonatirila *et al.*, 2020; Heim, 2022; Lee *et al.*, 2018)	Design Sensitivity (Section 4.5.2.8)
		Design integration	(Lee and Cassidy, 2007; Gloppen, 2009a; Lee *et al.*, 2018; Lili *et al.*, 2009; Micheli *et al.*, 2018; Topalian, 2012, 2002)	
		Design evaluation	(Micheli *et al.*, 2018; Miller and Moultrie, 2013b; Lee *et al.*, 2018)	
	Design Communication	Design Communication	(Attia, 2019; Baars and Rüedi, 2016; Frishberg and Convertino, 2020; Han and Bromilow, 2010; Koomans and Hilders, 2016; Lee and Cassidy, 2007; Lindberg *et al.*, 2024; Miller and Moultrie, 2013a; Pinheiro and Franqueira, 2022b; Ren and Bao, 2014; Seidelin and Moeslund Sivertsen, 2022; Tan and Chapman, 2017; Tcheparova and Doychinov, 2024; Valencia *et al.*, 2021)	Design Communication (Section 4.5.2.5)
	Design Collaboration	Collaboration and co-creation	(Attia, 2019; Buehring and de Mozota, 2022; Cabral *et al.*, 2020; Calabretta *et al.*, 2017; Collins, 2015; Cheng and Wang, 2017; Cooper, 2012; Eckert *et al.*, 2022; Frishberg and Convertino, 2020; Hu and Zhang, 2022; Kiernan *et al.*, 2022; Koomans and Hilders, 2016; Maciver, 2016; Muenjohn *et al.*, 2013; Pinheiro and Franqueira, 2024; Tcheparova and Doychinov, 2024; Tung, 2022)	Collaboration (Internal) (Section 4.5.2.10); Network Building (External) (Section 4.5.2.9)
		Relationship and Network	(Lee and Cassidy, 2007; Joziasse, 2011b; Tan and Chapman, 2017; Tung, 2022; Collins, 2015; Frishberg and Convertino, 2020; Leick *et al.*, 2023; Ouano and Mazzarella, 2021; Goto, 2024; Eckert *et al.*, 2022; Collins, 2015; Yuille *et al.*, 2014; Bianchini and Maffei, 2012; Wenting *et al.*, 2011; Pinheiro and Franqueira, 2022b; Troxler and Wolf, 2017; Lamba and Jain, 2022)	
		Interdisciplinary	(Lee and Cassidy, 2007; Lili *et al.*, 2009; Topalian, 2012; Green *et al.*, 2010; Kang *et al.*, 2015; Baars and Rüedi, 2016; Galli *et al.*, 2017; Kiernan *et al.*, 2022; Pinheiro and Franqueira, 2024)	
		Aligning and stakeholder management	(Baars and Rüedi, 2016; Cheng and Wang, 2017; Frishberg and Convertino, 2020; Gloppen, 2009a; Maciver, 2012; Magistretti *et al.*, 2023; Micheli *et al.*, 2018; Miller and Moultrie, 2013b; Topalian, 2012; Turner, 2013; Yuille *et al.*, 2014)	
	Training	Inspire, Motivate and Mentorship	(Topalian, 1990; Lee and Cassidy, 2007; Manu, 2006; Hsieh *et al.*, 2021a; Joziasse, 2011b; Muenjohn *et al.*, 2013; Miller and Moultrie, 2013b; Baars and Rüedi, 2016; Calabretta *et al.*, 2017; Gemser *et al.*, 2023; Hugentobler, 2017; Micheli *et al.*, 2018; Cheng and Wang, 2017; Lamba and Jain, 2022; Lindberg *et al.*, 2024; Tan and Chapman, 2017; Gray, 2014; Kasapoğlu, 2011)	Human-centred Leadership (Section 4.5.2.6)
		Support	(Topalian, 1990; Lee and Cassidy, 2007; Byrne *et al.*, 2009; Baars and Rüedi, 2016)	
		Development of others	(Turner and Topalian, 2002; Lee and Cassidy, 2007; Lili *et al.*, 2009; Han and Bromilow, 2010; Topalian, 2012; Muenjohn *et al.*, 2013; Miller and Moultrie, 2013b; Baars and Rüedi, 2016)	
		Cultivation Design Leaders and Designers	(Turner and Topalian, 2002; Topalian, 2012; Magistretti *et al.*, 2023)	
	Directing Investment	Directing Investment	(Turner and Topalian, 2002; Lili *et al.*, 2009; Muenjohn *et al.*, 2013; Micheli *et al.*, 2018)	Executive Leadership (Section 4.5.2.2)
	Problem-Solving	Creative Framing	(Byrne *et al.*, 2009; Cautela *et al.*, 2017; Kang *et al.*, 2015; Koomans and Hilders, 2016; Magistretti *et al.*, 2023; Møller Nielsen *et al.*, 2013; Schmitt *et al.*, 2016; Yamauchi, 2009)	Creative Problem-solving (Section 4.5.2.1)
	Seeking Change	Seeking Change	(Lee and Cassidy, 2007; Joziasse, 2011b; Miller and Moultrie, 2013a; Hsieh *et al.*, 2021a)	Goal Setting (Section 4.5.2.4)
	Continuous learning	Self-Improvement	(Han and Bromilow, 2010; Koomans and Hilders, 2016; Lee and Cassidy, 2007; Lili *et al.*, 2009; Muenjohn *et al.*, 2013; Miller and Moultrie, 2013a; Turner and Topalian, 2002; Topalian, 2012; Goldsby *et al.*, 2017; Christensen *et al.*, 2023)	Continuous Learning (Section 4.5.2.7)
		Self-Regulation	(Lee and Cassidy, 2007)	
		Learning Ability	(Manu, 2006; Galli *et al.*, 2017; Han and Bromilow, 2010)	
		Methodology	(Lili *et al.*, 2009)	

Themes	Sub-themes	Codes	References	Connect with the DLCM
	Goal-setting	Visionary	Broader and future vision (Choudhary and Shahid, 2025; Cooper, 2012; Galli *et al.*, 2017; Han and Bromilow, 2010; Hsieh *et al.*, 2021a; Joziasse, 2011b; Koomans and Hilders, 2016; Kumar *et al.*, 2016; Muenjohn *et al.*, 2013; Pinheiro and Franqueira, 2024; Telalbasic, 2021; Topalian, 1990, 2012; Turner and Topalian, 2002); Sets the clear vision or objectives (Best, 2006b; Choudhary and Shahid, 2025; Galli *et al.*, 2017; Gloppen, 2009a; Goto, 2024; Hargadon, 2005; Joziasse, 2011b; Koomans and Hilders, 2016; Lee and Cassidy, 2007; Lindberg *et al.*, 2024; Muenjohn and McMurray, 2017; Pinheiro and Franqueira, 2024; Ren and Bao, 2014; Telalbasic, 2021; Topalian, 2012; Turner and Topalian, 2002; Valencia *et al.*, 2021; Waqas *et al.*, 2022); Chance Seeking (Miller and Moultrie, 2013a).	Goal-setting (Section 4.5.2.4)
		Strategy	Strategy Formation (Byrne *et al.*, 2009; Hsieh *et al.*, 2021a; Maciver, 2012; Miller and Moultrie, 2013a; Muenjohn *et al.*, 2013; Nam and Jung, 2008; Turner and Topalian, 2002; Vogel *et al.*, 2023; Walls, 2021); Direction (Consistent) (Calabretta *et al.*, 2017; Gemser *et al.*, 2023; Joziasse, 2011b; Miller and Moultrie, 2013b; Muenjohn *et al.*, 2013; Rajabalinejad and Spitas, 2012; Vogel *et al.*, 2023)	
	Planning and implementation	Implementation	(Miller and Moultrie, 2013a)	Implementation Ability (Section 4.5.2.3); Governance (Section 4.5.2.11)
		Transformation	(Manu, 2006; Hsieh *et al.*, 2021a; Berglund *et al.*, 2020; Zheng, 2022; Zheng and Liu, 2022)	
		Environment Building	(Baars and Rüedi, 2016; Miller and Moultrie, 2013b; Lee and Cassidy, 2007)	
		Delegation	(Lee and Cassidy, 2007; Miller and Moultrie, 2013a; Topalian, 1990, 2012)	
		Recognising talent	(Lee and Cassidy, 2007; Miller and Moultrie, 2013b)	
		Resource	(Lee and Cassidy, 2007; Lee *et al.*, 2018)	
Mindset	**Systematic Thinking**	Holistic vision	(Buehring and de Mozota, 2022; Cooper, 2012; Falay *et al.*, 2007; Hsieh *et al.*, 2021a; Hung *et al.*, 2016; Kang *et al.*, 2015; Lamba and Jain, 2022; Lee *et al.*, 2018; Ouano and Mazzarella, 2021; Rajabalinejad and Spitas, 2012; Telalbasic, 2021; Topalian, 2012; Yamauchi, 2009)	Systems Thinking (Section 4.5.3.2)
	Contrarian Thinking	Contrarian Thinking	(Tan and Chapman, 2017; Yamauchi, 2009)	-
	Design thinking	Intuitive Thinking	(Kang *et al.*, 2015)	Design Thinking (Section 4.5.3.1)
		User-Centred (Client Focus)	(Chou, 2018; Gerlitz, 2016; Gloppen, 2009a; Han and Bromilow, 2010; Hu and Zhang, 2022; Howard and Melles, 2011; Joziasse, 2011b; Khoshabeh and Gessner, 2021; Klenner *et al.*, 2022; Lake *et al.*, 2016; Lee *et al.*, 2018; Tompkins, 2024; Turner and Topalian, 2002)	
	Business Awareness	Business Awareness	(Chou, 2018; Christensen *et al.*, 2023; Ekman and Ekman, 2009; Falay *et al.*, 2007; Gunes, 2012; Han and Bromilow, 2010; Heim, 2022; Ip and Liang, 2021; Liang *et al.*, 2022; Qonatirila *et al.*, 2020; Telalbasic, 2021; Tompkins, 2024; Turner and Topalian, 2002; Valencia *et al.*, 2023; Vere De, 2014)	Business Acumen (Section 4.5.1.1)
Knowledge	**Business knowledge**	Business knowledge	(Baars and Rüedi, 2016; Falay *et al.*, 2007; Heim, 2022; Kang *et al.*, 2015; Koomans and Hilders, 2016; Miller and Moultrie, 2013a; Qonatirila *et al.*, 2020; Topalian, 2012)	Business Acumen (Section 4.5.1.1)
	Management knowledge	Process Management relevant	(Baars and Rüedi, 2016; Green *et al.*, 2010; Kiernan *et al.*, 2022; Lee and Cassidy, 2007; Lee *et al.*, 2018; Micheli *et al.*, 2018)	
		Management knowledge	(Green *et al.*, 2010; Baars and Rüedi, 2016)	
	Design Knowledge	Design Knowledge	(Alawad *et al.*, 2017; Baars and Rüedi, 2016; Byrne *et al.*, 2009; Galli *et al.*, 2017; Green *et al.*, 2010; Joziasse, 2011b; Hsieh *et al.*, 2021a; Kang *et al.*, 2015; Kumar *et al.*, 2016; Miller and Moultrie, 2013a; Yukl, 2013; Tan and Chapman, 2017)	Design Knowledge (Section 4.5.1.3)

