

MSc Business Administration

Master's thesis

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Understanding the characteristics of an innovative top management team and **designing** a tool to discuss power dynamics

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Date: April 24, 2025

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Keywords: organisational innovativeness, top management team (TMT), demographic characteristics, team power distribution (TPD), tool design, team composition, team cooperation

Word count: 44457

The annexes can be found in the annexe book.

Abstract

Top management teams (TMTs) are critical in facilitating innovation and attaining organisational success. In previous studies, demographic diversity within TMTs has generally been associated with fostering organisational innovativeness. Conversely, while the positive effect of diversity on innovation is well documented, this paper also highlights the partial responsibility of diversity within TMTs for inequality amongst team members. Power imbalances resulting from inequality within a team have been demonstrated to harm collaboration and innovation. The starting point of this study is this so-called 'diversity/inequality dilemma'. In the study, an in-depth exploration of the configuration strategies employed by innovative TMTs to overcome the adverse effects of the aforementioned dilemma is performed. Furthermore, during the study a practical tool was designed to support TMT in addressing power dynamics and improving collaboration to drive innovation. This tool was named 'The wheel of managerial power'. The study is comprised of two phases. In phase one of the study, a qualitative research design was employed, involving in-depth interviews with five top managers from high-innovation Dutch organisations. These interviews aimed to explore and understand the composition of demographic characteristics, team power distribution (TPD), and the collaboration strategies employed by these organisations. The prototype was tested, and user feedback was gathered to improve the tool. The second phase of the study entailed the conceptualisation of a refined prototype through the utilisation of a design sprint methodology. The study results demonstrate that highly innovative TMTs emphasise functional and educational diversity whilst actively managing power dynamics through trust-based collaboration and expertise-driven decision-making. The testing of the tool revealed that it is a valuable means of initiating conversations about power. However, it was determined that usability improvements were required, and these were incorporated into the final design. This study makes a dual contribution by combining the development of theoretical concepts with the design of a practical tool. The study provides a deeper academic insight into how the composition of demographic characteristics and power dynamics within a TMT jointly influence organisational innovativeness. Moreover, it delivers a validated instrument for practice that empowers TMTs to identify the power structures within the team, reduce the adverse effects of inequality, and drive collaboration for innovation.

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1 Introduction

Companies must adapt and excel faster than ever to achieve organisational success and longevity in today's rapidly evolving business landscape (Şimşit et al., 2014), making continuous innovation a well-established key to business success (Wong, 2013). Since Schumpeter gave attention to innovation in an organisational context in 1939, research in this field has been a hot topic (Schumpeter, 1939). The necessity of innovation has led to increased research attempts to identify the factors that foster organisational innovativeness (Mokhber et al., 2018). The top managers' ability to proactively moderate organisational innovation processes is one of the most crucial success factors driving innovation (Hambrick & Mason, 1984; Nielsen & Nielsen, 2013; Sperber, 2021; Talke et al., 2011). Because of the importance of their role, numerous theories explaining the impact of top management teams (TMTs) on organisational innovativeness have emerged (Sperber & Linder, 2018).

Demographic-based TMT research is one of the most dominant and credited approaches in explaining TMT's relation to organisational outcomes. Evidence that TMT demographic characteristics correlate with organisational innovativeness is found in multiple studies (Boeker, 1997; Hambrick & Mason, 1984; Sperber, 2021). Based on the Upper Echelons Theory (UET) (Hambrick & Mason, 1984), researchers describe managers as making decisions based on their unique experiences, personal values, and individual characteristics. The school of demographic-based TMT research supports the idea that the demographic characteristics of the team provide evidence for understanding the decision-making process of TMTs and, hence, their role in driving innovation (Bantel, 1993; Hambrick et al., 1996; Hambrick & Mason, 1984). Other research shows an inconsistent link between diversity and innovation, suggesting a neutral or negative relationship between diversity and innovation (Carpenter et al., 2004). Thus, scholars argue that focusing solely on demographic characteristics provides a narrow view of TMT decision-making and its impact on innovation. An argument is that it might be more promising to analyse the processes that appear within the TMT (Simons et al., 1999; Smith et al., 1994; Tushman & Nadler, 1986), such as team power distribution (Eisenhardt & Schoonhoven, 1990). More recent research reflects a shift in the literature, moving from static demographic indicators towards a dynamic process view on TMT influence and innovation by arguing that *“a combination of various aspects might offer a better explanation for innovativeness than one school of thought on its own”* (Sperber & Linder, 2018).

Sperber (2021) captured the factors of TM's influence on innovation in a comprehensive framework, which serves as the theoretical foundation for this study (Sperber, 2021). This framework is particularly relevant because of its holistic perspective on how TMT demographic characteristics and power dynamics interact to drive innovation. While the framework provides valuable insights, it requires empirical validation and a deeper examination of the integrated perspective to which this study contributes. A key aspect of TMT influence on innovation from a demographic-based standpoint is team composition because it is generally believed that heterogeneity of TMTs' demographic characteristics (e.g., age, tenure, and functional background) enhances problem-solving, decision-making, and thus innovativeness (e.g., Alexiev et al., 2010; Wang et al., 2022; Talke et al., 2010). Diversity is a much-discussed topic at the management team level and is desirable in organisations' management teams. Innovation is an essential tool for achieving organisational success. However, when considering the broader view of TMT's influence on innovation, team power distribution has a mediating role in this relationship, which leads to a dilemma in composing the team. The composition of demographic characteristics of managers within a team partially explains the distribution of power in the team (Bunderson & van der Vegt,

2018). Various studies report that demographic heterogeneity negatively affects power distribution (Haleblian & Finkelstein, 1993; Iglesias, 2023; Smith et al., 2006), leading to unequal power distribution. Theories related to TMT power dynamics and an organisation's outcome reveal an adverse effect of power inequality on an organisation's innovative performance (e.g., Haleblian & Finkelstein, 1993; Buyl et al., 2010; Smith et al., 2006).

It can thus be argued that diversity has a positive influence on innovation. On the other hand, diversity creates power differences within the team, negatively affecting organisational innovativeness. This study addresses this diversity/inequality dilemma by deepening knowledge of demographic characteristics and power dynamics composition to promote innovation. Power dynamics and distribution are often challenging and sensitive topics in TMTs (Greer et al., 2018; Eisenhardt & Bourgeois, 1988). Therefore, the study also explores the opportunity to design a tool that provides management teams with an understanding of power dynamics in their team, aiming to facilitate the conversation about power dynamics to overcome inequality. These two deliverables of the study led to the following overarching research question: ***How can the diversity/inequality dilemma within top management teams be resolved to foster innovation?*** On the one hand, the study explores the best practices concerning innovation in the context of TMT composition—their demographic characteristics and team power distribution. By examining the composition of the TMT of highly innovative organisations and capturing their collaboration strategies, this study records how these organisations have overcome the diversity/inequality dilemma.

Alongside, based on theory describing the accumulation of power in a team, a comprehensive tool, 'The wheel of managerial power,' is proposed. The tool provides insight to teams into the distribution of power among their members based on their characteristics to overcome power differences and improve collaboration in favour of innovation. Although the study initially solely focused on deepening the theory related to the comprehensive framework, as requested by Sperber (2021) (Sperber, 2021), during the research, the focus largely shifted to the contribution to practice through designing the tool. In phase 1 of the study, the tool was received so positively that further development was considered of great value. The realisation after phase 1 was that the further development of the tool could be the study's most significant contribution. The study's shift led to a dual contribution, offering a valuable and unique contribution to theory and practice. The discovery of the diversity/inequality dilemma, as called for by practice (Shore et al., 2011), also contributed to developing a tool to facilitate the conversation about power dynamics. In today's business era, there is an increased focus on diversity and inclusion (Robertson, 2019) while organisations face mounting pressure to become more agile and innovative to remain competitive (Teece et al., 2016). The factors influence power dynamics (Ely & Thomas, 2001) or are influenced by power dynamics (Finkelstein, 1992), leading to a growing urgency to understand these power dynamics.

To address the contribution of the study and answer the research question, the study is grounded by a qualitative approach divided into two key phases: the first phase focuses on deepening the theory and validation of the tool, and the second phase on refining the tool by using user feedback – making the user feedback determining for the tool's further development – and testing its usability in practice. The study's first phase involves five top managers from highly innovative organisations. The study's second phase involves another five top managers from organisations in the Netherlands. The participants work in diverse sectors and hold various positions in the management team of the organisation in which they work. The manuscript's structure is, as can be seen in Figure 1, as follows: chapter 2 holds the theoretical framework in which the foundation

for understanding the relationship between TMT composition, demographic characteristics, power dynamics, and innovation is laid. In the following chapter, chapter 3, the initial design of the tool, 'The wheel of managerial power', is revealed. Then, in chapter 4, the first research phase follows, focusing on exploring TMT composition and collaboration strategies in highly innovative organisations and validation of the tool's first design, after which the research results are discussed in chapter 5. The second research phase method, chapter 6, focuses on refining the tool based on user feedback from research phase 1, ensuring its independent usability, of which the redesign and test results are included in chapter 7. In chapter 8, the final design of the tool is reviewed. The final chapter of the manuscript, chapter 9, discusses the manuscript and its conclusion.

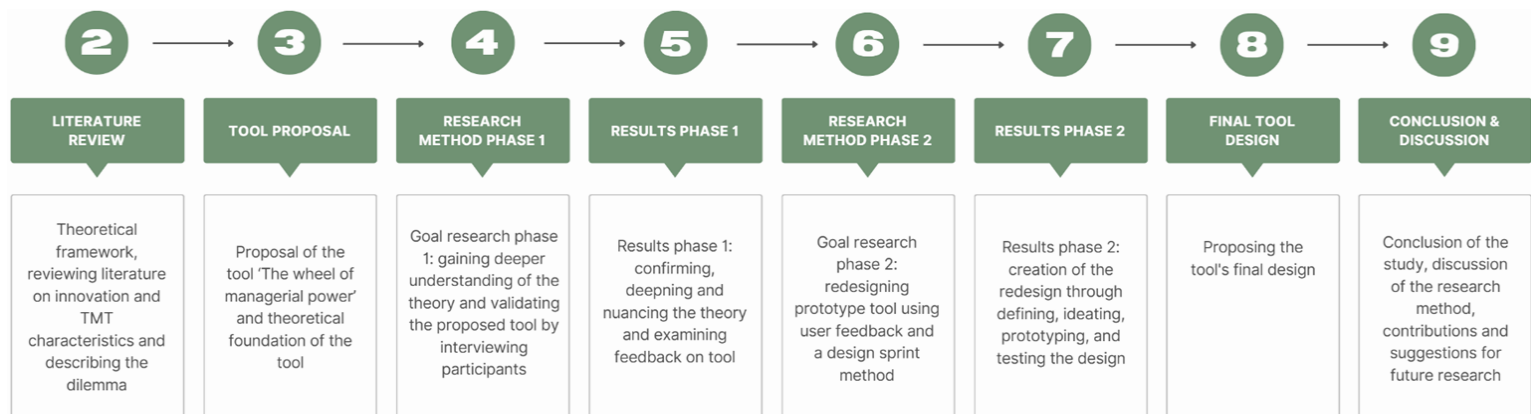


Figure 1: Structure of the manuscript

This study makes a novel contribution to understanding TMT composition and managing power dynamics in management teams by combining increased theoretical depth and practical applications. The findings provide organisations with a valuable source to enhance collaboration and improve decision-making to drive innovation. The study advances scientific understanding and presents a tangible tool for organisations to strengthen their position in an increasingly complex business environment.

2 Theoretical framework

The introduction highlighted the relevance of this study by introducing the diversity/inequality dilemma that TMTs face when the goal is to innovate. Generally, it is believed that demographic diversity drives innovation, while it is revealed that demographic diversity potentially leads to creating power differences, negatively affecting innovation. The dilemma asks for a deeper understanding of the composition of demographic characteristics and power differences in a TMT to drive innovation effectively. In this chapter, the theoretical foundation for addressing the dilemma is provided. This literature review starts with a review of the concept of innovation in academic literature. Then, the influence of the TMT on organisational innovativeness is highlighted. Building on this, the scholarly literature on demographic diversity, innovation, and team power distribution is explored. The study's design is guided by the comprehensive framework proposed by Sperber (2021) (Sperber, 2021), which combines these perspectives on innovation into a holistic model of top managerial influence on organisational innovativeness. Lastly, the literature review focuses on understanding the measurement of power distribution in the TMT, which reveals the dilemma of the study, after which the conclusion of the theoretical framework and the study's design are presented.

2.1 Perspective on innovation

Since Schumpeter first defined innovation in the organisational context in 1939, the amount of research on this topic has greatly increased, leading to many academic approaches and interpretations (J. Schumpeter & Backhaus, 2003; Schumpeter, 1939). Innovation is a multi-faceted concept, with researchers emphasising different aspects of innovation and often dedicating their definition to a specific discipline (Baregheh et al., 2009). These various definitions of the term ask for clarification of the meaning of innovation in the business context of this manuscript. According to the researcher, the essence of what innovation entails is revealed when looking at the prominent literature on organisational innovativeness. Schumpeter's definition of innovation highlights innovation as an outcome-oriented phenomenon and focuses on creating new combinations of products, production methods, markets, sources, and/or industry structures that fundamentally alter economic systems (Croitoru, 2012; Schumpeter, 1934; Śledzik, 2013). Schumpeter highlights innovation's disruptive and transformative nature by focusing on its outcome (Schumpeter, 1934; Śledzik, 2013). Rogers (1962), on the other hand, focuses his definition of innovation on the perceived novelty of innovation, describing innovation as "*an idea, practice, or object perceived as new by an individual or unit of adoption* (Rogers, 1962)." Rogers thereby underlines the importance of how innovation is recognised and communicated within the organisational or societal context, underscoring the adoption and diffusion of an idea. He frames innovation as a cognitive and communicative process, focusing on how innovation begins and spreads (Rogers et al., 2014).

However, there are far more interpretations of innovation in a business context. Baregheh et al. (2009) researched these different perspectives on innovation. They proposed a more comprehensive and process-oriented definition: "*Innovation is a multi-stage process whereby organisations transform ideas into new or improved products, services, or processes, to advance, compete and differentiate themselves successfully in their marketplace*" (Baregheh et al., 2009). Unlike Schumpeter's emphasis on transformative outcomes or Rogers' emphasis on perceived novelty, Baregheh et al. (2009) combine these elements, stating innovation as a continuous process that bridges the creative and transformative aspects. In this study, the concept of innovation is defined by the definition proposed by Baregheh et al. (2009), who describe innovation as a multi-stage process involving the transformation of ideas into tangible outcomes,

such as new or improved products, services, or processes, to advance organisational competitiveness (Baregheh et al., 2009). Baregheh et al.'s (2009) definition of innovation suits this study. This definition emphasises innovation as a continuous process that requires both ideation and implementation. Using Baregheh et al.'s (2009) definition, this study recognises that innovation is dynamic and iterative and that the TMT is crucial in fostering creativity and action to achieve innovation.

2.2 The top management team and its impact on organisational innovativeness

Being innovative is anything but a well-behaved linear process. Instead, innovation comes from uncertainty and cannot be easily interpreted (Kline & Rosenberg, 2009). Baregheh et al. (2009) emphasise that innovation is a continuous cycle of improvement rather than a single event. Activities to drive innovation are broad and thus take place in multiple stages of the process, including setting clear objectives, exploring new technologies, and shaping future expectations (Pavitt, 1991). Organisations must, therefore, leverage strategic, structural, and cultural factors to drive innovation effectively (Tidd & Bessant, 2021). In line with Baregheh et al.'s (2009) approach, which is process-oriented, this study acknowledges that TMTs have a crucial role in driving innovation by facilitating creativity and ensuring that ideas are transformed into concrete outcomes. The TMT composition plays an essential role in this (Sperber, 2021) because the top managers are one of the most decisive shapers of all innovation concerns within the organisational context (Daellenbach et al., 2002; Sperber, 2021; Wong, 2013). Most studies researching the influence of TMTs on organisational innovativeness focused narrowly on specific factors in the top management that influence innovation. Examples are demographic characteristics that are discussed by Hambrick & Mason (1984), leadership styles about which Jung et al. (2003) wrote, or the network interactions studied by Burt (1992) (Burt, 1992; Hambrick & Mason, 1984; Jung et al., 2003). In 2021, Sperber introduced a comprehensive framework on top managerial influence on innovation by combining the earlier-mentioned factors into a holistic model. Sperber's framework, which is shown in Figure 2, addressed the critical gap by highlighting the interconnectedness of the individual (demographic characteristics), group (team power distribution) and moderating factors (leadership styles and network interactions) that collectively interact with the TMT and influence organisational innovativeness. In this manuscript, the influence of the TMT on organisational innovativeness is examined through the lens of both the individual-level and group-level factors, which are argued to influence top managers and, thus, innovation. Therefore, Sperber's study serves as the theoretical foundation for understanding the influence of TMTs on organisational innovativeness, which this study builds on.

Whereas in the past, management literature mainly focused on the effect on organisational performance (e.g. Hambrick et al., 1996; Nielsen, 2010), Sperber differentiates by focusing on organisational innovation capability and outcomes related to innovation. Sperber's framework is unique from other literature in that it explains managerial influence on innovation because of the shift in focus from individual managers to the collective dynamics of the TMT. Sperber emphasises that the impact of TMTs on innovation arises from the interplay between the factors (Sperber, 2021), rather than isolated effects (Burt, 1992; Hambrick & Mason, 1984; Jung et al., 2003). This conclusion aligns with configurational approaches in organisational behaviour (Felin et al., 2012). Based on previous studies, the framework is built on the four central perspectives Sperber identified to have the most severe impact on the TM's influence on innovation: management, culture, leadership, and network perspectives. In the last chapter of the manuscript, Sperber highlights this need for empirical evidence to validate the interdependencies proposed in the

framework, such as the relationship between the perspective of management demographic characteristics, team power distribution and organisational innovativeness. The suggestion for further research suggests the framework's potential as a theoretical construct for empirical research because its current application in practice is limited. Furthermore, the resonance of Sperber's framework in the academic literature remains limited until this point, with only a few citations by other scholars. The low uptake might be due to its recent publication in the summer of 2021; therefore, scholars might not have enough time to empirically test the framework in further research. Because the framework is comprehensive, it may need refinement and empirical evidence before it can be widely applied. This study uses the framework as the foundation because of its structured approach to understanding TMT influence on innovation, making it suitable to empirically analyse the complex interplay between TMT composition and innovative outcomes. The framework's alignment with and extension of established theories such as Hambrick and Mason's Upper Echelons Theory (1984) strengthens its theoretical grounding and, thus, holds the promise that the framework increases its relevance for shaping future research on TMT's influence on innovation over the upcoming years (Hambrick & Mason, 1984). Especially when empirical tests deepen the relationships in the framework, the use of Sperber's model to study organisational innovativeness is expected to increase.