Appendix C: Competencies identified from interviews with design leaders

Competency	Definitions	Design leaders	Examples	Connect with the DLCM
Implementation ability	Setting goals, making decisions and organising tasks; The ability to see the different aspects of the thing and transform it into another; Can transfer ideas into operation and apply ideas to reality.	INT 2, 5, 6, 8, 9, 14, 15, 16, 18, 20, 24	*"You have to see the whole picture … lay out a clear direction so the team can rally around a shared target, and move forward." (INT 17)* *"People assume plastic pollutes while paper is eco-friendly, yet if the package is reusable, paper may cause more waste than plastic." (INT 3)* *"Both the usage scenario and even the discarded scenario are designed." (INT 3)* *"It is obvious: design leader's product and implementation capability are stronger. What they put into concrete form is stronger;* *"What is a designer's greatest strength? It's the different ways you can realise something." (INT 16)* *"When you magnify design without limit, you drill into details, but at the same time you have to think again about its rationality and value in business … whether your investment will bring a return." (INT 20)*	Implementation Ability (Section 4.5.2.3)
Problem-solving	Can identify and solve problems in time; Generates new ideas or innovative solutions; Able to explore and switch different approaches to solve problems or achieve a goal; Can make confident and correct judgements of the major decision-making.	INT 5, 6, 10, 11,15, 16,17,18, 19, 21, 23, 24, 26	*"I can make decisions very quickly … we can solve problems very fast." (INT 5)* *"As small problems arise at work … I tackle the small issues in my own tasks, and by methods such as setting alarms to check work progress on schedule." (INT 24)* *"We distilled leadership's decision-making logic and used algorithms to pre-allocate goods." (INT 6)* *"You can brainstorm inside the proposal, have free-wheeling ideas … and also do very rational, objective management work." (INT 17)* *"Brand and marketing are on one side, design and creativity on the other … but I can make decisions quickly, because brand and marketing are my work, and I come from a design and creative background." (INT5)* *"I truly understand these things, so the decisions I make are very accurate. When you manage the team you save a lot of effort, and everyone trusts you more." (INT 14)*	Creative Problem-solving (Section 4.5.2.1)
Planning ability	Ability to collect, process, and interpret data for problem-solving; Have a structured approach to planning and problem-solving, analysed in a logical sequence, and addressed methodically; Can identify the mission clearly and fairly allocate to suitable people who fit with it.	INT1, 2, 4, 6, 7, 8, 9, 13, 17, 22, 23	*"I need to do some industry analysis, so data acquisition is my strong strength, then help to solve problem." (INT 14)* *"Even if you enter another industry, if you've developed a set of problem-solving methods, you can still perform well." (INT 17)* *"I wasn't sure who was best, so I devised a competition. Everyone produced the same page and presented their plan … they judged whose thinking and design fit best." (INT 13)* *"We look at strengths in each dimension, then make an overall evaluation." (INT 2)*	Executive Leadership (Section 4.5.2.2)
Risk awareness	Sensing potential risks and preparing for them, and responding quickly when unexpected events occur.	INT 3, 5, 9, 18, 19, 20, 22, 23, 25, 26	*"If the worst happens, what do I do? How do I deal with this?" (INT 18)*	Creative Problem-solving (Section 4.5.2.1)
Goal-setting	Have a clear and achievable goal; Detect new opportunities recognises long-term opportunities at the early stage; Have a broad, clear vision for the future.	INT 3, 5, 6, 8, 9, 14, 17, 21, 22, 24, 25, 26	*"In your career planning … you should have a clear goal and direction, and that direction and goal won't really change … I'm now in landscape design. To reach that goal, I started interning in my junior year… ; You want to be innovation-focused, design-focused, execution-focused? … If you focus on one point and excel, it may slowly become your personal strength;* *Become a well-rounded person … move up to manager or coordinator … eventually reach master level or branch out in another direction…"(INT 17)*	Goal-setting (Section 4.5.2.4)
Design communication	Good at presenting and can express own ideas clearly.	INT 1, 2, 3, 4, 6, 8, 9, 10, 12, 15, 20, 22, 25	*"All designers have trouble making themselves clear … but I think I can sharp and to the point;* *Besides a design strategy, you need a communication strategy … you have to manage client expectations;* *From my angle, and with my understanding, I might stand for most people's sense of taste." (INT 20)*	Design Communication (Section 4.5.2.5)
Mentorship	See other people's needs and offer help actively and acting as a mentor to guide or support employees when they need it; Participate in design education.	INT1, 4, 5, 6, 8, 9, 11, 12, 14, 16, 18, 20, 21, 22, 24, 26	*"How do you earn people's trust? By helping them…. I love asking what you're working on these days, any new insights or interesting ideas;* *He would ask you right away: how's your current project going? I'm not checking progress; I'm looking for fresh insights. This isn't just management or leadership, you have to go beyond its limits." (INT 16)*	Human-centred Leadership (Section 4.5.2.6)
Self-regulation	Recognise the need for improvement, set high standards for their own performance and work hard to meet them; Continually seek change and push boundaries for personal or organisational development; Habitually reflect deeply on the situations they encounter.	INT1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26	*"I hope I can become both, but I still need to improve. After all, I've met some really impressive people, so I feel there's still room for progress." (INT 1)* *"I think there are things I experience every day that I could share with you. Now that the questions are done, I feel there's still a lot to improve, the points for improvement are in there. It's fine; I'll think more about it later." (INT 11)* *"I want to take on projects. I'm worried that after moving into management, if you don't stay in touch with the business, you'll forget things or make slip-ups. So I require myself to take at least two large projects every year, personally serving as project lead to follow through and to see what parts of the business lately need changes or adjustments." (INT 14)*	Continuous Learning (Section 4.5.2.7)
Continuous learning	Have strong learning skills, include acquiring, retaining, and applying new knowledge and techniques; Can actively improve themselves through various methods;	INT 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26	*"On top of that, I'm in a new and unfamiliar environment, so I've had to swallow my pride, keep asking questions, keep learning, keep taking notes, and feel my way forward step by step." (INT 7)* *"That's why I'm still iterating and learning. I've been on the road a lot, visiting different markets to understand local conditions so I can make informed decisions and act on them." (INT 14)*	Continuous Learning (Section 4.5.2.7)

Competency	Definitions	Design leaders	Examples	Connect with the DLCM
	Routinely reflect on past experiences or mistakes and excel at drawing conclusions from them.		*"Honestly, project coordination carries across domains – even in areas like water infrastructure. Keep taking on projects and learning as you go; once you get over the initial hump, everything starts to fall into place." (INT 24)* *"If it's straightforward and I can do it on my own, I'll self-study and shore up my skills." (INT 10)*	
Collaboration	Internal and external cooperation; The promotion of cross-disciplinary work.	INT 1, 2, 6, 9, 11, 14, 15, 16, 18, 20, 22, 24	*"On top of finishing our current tasks, everyone has to invest extra effort so we can build this together; I don't want this to become a one-man show [一言堂]... my personal utopia; we stress win-win cooperation." (INT 2)* *"Let's see if we can work together and achieve mutual benefit, seek help or banding together for warmth [抱团取暖]." (INT 11)*	Collaboration (Internal) (Section 4.5.2.10)
Environment building	Create an empowering, psychologically safe, and flexible workplace	INT 1, 7, 8, 10, 12, 13, 14, 15, 16, 17, 18, 20	*"I might be able to deliver a 90/100. If my team delivers an 80, I'm happy. I won't swoop in to push it to a 90, unless it's a mission-critical project. Otherwise you rob people of a sense of accomplishment, and how can they grow? The key is to delegate appropriately." (INT 12)* *"Exactly. Whenever we can pitch in, we do. If anyone's under the weather, dealing with family matters, short on cash, or just needs a hand, the two of us will help however we can." (INT 23)* *"They generally prefer flexible work arrangements. They want autonomy over their schedules, choosing when to visit the site and when to focus on drawings. As a manager, I should grant that freedom, rather than enforcing strict 9-to-6 hours or pushing overtime. It's okay if they start later or leave later. After all, they're juggling both design tasks and on-site responsibilities." (INT 7)*	Governance (Section 4.5.2.11)
Training	The ability to review and analyse employees' strengths and weaknesses; Offering opportunities to train and improve employees' skills in both business and design; Finding ways to align employees' development needs with the organisation's strategy.	INT 1, 4, 5, 6, 8, 9, 11, 12, 14, 16, 18, 20, 21, 22, 24, 26	*"During that period the overall quality of drawings was lacking, so I raised the scoring requirement for presentation sheets. Once everyone knows the standard, they focus their effort and study accordingly." (INT 20)*	Human-centred Leadership (Section 4.5.2.6)
Political power	Keen insight of political aspect; The ability that identifies and integrates different resources that benefit, use small efforts to gain bigger.	INT 5, 12, 17, 18, 23, 25, 26	*"The government doesn't like these young idol [小鲜肉] anymore ... I actually agree with this policy; But what if that isn't the case? What if the government supports a different approach?" (INT 5)* *"If you can obtain first-hand information ... with an information gap over others, you may not need to do some of the low-level work; It is always the rule-makers, rather than the rule-followers, who enjoy more resources." (INT 17)* *"Leveraging momentum means learning to ride on the social trend, the industry trend ... to accomplish things with half the effort and twice the outcome." (INT 18)*	Policy Sensitivity (Section 4.5.1.2); Network Building (Section 4.5.2.9)
Business knowledge	Understanding of business context includes needs and operations	INT 1, 2, 9, 12, 14, 15, 22, 24, 25	*"I think one key is being able to understand why we do something, and to know more about what happens at the grassroots [基层] level. I worked my way up from the front line, so I have a solid grounding among the rank and file." (INT 14)*	Business Acumen (Section 4.5.1.1)
Industry knowledge	Understanding industry changing	INT 1, 2, 3, 5, 9, 10, 12, 14, 15, 17, 22, 24, 25	*"The economy hasn't been good these past two years", if the downturn continues, it will affect "80 percent of design institutes or designers; they all need to think about what's next; Large-scale infrastructure and real-estate booms spawned many design firms." (INT 17)*	
Design philosophy and principles	Philosophical thoughts are generated from design-relevant experience including education and work; The principles or guidelines that they insist on in design.	INT 3, 4, 9, 17, 18, 20	*"Insisting on the features that must not be added." (INT 3)*	Design Knowledge (Section 4.5.1.3)
Design patent (IP)	Importance of protecting design patents and safeguarding their creations.	INT 4, 5, 9, 12, 15, 19, 25, 26	*"I've applied for patents, it's useless. Once it reaches the legal stage, problems arise; There are many knock-offs now, we fight counterfeits every day. It's extremely hard; the cost of defending rights is high [维权成本高] and that results are unsatisfactory." (INT 3)*	
Rule and regulation	Includes contract clauses and legal knowledge.	INT 2, 6, 7, 10, 11, 13, 21, 24, 25	*"You must be familiar with the traps hidden in contract clauses." (INT 24)*	Policy Sensitivity (Section 4.5.1.2)
Policy	Policy knowledge and understand how it can shape the present and future	INT 1, 2, 3, 5, 6, 9, 10, 11, 12, 13, 14, 15, 17, 18, 22, 23, 24, 25, 26	*"Whether you run a company or pursue a venture in China, it is largely policy-driven; If you aren't forced to the edge, you won't head in that direction, circumstances create heroes [时势造英])." (INT 17)*	
Systems thinking	Good at finding connections and integrating different aspects; Integrate every aspect of planning in advance; Keep the big picture and its interdependencies in mind during action.	INT 1, 2, 3, 7, 12, 13, 14, 17, 18, 19, 24	*"Within a company, industrial design is only one small segment ... I can view design across the entire chain; it runs through every stage from the very beginning to the very end;* *At the very beginning, you need to frame the whole picture ... only then do you decide what kind of procurement is required and what kind of engineers are needed;* *You may not know every detail, but you need a framework first and then refine it." (INT 3)*	Systems Thinking (Section 4.5.3.2)
Design thinking	Good at distilling things into small pieces and planning them step by step; Iterative and validation; User-centred	INT 1, 3, 4, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 19, 20, 24, 26	*"When a client buys your design, it's more like an investment than a simple purchase. An investment needs a return – if I spend one yuan, I expect to earn two, three, or five yuan back, or at least avoid a loss. As a designer, my job is to convince the client that by investing in my design, they can obtain a higher return." (INT 18)*	Design Thinking (Section 4.5.3.1)
Visionary thinking	Good at comparing things with pros and cons; Seeing things in a developed vision can know the future trends from the past and current.	INT 3, 5, 6, 8, 9, 14, 17, 21, 22, 24, 25, 26	*"As a sceptic, ... I pay attention to the business thinking and design thinking needs of companies ... I summarise where the strengths of successful firms match us, where they don't, and how we decide if we should change." (INT 22)*	Goal-setting (Section 4.5.2.4)
Empiricism	Emphasis on mean empiricism or empirical evidence.	INT 16	*"Design leader should be an empiricist... When the evidence is abundant, it doesn't stifle creativity, it inspires it." (INT 16)*	Continuous Learning (Section 4.5.2.7)
Service thinking	Highlight on service and client focus	INT 1, 2, 3, 6, 10, 11, 12, 14, 16, 17, 18, 19, 20, 21, 23	*"If a problem comes up and the other side promises to be on site in ten hours, I'll write eight ... I'll even base myself on site." (INT 11)*	Design Thinking (Section 4.5.3.1)

Appendix D: Competencies identified from job descriptions

Competency	Definitions	Job descriptions	Connection with the DLCM
Problem-solving	Anticipate issues, diagnose root causes, and resolve them efficiently through independent reasoning and sound decisions.	*JD1, JD2, JD5, JD6, JD7, JD8, JD10, JD11, JD12, JD13, JD14, JD15, JD18, JD22, JD24, JD26, JD27, JD34, JD38, JD49*	Creative Problem-solving (Section 4.5.2.1)
Risk awareness	Anticipate, assess, and mitigate risks; adapt and respond promptly to emergencies.	*JD5, JD8, JD17, JD18, JD28, JD29, JD32*	
Design communication	Convey vision and information clearly and persuasively to diverse stakeholders through speaking, writing, presenting and negotiation.	*JD1, JD2, JD3, JD5, JD6, JD7, JD9, JD10, JD11, JD15, JD17, JD18, JD22, JD23, JD24, JD25, JD26, JD27, JD30, JD31, JD32, JD34, JD38, JD39, JD40, JD41, JD44, JD47, JD48, JD49*	Design Communication (Section 4.5.2.5)
Collaboration	Build trust and coordinate across internal and external stakeholders to achieve shared goals; manage relationships and teamwork effectively.	*JD1, JD2, JD3, JD5, JD6, JD8, JD9, JD10, JD16, JD17, JD18, JD20, JD23, JD26, JD27, JD31, JD32, JD38, JD49, JD50*	Collaboration (internal) (Section 4.5.2.10); Network Building (Section 4.5.2.9)
Planning and implementation	Translate strategy into roadmaps and actionable plans, then lead delivery by coordinating people and resources while controlling scope, time, cost and risk.	*JD1, JD3, JD5, JD7, JD8, JD9, JD10, JD11, JD16, JD17, JD20, JD21, JD22, JD24, JD29, JD30, JD31, JD33, JD34, JD36, JD48, JD49*	Executive Leadership (Section 4.5.2.2); Implementation Ability (Section 4.5.2.3)
Goal-setting	Strategic direction strategy-making ability	*JD1, JD5, JD6, JD7, JD8, JD11, JD16, JD17, JD19, JD20, JD21, JD22, JD27, JD29, JD31, JD32, JD34, JD35, JD48, JD50*	Goal-setting (Section 4.5.2.4)
Visionary	Define clear long-term objectives	*JD2, JD5, JD7, JD8, JD10, JD16, JD18, JD22, JD26, JD31, JD35, JD38, JD39, JD40, JD44, JD46*	
Continuous learning	Learning ability, lifelong learning, comprehension and reflection	*JD5, JD15, JD33, JD39, JD44*	Continuous Learning (Section 4.5.2.7)
Management and leadership	Have team management ability and master the art of management	*JD1, JD2, JD3, JD4, JD5, JD6, JD7, JD8, JD9, JD10, JD11, JD12, JD13, JD15, JD16, JD17, JD18, JD19, JD20, JD21, JD22, JD23, JD24, JD25, JD26, JD27, JD28, JD29, JD30, JD31, JD32, JD33, JD34, JD36, JD37, JD38, JD39, JD42, JD43, JD44, JD45, JD 46, JD47, JD48, JD49, JD50*	Executive Leadership (Section 4.5.2.2); Implementation Ability (Section 4.5.2.3); Acumen of Business (Section 4.5.1.1)
Design	Solid design foundation	*JD1, JD2, JD3, JD9, JD10, JD11, JD12, JD13, JD14, JD15, JD17, JD18, JD23, JD24, JD25, JD26, JD29, JD30, JD31, JD35, JD36, JD37, JD38, JD39, JD40, JD 41, JD43, JD44, JD45, JD46, JD47, JD48*	Design Sensitivity (Section 4.5.2.8)
Training	Developing talent and environment building	*JD5, JD15, JD20, JD22, JD25, JD28, JD29, JD30, JD32, JD34, JD48, JD49*	Human-centred Leadership (Section 4.5.2.6)
Political power	Navigate and leverage university/government systems and policy networks	*JD4, JD7, JD8, JD12, JD13, JD17, JD22, JD24, JD26, JD34*	Policy Sensitivity (Section 4.5.1.2); Network Building (Section 4.5.2.9)
Business knowledge	Understanding of marketing knowledge, such as market channels	*JD8, JD9, JD17, JD18, JD19, JD22*	Business Acumen (Section 4.5.1.1)
Industry knowledge	Understanding of industry	*JD1, JD3, JD5, JD6, JD8, JD9, JD10, JD11, JD12, JD13, JD15, JD16, JD18, JD20, JD22, JD27, JD31, JD32, JD35, JD38, JD40*	
Management knowledge	Understanding of business management	*JD6, JD8, JD9, JD18, JD19, JD24, JD27, JD30*	
Design knowledge	Comprehensive knowledge of design methods and processes	*JD5, JD7, JD15, JD17, JD18, JD23, JD25, JD38*	Design Knowledge (Section 4.5.1.3)

Competency	Definitions	Job descriptions	Connection with the DLCM
Qualification	Recognised professional title, relevant certifications and appropriate educational background.	*JD1, JD2, JD3, JD5, JD6, JD7, JD8, JD9, JD10, JD11, JD12, JD13, JD14, JD15, JD16, JD18, JD19, JD22, JD23, JD24, JD26, JD27, JD28, JD29, JD30, JD31, JD34, JD36, JD38, JD39, JD40, JD42, JD44, JD45, JD46, JD47, JD49*	Design Sensitivity (Section 4.5.2.8); Design Knowledge (Section 4.5.1.3)
Accomplishment	Proven history and award of leading significant projects and teams	*JD2, JD7, JD8, JD14, JD15, JD24, JD26, JD29, JD36, JD40, JD41*	
Policy, rule and regulation	Understand and navigate government systems, laws, industry standards and investor requirements	*JD3, JD5, JD7, JD8, JD9, JD10, JD15, JD21, JD22, JD24, JD26, JD32*	Policy Sensitivity (Section 4.5.1.2)
Design thinking	Human-centred, iterative problem framing and solving	*JD3, JD5, JD7, JD10, JD19, JD29, JD39, JD40, JD43, JD49*	Design Thinking (Section 4.5.3.1)
Systems thinking	Big-picture view of enterprise and complex projects	*JD29, JD35*	Systems Thinking (Section 4.5.3.2)
Business thinking	Market awareness and marketing-led planning	*JD29, JD37, JD49*	Business Acumen (Section 4.5.1.1); Goal-setting (Section 4.5.2.4); Executive Leadership (Section 4.5.2.2); Implementation Ability (Section 4.5.2.3)
Entrepreneur spirituality	Explore and execute opportunities balancing value	*JD8*	
Digital mindset	Attitudes and behaviours that use data, algorithms and AI to spot opportunities, make user-centred, data-driven decisions and create value through rapid experimentation and platform fluency.	*JD7*	-