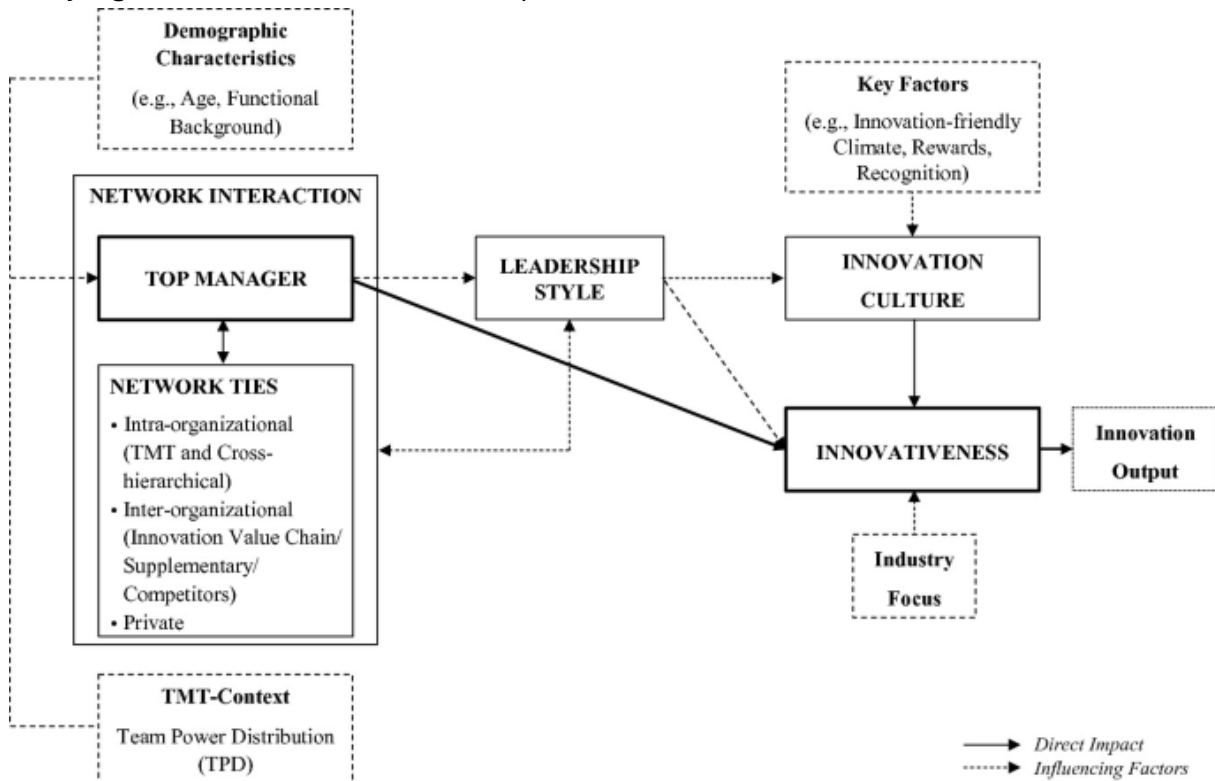


Figure 2: The comprehensive framework on top managerial influence on innovation (Sperber, 2021)

This study focuses on finding empirical evidence for the relationship between management and innovativeness by deepening the knowledge of the effect of TMT individual factors (demographic characteristics) and group-level factors (TPD). This focus is part of Serber's framework. The focus of this study is shown in Figure 3. The emphasis on demographic characteristics and team power distribution emerges from the foundational significance of these factors within Sperber's theoretical framework. Sperber's study shows that top managers' demographic characteristics significantly influence individual cognitive processes and decision-making styles (Hambrick & Mason, 1984; Miller & Triana, 2009). This directly impacts the approach to innovation. The team power distribution governs the distribution of power and authority in the TMT and is partially

explained by the combination of demographic characteristics (Bunderson & Reagans, 2011; Bunderson & Sutcliffe, 2002). These two factors have a strong interplay and serve as the building blocks upon which the other elements of the framework, such as leadership styles, network interactions, and culture, mediate (Felin et al., 2012; Jung et al., 2003). While it is theoretically possible to exclude part of Sperber's framework from this study, doing so requires attention to the limitation of the scope of the study. Sperber (2021) described leadership style, network interactions, and organisational culture as necessary for a comprehensive understanding of TMT's influence on innovativeness (Sperber, 2021). However, the effect of these elements on innovation is derived from the dynamics created by demographic characteristics and TPD. Because the study aims to reveal the highlighted diversity/inequality dilemma, the scope of the study is narrower than that of Sperber's framework because of the prioritisation of depth. It focuses on the most foundational factors to explain TMT influence on innovation: demographic characteristics and TPD. The scope of the study leaves room for future research to address other parts of the broader framework. The detailed limitations of the study are discussed in chapter 9.2. In short, this study focuses on the individual-level factors (the demographic characteristics) and the group-level factors (the TPD) that influence the impact the TMT has on organisational innovativeness (Sperber, 2021; Sperber & Linder, 2018) without considering the mediating factors.

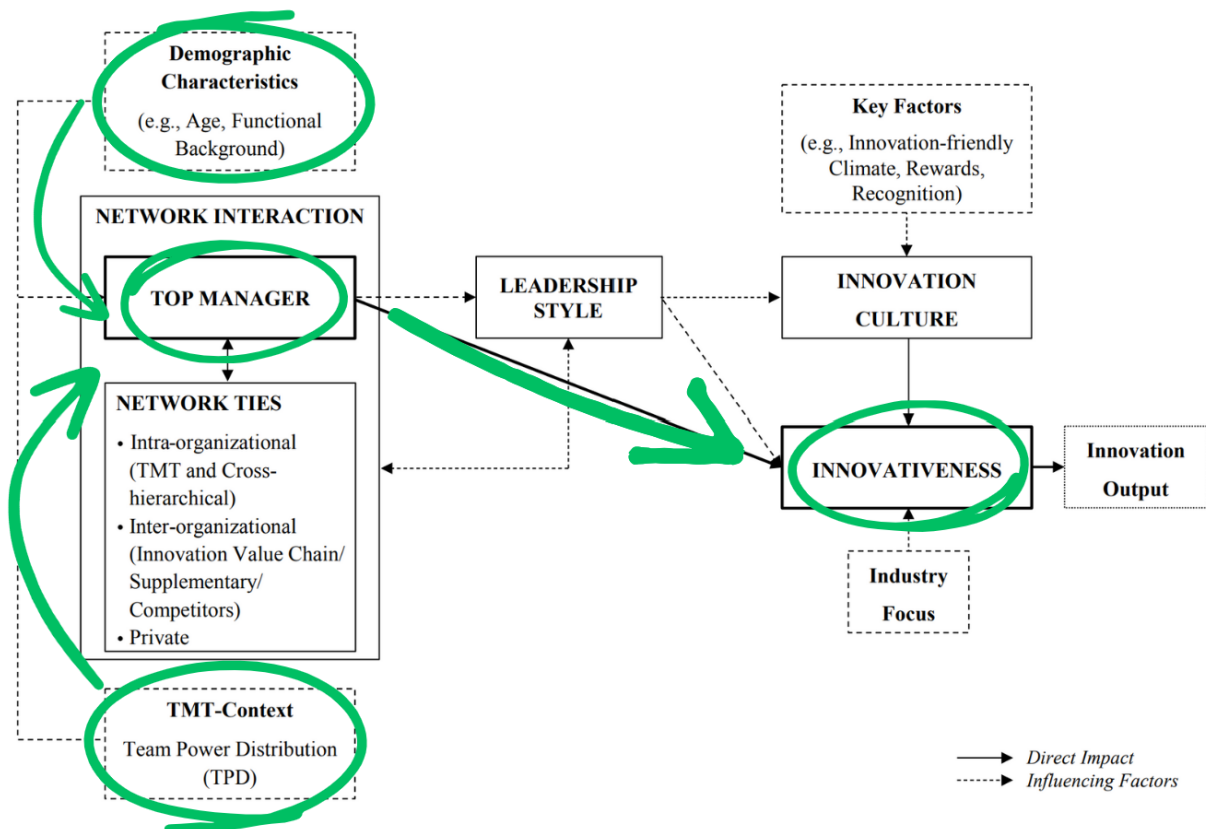


Figure 3: Focus of the study

2.3 Top managers' demographic characteristics and organisational innovativeness

Strategy literature mainly relates the influence of top managers on organisational innovativeness solely to the individual influence, while the impact that the entire TMT exerts remains somewhat more underexposed. As Sperber (2021) highlighted, innovation is primarily shaped by the dynamics in the TMT rather than by the isolated actions of individual managers (Sperber, 2021).

This study focuses on the collective influence of managers. Demographic-based TMT research explaining firm behaviour is often built on the Upper Echelons Theory (Hambrick & Mason, 1984; Carpenter et al., 2004; Nielsen, 2010; Bromiley & Rau, 2016). The central premise of the Upper Echelons Theory is that executives' experiences, values, and personalities greatly influence their interpretation of the situation they face and, in turn, affect their choices (Hambrick & Mason, 1984).

Knowing this, when trying to understand why organisations behave the way they do, the biases and dispositions of their most powerful actors – their top managers – must be considered (Hambrick, 2007). These factors, explained in the Upper Echelons Theory, shape a person's view in two ways: the observable factors (demographic characteristics) and psychological factors (cognitive base values) (Hambrick & Mason, 1984). Following the study's theoretical framework, this study provides a deeper understanding of the demographic characteristics in the TMT that influence innovation. According to Hambrick and Mason (1984), the observable factors (demographic characteristics) reflect deep cognitive traits, making them highly suitable for understanding TMT influence (Hambrick & Mason, 1984). According to the Upper Echelons Theory, the influencing demographic characteristics are age, tenure, educational level, and functional background (Hambrick & Mason, 1984). However, recent studies suggest that managers' gender and ethnicity influence the organisation's innovation ability (Saeed et al., 2023; Ponomareva et al., 2022; Lee & Chung, 2022). These six factors together form the manager's identity, which partially shapes the manager's interpretation of internal and external situations and facilitates the formulation of strategic alternatives (Carpenter et al., 2004; Sperber, 2021).

The negative age stereotype is that older workers are less innovative and more resistant to change (Ng & Feldman, 2013). Younger managers would facilitate innovation to a greater extent because of their higher willingness to change (Taylor, 1975) and to take risks (Wiersema & Bantel, 1992). While tenure is often associated with age, they are two different concepts. Length of tenure positively affects the commitment to the organisation's status quo and, in turn, decreases the willingness to consider new approaches, ideas, and routines and, collectively, contributes to innovating (Sperber & Linder, 2018). Hambrick and Fukutomi (1997) also describe how CEO tenure affects their behaviour toward innovation. The Upper Echelons Theory suggests that CEOs pass through two phases during their working life: 1) the initial period of adaptivity and 2) being overly committed to existing approaches (Chen, 2013; Hambrick & Fukutomi, 1991). After a specific period, a CEO's view towards the organisation's strategy stabilises, hampering innovation. In contrast, Okrah and Irene's study (2023) shows that as a manager's expertise in innovation increases, their proclivity to innovate also increases. Expertise comes with experience and age, which both strongly relate to tenure. Okrah and Irene (2023) substantiate the outcome by stating: *“Experience creates networks and increases managers' exposure to improved management methods, [leading to more innovative use of knowledge]”* (Okrah & Irene, 2023). Additionally, Ng and Feldman (2013) studied age and tenure as predictors of contribution to innovation-related behaviour among workers (Ng & Feldman, 2013). Their study did not show a negative relationship between age, tenure, or innovation-related behaviour. This duality highlights the nonlinear relationship between managers' demographic characteristics and organisational innovativeness.

Another predictor of innovativeness, according to Hambrick and Mason (1984), is educational background. In the Upper Echelons Theory, it is argued that, to some degree, education indicates a person's knowledge and skill base. It could also demonstrate their values and cognitive preferences (Hambrick & Mason, 1984). The consistent finding in research on the educational

backgrounds of managers and innovation is that the level of education is positively related to receptivity to innovation (Kimberly & Evanisko, 1981; Rogers et al., 2014). On the contrary, Hambrick and Mason (1984) theorise that professional education in management is associated with lower levels of innovation than 'self-made' executives, which is closely related to the managers' functional background (Hambrick & Mason, 1984). The manager's experience in certain areas (e.g. financial, marketing, or technical) influences their commitment to innovation in specific fields (Carpenter, 2002). These experiences are achieved through education or job experience (Sperber & Linder, 2018). Additionally, men and women approach innovation differently (Alsos et al., 2013; Gligor et al., 2022). For example, men are more likely to engage in risk-taking, exploration, and ideation activities (Zuraik et al., 2020). The results are that men are perceived as more effective innovation leaders (Gligor et al., 2022). While the literature reveals a gender bias in the innovation process (Blake & Hanson, 2005; Marlow & McAdam, 2012), other researchers explain how women often excel in adopting innovation and encourage employees to innovate (Alsos et al., 2013). The attitude towards innovation varies across ethnic groups and is influenced by cultural values and social experiences (Cooke & Kemeny, 2017). Cultural dimensions such as individualism and uncertainty avoidance affect societies' coping with new ideas (Everdingen & Waarts, 2003). The influence of these individual factors on innovation is often strongly influenced by the composition of managers and their demographics in the management team (e.g., Talke et al., 2010; Bantel & Jackson, 1989; Simons et al., 1999; Østergaard et al., 2011).

Horizontal diversity in the TMT and organisational innovativeness

Previous research has considered mainly the individual demographic factors influencing organisational innovativeness. However, the composition of personal demographic characteristics in the TMT might even be a more important predictor of organisational innovativeness (Buyl et al., 2010). Knowing how individuals' decisions are affected, it is often argued that TMT composition may directly affect innovation strategy and the results (Talke et al., 2010). Additional research even proposes that the higher the degree of heterogeneity, the better the organisational outcomes, such as innovation (Gschmack et al., 2015), while others show a more nuanced perspective (Simons et al., 1999). Finkelstein et al. (2009) further elaborated that the composition of TMTs influences key strategic decisions, such as resource allocation, risk-taking and organisational culture, which are critical for fostering innovation (Finkelstein et al., 2009). While research on demographic diversity in TMTs has shown mixed results across outcome variables, scholars largely agree that demographic diversity in TMTs represents a potential for more thoughtful decision-making in dynamic and uncertain environments in which innovation is essential (Simons et al., 1999; Bunderson & Van der Vegt, 2018). Heterogeneity of demographic characteristics in TMTs, for example, results in less group thinking (Hart, 1991) and is therefore associated with greater information use (Dahlin et al., 2005). Diversity also ensures more significant variance in decision-making (Hambrick & Mason, 1984; Mazur, 2010), stimulates creative thinking (Coser, 1956) and active participation (Simons et al., 1999), suggesting a positive relationship between diversity in the TMT and the organisation's strategic choices and outcomes (Talke et al., 2010), meaning that TMT diversity should have a positive influence on an organisation's performance. Former research either focuses on the impact of heterogeneity in top managers' demographic characteristics (Mehrabi et al., 2021) or selects just one characteristic as representative of the whole.

However, when explaining organisational innovativeness, other studies show a more nuanced relationship between TMT diversity and innovation. Simons et al. (1999) researched background heterogeneity as a predictor of innovative performance by dividing the characteristics into shallow

and deep factors (Simons et al., 1999). The descriptive study found no direct correlation between shallow-level factors (e.g. gender, age, ethnicity) and innovative performance. In contrast, homogeneity of deep-level factors (including career experience, education background, industry status, tenure, and other variables that are more dependent on acquired experience) negatively affect innovation performance (Simons et al., 1999; Wang et al., 2022), implying that there is moderate support for the positive effect of demographic diversity in a TMT on organisational innovativeness. The outcome of the study enriches the Upper Echelons Theory. In line with the outcomes of the study by Wang, He, and Yang (2022), scholars argue that individuals tend to associate more with similar personas. This theory, the Social Identity Theory, therefore suggests that heterogeneity in TMT members' identity inhibits the transfer of skills within the team, increases the likelihood of conflicts, and results in more significant differences in the process of formulating strategies, resulting in lower efficiency (Wang et al., 2022). However, the statements in the study by Wang, He, and Yang are not empirically tested, and the manuscript only studied the direct influence of heterogeneity.

The studies of top managerial influence on organisational innovativeness from the top manager's demographic characteristics perspective receive critique on their assumptions, which is what the latter limitation of Sperber's study also highlights (Sperber, 2021). The main critique of the assumptions from the Upper Echelons Theory is that the theory implicitly assumes that power is equally distributed among the members of the TMT. This assumption, however, has never been tested with evidence from an empirical study (Hambrick & Mason, 1984). Conversely, prior research found a complex and dynamic power structure within TMTs (Schulze et al., 2001). In other words, power in TMTs is most likely not equally (homogeneously) distributed (Peng & Ma, 2018). An additional critique that the diversity theory receives is the exclusion of the effect of perceived discrimination and social exclusion because of the variety of age, tenure, gender, and ethnicity in the relationship (Gao & Zhang, 2015). To explain the top managers' collective influence on organisational innovativeness through the TMT, further research must be done to consider the power distribution within the TMT. Therefore, in this study, the impact of mechanisms of action is examined by incorporating the TPD into the framework.

The manuscript uses several terms to denote diversity-related concepts. In Table 1 these different terms have been clarified.

Concept	Definition of the concept	Example sentence
Diversity	The fact of many different types of things or people being included in something; a range of other things or people (Cambridge Dictionary, 2025).	'It can thus be argued that diversity positively influences innovation.'
Demographic diversity	Demographic diversity refers to differences in readily observable characteristics such as age, gender, social status, and race/ethnicity (Williams & O'Reilly, 1998)	"... scholars largely agree that demographic diversity in TMTs represents a potential for more thoughtful decision-making in dynamic and uncertain environments in which innovation is essential.'
Cognitive diversity	Cognitive diversity refers to differences in how people think. This includes perspectives,	'Recent research found evidence that distinct patterns of TPD are associated with distinct

	interpretations, and heuristics (Page, 2007).	patterns of team cognitive diversity.'
Team diversity/TMT diversity	Team diversity, or TMT diversity, refers to the variety of characteristics among the team members (Carpenter et al., 2004).	'These demographic differences between people relative to the studied group they belong to shape the classic question of team diversity.'
Horizontal diversity	Horizontal diversity refers to the differences among team members based on attributes unrelated to power or rank, such as functional background and gender (Bunderson & Sutcliffe, 2002).	'Research showed that allocating power to team members depends highly on differences in characteristics, horizontal diversity (individual-level factors) and vertical inequality.'
Diversity in deep-level factors/professional diversity	Deep-level diversity involves differences in knowledge, traits, expertise, and other non-observable attributes (Harrison et al., 1998).	'From these results, it can be concluded that the surveyed organisations consciously decided to focus on the diversity of deep-level factors...'
Diversity in shallow-level factors/personal diversity	Shallow-level diversity includes immediate, observable individual differences such as race, gender, and age (Harrison et al., 2002).	'The descriptive study found no direct correlation between shallow-level factors (e.g. gender, age, ethnicity) and innovative performance.'

Table 1: Clarification of diversity-related concepts

2.4 Top management team power distribution and organisational innovativeness

According to Smith et al. (2006), power distribution in the TMT is one of the most determining aspects of decision-making in the organisational context (Smith et al., 2006), making the inclusion of TPD highly relevant when studying the TMT's influence on innovation. In business research, Pfeffer (1981) defines power as the capacity of an individual to get things done in contested situations (Pfeffer, 1981). This description of power is also used by Eisenhardt and Bourgeois (1988) (Eisenhardt & Bourgeois, 1988), and the description of power used in this study. For a team member to contribute to the problem-solving process with his experience and knowledge, the member must be involved and be in a position to have enough power to influence the processes that go on within the team (Bunderson, 2003; Buyl et al., 2010). Power is thus always relative to other social actors, such as TMT members (Sperber & Linder, 2018). In his study, Pfeffer (1992) explains that power is not just about the individual's hierarchical position but about someone's ability to influence others (Pfeffer, 1992), making power influential to highly social actors such as TMT members. Generally, the dimensions that are used to measure power are structural power, ownership power, expertise power, and prestige power. These dimensions are further elaborated in chapter 2.5.1. Additionally, top managers' demographic characteristics closely relate to their allocation of power within the TMT (Wellalage et al., 2019). Instead of investigating a direct and straightforward relationship between TMT characteristics and firm performance, TPD is thus an essential factor that influences the relationship between top managers' characteristics and

organisational innovativeness that should be included in the analysis (Talke et al., 2010; Sperber, 2021). This theory reveals an addition to the previously accepted measurement of power distribution, namely, the manager's demographic characteristics. Within the TMT context, power distribution means that the organisation's resources are distributed among the top managers in the TMT. This distribution's form affects the strategy's formulation and implementation (Peng & Ma, 2018). A more balanced power distribution corresponds to collective leadership (homogeneity of power), while an unbalanced distribution of power corresponds to individual leadership (heterogeneity of power) (Peng & Ma, 2018). The following subchapter explains how a heterogeneous power distribution within the management team affects innovation.

Vertical inequality in the TMT and organisational innovativeness

Literature on the effect of power distribution in TMTs and organisational innovativeness is scarce. Previous studies mainly focused on the impact of TMT power distribution on organisational outcomes in general. Those studies show mostly negative results (Smith et al., 2006), suggesting that power inequality negatively affects organisational performance. Kabanoff's study (1991) has proven that power inequality in teams reduces conflict and positively impacts the relationship between cognitive diversity and innovative performance (Kabanoff, 1991). More recent literature on the topic starkly contrasts Kabanoff's statements. In one of the leading studies on power distribution and team performance by Haleblan & Finkelstein (1993), a negative relationship between power inequality and team performance was found (Haleblan & Finkelstein, 1993). They argue that power inequality leads to inefficient processes because time is spent discussing arguments made by more powerful members rather than discussing alternative solutions (Buyl et al., 2010). The result is that discussions in diverse teams lead to more of a power struggle instead of collaborating with and combining the knowledge of TMT members. Other studies reveal that TMT power inequality suppresses information sharing and harms an organisation's innovative performance (Eisenhardt & Bourgeois, 1988). A skewed distribution of power in the TMT also increases the probability of biased group outcomes (Sperber & Linder, 2018). In other words, power equality in TMTs is associated with strategic consensus and power inequality with strategic dissent (Iglesias, 2023). The theory thus shows that unequal distribution of power in the TMT has negative consequences for the organisation's innovative performance. Therefore, power inequality must be managed and reduced. To do so, it is crucial to understand where power comes from and how it gets distributed. Recent research found evidence that distinct patterns of TPD are associated with different patterns of team cognitive diversity (Zhang et al., 2020), which the following subchapter discusses.

2.5 Measuring team power distribution in the TMT

Theoretically understanding and practically managing the power that influences organisational innovativeness starts with raising awareness of what power in the TMT entails, after which it can be acted upon. This subchapter highlights the measurement of vertical differences (inequality) and horizontal differences (diversity).

How do top managers get or use a certain amount of power, or how is power distributed in the TMT? To my knowledge, one comprehensive study explains how managerial power is obtained. The study by Bunderson & Van der Vegt (2018) divided obtaining managerial power into two dimensions: horizontal differences (diversity) and vertical differences (inequality) between top managers (Bunderson & Van der Vegt, 2018). The study by Bunderson & Van der Vegt (2018) explains how formal position and demographic characteristics contribute to a manager's power level relative to their fellow top managers who are part of the team. The managers' demographic

characteristics explain the horizontal differences, which shape their perceived legitimacy and influence in the TMT (Menz, 2012). Vertical differences, on the other hand, refer to the managers' power dimensions (Finkelstein, 1992; Hambrick & Mason, 1984). These two types of individuals interact to determine decision-making authority within the team. Building on these insights from both Bunderson et al. (2018) and the identified influencing demographic characteristics (Bunderson et al., 2008; Bunderson & Van der Vegt, 2018), this study takes inspiration from the design of Duckworth's framework and integrates both formal power structures and social identity-based influences into a comprehensive tool for assessing power distribution in TMTs.

2.5.1 Vertical differences in the TMT

The vertical differences between top managers in a TMT emerge from differentiation within formal or informal hierarchies of power, status, prestige, or privilege. Thus, when studying the vertical differences between top managers in management teams, we study the inequality among group members (Blau, 1977; Bunderson & Van der Vegt, 2018). In his work, Finkelstein (1992) identified four different sources of power among top managers, namely: structural power (e.g. compensation, number of titles), ownership power (e.g. executive shares, founder or relative), expert power (e.g. critical expertise power, positions in the firm) and prestige power (e.g. corporate boards, elite education) (Finkelstein, 1992). These elements together explain part of a top manager's control over resources and their power in the TMT towards colleagues (Emerson, 1962).

Vertical power differences

Structural power explains the distribution of formal positions within an organisation. Managers with high structural power are less dependent on other members of the organisation to form a dominant coalition. Managers with a high percentage of higher titles, high compensation, and a high number of titles compared to their colleagues have the highest structural power in the TMT.

In addition, shareholdings are relevant indicators of power. This kind of power, called **ownership power**, is explained by a manager's amount of executive shares and family shares (the higher the amount of shares, the more ownership power). A manager's ownership power is also related to its relationship with other powerful managers. The closer a manager is to other relevant shareholders, the higher the ownership power of the manager.

A manager's ability to deal with environmental dependencies explains their **expert power**. Expert power is measured by a manager's critical expertise power (the higher, the more expert power), a manager's experience in a certain functional area (the more experience, the more power), and their position in the firm (the greater the number of different positions, the more expert power).

The last type of power, **prestige power**, relates to a manager's ability to deal with uncertainty in an institutional environment. Managers gain prestige power when they sit on a high number of corporate or nonprofit boards compared to their colleagues, the average board rating of the boards they sit on is high, and the manager has an elite educational background (elite education positively influences prestige power) (Bunderson & Van der Vegt, 2018).

2.5.2 Horizontal differences in the TMT

Horizontal differences between top managers emerge from differentiation based on specialisations, social categories, cohorts, or backgrounds (Bunderson & Van der Vegt, 2018; Duckworth, 2021). Most management research includes gender, age, ethnicity, tenure, educational background, and functional or disciplinary background as predictors of significant horizontal differences between people (Knippenberg & Schippers, 2007; Phillips & O'Reilly, 1998). These demographic differences between people relative to the studied group they belong to shape the classic question of team diversity. These horizontal differences that lead to a difference in power in a team are similar to the demographic characteristics that explain the TMT's relation

to innovation, to which applies: the more diverse, the more innovative. The identified horizontal differences help explain power dynamics in a team. About TPD, the less varied the demographic characteristics, the more homogeneous the power distribution and the better the team's contribution to the organisation's innovativeness. It is essential to mention that the demographic characteristics influencing innovation, explained in chapter 2.3, and the demographic characteristics influencing TPD, explained in this chapter, come from different literature and are similar by chance. The currently available management literature mainly focuses on the diversity in demographic characteristics within a team (Nielsen, 2010; Joshi & Roh, 2009). However, this study is interested in how diversity in demographic characteristics distributes power within the team. Therefore, a combination of available knowledge from social sciences and management literature explains the power distribution within the TMT using the members' demographic characteristics as predictors.

Horizontal diversity leading to power inequality

The leading statement in power dynamics literature reveals that **gender** is a great predictor of someone's power (Ragins & Sundstrom, 1989; Alsos et al., 2013). Their research shows a consistent difference favouring men's inaccessibility to, and utility of, resources for power and making the path to power for women more like an 'obstacle course'. Duckworth's model shows that trans, intersex, and non-binary people experience the most difficulty in gaining power (Riitaoja et al., 2022).

Ageism (discrimination against people based on **age** (Butler, 1969)) frequently appears in discussions of ageism direction and experience of youth work practice. However, older people also experience the adverse effects of ageism. Ageism is based on both psychological and sociogenic processes. Younger people generally have less knowledge and experience, while older people are likely unable to keep up with the present rate of development (Franklin & Franklin, 1990). In business, the older group experiences fewer adverse effects of ageism than the youth because of their presumed experience and knowledge.

The most influential groups in society have the highest representation level (Oddy, 2021). In many Western Societies, predominantly white individuals are seen as 'more powerful', while Asian and Middle-Eastern groups in Western Societies often face stereotypes and biases that limit their power. Black groups are underrepresented in Western Societies and, therefore, have restricted access to power and resources. These examples show that **ethnicity** drastically influences a person's access to power in society (Haeseler, 2013; Serrano García, 1994), with the most represented group having the most power and the least represented group having the least power.

The study's results by Allen (1981) show considerable empirical confirmation for the power theory of managerial **tenure**. The study shows that there is a strong relationship between CEO power in terms of stock ownership and tenure. In other words, the CEOs with high power often have a longer tenure (Allen, 1981). In contrast, Darouichi et al. (2021) hypothesise that CEO tenure is a proxy for CEO power and entrenchment (Darouichi et al., 2021). Decision-makers within an organisation (top managers) possess more power when they have a longer tenure.

Education indicates a person's knowledge and skill base to some degree (Hambrick & Mason, 1984). In our society, education is a strong predictor of a person's power. Higher education is associated with emotional intelligence, practical communication skills, and sound ethical and moral development (Unity Environmental University, n.d.). This is also shown in Duckworth's framework, where persons with a higher and more extensive **educational background** are placed above others with lower levels of education on the power ladder (Riitaoja et al., 2022).

Knowledge and expertise that come through experience in different functional domains can be a source of power that comes with experience (expert power) (Finkelstein, 1992; French & Raven, 1959). Finkelstein (1992) suggests that a **functional (or disciplinary) background** is a source of expert power when it includes a breadth of functional experience profile combined with experience in management. A broad functional background also sources referent power from qualities and characteristics that inspire trust, liking, and identification (Bunderson, 2003). So, the conclusion is that a broad functional background equals more power than a narrow functional background.

2.6 Conclusion and study design

The literature review revealed that diversity in various factors of demographic characteristics in a TMT positively affects organisational innovativeness (Talke et al., 2010; Østergaard et al., 2011). The research also confirms that cognitive diversity in TMTs leads to power disparity in these teams. Power disparity, in turn, could negatively affect an organisation's innovative outcome (Greer & Dannals, 2020; Tarakci et al., 2016). This conclusion reveals a dilemma where demographic diversity is desirable and entails power inequality, which is undesirable when driving innovation. Overcoming this dilemma is the main contribution of this study. Therefore, after studying the literature on TPD, this study extends the framework proposed by Sperber, shown in Figure 2. The study design is portrayed in Figure 4.

The literature indicates a direct relationship between individual-level factors, demographic characteristics, and the group-level factor, team power distribution, to organisational innovativeness. Here, a higher degree of diversity in demographic characteristics in the team positively contributes to organisational innovativeness. In comparison, a higher degree of diversity in the team leads to unequal power distribution, negatively affecting organisational innovativeness. Additionally, research showed that allocating power to team members depends highly on interpersonal differences, horizontal diversity (individual-level factors) and vertical inequality. This is where we see a dilemma, highlighted by the big red dotted lines in Figure 4.

On the one hand, heterogeneity in demographic factors of managers in the TMT allows for better decision-making and more innovative outcomes. On the other hand, heterogeneity in demographic factors of managers in the TMT creates inequality in power. In the ideal world, an organisation can compose the TMT in such a way that the combination of demographic characteristics of the top managers and the distribution of factors is organised so that innovation is promoted. In the real world, composing the 'perfect' TMT for organisational innovativeness is inconceivable, either because management teams are not aware of the effect of TPD and do not pay attention to its impact on innovation, but also because organisations do not always have the choice to pick a fitting manager and therefore face the diversity/inequality dilemma of which they must leverage the adverse effects to foster innovation. These two obstacles contribute to the study. First, to promote innovation in an organisation through the TMT, it is crucial to be aware of the distribution of power within the TMT to make an informed decision on the composition of managers in the TMT. This study contributes to creating awareness of TPD by proposing a tool that explains how individual characteristics influence the allocation of power to members in the TMT in comparison to the other members of the TMT. The tool's design is discussed in chapter 3.

Additionally, the composition and collaboration strategy that TMTs of highly innovative organisations use to overcome the diversity/inequality dilemma and foster innovation is explored because these innovative organisations seem to have a practical approach to mitigate the dilemma's negative influence on organisational innovativeness. Therefore, in this study, a mediating variable, configuration of TMT, is added, which is shown by the straight line between the relationship between demographic characteristics and TPD and its effect on organisational innovativeness in Figure 4. The study captures the composition of highly innovative firms' managers in the TMT. Then, it focuses on how the managers best use the team's demographic characteristics and power distribution rather than adjusting the composition to drive innovation. The results of the qualitative analysis of these teams are portrayed in chapter 5.1. Additionally, the applicability of the proposed tool, 'The wheel of managerial power', in practice is tested by validation with users. The next chapter further discusses the tool's inspiration, theory, use and aimed applicability.

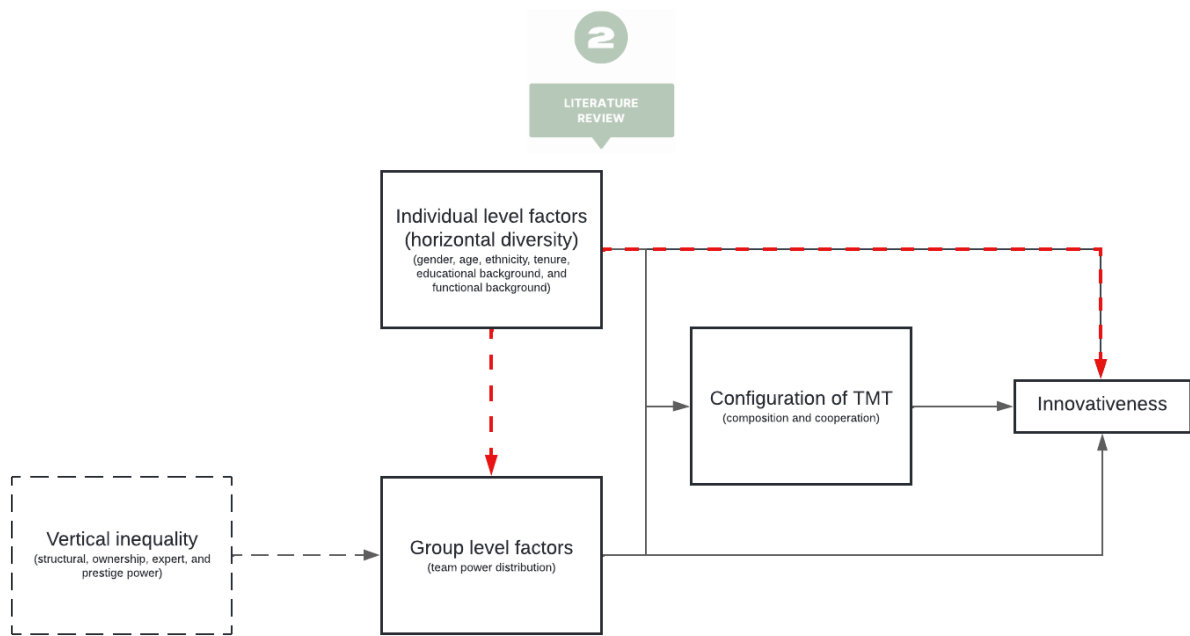


Figure 4: Focus of the study

3 Initial tool design: The wheel of managerial power

Fundamentally, it is impossible for the power within a group to be equally distributed (Bunderson & Van der Vegt, 2018). Therefore, the organisation's aim should not be to achieve equal power distribution among TMT members but to compose the TMT characteristics and achieve good cooperation within the TMT to stimulate organisational innovativeness. Studying factors in a TMT, such as demographic characteristics, is relatively straightforward since variables such as age, gender, and education are observable. On the other hand, the factors explaining power distribution are far more complex since power manifests in unconscious tendencies that are not capturable through traditional data collection methods (Finkelstein, 1992; Pettigrew, 1992). While the literature review revealed that deepening the current understanding of the power dynamics in the TMT is critical for explaining the effect of the managers' demographic characteristics on organisational innovativeness, it cannot be quickly acted upon because the influencing factors are not easily accessible.

Additionally, for the managers, it is critical to understand the power dynamics in their team to improve decision-making on composition and collaboration strategies so that the team can drive innovation. To my knowledge, there is not yet a tool available for practice to investigate power dynamics in a team and help managers collect information about the factors influencing the power dynamics in a team. Therefore, the tool proposed in this chapter has a dual contribution. Firstly, while existing research primarily focused on theoretical discussion of power distribution, this tool adds to existing literature by explaining the effect of the distribution of demographic characteristics on TPD. Secondly, this study bridges the gap from theory to practice by proposing a structured tool that makes power relations within the TMT more explicit so that the team can work on finding a balance in the diversity/inequality dilemma. This chapter discusses the inspiration and available literature on explaining power distribution in the TMT. Then, the designed tool, 'The wheel of managerial power', is introduced and discussed.