Appendix E: Competencies identified from grey literature

Competency	Definitions	Grey literature	Example cases	Connection with the DLCM
Adaptivity	Able to switch different approaches to solve problems; adjust to new conditions and manage change effectively in evolving circumstances	GL 5	*Even when I first started, my boss wasn't sure what tasks to assign me, so I proactively sought to understand and adapt to various types of work and environments. After working for a few years, I accumulated experience and skills in design and developed a deep passion and interest in industrial design. Ultimately, what's most important is adapting to different environments and conditions, so you can find a rhythm that suits you best. (Case 5,2024)*	Creative Problem-solving (Section 4.5.2.1)
Collaboration	Ability to maintain strong network of connections and resources in both industry and society; interdisciplinary collaboration;	GL 4, 5, 6, 7, 9 and 12	*Only when everyone returns to a shared objective, creating user value, can people leverage their unique experiences and methods to effectively resolve issues, despite differences in their disciplinary backgrounds and knowledge systems. (GL 12, 2024)* *Through this re-examination of multidisciplinary collaboration, we can rapidly bring experience and product design projects to life, instead of leaving them solely at the conceptual stage. Moreover, these initiatives extend beyond internal Lenovo projects, involving close collaboration with external ecosystem partners as well. (GL 9, 2024)* *At that time, design projects ranged from tens of thousands to hundreds of thousands or even over a million yuan. Through these collaborations, I built deep relationships with many peers in China's industrial design community, enabling extensive interaction, learning and knowledge exchange. (GL 4, 2024)*	Collaboration (internal) (Section 4.5.2.10); Network Building (Section 4.5.2.9)
Communication and persuasion	Communication strategy, persuasive ability, interpretation and clear conveyance, and the channels used within a company.	GL 2, 4, 7 and 12	*Many of my friends laughed at me, saying I was too naive. However, I still managed to get his phone number through various means, though the call was hung up as soon as it connected. Later, I tried adding him on WeChat, changing my approach every two or three days, but I still failed. Eventually, after going around in circles, I created a group with seven or eight acquaintances, finally managing to bring Ji into it. (GL 2, 2024)*	Design Communication (Section 4.5.2.5)
Continuous learning	Eagerness and intention to acquire new knowledge, make ongoing progress, engage in cross-disciplinary studies, and learn from peers	GL 1, 3, 4, 5, 6 and 12	*In many constrained propositions, there are numerous open possibilities and an infinite amount of things to learn. (GL 5, 2024)*	Continuous Learning (Section 4.5.2.7)
Design skills	Strong design abilities including foundational skills, craftsmanship, practical design and integration with marketing and product innovation.	GL 1, 2, 4, 5, 7 and 10	*Zheng (GL 1) creatively used waste cardboard boxes to make a portable portfolio case, demonstrating strong fundamentals and craftsmanship that helped him secure a scholarship; Qian (GL 4), who learned practical, hands-on skills from Japanese designers, such as producing tangible products through actual design practice (e.g. building bathtubs), shows proficiency in applied craftsmanship; and Chen (GL 2) diligently produced extensive foundational exercises (thick stacks of designs), reflecting solid basic design skills gained through disciplined practice.*	Design Sensitivity (Section 4.5.2.8)
Quality Control	Ensure that all aspects of their work meet high standards and are free of errors, and they show a strong attention to detail.	GL 1, 5, 7, 8, 11 and 12	*Use of German-imported materials, multiple iterations of mold development and advanced hot-runner technology illustrate a commitment to top-tier quality, and he believes that ensuring oral-care products exceed the quality standards of even tech products (like smartphones) reflects an uncompromising approach. (GL 7, 2024)*	Implementation Ability (Section 4.5.2.3)
Goal-setting	Set goals before launching their own businesses or at the preliminary stage.	GL 1, 2, 3, 6, 7, 8, 11 and 12	*Whether you're a designer or a CEO, you need forward-thinking vision to anticipate trends. Would you really want to ride first class on the Titanic? If you're in an industry that's about to sink, having a competitive edge ultimately leads nowhere. (GL 2, 2024)* *First, focus on doing product entrepreneurship well. Because it's most aligned with manufacturing, I want to leverage China's comparative advantages to get things done. (GL 6, 2024)* *Drucker once said it very well: The most inefficient thing in the world is doing the wrong thing efficiently... You must thoroughly understand your goals before working hard. (GL 12, 2024)*	Goal-setting (Section 4.5.2.4)
Implementation	Proactive prototyping and testing; balancing vision with feasibility, and careful planning from the start	GL 1, 2, 3, 4 and 12	*Zheng shared a story about himself: he insisted on building a working prototype for testing in an auto-sales environment, even though the assignment required only a paper-based design. (GL 1, 2024)*	Implementation Ability (Section 4.5.2.3)
Problem-solving	The ability to identify issues and explore solutions	GLs 1, 2, 3, 4, 11 and 12	*Zheng noticed shortcomings in a widely used yet basic product, the cardboard sunshade, and developed a solution tailored to local conditions, namely California's long hours of sunshine. (GL 1, 2024)*	Creative Problem-solving (Section 4.5.2.1)
Risk awareness	The ability to identify emerging threats early, learn from past crises and design flexible responses that protect the organisation.	GLs 1, 9, 10 and 12	*It is important for us to recognise and acknowledge crises and risks. (GL 12, 2024)*	
Self-regulation	Managing one's emotions, thoughts and behaviours in pursuit of long-term goals, with a tendency to explore personal boundaries and step out of comfort zones.	GLs 1, 2, 3, 4, 8, 10, 11 and 12	*Zheng discovered errors in an earlier patent-application process, which eventually required him to spend 60 % of his time dealing with lawsuits. (This setback forced him to developed stronger self-regulation by implementing more rigorous review processes to avoid future mistakes,) (GL 1, 2024)*	Continuous Learning (Section 4.5.2.7)

Competency	Definitions	Grey literature	Example cases	Connection with the DLCM
Business knowledge	Knowledge and approaches of consumer behaviour, investment and business environment	GL 9,12	*Yan focuses on macro-level technological developments (bandwidth acceleration, cloud, etc.) that shape new business models and strategic innovation, positioning these trends as opportunities for the company's strategy. (GL 12, 2024)*	Business Acumen (Section 4.5.1.1)
Industry knowledge	Industry structure, production and supply-chain insights, and competitive landscapes	GL 5,7	*Zhang discusses market fragmentation and finds that the toothbrush industry, an 'ant market', suffers from low brand share and low brand loyalty. He also observes that consumers often show confusion about product selection. Therefore, based on market and consumer behaviour, he emphasises that this long-standing, stagnated industry presents opportunities for innovation. (GL 7, 2024)*	
Design knowledge	Design methods, materials and manufacturing, constraints, and IP that enables translating concepts into market-ready products	GL 1, 2, 4, 7 and 8	*Qian applies technical and craft expertise to the Asian Games torch design. He explains how he moved from initial exploration to an advanced grasp of techniques, showcasing the depth of skill involved in creating complex products. (GL 4, 2024)*	Design Knowledge (Section 4.5.1.3)
Management knowledge	Knowledge of economics, finance, organisational behaviour, and strategic management	GL 4, 12	*Qian said that he acquired knowledge of economics, finance, organisational behaviour, and strategic management. (GL 4, 2024)*	Business Acumen (Section 4.5.1.1)
Multidisciplinary	Understanding knowledge across multiple areas, not just a single focus	GL 4, 5,10	*Similarly, design leaders in GL 5 and 10 emphasise deep specialization in a core design discipline (the vertical) while also cultivating a broad set of complementary knowledge and skills (the horizontal).*	Business Acumen (Section 4.5.1.1); Collaboration (Internal) (Section 4.5.2.10)
Business thinking	Commercial and market awareness, signalling a business-oriented mindset	GL 1, 3, 4, 5, 11 and 12	*Zheng observed that startup products, such as the foldable sunshade, possessed strong market potential in terms of design, usability, and future returns. (GL 1, 2024)*	Business Acumen (Section 4.5.1.1); Goal-setting (Section 4.5.2.4); Executive Leadership (Section 4.5.2.2); Implementation Ability (Section 4.5.2.3)
Design thinking	User-centred approaches, iterative processes, and cross-functional collaboration to find innovative solutions	GL 1, 3, 4, 5, 7, 8, 9, 10, 11 and 12	*Tong stated that he placed design at the heart of the company: his very first hire was an industrial designer, and designers now make up as much as 60% of the workforce. (GL 3, 2024)* *Qian noted that his team always went through multiple rounds of product iteration, continually upgrading their supply chain. (GL 4, 2024)*	Design Thinking (Section 4.5.3.1)
Systems thinking	Holistic view of interrelated components; global perspective and the importance of a collaborative ecosystem	GL 2, 3, 4, 7, 8, 10, 11 and 12	*Except for extracting oil and refining plastic pellets, we handle every step related to shoes after the pellets are produced! This allows our company to establish a closed-loop, fully integrated supply chain… (GL 3, 2024)* *In today's globalised world, each country has its own unique advantages. For any industry to thrive, we need to stay open-minded and draw on strengths from around the globe. We shouldn't isolate ourselves; instead, we should lay out different plans across various industries. (GL 3, 2024)* *I happened to be transferred from GAC Trumpchi to GAC Toyota for a rotation, moving from design and R&D into enterprise management, which allowed me to think about problems from a more macro perspective. (GL 10, 2024)* *Design development is just one part of the overall product development process, leaving designers with very limited control over the product. But I personally yearn for the opportunity to drive the entire development from start to finish. (GL 7, 2024)*	Systems Thinking (Section 4.5.3.2)
Ethical mindset	Sense of social responsibility and commitment to the community	GL 3, 9 and 12	*Wang said that they collaborate with NGOs, teaching children from rural areas to use creative AI tools and helping people with physical limitations see hope through assistive technologies. (GL 9, 2024)*	Human-centred Leadership (Section 4.5.2.6)

Appendix F: The result of normalisation

The DLCM	Policy	Design programmes			Industry	Absent or underemphasised Competencies	
		Design	DM	SUAD		Education	Industry
1. Business Acumen	1	0.91290323	0.521875	0.56363636	0.25882353	0.28	0.28
(1) Brand & Marketing	0.35875	0.33225806	0.15625	0.20909091			0.1
(2) Industry Knowledge	0.5275	0.41935484	0.128125	0.18181818	0.20588235		0.1
(3) Management and Company Governance	0.145	0.12903226	0.38125	0.31818182	0.1		0.1
2. Policy Sensitivity	0.3925	0.15806452	0.128125	0.15454545	0.1		0.1
(1) Political Insight	0.235		0.128125	0.15454545			0.1
(2) Government Mechanism	0.1675						
(3) Legal Acumen	0.1675						
3. Design Knowledge	0.2125	0.50645161	0.465625	0.34545455	0.41764706		0.19
(1) Design Understanding	0.2125	0.21612903		0.20909091	0.25882353		
(2) Design Principle		0.21612903		0.20909091	0.20588235		
(3) Intellectual Property							
4. Creative Problem-solving	0.85375	0.56451613	0.83125	0.64545455	0.52352941		0.37
(1) Iterative Process	0.1						
(2) Creative Framing	0.13375						
(3) Rapid Response							
(4) Analytical ability	0.1	0.12903226	0.465625	0.34545455	0.52352941		
(5) Adaptivity		0.18709677					
(6) Risk Anticipation	0.11125						
5. Executive leadership	0.56125	0.39032258	0.6625	0.45454545			
(1) Planning	0.1	0.21612903	0.60625	0.42727273			
(2) Decision Making	0.11125	0.15806452	0.128125	0.1			
(3) Design Integration		0.1					
(4) Empowerment							
(5) Budgeting and Investment			0.1				
6. Implementation Ability	0.82	0.62258065	0.2125	0.37272727	0.20588235	1	0.28
(1) Resource Allocation and Delegating					0.1		
(2) Quality Control	0.1225	0.15806452	0.1				
(3) Progress Monitoring and Control	0.1225			0.12727273			0.19
7. Goal-setting	0.60625	0.68064516	0.128125	0.12727273	0.20588235		0.1
(1) Visionary and Initiative	0.26875	0.68064516	0.1	0.12727273			0.1
(2) Goal alignment					0.20588235		
(3) Strategy Formulating	0.145		0.1				
8. Design Communication	0.26875	0.62258065	1	1	0.25882353	0.28	0.1
(1) Presentation		0.1	0.353125	0.34545455	0.15294118		
(2) Listening		0.1					
(3) Persuading and Negotiating					0.1		
(4) Multilingual	0.26875	0.12903226	0.15625				
(5) Visualisation		0.21612903			0.1		