3.1 Inspiration and literature on explaining power distribution

Leading research on TMT power distribution suggests that four dimensions of power influence decision-making in the TMT: structural power, ownership power, expertise power, and prestige power (Finkelstein, 1992; Hambrick & Mason, 1984). Structural power is derived from an individual's formal position within the hierarchy of a team. Ownership power relates to a person's financial stakes in the organisation. A person acquires expertise and power from their specialised knowledge. Lastly, prestige power is gained by a person's reputation and external recognition (Carpenter et al., 2004). The definitions of these factors are further elaborated in chapter 2.5.1. These formal power structures are crucial to understanding a TMT's power dynamics, but they do not exclusively explain the power structures. Other studies explaining power distribution in general show that individuals' characteristics play a significant role in shaping the power relations within a team (Eagly & Karau, 2002; Ridgeway, 2008). Various studies suggest that women or ethnic minorities in executive roles are often perceived as less influential than their white male colleagues. They face less trust and scrutiny, leaving them disadvantaged (Eagly & Carli, 2007; Ely & Thomas, 2001). This insight reveals that demographic characteristics such as gender, ethnicity, and education level explain how individuals interact and make decisions and influence how much power or privilege a person has (Duckworth, 2021). Duckworth's wheel of power, privilege, and marginalisation was found when looking for existing frameworks explaining power distribution. To my knowledge, this is the only comprehensive framework, while previous studies focused on a

single dimension explaining power distribution. In 2021, Sylvia Duckworth presented a framework explaining the distribution of power, privilege, and marginalisation among groups, as shown in Figure 5 (Duckworth, 2021).

Social workers developed the framework as a pedagogical tool to understand interconnected inequalities better. The framework is read as follows: the innermost ring is the most powerful/privileged. The outer ring, in turn, indicates the least power/privilege. Since its release, various researchers have picked up the framework to explain power distribution and have had multiple variations made to it (Riitaoja et al., 2022; Recipes for Wellbeing, n.d.; International Council of Voluntary Agencies, n.d.). While some variations aim to deepen the framework (Duckworth, 2021), others focus on a specific group, problem or cause (Canadian Council for Refugees, n.d.). The broad use of the framework by science and in practice shows the prevalence of the framework for design scholars to discuss diversity in power. Inspired by Duckworth's framework, this study creates a version of the framework explicitly focusing on the power distribution within TMTs. However, because this study's variation of Duckworth's framework is applied to practice as a conversational aid, the version is called a tool by the name 'The wheel of managerial power', which can be seen in Figure 6. Duckworth's framework inspires the tool's design, rather than its content. While some dimensions of the tool correspond to Duckworth's framework (e.g. age and gender), the dimensions in this tool are based solely on the factors that contribute to the distribution of power in the specific target group: TMTs.

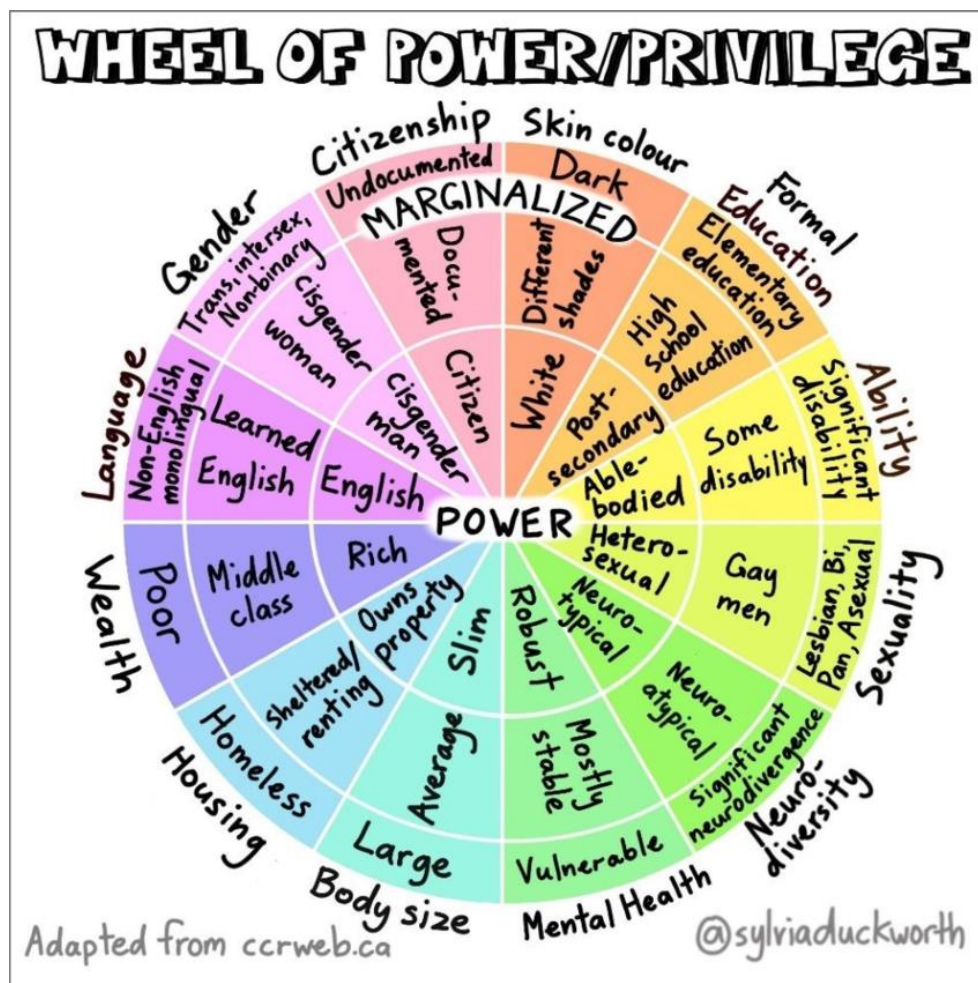


Figure 5: Wheel of power, privilege, and marginalisation (Duckworth, 2021)

3.2 The wheel of managerial power explained

The tool designed in Figure 6 combines the horizontal and vertical predictors of power and provides a comprehensive view of how power is distributed among managers within a management team. The tool, presented as 'The wheel of managerial power,' is used in management teams to guide the conversation about power differences and their effect on organisational innovativeness. The tool's relevance to this study is that it gives managers the ability to start implementing collaboration strategies after identifying power differences to overcome these power differences and foster organisational innovativeness. Because of its simple design, the tool provides an understandable and straightforward representation of a large body of literature. The comprehensiveness of the tool, based on carefully selected and highly relevant literature in the specific field of top management, provides management theory with additional insights in describing power dynamics. On the other hand, because of its simple design, the tool can be used as a conversation tool in practice by management teams who wish to improve decision-making and the organisation's innovativeness.

As mentioned, the tool's design is similar to Duckworth's framework. The design of the top half of the tool (horizontal differences) is identical to the design of Duckworth's framework. Each dimension is divided into three categories: the category with the most power relative to the other categories is positioned in the centre, whereas the category with the least power relative to the other categories is placed in the outer ring. The design of the bottom half of the tool (vertical differences) is, by contrast, not inspired by a specific example. These dimensions are not specified in three categories since categorisation in these dimensions is ambiguous. Instead, a scale-like design is used. Positioning towards the centre of the tool relates to more power relative to the other team members. In contrast, positioning towards the tool's edge relates to less power than the persons positioned near the centre. All team members fill in the tool independently but simultaneously. In doing so, team members fill in their place on the dimensions relative to the other team members. In the upper half of the tool, this is less complex than the lower half, where individuals have to estimate for themselves how much power he has relative to the team members. This requires honesty, openness, vulnerability and trust.

It is essential to mention that the tool is not a solution but rather a resource for overcoming power differences and the diversity/inequality dilemma. As this method is error-prone, team members must engage with each other based on the input the tool's outcomes give. Engaging in conversation about the differences in power in the team is the most crucial part of the process, where filling in the tool is just a means of gathering input for the conversation. Using the tool without having a conversation afterwards is not recommended because it most likely would not be valuable. During this conversation, discussing the members' outcomes jointly is essential. Afterwards, the team can engage in a collective discussion to work out configuration strategies to overcome the differences in power in the team and further encourage innovation. An independent moderator can be valuable to help get the conversation going and ensure that the most powerful person in the team does not take over the conversation. However, the tool has not been validated. The tool, as proposed in this chapter, is the initial design of the tool. This study validates the tool's initial design using end-user feedback. This chapter includes the results of the first iteration of designing the tool. chapter 5 discusses the test results of the initial design. chapter 7 consists of the redesign of the tool (results iteration two), and chapter 8 reveals the final design of the tool.

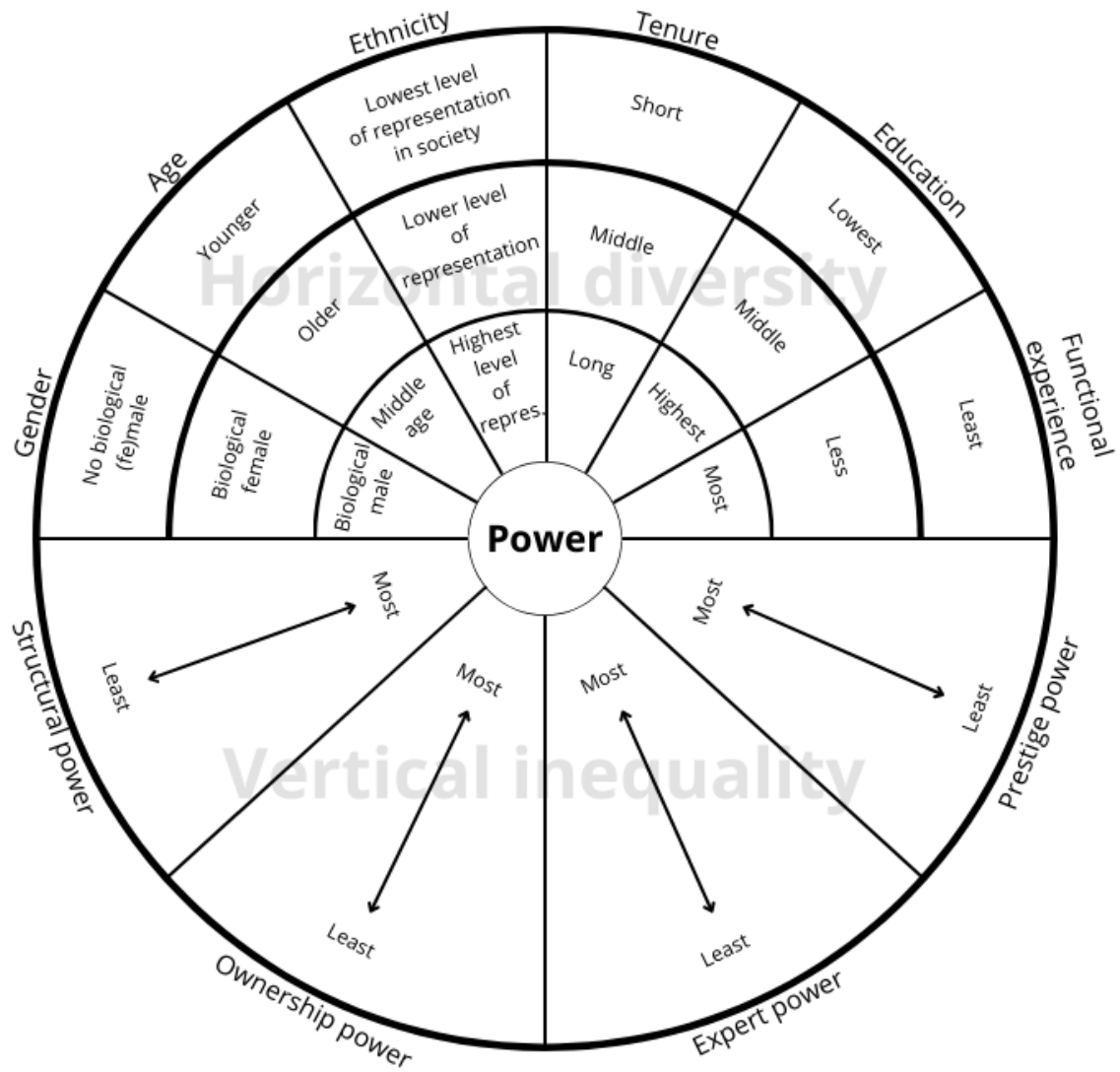


Figure 6: The wheel of managerial power

4 Research method for theory deepening and tool validation

The research question focuses on (1) deepening the understanding of the characteristics of highly innovative TMTs and (2) designing a tool to discuss power dynamics in the TMT. The duality of the focus of the research question of this study means that the description of the research method calls for a clear distinction between the two subgoals, denoted by (1) and (2). This approach will be used in the rest of the sections of this chapter, which consists of an explanation of the research methodology, the data collection method and measures, the sample and study's descriptive statistics and which ends with the approach to data analysis.

4.1 Methodology

The selected data collection method of the study is in-depth interviews. A semi-structured interview guide is used as a data collection instrument, which is added in Annexe 1. The questions in the interview guide are prepared based on the conceptual framework embedded in the research question (Hennink et al., 2020). The approach of in-depth interviews is critical for studying complex phenomena (Hammarberg et al., 2016) as leadership and innovation (Conger, 1998; Frisch & Huppenbauer, 2014), and to allow for an exploration of the participants' experiences and perspectives providing rich and context-specific insights (Rubin & Rubin, 2012; Hammarberg et al., 2016) that gives insight in both focusses of the research question.

(1) In-depth information about demographic characteristics and TPD influencing top managers' influence on innovation is unavailable (Sperber, 2021). It limits the understanding of TMT's demographic characteristics and team power distribution, which drive organisational innovativeness. The gap of how to overcome the dilemma between a more diverse team in terms of demographic characteristics, leading to more inequality in power distribution, introduced in chapter 1, is closed in this study by extending available literature using a qualitative research approach, using semi-structured in-depth interviews (Hennink et al., 2020). This approach comprehensively explores TMT composition, power dynamics, and collaboration strategies in highly innovative organisations. A qualitative research approach was chosen to help gain a deeper understanding of the key factors of an innovative TMT (i.e. demographic characteristics, TPD), jointly influencing organisational innovativeness and capturing collaborative strategies used by highly innovative TMTs to overcome the presented dilemma. Semi-structured interviews ensured a structured framework. On the other hand, semi-structured interviews are flexible so that the interviewees can elaborate further on their experiences. This flexibility results in richer insights (Brinkmann & Kvale, 2015). This type of interview also contributes to the interaction between the interviewer and the participant, leading to more profound responses and the ability to explore insights further, enhancing the validity of the data (Maxwell, 2013).

(2) The literature explaining power distribution within TMTs was extended with a tool, presented in chapter 3 as 'The wheel of managerial power'. The construct validity of this tool was tested using a qualitative, interactive approach (Hennink et al., 2020). Participants actively engage with the tool and provide real-time feedback on its usability. The interactive approach is particularly suitable for capturing user experiences while exploring the tool to gather user feedback that can be used for future empirical testing and refinement (Brinkmann & Kvale, 2015; Maxwell, 2013). The qualitative validation process also ensures that the tool is theoretically sound and enables a practical assessment of the tool (Yin, 2018). The qualitative approach to validating the proposed tool contributes to strengthening the theoretical foundation on which the tool is built while ensuring practical applicability and providing data for future refinement.

4.2 Data collection and measures

The interviews were conducted in the participants' mother tongue, which was all Dutch, to enhance participant engagement and data quality, providing richer insights (Squires, 2009). The interview guide, added in Annexe 1, is used to ensure consistency in the questions that are asked in the interviews and ensure all of the participants discuss all the concepts. All the questions are open, straightforward and focused on one issue at a time (Hennink et al., 2020), inviting interviewees to share their perceptions on specific topics. The interview guide has two focus areas, which are directly aligned with those in the research question. The guide consists of 25 questions and 28 sub-questions and is composed as follows:

The interview starts with a few questions about the general background of the interviewee and the organisation. This part of the interview focuses solely on sketching the situation. The main questions in part 1 are designed to get the conversation started, get to know the participants and reflect information about their background and that of the organisation. This section's main topics describe the firm, its innovativeness, and the manager's role. This information was used to paint a picture of the participants, which helps to assess the validity and transferability of the research findings (Colorado State University, n.d.). A few examples of questions and sub-questions that are asked in this part of the interview are:

Could you briefly describe the organisation you work for?

How does the respondent define and measure innovation success?

How does the organisation's TMT contribute to organisational innovativeness?

How would you describe your contribution to the organisation's innovation success?

After the introductory questions, the interview starts with the first question focusing on (1) deepening the understanding of the characteristics of highly innovative TMTs. The topics in this focus area of the research question are: (A) the demographic characteristics of managers within the TMT, (B) power distribution within the TMT, (C) the team's composition, and (D) collaboration within the TMT. The data collection approach per topic is discussed next.

(A) The demographic characteristics of managers within the TMT of highly innovative organisations are assessed through the six predefined variables derived directly from the literature review: age, gender, ethnicity, tenure, educational background, and functional background. The questions associated with measuring demographic characteristics mainly focus on understanding the diversity of the six dimensions in the TMT. The theory about demographic characteristics and diversity can be read in chapter 2.3. The data from these questions allowed for analysis of how these factors collectively influence the firm's innovative performance. The questions at each variable are structured in the same way. An example of the asked questions is:

Could you describe the educational backgrounds of the TMT members?

(B) Team power distribution is also measured by four predefined variables derived directly from the literature review: structural, ownership, expertise, and prestige. This theory about team power distribution can be found in chapter 2.4. The collected data on team power distribution described the team's power distribution by understanding vertical inequality. The questions at each variable are structured in the same way. An example of the asked questions is:

Could you explain the distribution of prestige or recognition power among managers inside or outside the company?

(C) The composition of the TMT in terms of demographic characteristics and power distribution is captured by analysing how the demographic characteristics of the team managers and power

distribution within the team come together within the TMT of the highly innovative organisations that participate in the study. The collected data from topics A and B in this focus area are the primary input for sketching the composition within the team. Topic A gives insight into the degree of diversity within the team through the six dimensions mentioned in chapter 2.5.2. Topic B provides insight into the (in)equality within the team through the four dimensions mentioned in chapter 2.5.1. Therefore, the questions about this topic are embedded in topic A or B. An example of the asked questions is:

How does the distribution of prestige or recognition power influence the power dynamics in the TMT?

How does the distribution of prestige or recognition power influence decision-making within the team?

The information gathered for this topic provides a holistic view of the TMT's structure and allows for evaluating how diversity (or lack thereof) and (in)equality influence innovation outcomes. While not explicitly discussed with the participant, this topic highlights the previously mentioned dilemma between diversity and inequality in the specific situation of the organisations spoken to, to understand how innovative organisations deal with this dilemma of either being more diverse in demographic characteristics, but also having to deal with inequality of power or the other way around.

(D) By reviewing **collaboration**, the collaboration strategies from TMT members in highly innovative organisations are assessed to gain a deeper understanding of how these managers work together to foster innovation. The expectation is that TMTs of highly innovative organisations are particularly good at cooperating, finding a balance between being diverse and equal, and thus overcoming the dilemma since building the 'best' composition for innovation is only possible in theory. Collaboration strategies across horizontal and vertical differences in the team are explored by measuring cooperation. Insights into the techniques highly innovative organisations use to ensure collaborative decision-making results from this topic. Examples of questions that are asked on this topic include:

How do you, as a team, deal with (unequal) distribution of power?

What collaboration strategies does your team use to improve decision-making about innovation?

What are the main challenges the TMT faces when working together to innovate?

How do you address these challenges?

The interviews ended with a concluding question asking for final thoughts on the topic to give the participants space for their input and discuss issues the interviewer might have overlooked (Roller & Lavrakas, 2021).

The second focus of the research is (2) designing a tool to discuss power dynamics in the TMT. During the interview, the goal for this topic was to gather data to validate the tool developed in chapter 3. Therefore, the focus area of the research question is evaluating the designed tool. This topic can be divided into two means of data collection: (A) using feedback from the participant and (B) using the interviewer's input. The data collection approach for this topic's two means of data collection is discussed.

(A) Firstly, the tool is evaluated by gathering **participants' feedback**. During the interview, the tool 'The wheel of managerial power' is introduced to the participant, who fills it in and receives an explanation about the tool. After receiving the explanation and filling in the tool with the interviewer's help, the participant answered a few questions to validate the tool. The questions guiding this topic test whether practitioners see value in using the tool to spark conversations, gain insight into power distribution, and address the previously discussed dilemma that organisations may not yet have known about. The purpose of asking these questions was to test

whether the designed tool can significantly contribute to practice and to gather user feedback to refine the tool. These questions and the participant's comments while filling in the tool are used as the participant's feedback for evaluating the tool. A few examples of questions that the participants answered are:

What do you think of this tool as a tool to start the conversation about power differences and decision-making in your management team?

Can you describe how you would use the tool in the team?

(B) Reflect-on-action is another helpful way to evaluate and refine the tool used in this study (Schön, 1983). Reflection on the action of the interviewer allows for a critical analysis of the facilitation methods and assesses how the participants interacted with the tool. This ensures the tool's effectiveness in practice, and the reflection contributes to the research's trustworthiness and validity (Costello et al., 2015; Heikkinen et al., 2001). In this study, reflection on the action of the interviewer is used to evaluate the input given by the interviewer to the participant to fill in the tool. This data collection method is used to identify gaps in the tool because additional explanations must be given to refine the tool's instructions. The feedback gathered in this focus area is used as input for a second tool design, described in chapter 6 and beyond.

The complete interview guide is available in Annexe 1. Notice that the order of the interview questions slightly differs from the order described above. During the interview, the questions are asked logically for the interviewee to prevent confusion and increase the data quality (Hennink et al., 2020). During the interview, additional deepening and broadening questions, which were not all in the interview guide, were asked, while the participant was also given room to comment on details and other issues that might affect the concepts discussed. The interviews were conducted online due to tight schedules and moderate on-site availability of the participants, increasing inclusion (Irvine, 2011). All participants signed an informed consent form to show their approval for using the interview data. The signed informed consent forms are added in Annexe 2. All interviews are audio recorded, as communicated before and after the recording, to record the approval. After the interview, all of the audio recordings were transcribed, and the transcriptions were anonymised before they were sent to the interviewees via email for their approval for usage (Creswell & Poth, 2016), which they all gave. All interviews were transcribed verbatim and analysed using Corbin and Strauss's (2015) suggested approach (Corbin & Strauss, 2015), resulting in about 350 pages of interview data, including transcriptions and coded data, which is included in Annexe 4.

4.3 Sample and descriptive statistics

By researching the principle 'learn from the best', purposive sampling was employed to select the most informative participants (Guest et al., 2006; Patton, 2002). TMTs from highly innovative organisations in the Netherlands were the target population for the study (Hennink et al., 2020). Suitable participants were selected based on their role as top managers of a highly innovative organisation in the Netherlands. Because innovativity is hard to measure (Ciric et al., 2021), the companies in the sample were selected based on their recognition of their innovative performances. In this study's case, organisations listed in the 'Kamer van Koophandel's top 100 most innovative organisations, exclusively in 2023 or 2024, are included in the sample (Kamer van Koophandel, n.d.). This prize is awarded to the most innovative organisations in the Netherlands, and the approach ensures that the firms included in the research have a demonstrable track record of innovative performance, which is necessary to answer the research question. After this selection, 200 organisations, 100 from the awards in 2023 and 100 from the awards in 2024, remained in the sample.

Secondly, the websites of these 200 highly innovative organisations were used to determine whether the organisation has a TMT. After this purposive sampling method, 62 organisations remain in the sample. The other 138 organisations are unsuitable for the study because they do not have a management team and are, for example, sole traders. Between November and December 2024, all these firms were contacted by email to evaluate their willingness to participate in the study. Since the focus was on top managers, the emails were sent directly to one of the top managers in the organisation or their general address, asking if one of the managers was willing to participate. Five of the 62 organisations contacted were interested in participating in the study. The other 57 organisations indicated that they were not interested, did not have time, or never responded to the request. Therefore, the final sample included five highly suitable participants from varying industries: education support, the temporary staffing industry and the MedTech field. This sample is used as the data source for both (1) deepening the understanding of the characteristics of highly innovative TMTs and (2) designing a tool to discuss power dynamics in the TMT. Because of the deep level of information given in the interview and because the collected data reached the point of saturation, where new interviews largely confirmed rather than added new insights (Glaser & Strauss, 1967), it was decided not to seek additional respondents after the five interviews. While a larger sample could have been beneficial, the interviews were highly detailed and lengthy (see Table 2 for the length of the interviews), allowing for an extensive exploration of the topics. As suggested by the results of Nielsen's (2000) tests, which explain that 85 per cent of the problems were observed after just five people (Nielsen, 2000), the five participants showed strong similarities in themes and patterns. Testing with more than five people would not lead to more insights because the number of findings quickly reaches the point of diminishing returns (Nielsen, 2000; Knapp et al., 2016). The interviews indicated that theoretical saturation was progressively approached with each additional interview. Repeating key concepts and strategies signals that fewer new insights have emerged (Strauss & Corbin, 1998). The recurrence of themes aligned with the principles of saturation in qualitative research (Guest et al., 2006). Therefore, it was decided to recruit additional respondents for research phase 2 to test the refined tool based on the user feedback from the five participants in phase 1.

Because the selection of participants was based on availability, various management positions were involved in the study, as shown in Table 2. In this Table, the duration of the interview with the participant, among the participant's demographics, and the managers' contribution to the organisation's innovation success, as described by the person themselves, is shown.

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Duration of interview	50:39	59:44	1:01:27	1:01:43	1:05:21
Gender	Female	Male	Male	Male	Male
Tenure in the organisation	2 years	3 years	15 years	5 years	6 years
Share in the organisation.	Yes	Yes	Yes	Yes	Yes
Role in organisation	Managing director	Founder (CEO)	Founder (CEO)	Founder (CEO)	Founder (CEO)
Functional background	The internal organisation (culture, HR, legal and finance)	Visionary (sales, market analyst) & other unfulfilled roles	The commercial side (sales and marketing)	General management	The non-technical aspect of the business (sales,

					marketing and fundraising)
Educational background	Internal business and Languages & Organisation Psychology	Journalism	Digital communication	Strategic collaboration	No finished study
Contribution to innovation success	Rationalist	Creator & idea-bearer	Enabler	Guard enabler and	Enabler

Table 2: Specifications interviews research phase 1

During November and December 2024, the five participants were interviewed one-on-one by the same interviewer to ensure they could feel at ease and talk freely (Hennink et al., 2020). The interviews lasted between 50 and 65 minutes, and the average length was 59,5 minutes. This duration provides enough time to explore complex topics without causing fatigue (Corbin & Strauss, 2015).

4.4 Data analysis

The data analysis strategy followed the focus of the research question and was aimed at adding to the path of existing theory (Van der Aa & Efring, 2002) while also testing the proposed tool. To achieve this goal, the analysis of the collected data has been divided into three sub-analyses: (1) gathering empirical evidence for the theoretical framework of the study, (2a) the evaluation of the tool by participants, and (2b) reflecting on the input of the interviewer according to the reflection-on-action principle. Because of the dual focus of the study, a hybrid approach to coding was used to deepen the theoretical understanding of the concept of TMT composition and organisational innovativeness and to validate the designed tool.

(1) To structure the information, leading to a deepened understanding of the theoretical framework, multiple coding steps are used to analyse the data to ensure methodological rigour. The coding process started with identifying themes and developing a codebook with a set of code groups. The pre-identified code groups for deepening the understanding of the characteristics of highly innovative TMTs are derived directly from the literature review. They are divided into three themes: composition of demographics, power distribution, and collaboration. The types of code groups in these three themes are similar. For example, the pre-identified code groups in the theme 'composition of demographics' confirm, deepen, and nuance the theory about team composition. This codebook is available in Annexe 3.1. A dual approach to coding is used. After identifying these code groups, the first coding round started using Atlas.ti. This software was chosen because of its ability to manage complex datasets (Friese, 2019) and the researcher's prior experience using Atlas.ti. Atlas.ti is especially useful for structuring and interpreting data efficiently because of the many data documentation and visualisation options (Guthrie, 2021). The first round of coding was an open coding approach, which is an inductive approach (Strauss & Corbin, 1998). An example of the coded quotations is added in Annexe 5. After collecting as many important insights as possible, the data required structure before it could be interpreted (Saldaña, 2016).

In the second coding round, axial coding, similar unique codes were merged, and all codes were grouped into the pre-identified code groups to identify relationships and structure the data (Miles et al., 2014). This step is a more deductive approach to data analysis, as the data was categorised in predefined categories or, in this case, code groups (Ritchie & Spencer, 1994). An overview of the codes per group is available in Annexe 6. However, despite categorisation, these groups still

contained widespread information that needed more clarification before interpreting the data. In the final coding stage, the codes in the code groups are refined to code networks in which the code group's name is also the network's subject. This process resembles thematic analysis, which helps to visualise the relationships between different concepts and provides a deepening understanding of the structures in the data (Attride-Stirling, 2001). All the codes in a group are systematically grouped in themes of related codes, allowing core themes within each code group to emerge. This systematic approach ensures that the findings are data-driven (Braun & Clarke, 2006) and enhances the interpretability of the data (Miles et al., 2014; Nowell et al., 2017). All networks are listed in Annexes 7.1- 7.3. The approach used in data analysis ensured that the research results were displayed clearly and grouped, which helped to interpret the results, the outcome of which can be found in chapter 5.1.

(2a) The approach of the second analysis, aiming to **evaluate the tool by the input of the participants**, is the same as in the first sub-analysis. The pre-identified code groups for focus area 2, designing a tool to discuss power dynamics in the TMT, primarily focus on finding evidence to validate the tool and gathering participant feedback to redesign the tool. This allows for theoretical and practical refinement of the tool. Examples of pre-identified code groups in this focus area for collecting participants' feedback are indications and contraindications (Van Zeeland, 2016). The codebook for this sub-analysis can be found in Annexe 3.2. For the rest, the sequence of coding steps is the same, starting with open coding. An example of the coded quotations in this sub-analysis is added in Annexe 5. The second step is axial coding, the distribution of open codes among the pre-identified groups, of which an overview of the codes per group is available in Annexe 6. The last step is creating code networks, which resemble thematic analysis, that are added in Annexe 7.4. The systematic approach led to the straightforward interpretation of indications and feedback from the participants, of which the results are added in chapter 5.2.1 and chapter 5.2.2, and valuable input to improve the tool, which is discussed in research part 2.

(2b) Additionally, **the input from the interviewer** is analysed by reflecting on the interviewer's actions. For this sub-analysis, a different approach was used to collect the information from the data. No pre-identified codes in a codebook were used to collect the data from the interviewer's input. The first round of coding was open coding. This approach to data analysis was used for reviewing the interviewer's input because the goal was to open up to the possibilities and track new ideas and connections. This way, similar events in the data are compared, and contrasts are identified (Corbin & Strauss, 1998). An example of the coded quotations in this sub-analysis is added in Annexe 3. This analysis led to a round of axial coding, structuring the initial codes into code groups, which can be found in Annexe 6. Because no predefined code groups were identified, the round of axial coding led to the start of seeing patterns in the different pieces of data. This step helped to understand how the information works together instead of describing what is seen (Corbin & Strauss, 1998). The last coding step in this round was similar to the previous steps in the other two sub-analyses: a thematic data analysis by making code networks. The networks of this sub-analysis are added in Annexe 7.5. The approach to data analysis in this sub-analysis has led to new insights into improving the tool based on the input given by the interviewer. The results of this data analysis are discussed in chapter 5.2.3.

By using an interview guide, a careful transcription and coding strategy and validating the participant's input, this study ensures trustworthiness and credibility (Nowell et al., 2017). Each transcript was analysed line by line to identify as many concepts as possible (Corbin & Strauss, 1998). During the first stage of the coding process, over 1,250 quotations were coded by over 900

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unique codes to ensure no critical insight was overlooked, demonstrating the richness of the data. The second coding phase led to 19 code groups, and the final coding phase resulted in 19 code networks.

5 Results phase 1

This section describes the findings from the interviews. Following the manuscript, the results are presented in two main themes: (1) the composition and collaboration strategies of highly innovative TMTs, and (2) tool validation and feedback. The results deepening the literature on TMT composition and collaboration strategies for innovation consist of explaining the composition and collaboration strategies of highly innovative TMTs. The review then focuses on the collaboration strategies of highly innovative TMTs to overcome the diversity/inequality dilemma. The results to deepen the knowledge about TMT composition and collaboration strategies for innovation end with the presentation of additional results, which adds a factor to Sperber's comprehensive framework: attitude and personality. The discussion of results then shifts to the test of the tool's design, 'The wheel of managerial power'. This review discusses user feedback by explaining the indications and contraindications that the participants gave. Discussing the tool's test results is supplemented by reviewing the interviewer's input (interviewer's feedback) and reflecting on the interviewer's action.

5.1 Part 1: Composition and collaboration strategies of highly innovative TMTs

The results that contribute to deepening the theory on TMT's influence on organisational innovativeness consist of three main themes: demographic characteristics in highly innovative TMTs, power distribution in highly innovative TMTs, and collaboration strategies of highly innovative TMTs. In addition, the finding that adds to Sperber's comprehensive framework is highlighted.

5.1.1 Demographic characteristics in highly innovative TMTs

Researching the demographic composition within the TMTs of highly innovative organisations has led to the insight that the TMTs of these organisations are likely to be similarly structured. In the sample, the composition of the demographic dimensions in the team is characterised by relatively high age diversity, moderate gender diversity, low ethnical diversity, relatively high tenure diversity, high educational diversity and high functional diversity. The tables with the diversity information of the studied TMTs per dimension are added in Annexe 8.

Participants 2 and 4, whose personas, among the other three participants, are included in Table 2 in chapter 4.3, further explain the importance of diversity for their innovative performances:

"There are a lot of different people involved, and because of those differences, I think we come up with many innovative things, because there are just many different people with different views." - (Participant 2)

"And there we do have an interesting hook with ethnic diversity. The horizon of experiences can also help you immensely to see things you do not see otherwise." – (Participant 4)

In the third interview, the participant explained that their organisation's strategy for composing the TMT in terms of demographic characteristics is always to choose based on what is best for the team regarding knowledge. Participant 4 shows his opinion towards multidisciplinary teams and their necessity in innovation, and even expressed his concern about the adverse effect that uniformity in expertise and functional background could cause:

“Innovation that we are working on is really only about the business and is by definition multidisciplinary if you want to make something work, so from the mono-discipline it is never going to work.” – (Participant 4)

“Yes, we do not want overlap in [functional background].” – (Participant 4)

The importance of functional diversity, or diverse disciplines and educational backgrounds, is highlighted by the need for substantive knowledge in the field and about operations. In interview one, it is mentioned that categorising persons by knowledge and ability is the appropriate way to structure the TMT for innovation. Participant 3 adds to that by noting that various experts are needed because of the in-depth knowledge they can bring to the discussion within the different subject areas. Expertise thus brings specialism, allowing high-level collaboration on innovation. In addition, further interesting insight was found about the trade-offs for team composition made by the organisations surveyed. In addition to the highlighted importance of functional and educational diversity, several participants hinted that a lack of diversity in age, gender, ethnicity and tenure may affect the choices made by the TMT about innovation, but do not highlight the uniformity in these dimensions as possibly unfavourable for innovation. In interview one, the participant explained how missing perspectives from persons with other ethnicities, other than, in this case, Dutch, might be interesting to add to the discussion. Participant 2 also has different experiences with diversity in ethnicities:

“We work with people from a lot of different backgrounds. Cultural differences can sometimes create a problem, whether good or bad. That is very dependent.” – (Participant 2)

In the interview with participant 2, he expressed how it is imaginable that a TMT consisting of men only might make different choices than someone of a different gender would have made. From these results, it can be concluded that the surveyed organisations consciously decided to focus on the diversity of deep-level factors and take for granted possible uniformity in shallow-level factors and their adverse effect on innovation due to the chosen focus. While diversity is a key agenda item of the management teams, they focus on where they believe diversity contributes most to innovation. This choice to emphasise functional diversity more often creates uniformity in the other dimensions. All participants explained the possibility of diversity in all dimensions, but also expressed how difficult this is to achieve.