9. Human-centred Leadership	0.31375	0.4483871	0.1	0.12727273			0.19
(1) Talent development							
(2) Providing Support	0.11125						0.1
(3) Ethical Cultivation	0.29125	0.4483871	0.1	0.12727273			0.1
10. Continuous Learning	0.2125	0.39032258	0.409375	0.34545455	0.36470588		1
(1) Self-awareness and regulation	0.1	0.1					0.19
(2) Reflective	0.13375				0.20588235		0.28
(3) Active learning	0.15625	0.36129032	0.325	0.34545455	0.20588235		0.55
11. Design Sensitivity	0.53875	1	0.465625	0.4	1	0.1	0.46
(1) Design Perception	0.46	0.21612903	0.15625	0.15454545	0.41764706	0.1	0.46
(2) Design Passion							
(3) Design Achievement	0.1675	0.4483871	0.38125	0.31818182	0.62941176		
12. Network Building (External)	0.7975	0.18709677	0.128125				
(1) Political Connection							
(2) Academic Connection							
(3) Talent Resource							
(4) Network Maintenance	0.4375						
(5) Resource Leveraging	0.13375	0.18709677	0.128125				
13. Collaboration (Internal)	0.3925	0.47741935	0.746875	0.78181818	0.20588235	0.37	0.1
(1) Maintain Alignment	0.1225	0.15806452	0.184375	0.15454545			0.1
(2) Addresses Conflicts							
(3) Multidisciplinary	0.35875					0.37	
14. Governance	0.11125						
(1) Empowered flexibility							
(2) Creating a positive environment							
(3) Leads through vision and values							
15. Design Thinking	0.3475	0.59354839	0.1	0.23636364	0.31176471		0.19
(1) Problem Awareness							
(2) Empathy							
(3) Intuitive Insight					0.1		
(4) User-Centred Approach	0.1225	0.24516129			0.1		0.1
(5) Service Orientation	0.11125	0.15806452					0.1
16. Systems Thinking	0.1675	0.36129032	0.15625	0.20909091	0.15294118		
(1) Understanding Interconnection	0.13375						
(2) Holistic Perspective							

Appendix G: Teaching competencies identified from design education

Competency	Definition/Summary	Code	Design programme (University)	DM programme	Educators[1]	Students[1]	Alumni[1]	Syllabi[1]	Example quote	Connect with the DLCM
Goal-setting	Sets and achieves organisational goals through strategic planning that integrates vision and design knowledge.	Strategic planning	-	*DM 1, 4, 5, 6, 7, 8*	-	-	-	-	*"Trained to look beyond the immediate and anticipate where things are headed." (STU 6)*	Visionary and Initiative (Section 4.5.2.4)
		Strategic vision	*UNI 1, 2, 3, 6, 7, 17*	-	-	*STU 6*	-	-		
		Global vision	*UNI 1, 3, 4, 5, 7, 8, 9, 10, 11, 13, 16, 17;*	*DM 1, 4*	-	-	-	-		
		Vision for venture creation	*UNI 1, 4*	-	-	-	-	-		
Communication	Expresses ideas clearly, listens actively and communicates effectively in multiple languages within diverse and international contexts.	Communication ability (overall)	*UNI 1, 2, 4, 5, 7, 9, 10, 11, 12, 17*	*DM 1, 5, 6, 7, 8*	*EDU 1,2,3;*	*STU 1, 3, 5, 8*	*ALU 2*	*17*	*"Some people had never spoken up and were extremely nervous, but after doing it a few times, they became completely different. You really need those opportunities to push you to grow." (ALU 2);* *"...communicating with designers or professional practitioners, as well as with the client and project stakeholder." (STU 5)*	Presentation, Listening, Persuading and Negotiating, Multilingual, Visualisation (Section 4.5.2.5)
		Spoken and written language expression	-	*DM 6*	-	-	-	-		
		Multilingual	-	*DM 1, 5, 6*	-	-	-	-		
		Listening skills	*UNI 7*		-	-	-	-		
		Communication and coordination	-	*DM 7*	-	-	-	-		
		Presentation skills	-	-	-	-	-	*10*		
Implementation ability	Plans, organises and executes design projects, ensuring quality control and effective resource integration.	Implementation (overall)	*UNI 1, 5, 7, 9, 10, 13, 17*	*DM 5, 8*	*EDU 2*	*STU 2, 3, 6, 7, 8*	*ALU 2*	*2*	*"I think that at the undergraduate level, it's more about teaching design and implementation skills, how you carry out a product design or a plan and then present it." (STU 8);* *"...our undergraduate programme focuses on training application-oriented talent with strong practical and hands-on skills." (STU 2);* *"The school organises creative markets and other activities to spark students' urge to get hands-on and create their own works. This strongly emphasises students' manual dexterity and practical abilities, which remain vital in future careers." (STU 2);* *"In design management courses, you simply can't stay at a purely academic level: if you only deal with theory and never test it in practice, it's not very reliable. And I believe that if a design manager wants to advance, they must validate ideas through practice. Doing real work is crucial." (STU 3)*	Resource Allocation and Delegating, Quality Control, Progress Monitoring and Control (Section 4.5.2.3)
		Quality control	*UNI 16*	*DM 8*	-	-	-	-		
		Resource integration	*UNI 1, 8, 12, 17*	*DM 3, 4, 5*	-	-	-	-		
		Managing the design process	-	*DM 6*	-	-	-	-		
		Project accounting	-	-	-	-	-	*1*		
Research ability	Conducts literature reviews, fieldwork and data analysis to produce research reports and academic writing.	Research ability (overall)	*UNI 1, 4, 5, 7, 10, 11, 12, 13, 14, 15, 16,17*	-	*EDU 1, 2, 3*	*STU 1, 2, 5*	*ALU 3*	*10*	*"Familiarising yourself with cutting-edge theories and distilling their essence... synthesise them into a concise summary." (STU 1)* *"[HR] felt your ability to plan campaigns was strong, as were your skills in writing, organising and distilling key selling points." (ALU 3)*	-
		Academic writing skills	*UNI 1, 11*	*DM 6, 7, 8*	-	-	-	*1*		
		Conduct fieldwork and market research	*UNI 5, 7, 12, 16, 17*	*DM 1, 5, 6*	-	-	-	*13*		
		Data analysis ability	-	-	-	-	-	*2*		
Collaboration	Works effectively in teams, demonstrating strong interpersonal skills and	Collaboration	*UNI 1, 2, 4, 5, 6, 7, 8, 10, 11, 12*	*DM 4, 6*	-	*STU 1, 3, 7*	-	*19*	*"In a team environment, I experienced design leadership firsthand. Practice-oriented collaboration strengthened my leadership,*	Collaboration (Internal) (Section 4.5.2.10)

Competency	Definition/Summary	Code	Design programme (University)	DM programme	Educators[1]	Students[1]	Alumni[1]	Syllabi[1]	Example quote	Connect with the DLCM
	engaging in international and cross-disciplinary projects.								*teamwork and communication skills, especially when working with others and sourcing external resources." (STU 2)*	
Project/team management	Leads and manages design teams or projects through effective coordination, operational planning, decision-making and leadership.	Project/team management (overall)	*UNI 1, 5, 9, 10, 12, 14, 15, 16, 17*	*DM 1, 2, 3, 4, 5, 6, 7*	-	-	-	-	*"Project management skills, including project accounting, project dynamic control"; "Decision-making"; "Overall project control"; "Organisational ability"; "Branding management"; "Coordination ability"*	Executive Leadership: Planning, Decision Making (Section 4.5.2.2) Implementation Ability (Section 4.5.2.3)
		Leadership skill	*UNI 7, 12*		-	-	-	-		
		Coordination	*UNI 1, 7, 12*	*DM 3, 4,7*	-	-	-	*3*		
		Operational planning	*UNI 1, 2, 7, 12, 17*		-	-	-	*13*		
		Decision-making	*UNI 2, 5, 7*	*DM 7*	-	-	-	*1*		
		Branding management	-	*DM 5*	-	-	-	-		
Design sensitivity	Applies design skills, creative communication, technology and aesthetic judgement to develop and evaluate design outcomes.	Design practice/experience	*UNI 5, 12, 15, 8, 10*	-	-	-	*ALU 3*	-	*"When we produce cultural-creative items or handle publicity for our department, those aesthetic and design sensibilities really come into play." (ALU 3)*	Design Perception, Design Achievement (Section 4.5.2.8)
		Design skills	*UNI 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17*	*DM 1, 2, 3, 8*	-	-	-	*3*		
		Design communication/ creative expression using design-related methods	*UNI 1, 5, 10, 11, 12,13*	*DM 6*	-	-	-	*6*		
		Software proficiency (operational ability)	*UNI 5, 10, 11,13,17*	*DM 6*	-	-	-	-		
		Aesthetic ability	-	-	-	-	-	*2*		
		Design qualifications	*UNI 7*	-	-	-	-	-		
Problem-solving	Identifies, analyses and solves problems with innovative and adaptable solutions.	Problem-solving (overall)	*UNI 1, 2, 3, 5, 7, 8, 10, 11, 12, 14, 17*	*DM 1, 4, 5, 6*	-	*STU 3, 4, 6*	*ALU 2*	*19*	*"We ran the numbers to see exactly how many residents had to move in before the entire operation could get off the ground." (ALU 2)*	Creative Problem-solving: Analytical Ability; Adaptivity (Section 4.5.2.1)
		Analytical ability	*UNI 1, 5*	*DM 8*	-	-	-	-		
		Integration of theory and practice	-	*DM 1, 2*	-	-	-	*6*		
		Innovative ability	*UNI 1, 2, 4, 5, 7, 8, 10, 12, 16, 17*	-	-	-	-	*1*		
		Apply design management theory in practical contexts	-	*DM 4, 5, 7*	-	-	-	-		
		Adaptability	*UNI 7, 8, 10, 12*	-	-	-	-	-		
Self-development	Demonstrates independent and self-directed learning skills for continuous development.	Self-development (overall)	-	*DM 6, 7*	-	*STU 1, 2, 4, 6*	*ALU 1*	*4*	*"Your cross-industry, interdisciplinary knowledge and your ability to learn on your own, both are solid. Honestly, I think our program trains us so broadly that we can handle anything." (ALU 1): "I'd give myself about a certain score." (STU 6)*	Active Learning; Reflective (Section 4.5.2.7)
		Career-Planning Ability	*UNI 10 (job responsibility)*	-	*EDU 3*	*STU 6*	-	-		
Ethical awareness	Demonstrates social and professional ethics, embraces sustainability and promotes the revival of traditional culture.	Social responsibility	*UNI 1, 2, 4, 6, 7, 8, 10, 11, 12, 13, 16, 17*	*DM 4, 5, 6*	*EDU 3*	*STU 6*	-	*2*	*"As design leaders or designers, they must think through how to respond to these challenges and provide practical solutions… courses stress heavily the sense of responsibility that both entrepreneurs and designers must uphold." (STU 6)*	Cultivating an Ethical Stance (Section 4.5.2.6)
		Sustainability	*UNI 2, 5, 11, 12, 17*	-	-	-	-	-		
		Revival of traditional Chinese culture	*UNI 2, 3, 4, 5, 8, 9, 11, 12*	-	-	-	-	-		