“I wish there were a gender balance, but we do notice that generally, men apply for the open positions because of the sector we operate in.” – (Participant 5)

“Anyway, you have to have them at your disposal.” – (Participant 4)

Discussing the topic of TMT diversity with the participants has been very interesting and twofold. All participants indicated that diversity is a focal point in their management teams, confirming that diversity might be the recipe for innovation. However, while the importance of diversity was confirmed by the TMTs of organisations that can be taken as an innovative example, the interviews showed that the focus on diversity in these organisations is mainly on functional diversity, educational diversity and having different disciplines in the team. The management members consider their team diverse when they have other jobs and academic backgrounds. Diversity in biological characteristics such as gender, ethnicity and age was not discussed, and the management members' statements show that diversity in these so-called shallow-level factors is not essential for the TMT's innovative capacity, according to the participants. It is striking that the TMTs of which the surveyed management members are part are, on average, not very diverse in

these shallow-level factors. Moreover, while they suggest that age, tenure, gender, and ethnical diversity are not crucial for their teams' innovative performances, both the verbal and non-verbal insights during the conversations, on the other hand, do show a defensive attitude of the participant when the answers show that the team is not very diverse in terms of shallow-level factors. For example, to hide the lack of shallow-level diversity, the participants often choose to talk about something else and mainly focus on the dimensions where there is diversity, or they increase their talking speed. This seems to indicate discomfort, which may suggest that diversity in areas other than functional and educational diversity may, after all, be of value to the organisation's innovative capacity.

To conclude the strategy of highly innovative organisations for composing their TMT, the main criteria are to focus on functional diversity and complementary collaboration in knowledge, in which a person's contribution to the team through their knowledge has higher priority than focusing on their other characteristics.

“If you want to create value, you need them all simultaneously, and that cannot all be in one person's head. So yes, the separate disciplines, separate people.” – (Participant 4)

Participant 4 summarises the attitude of highly innovative TMTs towards diversity and innovation:

“Well, very positive because you have to bring different disciplinary perspectives in, which is exactly what you need for a growing business.” – (Participant 4)

5.1.2 Power distribution in highly innovative TMTs

The second main finding in the results explains the power distribution within the management team of highly innovative organisations. The themes ‘diversity and power’ and ‘inequality and power’ are discussed in detail. To conclude chapter 5.1.2, attention is paid to the participants' vision of the effect of diversity and inequality on power distribution.

5.1.2.1 Diversity and power

Chapter 5.1.1 showed that the composition of the TMT of highly innovative organisations in this study is partly diverse based on the characteristics examined. This insight suggests that the TMT of these organisations may face power differences stemming from diversity in demographic characteristics. Although participant 5 describes recognising noticeable differences in decision-making based on gender in his organisation, these differences in decision-making do not affect the degree of influence that the different genders can exert, according to him. Participant 3, on the other hand, expresses that he does think that women bring a completely different perspective and dynamic to the table. In his case, gender influences how the team looks at things and can only be a good thing.

In his interview, participant 4 revealed that age differences do not influence the power distribution within their management team. While most of the managers in his TMT are of the same age, around 55 years old, the younger manager, who is not even 30 yet, brings in a fresh perspective. Instead of age differences being a hurdle, he considered the age difference as positive:

“We do not notice any imbalance because we want to learn from each other. I find it interesting how that works. Moreover, we want to learn a lot from our younger colleagues and they from us. So yes, you do not notice any tension, and that is very interesting to see.” – (Participant 4)

Most interviewed participants are part of a TMT consisting solely of Dutch members, so differences in power based on different ethnicities do not apply. Participant 5, on the other hand,

is part of an ethnically diverse TMT and shares his experiences with the effect of ethnic diversity on the decision-making and innovative capacity of the TMT.

“I do not notice any ethnic barrier or cultural difference in making decisions. Moreover, I think that comes back to how we have organised the organisation, namely very flat and relaxed and treating everyone as equals.” – (Participant 5)

The interview with participant 3 discusses how shorter tenure negatively influences the body and strength a person has to contribute to the conversation. He suggests it is difficult for people with shorter tenure to influence because there might be a gut feeling that he has less power. Participant 4, on the other hand, explains why the difference in tenure does not affect the amount of influence a person has in the TMT. It is even suggested that a shorter tenure might have more power in the team.

“Your history, you just take it with you, and that is in people's heads and decision-making that will play its role under the surface, right? However, what it is not is that, well, if you work here longer, then we will decide for a while because you work here briefly. You do not know it all. Rather, the other way around.” – (Participant 4)

This contradiction shows how situation-dependent the sensing of power dynamics is. Where a difference in tenure leads to noticeable power differences within one organisation, it may even be the opposite within another.

In contrast to diversity in the previously mentioned demographic characteristics and the effect on the degree of influence of the team members, diversity in education (level) and positions is an essential factor in the interviews for determining the degree of power of the persons in the management team. The results show that the TMTs of the interviewed managers are oriented towards knowledge distribution and placing power and responsibility with the person with the most knowledge about a particular subject. The interviewees had the following to say about this:

“Well, insofar as I am technically capable, I am willing to let him, let us say the person with this expertise, decide what is technically necessary, and make the decisions, but I want to know what he does. I think I trust him in all those things. Moreover, technically speaking, it is his thing, but business-wise, no, and that is also why he says, This is your thing, and I trust you to make good decisions.” – (Participant 5)

“Well, that is very simple. Everyone has their area of expertise, and in principle, you decide on that basis.” – (Participant 4)

These results suggest that diversity in education and functions leads to the distribution of power in the team.

5.1.2.2 Inequality and power

Power is additionally comprised of the four dimensions that describe the vertical inequalities between individuals on the team. In the sample, the composition of the four dimensions that correspond with inequality in the team is characterised by moderate diversity in formal roles, moderate diversity in ownership stake, high diversity in expertise, and relatively high diversity in prestige. The tables with the power distribution information of the studied TMTs per dimension are added in Annexe 9. The results of chapter 5.1.2.2 are divided into four dimensions corresponding to the dimensions that describe vertical inequality: formal roles and power, ownership stakes and power, expertise and power, and prestige and power.

5.1.2.2.1 Distribution of formal roles and innovation

When participant 3 was asked if the formal roles in the team influence the power dynamics in the team, he answered that it does and is not necessarily a good thing. Power differences because of formal roles could lead to the feeling that one has the last word because, in the end, that is the situation. However, for innovation, participant 3 wants people to work outside of their comfort zone, and according to him, if they are working for a boss, that is not always convenient. Participant 4 makes a similar statement to participant 3 and explains the following:

“And it also has an impact, doesn't it? People know it, and so they take that into account implicitly. In practice, that does not happen much, if at all, but people know that and ultimately if a particular decision has to be made, yes, those do go through me formally” – (Participant 4)

Thus, it is concluded that formal roles influence the TMT's power dynamics.

5.1.2.2.2 Distribution of ownership stakes and innovation

In the interview with participant 5, he explained how creating a more equal distribution of ownership stakes among the TMT members had a positive influence on decision-making within the team, which could thus be seen as a solution to power differences:

“I think that now that he has received a piece of shares, it ensures a more equal discussion based on shareholders' meetings. Even though you can push through a veto with a majority share, that is not how we want to do business together. I asked him last week if it feels different now that you have this. And then he said yes, I am even more engaged with what I was already doing. That is cool, so there is a certain emotional component there, but it doesn't influence decision-making.” – (Participant 5)

Participants 2 and 4 make similar statements, but add that an unequal distribution of ownership does not necessarily change or influence relationships. Participant 3 discusses how everybody on the team, despite the unequal distribution of ownership, is equally crucial for innovation. When looking at the shares the people have at the table, they may not be proportional because several people might have multiple hats. In the case of participant 3, his organisation, having more shares than other team members does not mean they have more input on the organisation's decisions and innovation.

So, in terms of influence on innovation, according to the spokesperson, unequal distribution of ownership does not harm decision-making power. As seen in the Table 2 in chapter 4.3, all participants are shareholders in the organisation where they work. Non-shareholders are also part of the TMT in two of the five organisations. Because the interviews were conducted with five managers from five different organisations, this statement has not been tested among the other members of the spokespersons' teams. The results suggest that the participants do not feel that ownership gives them power. However, nothing can be concluded about the view of non-shareholding team members on ownership and decision-making power. The results show that ownership affects the decision-making power when considering critical financial decisions or decisions that influence operations. Participants 1 and 2 elaborated on non-owners' involvement in making these decisions.

“I do think that some business decisions involving a lot of financial issues are sometimes approached more by the three of us than by the four of us, because that affects the organisation's business side more. We do differentiate that.” – (Participant 1)

“Ultimately, if you have someone on the team who doesn't have ownership and there are knots to be cut, then it's the ones who have the ownership who have to make those decisions.” – (Participant 2)

Reflecting on ownership and influence, the participants agree that majority decision-making is not the desired way to decide. According to the shareholding interviewees, whether or not a team member has ownership stakes in the organisation does not influence the degree of influence a team member can exert on decision-making that is not directly related to share results. Consensus is essential to move the organisation forward and is part of the collaboration strategy of these organisations, which is discussed in chapter 5.1.3.

5.1.2.2.3 Distribution of expertise and power

According to the surveyed persons, knowledge or expertise is the most critical source of decision-making power of the TMT members. However, the analysis of differences based on the dimensions that describe the power distribution among the team members shows that the management teams are not diverse apart from knowledge and function. Expertise or a field of knowledge is, therefore, something in which a manager can distinguish themselves and increase their power. These results do not indicate whether expertise is also the most significant source of decision-making power when the team is more diverse in other dimensions.

In the interview with participant 5, he explains that inequality in decision-making power exists because of differences in expertise in their organisation, but is not a negative result. Participant 2 perfectly summarises how knowledge influences decision-making power within the TMT of their organisation and explains that the person with the most expertise does not provide the person with overall decision-making power. However, expertise in a particular area gives a person the most decision-making power. Participants 1 and 4 add that there is a big difference between power due to formal role and power because of knowledge in a specific field.

“That's really on topic, on theme, we know each other. We never actually take that hugely formal route. I can say, no, we don't do that, but I don't because I'm the boss, but because it can't be done financially.” – (Participant 1)

“Yes, people have the most to say about their area of expertise.” – (Participant 4)

So, knowledge gives team members decision-making power in their areas of expertise. However, an essential sidenote that the participants mention is that knowledge does not provide the power to independently make significant decisions that affect the whole company. Instead, it gives the power of sharing knowledge with the team and taking an advisory role, after which the team collectively decides. Participant 4 describes this approach as follows:

“Well, that's very simple, everyone has their area of expertise, and in principle, you decide on that, but you do that collectively. The expert proposes ‘I would do it this way and that’; people can say yes or no, but if you say no, you should also be able to explain how you would want it done. Then the person who knows about it is listened to pretty quickly. Things get debated, so ultimately, you decide what needs to happen there from your area of expertise, but we challenge each other.” – (Participant 4)

Participants agree that it is wise to leave the decision to the expert. It can be concluded that the participating organisations share influence based on knowledge. In this model, the expert has the most control and, therefore, responsibility over his expertise, and team members jointly make the decisions based on the expert's knowledge.

5.1.2.2.4 Distribution of prestige and power

The last dimension is prestige, which, according to participant 4, 'comes with the job' and is not a factor that exercises influence on decision-making power. Generally, all participants agree that prestige does not affect the degree of power a person has in the team. Participant 2 states the following about the topic:

“Look, it doesn't give me any extra power. It's just that I happen to be in the spotlight and he is not.” – (Participant 2)

Participants 3 and 5 explain that they do experience prestige differences. Still, they add that prestige refers more to the outside world's status on the organisation's founders than their colleagues.

“But we have zero prestige or status towards each other in that respect, and it is not used at all.” – (Participant 5)

This raises the question of whether it is adequate to ask the person in power or the spotlight whether this position gives them power, or whether the other team members should be the ones to judge this. While the others explain how prestige comes from having a specific role in the organisation or from being in the spotlight, participant 4, on the other hand, believes that knowledge leads to prestige. Mainly because of the high-tech sector the organisation operates in, its engineers receive high praise from outsiders who use the solutions designed by these professionals, leading to prestige. Because knowledge leads to prestige and positively influences decision-making power, participant 4 believes prestige contributes to power distribution within the team, but only when this prestige originates from expertise. This result again shows that assessing power distribution should be seen as collective because the dimensions are highly dependent on each other.

5.1.2.3 The vision of diversity, inequality and power distribution

In general, the results show that the participants think alike about power inequality in the TMT having adverse effects on the organisation's innovative performances, suggesting that an equal distribution of power among the members of the TMT positively influences the organisation's ability to innovate.

“I think if you have differences in power, that generally doesn't benefit that ability.” – (Participant 2)

“Yes, the more it gets vertical, the worse it gets for innovation, I am convinced.” – (Participant 4)

Participant 2 elaborated on the adverse effects of power inequality by explaining how taking away influence from a particular team member leads to a loss of creativity. According to him, innovation comes from working together towards a solution collectively, and everyone should be heard in the discussion. To realise the full potential of this collaboration, each team member needs some degree of influence to share their knowledge with the team. All the participants confirm the need for equal power distribution to promote innovation. However, the survey shows that the willingness to talk about power dynamics in the organisation's management teams is not an issue, and they may even prefer to avoid it. This unwillingness to talk about power dynamics manifests differently among the participants. Some participants claim that power differences are not an issue at all within their organisation:

“That is not so much an issue with us.”- (Participant 1)

Others reveal that they are not concerned with the differences that might exist in their team:

“Yes, we haven't been conscious about it.” – (Participant 2)

On the other hand, participant 4 told how their team does not act from a power point of view, but rather from the concept of leadership, and others revealed that the members do not make use of the power they have:

“We are all part of the success. I don't do that alone, or my associate doesn't do that alone. He also does not believe in that, in the whole concept of power, so that does not apply to our organisation, because no one exercises that power on another or in their role.” – (Participant 5)

“Formally, of course, you have some control, but in practice it is not implemented that way at all.” – (Participant 1)

All these answers suggest that the surveyed highly innovative organisations either do not experience power differences within the TMT, they do not experience the adverse effects of the power differences, or they might not correctly understand how power differences manifest themselves. An alternative scenario is that the most influential people in the TMTs were interviewed. Although this cannot be factually tested, because only one manager was interviewed from each TMT, the results of the completed wheels of managerial power, which have been added in Annexe 10, show that the participants in the survey are all very influential people in their TMTs. The lesson to be learnt from this insight is that these individuals may be biased in their view of actual power and decision-making power in practice in their TMTs.

It can be concluded that the TMTs of participating organisations face power differences due to diversity in demographic characteristics and unequal power distribution due to the managers' formal roles, ownership, expertise and prestige. However, these organisations give the impression that they have managed to overcome the adverse effects of power dynamics to the extent that they are considered highly innovative by reducing the negative impact of power differences on innovation capacity. How these organisations reduce these adverse effects becomes apparent in the following chapter. On the contrary, it would benefit these organisations' innovative results even more if they could better reflect on the influence of power on decision-making and innovation. Although the results suggest that these organisations have found a suitable collaboration strategy to overcome the diversity/inequality dilemma, it could be that the managers interviewed have little reflective capacity, which means that they may not see the adverse effects of the diversity/inequality dilemma in their team. In addition, the designed tool and the test results included in chapter 7 could be a suitable means to this end.

5.1.3 Collaboration strategies of highly innovative TMTs

Finally, to substantiate how the organisations studied overcome the diversity/inequality dilemma, the collaboration strategies of these organisations are discussed. Highly innovative organisations are particularly good at collaboration, which increases team diversity while countering the adverse effects of inequality. Many tactics, principles, and strategies are spoken about in the interviews. The results are divided into the themes: team effort, trust, learning from each other, combining perspectives, and balancing speed and quality. The results explaining the collaboration strategies of highly innovative TMTs end with the insight that collaboration for innovation is different everywhere, but is based on similar principles.

Surprisingly, most interviewed organisations admit they do not have a defined collaboration or collective innovation strategy. Participant 4 has the following explanation for why they do not have to use a defined strategy:

“People have their own responsibility. Yes and it becomes visible very quickly if you wouldn't do things properly, fortunately we don't suffer. These are all people who are intrinsically motivated, self-employed people you have to slow them down rather than push them.” – (Participant 4)

The input and attitude of the participant suggest that having a defined cooperation strategy for his organisation is not important because the team members are intrinsically motivated. His input also shows the importance of attracting the 'right' people for innovation, which would make a cooperation strategy less urgent. According to these results, creating a team for innovation would, therefore, also have a lot to do with the attitude and personality of the person, which is discussed in chapter 5.1.4.

5.1.3.1 Innovation is a team effort

The interviewed participants agree that innovation is a team sport or team effort. Participant 3 uses a football team as a metaphor to highlight the need for group effort and describes how all players are needed to win because if one starts dribbling with the ball, the chance is higher that one will lose the ball.

Participant 4 also explains why innovation is a team effort because he believes that not all necessary knowledge can be contained in one person's head. Hence, the TMT members of highly innovative organisations work together to drive innovation. In the end, a decision must be made by the team, and, according to the participants, everybody in that team is equally important for success, but they all have different roles, depending on the topic. Participant 2 states the following about innovative decision-making:

“I think that's the most important thing to know that we don't decide a lot of these innovative things on our own either. And that is because I don't really have a very hierarchical organisation, we also do a lot of these things together with our team.” – (Participant 2)

Additionally, the studied organisations confirm their qualities regarding cooperation for innovation by explaining how their collaboration strategies lead to innovation success. For example, participant 3 reveals how the team dynamic ensures that you always have someone who occasionally whistles you back or kicks you in the ass like, ‘Hey, we have to sort this out’. While participant 5 believes that, as a collective, you can speed up innovation. Participant 1 has the following explanation of why collaboration promotes innovation:

“Ultimately, by talking to each other, you create new perspectives and actually improve the outcome. I also believe that by really looking at the subject matter from different perspectives, you make a better, often more informed choice” – (Participant 1)

The interview with participant 5 shows that, although he also believes innovation is a team effort, this strategy mainly applies in his organisation when making significant decisions. Participant 4 makes a statement that reveals the same strategy

“Just your own decisions, which nobody has anything to do with, don't go bothering others with them.” – (Participant 4)

In other words, innovating and collaborating in a TMT is not always a team sport, especially when strategic and tactical decisions are made. At the same time, operational decisions are made independently by the responsible person.

5.1.3.2 Innovation is based on trust

In the interview with participant 3, it is highlighted that innovation can only be achieved if power is distributed and everyone has a say. Therefore, each member is responsible for the collaboration; if people with power try to stop the innovation, it will not work.