Competency	Definition/Summary	Code	Design programme (University)	DM programme	Educators[1]	Students[1]	Alumni[1]	Syllabi[1]	Example quote	Connect with the DLCM
Design management knowledge	Understands core concepts and frameworks in design and management, building a solid foundation for practical application and problem solving.	Design management knowledge	*UNI 7*	*DM 1, 2, 3, 4, 5, 6, 7, 8*	*EDU 2, 3*	*STU 2, 3*	-	-	*They'll need to build up their experience slowly on the job, since certain market instincts just can't be conveyed in the classroom. What we must do is make sure they firmly grasp the fundamentals, which is gives them solid basics and raise their awareness of methods, so that once they're out in practice, they can accelerate their own growth. (EDU 2)* *"Make sure students firmly grasp the fundamentals…" (EDU 2);* *"Build out the discipline's framework, from basic concepts through research projects, and encompass current hot topics in design management." (STU 3);* *It includes the evolution, characteristics, content, importance and research scope of design management; the operating models of design firms; design management principles and methods; business design strategy; designer motivation and team leadership strategy; design quality management; design resource management; and communication principles.*	Design Knowledge; Management and Company Governance (Section 4.5.1.1; 4.5.1.3)
Management knowledge	Understands principles of quality, project, organisational and operational management in design contexts.	Management knowledge	-	*DM 1, 2, 5, 6, 7*	-	-	-	*mentioned*	*Concepts, principles and methods; Goal management; Human resource management (HRM); Design organisation/team management; Design quality management knowledge; Design project management knowledge.*	Management and Company Governance (Section 4.5.1.1)
Business knowledge	Understands branding, market trends and customer needs to inform strategic design and brand development.	Business knowledge	*UNI 1, 4, 5, 8, 12, 17*	-	-	-	-	-	*Brand strategy and brand planning knowledge; Design strategy knowledge; Marketing and marketing planning knowledge; and Business copywriting knowledge.*	Business Acumen (Section 4.5.1.1)
		Branding knowledge	*UNI 1, 5, 7, 17*	*DM 1,3*	-	-	-	*mentioned*		
		Market knowledge	*UNI 1, 5, 7, 12, 17*	*DM 5,7*	-	-	-	*mentioned*		
Design knowledge	Understands core principles, processes and management of design.	Design knowledge	*UNI 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17*	*DM 1, 2, 3, 4, 6*	-	-	-	*mentioned*	*"Consists of composition and graphic design knowledge"; "Design software knowledge"; "Data visualisation and information design knowledge"; "Design process knowledge"; "Service design knowledge"; "Knowledge of consumer behaviour, customer value and satisfaction"; Theories, concepts and functions of design; Principles of design, such as planar colour and spatial composition; Design research methods, including secondary research, interviews and questionnaires; Design and innovation tools; Design processes and service design; Design psychology; and Knowledge of design thinking.*	Design Knowledge (Section 4.5.1.3)
		Design principles	*UNI 4, 5, 8, 17*	-	-	-	-	-		
		design process	*UNI 5, 7, 11*	-	-	-	-	-		
Industry knowledge	Understands the economic environment and industry context.	Industry knowledge	*UNI 1, 2, 4, 5, 6, 7, 8, 10, 11, 12, 17*	*DM 1, 4, 5, 7*	-	-	-	*mentioned*	*Understanding of the design industry; The cultural and creative industries understanding; Understanding the economic environment.*	Industry Knowledge (Section 4.5.1.1)

Competency	Definition/Summary	Code	Design programme (University)	DM programme	Educators[1]	Students[1]	Alumni[1]	Syllabi[1]	Example quote	Connect with the DLCM
Interdisciplinary knowledge	Integrates knowledge from natural sciences and humanities with design expertise.	Interdisciplinary knowledge	*UNI 1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 16, 17*	*DM 6*	-	-	-	-	*"Understanding of cultural resources, including concepts, content, categories and methodological approaches"; "Sociology, encompassing society, social behaviour and social development"; "Communication studies"; "Knowledge of probability theory and statistics"; "Natural sciences, engineering technologies" Statistical knowledge (mathematical statistics and probability theory); economics knowledge (content, framework, development and evolution); STEM knowledge; culturology; cultural resources (concepts, content, categories and methodological approaches); Sociology (society, social behaviour and social development); communication studies.*	* Active Learning (Section 4.5.1.3)
		Social sciences and humanities knowledge	*UNI 11*	-	-	-	-	*mentioned*		
Policy knowledge	Understands relevant policies, regulations and laws.	Policy knowledge	*UNI 5, 6, 10*	*DM 1, 4, 5, 7*	*EDU 3*	*STU 1*	*ALU 2*	*mentioned*	*"…this calls for keen sensitivity: the ability to turn those policies into new lines of business." (EDU 3);* *"…the ability to grasp macro-level policies." (STU 1)*	Policy Sensitivity (Section 4.5.1.2)
Research knowledge	Research knowledge includes research methods	Research knowledge	-	-	-	-	-	*mentioned*	*"Research methods such as surveys, interviews and questionnaires"; "Academic writing requirements"*	-
Systems thinking	Adopts a systems perspective, focusing on interconnections and interactions within complexity.	Systems thinking	*UNI 1, 2, 3, 4, 5, 7, 10, 11, 12, 17*	-	*EDU 3*	*STU 3, 6*	*ALU 2*	*3*	*"Students must anticipate and coordinate across all downstream processes." (EDU 3);* *"You need a big-picture perspective and awareness of the finer steps to tie everything together." (ALU 2);* *"I need the ability and mindset to oversee a large, continuous operation." (STU 6)* *For me, if in the future I want to get into the apparel business, I must cover both ends: production and sales (or production and export). … Can I manage everything in between such as transportation, logistics and all the rest of the supply chain? If I don't have the ability and mindset to oversee such a large, continuous operation, I might choose to focus on just production or just sales, asking myself whether that would be feasible. So I'm considering all of these factors. (STU 6)*	Systems Thinking (Section 4.5.3.2)
Design thinking	Adopts a user-centred, creative and innovative mindset focused on service, experience and practical solutions.	Design thinking	*UNI 1, 2, 4, 7, 8, 10, 12, 13, 17*	*DM 3, 6, 8*	*EDU 3*	*STU 6*	-	*4*	*"Even if [students] don't go on to work in design, design thinking helps them improve their problem-solving skills and heightens their sensitivity when facing challenges, thereby enhancing students' ability to anticipate and respond to situations. This is a necessary capability." (EDU 3);* *"…move from 'self' to 'other' is crucial. For example, if I decide to design clothing in the future, or work in e-commerce, I won't just*	Design Thinking (Section 4.5.3.1)
		Service focus	*UNI 8, 17*	-	-	-	-	-		
		Experience oriented	*UNI 5*	-	-	-	-	-		
		User-centred approaches	*UNI 1, 3, 5, 7, 12, 13*	-	-	-	-	-		
		Innovate and creative thinking	*UNI 3, 5, 7, 10, 12, 15*	*DM 1, 5*	-	-	-	-		

Competency	Definition/Summary	Code	Design programme (University)	DM programme	Educators[1]	Students[1]	Alumni[1]	Syllabi[1]	Example quote	Connect with the DLCM
									assume what to do. Instead, I'll start with market insights and the customer's point of view, and then develop a project or product accordingly. I see this as an essential skill to cultivate and plan for." (STU 6)	
Critical thinking	Maintains a questioning and analytical mindset towards issues in design or academic.	Critical thinking	*UNI 1, 2, 4, 8, 12, 16*	*DM 6*	-	*STU 3*	-	*mentioned*	*"The phenomena you observe may be only superficial, and you must look beyond the surface to grasp their true essence... You reflect on design problems and carry a critical stance as you investigate them." (STU 3)*	* Continuous Learning (Section 4.5.1.3)

Notes:

- Numbers in the 'Syllabi' column indicate the number of times the competency is mentioned.
- ' – ' Indicates the competency was not identified in the corresponding source; or was not explicitly shown in the DLCM.
- [1] Case study data from SUAD.
- * An asterisk (*) in the 'Connect with DLCM' column indicates that this competency is not an explicit standalone category in the DLCM, but its content is represented or partially covered under the referenced section.