As discussed in chapter 5.1.2, in general, all participants agree that decisions must be made based on the expert's input on the topic, but there must be consensus within the team. Therefore, the team members must trust each other to handle things to the best of their abilities. The role of the expert is to gather information and advise the team about the decision options. Participant 1 elaborated more on the role of the expert:

“The idea is that you can properly inform the other three and present the problem with possible solutions, so the preparation is in the hands of the expert. In the end, you all need to take a moment to consider whether you agree with this. And in that we do find a consensus and we make the decision” – (Participant 1)

5.1.3.3 Innovation is learning from each other

Cooperation is also about learning from each other and improving the organisation together. This also involves different opinions and asking each other critical questions. Participant 3 describes how discussing from time to time is not necessarily a bad thing. Participant 2 said the following about discussions in the team:

“If we disagree, we will simply look at the facts, the arguments, and the best solution. Is there a middle ground?” – (Participant 2)

In the interview with participant 1, differences of opinion are even discussed, fueling innovation. She argues that you cannot make an omelette without breaking eggs; the discussions are the eggs, and the innovative outcome is the omelette. In summary, according to the participants, the expert in a specific topic on which a decision must be made is always in the lead. The expert is responsible for providing the team with the knowledge needed to make an informed decision. The rest of the team gives the expert confidence, which the expert handles professionally, and the team ensures that the expert is in his power. In addition, the team asks critical questions, and an open discussion occurs, after which the team makes an informed and shared decision.

5.1.3.4 Innovation is combining perspectives

As a strategy to increase diversity in the team, if diversity is lacking in the eyes of the TMT, the participants surveyed regularly choose to include other stakeholders in the team, allowing them to participate in the discussion and influence the decision. Generally, the participants describe that they increase diversity in the team by looking at the additional specialisations or roles that are important for them to consider. So, increasing diversity in the teams of the participating organisations is mainly achieved by enriching the knowledge available in the decision team. Participant 1 states the following:

“We have a strategic team in addition to the top management; they are also responsible for the various sub-teams in different disciplines, so the moment we want more perspectives, we also use them to engage with.” – (Participant 1)

5.1.3.5 Innovation is being involved

The TMTs of the surveyed participants meet regularly to inform all stakeholders about what is going on in the organisation and ensure enough space to share ideas and opportunities.

“It's about speaking to each other a lot and regularly.” – (Participant 4)

The participants shared their experiences and highlighted the importance of changing the setting, team, and meeting agenda to remain creative. Participant 5 reveals that they meet monthly with the entire team to keep in touch, and participant 4 also reveals how they meet with the team to ask for help or find additional insights.

5.1.3.6 Innovation is balancing speed and quality

There is also much emphasis on the speed of decision. For instance, keeping up with developments is very important, but being ahead of the market requires innovation.

“Our collaboration in driving innovation is going very well. If you look at it on a scale of 1 to 10, you are at an 8, maybe 9. That shows in the speed of innovation, which is also part of our strategy. We outinnovate the others. That goes very fast.” – (Participant 4)

However, the participants also highlighted the importance of making well-considered decisions. This emphasises that distancing yourself from the situation, conducting research, and preparing to make decisions are essential for reaching a rational decision. However, it also shows the difficulty of balancing the speed and quality of a decision. Participant 4 shares their strategy for considering whether decisions need time or can be made quickly:

“When things become more complicated, you have to create time and space to catch up with each other and coordinate things, because they increasingly start to interlock and influence each other.” – (Participant 4)

5.1.3.7 Innovation is different everywhere, but based on similar principles

The diversity in the results reveals that organisations do not all use a defined strategy and that their methods are diverse. Innovation is not the same in all situations, nor are the necessary cooperation strategies. The cooperation strategy is firmly based on agreements, standards and values. What is certainly consistent in the organisations' cooperation strategies is that they all act based on trust in each other's knowledge and expertise. An open culture and respecting each other's opinions and choices are essential. In addition, one must be aware of one's place and be willing to hand decisions over to the expert.

In conclusion, innovation within the organisations studied involves collaboration between disciplines. These collaborations are supported by principles that the team members adhere to. The team is intended to improve innovation, and they do this by specialising in different fields and strengthening each other. Although not explicitly defined, the cooperation strategy for innovation can be described as follows: Innovation is a team effort in which people work together based on trust, learn from each other, combine different perspectives, are involved, and balance speed and quality to reach a decision together.

5.1.4 Additional results: model evaluation and nuances

While the study focused on deepening the knowledge about the composition of demographic characteristics, the distribution of power, and the collaboration strategies of highly innovative organisations, an additional insight emerges from the study's results. Participant 5 reveals the importance of team members' attitude and personality if they want to innovate as an organisation.

Participant 3 confirmed the importance of the personality and attitude of the team members and said they have taken great care to see if people are a good fit with the organisation. This result suggests that a person's fit within the team is important, as collaboration plays a crucial role in innovation, as the results in chapter 5.1.3 suggested. According to the participants, all team members should match each other in terms of personalities to promote cooperation. An individual must be flexible because of the volatile situation in which innovation evolves, have intrinsic motivation to get things done and take ownership, and have confidence in the process, the team and the members to divide responsibilities. The results per characteristic are discussed in chapters 5.1.4.1 – 5.1.4.3.

5.1.4.1 Flexibility

According to participant 5, adaptability and resilience are essential personality traits that he looks for in team members because managers in innovative environments need to be flexible and deal with volatile situations to drive innovation. Participant 3 describes innovating in a team as being willing to work outside your comfort zone and being flexible, thus indicating that managers' flexibility is required. Participant 1 explains the need for adaptability for innovation in their organisation with the following example:

“You must know where you want to go and how you think you can get there. And then, of course, you need a certain level of decisiveness and executive power; otherwise, you won't be able to innovate as quickly as possible. You also have to be agile. So the moment you decide, I have an idea, I have the power to execute and the power to act, we're going for it, you also have to have a certain size of team that is prepared to say, yes, it will never always be exactly the route that we have walked, but you have to be able to look at each other and say, well, where are we and what is good now with the new insights we have?” – (Participant 1)

This indicates the trial-and-error method of innovating, whereby reviewing the situation is critical. Innovation is not static because the market in which it is implemented is changeable.

5.1.4.2 Intrinsic motivation

In addition, the participants consider personal involvement and interest in the organisation's mission highly important.

“I do believe that you must still have enough space in your head and also interest in the sector and in everything that is happening around you, so you must be interested to be able to stimulate innovation in the end.” – (Participant 1)

“So a certain person must be a good fit for what we are doing and our mission.” – (Participant 5)

The TMT expert on a particular subject is expected to have intrinsic motivation, show ownership and have a proactive can-do mentality to fulfil their advisory role within their topic as well as possible. Being an expert in a particular field in the organisations under investigation goes hand in hand with bearing a great deal of responsibility for that subject. Therefore, the expert is expected to be motivated to work hard for the organisation and carry out what is expected of them independently. This leads to appropriate advice on which the entire team can base their choices.

“But it is mainly about recognising an opportunity and diving in, which I think is inherent to entrepreneurship.” – (Participant 5)

“People must be good at their job, very good, and intrinsically motivated.” – (Participant 4)

5.1.4.3 Trust

As can be seen in the cooperation strategy of the TMTs of highly innovative organisations, this is based on trust in the knowledge and skills of the team. Essential skills that the managers in the team must possess to delegate tasks to the expert are being open to new insights and having an inquisitive attitude. Participant 1 has this to say about the attitude a team member should have towards the expert:

“You also have to believe in it, have faith in your colleagues, and rely on each other.” – (Participant 1)

In summary, the results indicate that the people's personalities and attitudes in the TMT significantly influence the innovative capacity of the organisations surveyed. To drive innovation in the studied organisations, they see a manager's adaptability, intrinsic motivation and confidence in the team as having a positive influence on innovation. Because a person's attitude and personality are such essential selection criteria for management teams of innovation-oriented organisations, the comprehensive model proposed by Sperber in Figure 2 may need to be expanded to include the variable attitude and personality incorporated in Figure 7 in orange.

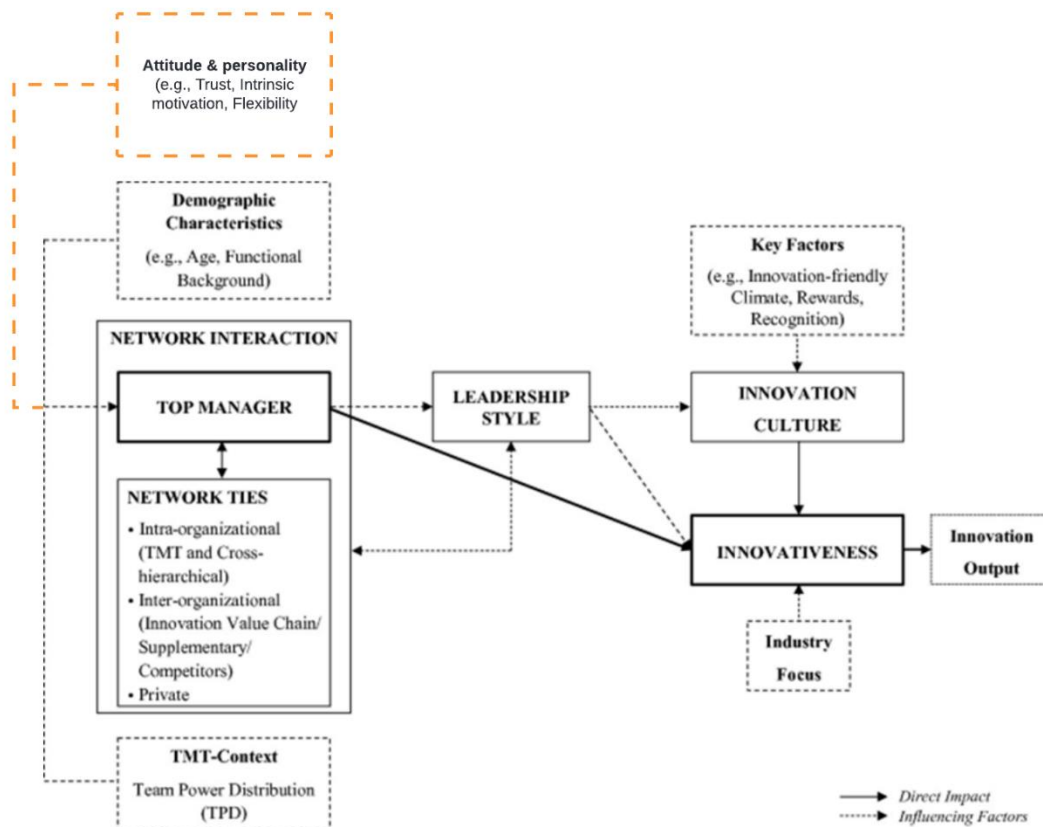


Figure 7: Addition to Sperber's comprehensive model

5.2 Part 2: Test results design #1

Three findings contribute to validating and improving the tool design to expose the power differences in groups: user feedback with indications, user feedback with contra-indications, and interviewer feedback with reflection-on-action. These findings are discussed in the following chapters and used in chapter 7 to refine the tool's design and improve usability for practice.

5.2.1 User feedback (2a): indications

“We may still be allergic to it, but it is there” – (Participant 4)

With this statement, participant 4 suggests that the conversation about power cannot be avoided. During the interviews, the participants filled in the tool with the interviewer's help to validate whether the tool was valuable and useful in practice. The results showing the indications are divided into themes: the added value of the tool, how the tool would be used, and the functionality of the tool's design.

5.2.1.1 The added value of the tool

When asking the participants what they think of the tool as a conversation tool for discussing power dynamics, all suggested that it is a valuable addition to discussing power in an organisation. The participants see power as an essential topic of discussion, but there are significant differences in the current degree to which it is open to debate within the organisation. Participant 2 shares the following about this:

“We have many conversations about these things and our relationship with each other, for example, and things like that. Those are things that are important to us.” – (Participant 2)

This suggests that power is a topic of discussion in participant 2's organisation. Participant 3, however, reveals that their TMT does not have these conversations. On the other hand, he does suggest that all organisations should hold these conversations for the organisation to be healthy. Participant 4 also reveals that the subject is not currently on top of their agenda:

“No, well, the only thing is that the whole phenomenon of power is not on our agenda.” – (Participant 4)

The participants do not differ; they see that the tool opens up possibilities for discussing power differences. For example, participant 4 indicates that the tool gives rise to discussion and that breaking down power into different dimensions provides deeper insight that people can reflect on. The tool would be thought-provoking. Participant 2 describes the gap that the tool can fill, according to him:

“I also think it could lead to some people engaging in self-reflection. That is something that people perhaps lack a little from time to time.” – (Participant 2)

While participant 3 even said that he thought it was a good tool, other indirect indications also suggest its value.

5.2.1.2 How the tool would be used

For example, participant 5 describes how he would use the tool in their organisation:

“I am particularly curious about what changes will occur when we move on to the next phase, so I think this model is beneficial for starting the conversation and seeing where you stand.” – (Participant 5)

Others also indicate that they would use the tool in their organisation for the intended purpose. The participants describe how they believe the tool clarifies power dynamics in the team and can contribute to assessing experiences. While one participant thinks it can be used effectively as a baseline measurement, another describes the tool's value in evaluating situations.

“I think it is about evaluating the collaboration. How are we doing? Are we still happy? How do we reach decisions? How do we achieve innovation? What does it take? Of course,

these are all dynamics that occur below the surface, in everything you do.” – (Participant 1)

How the participants would use the tool is proactive. This indicates that they want to prevent power dynamics from negatively affecting the organisation's ability to innovate by using the insights provided by the tool.

“I would not necessarily just start a conversation if things are not going well, because it is often too late.” – (Participant 1)

5.2.1.3 The functionality of the tool's design

In addition to the results providing clarity about whether the tool achieves the goal for which it was designed, participants also indicate that the design improves the tool's usability in several ways. These instructions were mainly given while participants were filling in the tool, and their explanations when choosing an option showed that they understood what they were doing and how the tool should be filled in. The following comments are an example of this:

“And then it is about comparison and contrast. First, individually, then you share the results as a team, and then you look at the differences and discuss them with each other.” – (Participant 4)

“I think he is more powerful because of his technical knowledge so that I would say rather least or in the middle.” – (Participant 5)

However, there are indications that the tool's use is not yet clear enough for the team to use independently. The chapter discusses the contraindications and the participant feedback on the tool.

Both direct and indirect indications that the participants gave the signal that the tool is a valuable addition to practice and that it can be validated that the tool contributes to achieving the intended goal, namely making power differences within TMTs more open to discussion. Although the tool's functionality may require further development, the participants' curiosity about the study results and their use of the tool with their team members shows that they find the subject of power essential and enjoyable.

“I am curious to know how the other three experience it.” – (Participant 1)

“So I am curious to know how he would interpret it.” – (Participant 2)

This would mean they are open to discussing power with team members and find it interesting.

5.2.2 User feedback (2a): contra-indications

While the participants fill in the tool, they ask for help at various points. This request for help indicates that the tool in its current form cannot be used independently, as the interviewer's explanation is needed to clarify any ambiguities. The results revealing the contra-indications for the tool are divided into the following themes: unclear terminology, where to fill in myself, unclear purpose, lack of nuance, target group and situation, and concerns about the process which the tool is part of.

5.2.2.1 Unclear terminology

While participant 1 repeatedly stated that she needed help, the other participants expressed their lack of clarity in other ways or by asking more specific questions. The lack of clarity in the use of the tool, which prompted the participants to ask for help, can be divided into two themes:

questions about the terminology used and other questions that aim to determine how to use the tool. The questions about the terminology are about what is meant by the term 'high level' that is used, and about what tenure means. However, during the interviews, the interviewer also provided the participants with explanations before questions were asked. This reflection on the interviewer's action is discussed in chapter 5.2.3. Not explaining prior might have led to more questions that indicate unclear terminology. The questions imply that the terminology used may not be sufficiently accessible to the target group, hindering the tool's completion.

5.2.2.2 Where do I fill myself in

The questions and comments that point to the need for clarification on how to use the tool are indicated by questions of where one should place oneself in the tool consisting of outlining the situation in which the participant finds him or herself, after which the participant asked where they should place him or herself in the tool. Participant 2 shows precisely how this lack of clarity came about in his situation:

“You could say it's long or short. Yes, that depends on how you record it on the company's timeline. If you look at it that way, you would say it's long, because it's been going on for as long as the company has existed, but if you say, well, yes, 3 years in a human life is not that long, then you could say it's short. I don't know how you want to divide it up.” – (Participant 2)

The test subjects also wondered what the categories low, middle and high in the tool meant and where you would have to place yourself.

“Do you mean younger, older, middle age? Is that based on numbers or others?” – (Participant 4)

“I guess somewhere in the middle. Is that possible or not?” – (Participant 1)

“What if it is the same?” – (Participant 1)

“Yes, exactly, yes, I don't know if I can be in the middle then, can I?” – (Participant 2)

These remarks accurately describe that it was not always clear to the participants how to use the tool's categories.

5.2.2.3 Unclear purpose and design of the tool

Other questions showed that the participants did not receive enough clear explanations about how they could use the tool and its purpose. Participant 3 demonstrated this lack of clarity by asking whether it was about filling in the form for the management team or overall, which indicates that he did not understand that filling in the form was for a defined group. Participant 1, on the other hand, made comments suggesting she did not understand that filling in the form was about herself and not the composition of the group:

“Gender, yes, that is what I said, two men, two women.” – (Participant 1)

The other participants also commented that it was too unclear that the tool should be filled out about themselves. Other comments that indicate that the tool cannot yet be completed independently are concerned with using it in its current form as a fill-in sheet. For example, participant 1 did not understand how to fill in the sheet. This indicates that the current design is not intuitive.

5.2.2.4 Lack of nuance

Participant 4 indicated having difficulty separating theory from practice:

“Yes, ultimately, if I have to sign something, then I can refuse. So in theory, you have the most control.” – (Participant 4)

During the interview, participant 4 described how diversity in a particular tool dimension does not influence the team's power distribution and decision-making. He explains that he would put himself on the middle scale, while in theory, he does have the most control. This statement reveals how the interpretation of the tool between theory and practice needs more clarification, since the goal is to fill it in according to theory and then discuss how diversity leads to power distribution in practice.

5.2.2.5 The tool's target group and situation

The most frequently asked question by the participants is: Who is the tool for? The discussion highlights whether everyone needs the tool, the conversation about power, and what attitude the team should have to be able to use the tool. For example, it is stated that the expectation is that the tool is mainly for teams that are not functioning, while others describe the tool as valuable for every team. However, the team must be ready to engage in this dialogue.