Appendix H: Absent competencies identified from case study interviews

Competency lacking	Stakeholder(s) reporting	Summary	Example Quote	Connect with the DLCM
Aesthetic Sensitivity	*EDU1*	-	-	Design Perception (Section 4.5.2.8)
Implementation Ability	*EDU 1,3; STU 1, 2, 3, 4, 6, 7, 8; ALU 1, 3*	Insufficient practical project and implementation training; limited real-world or industry-linked experience	*"Without understanding design, empty talk of management leaves no room for growth" (EDU 1);* *"...[HR] hit me with a key question: 'Which of your project planning have actually been implemented? No matter how good your plans are, there's still no real execution point'. I realised that this was a gap in my preparation." (STU 1);* *"Even if you create a planning proposal as an undergrad, you never face the actual challenges of implementation; the closest you get is your graduation project"(STU 1);* *"Innovation needs to be validated through practice to ensure that your innovation strategies are feasible. I feel that our courses' practical teaching components are somewhat lacking." (STU 7);* *"When you tackle real-world projects, you run into far more roadblocks and bottlenecks than you ever do in a classroom assignment. Especially when you first enter the workforce, not knowing how to handle these hurdles can feel overwhelming. I never realised work could be this challenging until I hit so many of those 'unknowns'".(ALU 1);* *"What I'm saying is that at the start we never really understood the true needs of the clients. At the school they'd give us only a very simple brief: there was no concrete direction or actual problem they wanted solved. In fact, there were basically no real clients."(ALU 3);* *"We didn't have in-depth conversations with the companies or stakeholders; instead, we just relied on our own imaginations to draft solutions." (ALU 3)*	Implementation Ability (Section 4.5.2.3)
Active Thinking	*ALU 2*	Lack of independent, critical and initiative-driven thinking; over-reliance on rote methods.	*"You must learn to take the initiative to ponder these questions yourself, rather than simply applying the solution the teacher gives you. Otherwise, I feel there's little point in your existence."(ALU 2)*	Active Learning (Section 4.5.2.7)
Communication	*STU 5, 8; ALU 1,3*	Limited development of practical, workplace-relevant communication skills; no dedicated training in communication strategies.	*"These communication skills are definitely under-developed during our studies" (STU 8);* *"Upward, I've learned to present solutions; downward, I break tasks down and drive execution, which both skills I've built up on the job. Often you find your boss isn't sure which option is best either, but you can't approach them with a list of problems, you must come with a proposed solution. And when assigning work to your team or subordinates, you have to lay out the tasks clearly; otherwise you'll end up going back and forth on rework, which is a real headache and eats up time. Sometimes I've noticed that managing someone else's work can take even longer than doing it myself: it's exhausting, like they simply don't grasp what you're asking." (ALU 3)*	Communication (Section 4.5.2.5)
Reflective Ability	*STU 5*	Limited emphasis on reflective practice; need for structured support in learning from experience.	*"With positive experiences, you absorb the lessons; with negative ones, you consider exactly where things went wrong." (STU 5)*	Reflective (Section 4.5.2.7)
Project Management	*STU 5, 6, 8*	Lack of practical training in team leadership, delegation and project management.	*"I think it comes down to management ability. In a class this large, with group projects, it's always the same few students taking the lead, and they don't get much real practice in managing."(STU 5)*	Resource Allocation and Delegating (Section 4.5.2.3)
Interdisciplinary Collaboration	*EDU 3, STU 2, 4, 6*	Few practical opportunities for cross-disciplinary collaboration and problem-solving.	*"I felt the level of integration with other majors was fairly low. I didn't have many chances to work with students from other fields to solve problems or develop solutions together."(STU 2)*	Multidisciplinary (Section 4.5.2.10)
Academic Writing	*STU 6*	Limited training in academic writing, paper structure and research communication.	*"I'd love a course that clearly lays out what sections a paper should include, how to choose a topic, how to structure it so that it clearly has scholarly value and is fully readable."(STU 6)*	-
DM/Management Knowledge	*STU 2, 3, 6*	Insufficient foundational knowledge in design management and management theory; Lack of	*"Management focus courses were relatively few. As a design manager in a company, your primary role is to coordinate design resources and ignite creative energy. That role inevitably demands a*	Management and Company Governance (Section 4.5.1.1)

		clarity distinguishing the programme from similar subjects (e.g. advertising).	*broader toolkit of management methods and solutions, which is an area where our current curriculum still falls short." (STU 2);* *"As an undergrad, I didn't understand design management well. Indeed, I even had some misconceptions" (STU 3);* *"When I spoke with the new freshmen, I got the same impression: they didn't know what design management is. After four years of undergrad, my own grasp of the concept wasn't deep." (STU 3);* *"Many undergraduates end up thinking our programme is just about planning, much like an advertising programme, because in undergrad we enter the same kinds of competitions as the advertising majors, yet we don't even have a dedicated programme of our own." (STU 6)*	

Notes:

- ' – ' Indicates the competency was not identified in the corresponding source; or was not explicitly shown in the DLCM.

Appendix I: Required competencies identified from policies

Competency	Code	Design policy	Connect with the DLCM
Design and innovative ability	design skills	POL 2, 3, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 27, 30, 31, 33, 35, 36, 37, 38, 39, 40, 42, 43, 52	Design Sensitivity (Section 4.5.2.8)
	qualification and certification	POL 3, 8, 10, 11, 14, 31, 33	
	design quality	POL 20, 22, 23	
	innovation ability	POL 1, 3, 4, 8, 9, 12, 14, 15, 17, 21, 28, 31, 36, 42, 45, 48, 49	
	creativity	POL 21, 36	
Practical and problem-solving	practical ability	POL 1, 2, 3, 4, 9, 10, 11, 12, 14, 15, 17, 18, 23, 27, 28, 30, 33, 43, 45	Creative Problem-solving (Section 4.5.2.1); Implementation Ability (Section 4.5.2.3)
	problem-solving process	POL 4, 5, 6, 30, 48	
	research ability	POL 1, 2, 3, 4, 7, 8, 9, 13, 17, 18, 19, 20, 22, 27, 35, 42, 43, 48, 50	
	analytical ability	POL 6	
	idea generation	POL 17, 31, 36, 37	
	concept validation	POL 42	
	decision-making	POL 5	
	judgement	POL 5	
	technical ability	POL 4	
	application ability	POL 13, 32, 42, 43, 49	
	implementation ability	POL 4, 21, 26, 31, 36	
	transformation ability	POL 4, 14, 17, 19, 21, 22, 26, 28, 29, 36, 42, 48	
	operational ability	POL 31, 36, 37	
Management skills	management skill	POL 4, 5, 13, 17, 20, 22, 25, 31, 35, 38	Executive Leadership (Section 4.5.2.2); Implementation Ability (Section 4.5.2.3)
	organisational management ability	POL 28	
	process management ability	POL 5, 29, 34	
	branding management	POL 20, 22, 26, 37	
	product management	POL 22	
	coordination ability	POL 3, 4, 42	
	team-building ability	POL 4, 48	
Entrepreneurial skill	venture creation	POL 2, 3, 4, 6, 7, 8, 9, 17, 18, 21, 27, 36, 37	Business Acumen (Section 4.5.1.1); Executive Leadership (Section 4.5.2.2); Goal-setting (Section 4.5.2.4); Network Building (External) (Section 4.5.2.9)
	business awareness	POL 9	
	building industry connections	POL 1, 7, 8, 10, 11, 12, 13, 15, 18, 22, 23, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 37, 39, 41, 42, 43, 46, 48, 50, 52	
	opportunity-seeking ability	POL 5	
	visionary	POL 16, 30, 34	
	global vision	POL 7, 17, 25, 31, 35, 38, 43, 52	
	risk awareness	POL 5, 29	
Self-development	Self-development	POL 3	Continuous Learning (Section 4.5.2.7)
	active learning	POL 1, 3, 5, 43	
	active thinking	POL 1, 5	
	future development	POL 3, 4, 10, 40	
Digital integration	integrating technology	POL 1, 2, 17, 27, 29, 36, 42, 43, 47, 49	-
Ethical awareness	social responsibility	POL 2, 3, 11, 16, 25, 28	Policy Sensitivity (Section 4.5.1.2); Human-centred Leadership (Section 4.5.2.6)
	revitalise traditional Chinese culture	POL 2, 4, 10, 12, 16, 17, 18, 20, 26, 35, 42, 51	
	policy, regulations and laws	POL 16, 17, 19, 20, 28, 29, 42	
Communication and Collaboration	global collaboration	POL 2, 3, 4, 5, 10, 11, 13, 14, 16, 17, 18, 19, 20, 24, 25, 26, 28, 29, 30, 31, 32, 34, 36, 41, 42, 44, 47, 48	Design Communication (Section 4.5.2.5); Network Building (External) (Section 4.5.2.9)
	multilingual ability	POL 2, 3, 9, 10, 11, 13, 14, 15, 20, 24, 25, 26, 28, 30, 36, 42	
Design knowledge	fundamental knowledge	POL 4, 8, 10, 11, 18, 24, 30, 32, 38, 45, 46	Design Knowledge (Section 4.5.1.3)
Entrepreneurship knowledge	entrepreneurship knowledge	POL 5	Business Acumen

Competency	Code	Design policy	Connect with the DLCM
	understanding business models	POL 5, 10, 17, 19, 20, 22, 26, 27, 31, 34, 37, 44	(Section 4.5.1.1)
	marketing knowledge	POL 5, 10, 11, 17, 19, 26, 27, 34	
	industry knowledge	POL 24, 26, 34, 45, 51	
	industry chain	POL 36, 38	
	product chain	POL 22	
Interdisciplinary knowledge	interdisciplinary knowledge	POL 1, 3, 4, 6, 7, 8, 13, 15, 17, 19, 22, 24, 28, 30, 31, 33, 36, 37, 42, 43, 44, 46, 47, 48	-
Critical thinking	critical thinking	POL 6, 30	-
STEM thinking	STEM thinking	POL 30	-
Systems thinking	systems thinking	POL 29, 34, 38	Systems Thinking (Section 4.5.3.2)
Creative and design thinking	creative and design thinking	POL 6, 30	Design Thinking (Section 4.5.3.1)
	service design	POL 34	
	user-centred approaches	POL 26, 34, 42	
	user experience	POL 34	
Digital mindsets	digital mindsets	POL 30, 42	-

Appendix J: Teaching competencies identified from design leaders

Competency	Code	Industry	Example quote	Connect with the DLCM
Collaboration	Team work	DL1, 6, 7	*"Different people take on different roles, including video editing, scripting, planning, team leader, editing." (DL1)*	Collaboration (Internal) (Section 4.5.2.10)
Communication skills	communication skills	DL1, 4, 7, 13	*"Second is about how to supervise: how to prompt them so they can complete the assigned deliverables on time." (DL 1)* *"I've found storytelling incredibly useful. In school, what's valued in a project is a coherent logic, not so much the final artifact, but the full arc from initial research through experiments to the outcome: does it hold together as a system, and is it persuasive? That skill translates perfectly to presenting solutions at work." (DL 13)* *"It's about presentation. Whatever it is, you've got to talk it through, keep talking and have the thick skin to go on about this and that. Basically, the ability to shoot the breeze with clients." (DL 7)*	Design Communication (Section 4.5.2.5)
	information conveyance and negotiation	DL1		
	presentation skills	DL4, 7		
	storytelling ability	DL13		
Design sensitivity	design sensitivity	DL1, 3, 4, 5, 6, 11, 12, 13, 16, 17, 20, 22, 24, 25	*"It's given me a fast eye for aesthetics. I have my own taste, and when I'm drawing or working in Photoshop I can give clear, actionable notes, do this, change that, adjust here. I can say what works and what doesn't, and I can give photographers concrete direction. Many people in creative roles lack that experience and default to feedback like, 'I just don't like it,' without knowing why. Because of my design background, I can say, 'Let's go this way, let's try this', and provide specific guidance. That's something I truly took from school: design, painting and art." (DL 5)* *"Looking back, it was really an upgrade in my basic literacy, cultivating the fundamentals: basic aesthetics and a basic sense for design." (DL 3)* *"Primarily, it's about design and aesthetics." (DL 26)*	Design Sensitivity (Section 4.5.2.8)
	aesthetic ability	DL1, 3, 5, 6, 13, 25		
	design methods	DL6		
	design perception	DL3		
	hands-on and software skills	DL4, 5, 11, 12, 16, 17, 20, 22, 24, 25		
Implementation	implementation	DL1, 24	*"You could directly go to work after graduation, already meeting the requirements of a junior planner" (DL24)* *"First, it's about resourcing: how to divide up the work – who should own which task, and who to put in charge of this project (or competition brief)." (DL 1)*	Implementation Ability (Section 4.5.2.3)
	delegating tasks	DL1		
Open vision	open vision	DL4, 8, 19	*"It may allow you, when you enter the workplace, to have a slightly higher/broader perspective than others." (DL 8)* *"It really broadened my horizons. In school, you should absorb a wide range of information: engage broadly and keep an open mind to new things, so you can 'open your eyes'. Later at work, that breadth of exposure can be a real advantage."(DL 19)*	Goal-setting (Section 4.5.2.4)
Problem-solving	analytical ability	DL11, 25	*"In the end, what I gained was how to analyse, for instance. And once you're on the job, you find the things our teachers emphasised do matter in practice. They really do." (DL 11)*	Creative Problem-solving (Section 4.5.2.1)
Research ability	research ability	DL8	*"In other words, it equipped me with some research skills, enabling me to probe problems more deeply at work, to think them through in greater depth." (DL 8)* *"it's also about certain methodologies: how to make your work or design more systematic. These kinds of methods are often taught in school as well." (DL4)*	-
	methodology	DL2, 4, 24		
Self-development	self-development	DL5, 6, 11, 17	*"It really feels like I can now learn any kind of knowledge. They asked me to help with auditing, and now I can understand contracts and such as well. I learn new things quite quickly" (DL6)* *"What really helped me in school was that I read a lot of books during my student years. It's not that the book content itself directly helps at work, but the 'state' it cultivated, so at work I can keep my emotions more stable and learn more effectively." (DL 17)* *"In school our instructors had us do mock 'business operations' projects. In hindsight our approach was pretty simplistic, essentially just assembling a BP (business plan). I now see the same mindset in some of my team: 'this looks easy'. With years of cases to draw on, I can walk them through why it actually isn't that simple." (DL 11)*	Continuous Learning (Section 4.5.2.7)
	learning ability	DL5, 6, 17, 25		
	learning from experience	DL11, 17		
Design knowledge	design knowledge	DL6, 8, 10, 14, 23, 24	*"In other words, what I took away was a core design principle, the underlying fundamentals." (DL 24)* *"Mainly, what I learned at school was a concept, specifically a design concept. School training was focused on design, tailored to design itself." (DL 10)* *"The classes I found most valuable were the history and theory ones. Once you've got that historical and theoretical grounding, you naturally think further and see more angles than most." (DL 8)*	Design Knowledge (Section 4.5.1.3)
	fundamental knowledge	DL14, 23		
	design principles and concepts	DL10, 23, 24		
	historical knowledge (design and art)	DL8		
	service design	DL6		
Industry knowledge	industry knowledge	DL4, 9, 15	*"Back then and even now, almost every major looks ahead: what is the industry we're going into like? Especially in the final year, we'd examine how companies in that field have developed, and we'd do internships to learn more." (DL 9)* *"In undergrad I did learn quite a bit, we looked at lots of industry cases. And back then the teachers often introduced knowledge we hadn't heard before, the kind of material that's frequently covered in foundational undergraduate education." (DL 4)*	Business Acumen (Section 4.5.1.1)

Competency	Code	Industry	Example quote	Connect with the DLCM
Interdisciplinary knowledge	interdisciplinary knowledge	DL2, 6	*"In fact, our discipline is quite wide-ranging. When we design projects or products and their branding, we have to draw on knowledge from many different fields. Compared with other majors, it naturally has a greater potential to be cross-disciplinary." (DL 2)*	Active Learning (Section 4.5.2.7)
Management knowledge	management knowledge	DL1	*"Management knowledge wasn't taught to us in class as a formal professional subject; instead, we gradually developed it ourselves through group collaboration in practice."(DL 1)*	Business Acumen (Section 4.5.1.1)
Branding knowledge	branding knowledge	DL 26	*"When it comes to overseeing the whole company, I tend to think from a perspective of branding, just like I mentioned at the beginning. I want to develop the company into a better brand, or even a recognisable symbol." (DL 26)*	Business Acumen (Section 4.5.1.1)
Policy	policy	DL 25	*"We need to stay sensitive to society. And that sensitivity isn't just about the general social winds/trends; it also includes things like advance decisions or policies from the government." (DL 25)*	Policy Sensitivity (Section 4.5.1.2)
Design thinking	design thinking	DL13, 16, 25	*"I think designers have always been trained to figure out what kind of approach can be used to achieve a certain goal for people, this is something every designer should have. It's not about whether you studied graphic design, interior design, or something else." (DL16)* *"I think designers are trained to ask: by what means can I help people achieve a certain goal? That repertoire of ways is something every designer should have. It isn't about whether you studied graphic, interior, or anything else. The big problem now is that design gets boxed into one form – one category of artifact. But in reality, if you compare design with, say, finance and ask what our edge is, it's our range of ways to realise intent. I can create a space, an interactive interface, a physical product, or a booklet – no problem. The choice is determined by the target audience and the outcome I want." (DL 16)*	Design Thinking (Section 4.5.3.1)
	user-centred approaches	DL16		
	intuition	DL25		
Systems thinking	systems thinking	DL2, 7	*"when I do this job, I feel very fortunate that I learned this way of thinking, not just to focus on being a small cog in the machine or working on a minor aspect, but to look at the entire project from a broader, more macro perspective". (DL7)*	Systems Thinking (Section 4.5.3.2)

Appendix K: Absent competencies identified from design leaders

Competency lacking		Stakeholder(s) reporting	Example Quote	Connect with the DLCM
Communication ability		DL10	*"The ability to communicate with clients." (DL10)*	Design Communication (Section 4.5.2.5)
Visionary		DL25	*"Also, an insight into such things, a keen sense of perception. I'm really curious about that." (DL25)*	Goal-setting (Section 4.5.2.4)
Design sensitivity	Design sensitivity	DL1, 10, 15, 20, 22	*I noticed that there are some students who are academically excellent. But the issue is that, among this group, some are actually not passionate about design, nor do they plan to pursue design as a career, they're simply top students, really good at studying and taking exams, but that's it. They finish their major requirements, but what we really hope for is to see people who will continue to develop and contribute within the design industry.* *"It's about mobilising students' ability to learn design. This may differ somewhat from how design courses are usually set up. Why bring it up? In times of rapid development, when design was booming, everyone wanted to be a designer, so there wasn't much need to discuss this. But now, with an economic downturn, a shrinking design market, and muted expectations, our design students, whether they chose the major actively or passively, have still entered the programme. The question is: can we ignite their love for design from the very beginning? I think that's a very important need." (DL22)* *"At the undergraduate level, what schools should cultivate is students' design ability." (DL1)*	Design Sensitivity (Section 4.5.2.8)
	Passion for design	DL15, 20, 22		
	Design skills	DL1, 10, 22		
Management skills		DL6, 10	*how to develop people and lead a team. I never really had any formal training in this; another important thing is building your own talent pipeline, how to develop your first, second, and third tiers of team members. That's also crucial" (DL6).*	Implementation Ability (Section 4.5.2.3)
Implementation		DL25	*"Implementation skills? Compared with others I'm certainly not as strong as they are." (DL25)*	Implementation Ability (Section 4.5.2.3)
Patent protection		DL4	*Back when I was a student, I made a lot of things, but sometimes they could be copied or even used by some teachers at school. So, if students can obtain some patents of their own during their studies, building up a reserve of intellectual property, like patents or awards from competitions, these things could later serve as a form of personal credential for them. (DL4)*	Design Knowledge (Section 4.5.1.3)
Problem-solving	Problem-solving	DL5, 6, 7, 15	*how to ask questions and then provide a solution, and how to convince people your solution is the right one" (DL5).* *"Another thing is cultivating their ability to solve problems."(DL6)* *"I think that in today's education, what I keep emphasising is that students must learn analytical capability."(DL 5)*	Creative Problem-solving (Section 4.5.2.1)
	Analytical skills	DL5		
	problem orientation	DL5, 6, 7, 15		
Self-development		DL2, 4, 6, 7, 13, 19, 23	*"I still think it ultimately comes down to the individual, personal growth. The question is: how can someone truly make learning their own, so that their cognition/understanding is elevated?"(DL19)* *"Let students have more autonomy, encourage them to explore things on their own instead of passively listening to what's in the textbooks." (DL7)*	Continuous Learning (Section 4.5.2.7)
Social responsibility		DL9	*As DL9 stated, "apart from design itself, research on materials might go deeper, but research on the environment or social welfare is often lacking. In these aspects, we might need to learn from other countries, how to use design to guide the industry toward positive or beneficial development".*	Human-centred Leadership (Section 4.5.2.6)
Business knowledge		DL10, 26	*"…Some knowledge of economics. " (DL26)* *"…familiarity with the overall market.." (DL10)*	Business Acumen (Section 4.5.1.1)
Design knowledge		DL9, 12	*"I think the bigger issue is in basic materials, possibly including related areas. In terms of applications, industry-specific uses like new materials, is still relatively weak." (DL9)*	Design Knowledge (Section 4.5.1.3)
Interdisciplinary knowledge		DL4	*As DL4 remarked, "I've been watching a show and noticed that in the US, many students start their own businesses at a young age. I think this is closely related to their early education. They tend to acquire a variety of skills, such as programming or hands-on abilities, which helps them better develop and realise their ideas".*	-
Policy and regulation		DL26	*"…public-sector regulation in construction/architecture…"(DL26)*	Policy Sensitivity (Section 4.5.1.2)
Job understanding		DL6	*"What students need to really understand is what abilities the job position requires. The employer won't have to spend extra time teaching you, because students already know what's needed." (DL6)*	Business Acumen (Section 4.5.1.1)
Design thinking		DL15, 16	*"A designer is someone who doesn't always follow conventional rules and stays true to their instincts. Education should encourage people to think creatively and to create things, rather than just teaching them rigid theories" (D15);* *I need to step outside of my own perspective and really try to understand things from the user's point of view, rather than just my own. However, I'm not entirely sure how this user-centred approach can be better incorporated or optimised in our current design education system. (DL16)*	Design Thinking (Section 4.5.3.1)

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