“As a team, you must already be aware that power dynamics can play a role in your team before you even consider discussing them.” – (Participant 4)

This result counters the idea that anyone could fill in the tool. Being open to entering into the conversation about power, which has previously proven to be a complicated subject to talk about openly, would be crucial to using the tool. Participant 3 suggests that the team's attitude when working with the tool must be open to the topic. According to him, the organisation must be open to the conversation before using the tool. This suggests that the team must already have ongoing discussions about power dynamics.

5.2.2.6 Concerns about the process in which the tool is part of

In addition, several people have expressed concern about filling in the tool independently, and it seems necessary from these results to have an expert on the model explain the tool and a moderator to assist in filling it in:

“You should do this with someone who understands the model, knows the background, and can use this to guide the conversation.” – (Participant 4)

5.2.3 Interviewer feedback (2b): reflection-on-action

During the interviews, the interviewer explained how the test subjects received help filling in the tool. These reflection-on-action insights are divided into the themes: intended target group and situation, the tool's content, the application of the tool, and the usage of the tool.

5.2.3.1 The intended target group and situation of the tool

Before filling it in, all participants received a description of the tool, focusing on the reason for developing it. In addition, the interviewer addressed who the tool is intended for and which team can use it:

“I am developing the tool as a discussion tool for management teams.” – (Interviewer, interview 2)

“It has been shown that the better the power is distributed and thus equal among the team members, the better a team functions concerning innovation.” – (Interviewer, interview 3)

The participants' responses demonstrate the necessity of this explanation. After this, the tool's purpose was discussed, focusing on the tool's contribution to practice.

“You fill in the tool and then discuss what we see. Who has the most power over the manuscript, and does anyone else feel they have more power or responsibility? You can then discuss this and devise a strategy to break through this and improve the collaboration.” – (Interviewer, interview 3)

“And I'm trying to get people to use this tool and start the conversation about power.” – (Interviewer, interview 4)

During the interview, the participants completed the tool as if they were doing so with the management team members. However, the explanation also addressed using the tool in a different setting or team composition.

5.2.3.2 The content of the tool

During earlier parts of the interviews, discussed in chapters 5.1.1 – 5.1.3, the factors that also appear in the tool were discussed. To clarify things for the participants, this link between the previously discussed theory and the tool was made in the following way:

“There are questions about basically everything we just went over, so the demographic characteristics, but also the bit about power we were talking about.” – (Interviewer, interview 4)

“So these are all the factors that I found in the theory that influence the amount of power a person could have over the other management team members.” – (Interviewer, interview 5)

5.2.3.3 Application of the tool

Further explanation that the participants received before filling in the tool focused on describing the application of the tool. Attention was paid to the idea that each team member should fill in the tool to discuss it with each other. It was explained how the tool should be filled in for oneself, as opposed to the other team members, and emphasised that filling in the tool is about personal interpretation, after which the conversation is needed to discuss each other's insights and to understand each other better, so there is no right or wrong answer. Examples of statements that have been used are the following:

“Yes, this is only about you, so you only have to fill in the wheel for yourself, concerning the others in your team.” – (Interviewer, interview 1)

“So everyone fills it in for themselves, in comparison to the others, and then the idea is that a conversation will start.” – (Interviewer, interview 4)

5.2.3.4 Usage of the tool

After the information about the tool's design, the focus shifted to how to use the tool. For example, it was explained that all dimensions around the wheel should be filled in after filling in the wheel itself, but it was also advised where to start. Explanations were given about how the scale should be interpreted per dimension and how the inequality ladder can be filled in. After this information, the participant was encouraged to start filling in the tool. As chapter 5.2.2 showed, the use of the

tool was not immediately apparent to all participants. In some cases, it was necessary to explain the terminology beforehand:

“The structural power aspect is about the title you hold or your role in the organisation.” – (Interviewer, interview 5)

While in the case of participant 1, the answer to her question about what tenure meant was given:

“Tenure is how long you have been working at the company and are part of the management team.” – (Interviewer, interview 1)

Based on this explanation, the participant could continue filling in the form. However, in addition to providing explanations, other ways of delivering information were used to get the participants thinking and help them in the right direction. Sample situations were outlined, and the interviewer also asked the participant questions that clarified the tool's use.

“So it could be that you have three Dutch people on the team and one who is not Dutch. In that case, the Dutch people would be at the highest level of representation.” - (Interviewer, interview 4)

“So if the question is about age, for example, would you position yourself as younger or older than average compared to the others on the management team you are part of?” – (Interviewer, interview 1)

However, questions were also asked that made the participant think about how he could fill in the tool:

“You also indicate that it does not necessarily have much influence. How would you place him here then?” – (Interviewer, interview 2)

“Then your level of education compared to the others. So if you are the most highly educated, for example, you would put yourself at the highest, but if you are the least educated, you would put yourself at the lowest.” – (Interviewer, interview 3)

“Do you have the role that you would say probably has the most or the least power in theory?” – (Interviewer, interview 4)

Finally, the researcher confirmed when the participant asked for it or indicated that the participant had filled in the tool correctly. This helped to build the participant's confidence in filling in the tool correctly. After completing the tool, the focus shifted to the conversation that should now be held with the team. The interviewer discussed in more detail what could be done with the results and urged the team to do the test.

“After this, you can start discussing it, and then you can start thinking, does this influence us positively or negatively? How can we change this?” – (Interviewer, interview 2)

“Then you can start that discussion and break it down by dimension.” – (Interviewer, interview 5)

The participants could complete the tool because they received more explanations while filling it out and could ask the researcher questions. The chapter's results showed that the tool's design needed more reasons to promote independent filling-in. The results of this chapter show that the interviewer's input effectively promoted correct completion. Study phase 2 uses these results to

create a second design of the tool (redesign) and test this design, the results of which are included in chapter 7.

-- END OF STUDY PHASE 1 --

6 Research method for tool refinement

As a result of the first iteration of the tool's design, which study phase 1 shows, the participants received the tool very enthusiastically. The purpose of the tool and its content were particularly well received. However, the findings from the first research phase revealed that the tool, 'The wheel of managerial power', requires refinement for the users to use it independently. Combining the results of chapter 5.2.1 – 5.2.3 shows that the current design of the tool needs an add-on in the form of explanations to improve usability. Therefore, this research phase includes the second design iteration of the tool and continues designing a tool to discuss power dynamics in the TMT, which corresponds with the second focus of the research question of this manuscript. While it can be established from the results of research phase 1 that the tool provides a structured framework for dialogue, it was observed that participants struggled with its independent use, which can be inferred from the contra-indications shown in chapter 5.2.2, and the explanations given by the interviewer shown in chapter 5.2.3. These results indicated that practical applicability was limited, and additional instructional support was necessary. The tool, therefore, needs an add-on in the shape of instructions. In this chapter, the general methodology for tool refinement is discussed. Then, the content focuses on defining the design challenge, ideating and collecting design choices, redesigning the tool, and testing the design with the actual users.

6.1 Methodology

This research has a qualitative, developmental research design while incorporating design-based research principles (Collins et al., 2004). Developmental research is highly suitable for refining tools because it allows for systematic iterations of refinement based on empirical testing and user feedback (Reeves, 2006). This chapter described how design thinking, a method using the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity (Brown, 2008), was used for the refinement of the tool 'The wheel of managerial power' ensuring that the solution is developed and tested based on real-word user feedback (Carlgren et al., 2016) to ensure practical applicability (Brenner & Uebernickel, 2016). Design thinking is a well-documented research method widely used to create user-centred interventions and validate conceptual models (Kolko, 2015). It is an appropriate method for refining and validating a discussion tool for TMTs (Carlgren et al., 2016). This method of choice makes the study contribute to design-based research in management while developing a tool for enhancing discussions in TMTs for practice.

The design thinking approach used in this study is similar to the traditional approach but also deviates in some ways. Design thinking is an iterative approach structured into five key stages: empathise, define, ideate, prototype, and test, as shown in Figure 8 (Van Zeeland, 2016; Brown, 2008).

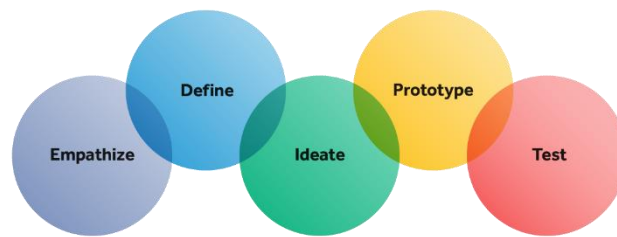


Figure 8: Design thinking stages

These stages are also used in this research, but the starting point is a tool design that is tested and proven valid, but not practically applicable. Therefore, the input for the empathise stage results from the first tool testing highlighted in chapter 5.2. The rest of the stages of this study's approach to design thinking are similar to the traditional approach to design thinking. The design stages of this study are highlighted in Figure 9. Working in teams is encouraged when implementing a design thinking approach (Wolniak, 2017). This study deviates from this and is carried out independently. In this iteration, the tool was redesigned in three days. This approach aligns with the design sprint method, which implements the design thinking process in a few days (Knapp et al., 2016). The sprint methodology has the benefits of rapid iteration, focus, and quick validation of ideas with users. This approach allows for a fast learning cycle. The first day was used to re-analyse the gathered information from study phase 1, define this iteration's goal, and develop ideas to redesign the tool. The second day was used to build the new prototype, and on the third day, the prototype was tested. In chapters 6.2 – 6.5, the activities (defining, ideating, prototyping, and testing) in the design stages of this iteration are described.

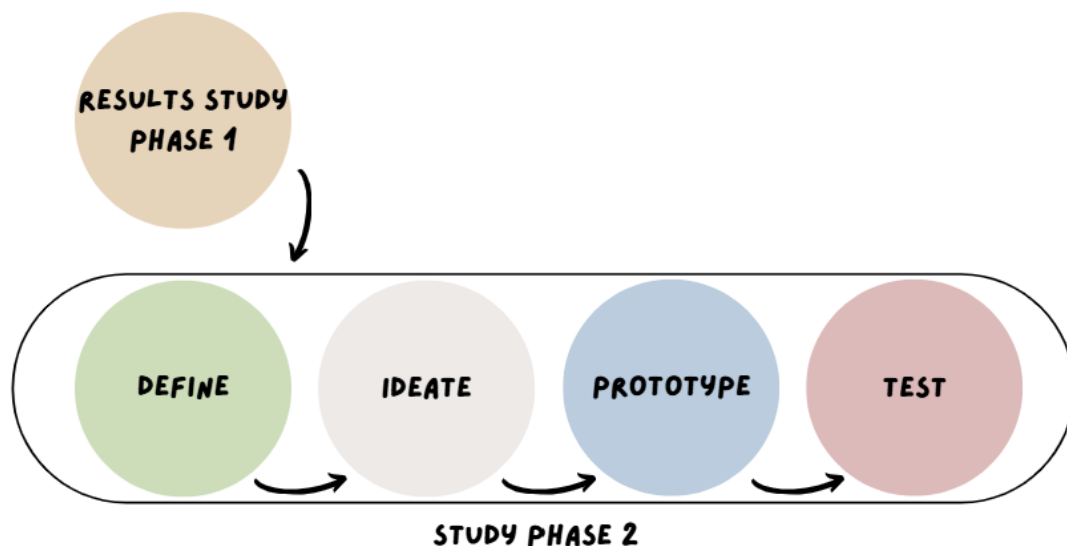


Figure 9: Design stages of this study

6.2 Defining design challenge and principles

Chapter 5 discusses the results from the data analysis of the interviews from study phase 1. In these interviews, among other research goals, the participants described their experiences using the tool during the interview. Feedback on their challenges and suggestions for improvement was

gathered. Concurrently, a reflection on the interviewer's input in the interviews with users from phase 1 is done. A reflective analysis was thus carried out (Osmond & Darlington, 2005). Reviewing the feedback given by the interviewer to the participant for completing the tool provided insight into explanations and directions that made users better understand and work with the tool. The interviews revealed the explanations the participants needed to complete the tool. This reflective act is similar to Schön's (1983) concept of 'reflection-on-action'. Schön (1983) explains that when individuals critically assess their experiences, they can inform and improve future design decisions (Schön, 1983). Chapter 4.4 described a systematic review of the interview transcripts by coding, organising, and visualising the data in networks. The network helped to cluster user needs, and the method follows principles in thematic analysis (Braun & Clarke, 2006). This analysis allowed for extracting honest user feedback (Kolko, 2015), and this approach aligns with the iterative nature of design thinking, where new data is not always required when meaningful user insights exist (Razzouk & Shute, 2012).

By gathering user feedback and improving the redesign based on the input, the adjustments made to the tool are based on the real needs of the target group. The goal of this iteration of the tool design is to synthesise insights from the input data to articulate must-haves and might-haves of the design and the design challenge, guiding the principles of the redesign of the tool (Brown, 2008). The first stage of this iteration resembles a defining stage, which is analysing user data and identifying patterns and themes to understand the core user issues (Liedtka & Ogilvie, 2011). By clustering similar codes within code groups in networks, related insights are already clustered during the data analysis from phase 1. This technique is also called affinity mapping. Affinity mapping is used to gain an overview of the information by organising the items (Meinel et al., 2011). When the themes are identified, prioritising them based on frequency and impact is the next vital step to ensure the redesign meets the most critical user needs. Instead of limiting the analysis to individual code groups, as done in the empathise stage, during the define stage, a cross-group colour coding technique was used to identify overarching patterns of problems and feedback. This quantitative analysis of results is used to find the most frequently mentioned themes in the feedback (Christ, 1975), to prioritise the input in must-haves for the redesign, and additionally, might-haves of the redesign. Prioritising the input like this ensured that the formulated design challenge is user-oriented.

All adjustments are made based on the feedback, but they are still feasible because only the most critical feedback is at least incorporated in the redesign (Brown & Wyatt, 2010). Formulating a well-defined design challenge suitable for the given issue is vital. The design challenge guides the ideation stage towards the goal of the iteration. The problem statement of the iteration ensures that the solution, or prototype, is tailored to the user's real problem (Brown, 2008). From the design challenge, the design principles are developed. The design principles help maintain focus on user-centric criteria throughout the design process (Liedtka & Ogilvie, 2011), which allows the design goal to be achieved. They are the benchmark for evaluating solutions, ensuring they meet the user's needs and design goals. After completing this stage, there is a solid foundation for creative and effective solution development for redesigning the tool (Meinel et al., 2011). This continues with ideating how to improve the tool's instructional design.

6.3 Ideating and collecting possible design choices

While the tool is already designed, it requires additional instruction for the users to use it independently, as the results in chapter 5.2 suggest. In this step of the iteration of the tool's design, ideas for improving the instructional design are gathered. Ideation is generating ideas and solutions through techniques such as brainstorming (ICI Tutor, n.d.). The aim is to create many

ideas that can be filtered into the best-fitting idea for the challenge (Van Zeeland, 2022). Three techniques were used during this study's ideation stage: best practices, Crazy 8, and SCAMPER. Using these techniques, solutions were generated to improve the tool's design.

6.3.1 Best practices of instructional design: inspiration for ideation

Effective instruction communication is essential for developing intuitive tools (Norman, 2013). Therefore, the first step in ideation is exploring the best practices for instructional design among various domains. The cross-disciplinary approach of this method contributes to exploring diverse perspectives on user guidance (Csikszentmihalyi, 1996). By examining instructions from fields such as games, furniture and organisational tools, the best-fitting solutions for overcoming design challenges are discovered. According to Titus (2000), integrating insights from multiple fields fosters creative breakthroughs by leveraging established principles in a new way. Therefore, the approach fits this challenge (Titus, 2000).

6.3.2 Crazy 8: generating multiple ideas

After all the input into the ideate stage was analysed, a Crazy 8 technique was employed to build upon the insights and rapidly generate a wide array of ideas for adding an explanation to the tool's redesign. Crazy 8 is a time-restricted ideation method that challenges you to sketch eight ideas for a specific challenge in eight minutes. The technique encourages divergent thinking, and there is no time to allow initial biases in idea generation (Brown, 2008). This method is mainly suitable for breaking free from conventional thinking patterns and promoting creativity (Knapp et al., 2016), and this study mostly added value by not thinking in a box but looking beyond the first few apparent solutions that often come to mind (Van Zeeland, 2022). The Crazy 8 technique structures the creative process through quick ideation and prototyping and is frequently used in design sprints (Knapp et al., 2016). It fosters a rapid iterative method to solve problems and allows for ideas in various directions. Using the Crazy 8 technique leads to structuring the best practices into a maximum of 8 ideas that align with the user feedback.

6.3.3 SCAMPER: further developing an idea

The SCAMPER technique is used to further develop and refine the most promising idea from the Crazy 8 session. SCAMPER is the acronym for Substitute, Combine, Adapt, Modify, Put to another use, Eliminate, and Reverse (Van Zeeland, 2022). This technique has a structured approach for exploring modifications to enhance an existing idea (Michalko, 2006). The SCAMPER technique benefits further product development because it uses a focused and iterative refinement process. Therefore, it ensures the tool evolves while maintaining its most important functionality. By incorporating the input of the ideation stage and systematically applying the various steps of the SCAMPER technique, the best-looking solution from Crazy 8 was critically examined and transformed into a more elaborated user-oriented design solution for the design challenge. The SCAMPER technique facilitates the tool's further development, resulting in a redesign.

The ideation stage's methodical approach, including researching best practices, conducting a reflective analysis, and using structured ideation techniques, explored possible improvements to the initial design. Each step builds on the knowledge gathered earlier, ensuring a streamlined design process that improves the tool's usability and effectiveness based on user feedback. The ideation stage provided input for the redesign, as described in the following chapter.

6.4 Redesigning the tool

The prototype stage aimed to refine and transform the ideas into a tangible, testable model to evaluate the effectiveness in practice (Brown, 2008). Prototyping bridges the gap between

ideation and implementation by making iterative testing and refinement based on user feedback possible (Camere & Bordegoni, 2021), ensuring the design solution fits the user's needs. The primary focus of this stage of designing was to construct a prototype of the redesign of the tool's concept based on the insights from the ideate stage. The emphasis was on incorporating key usability elements directly derived from the best practices in instructional design to overcome user pain points in the initial design. Prototyping and testing are primarily iterative design stages (Brown, 2008). This study's first prototype and test stages are executed in phase 1. After the first test, the user's feedback is used to create a new prototype in this chapter, study phase 2. Therefore, this approach to prototyping and testing aligns with recommendations that effective prototyping strategies involve quick and low-cost experimentation that allows for interaction and feedback (Camburn et al., 2014). Thus, this study's prototype stage focused on developing a low-fidelity digital prototype for which Microsoft PowerPoint was used because of its ease of use (Snyder, 2003). Low-fidelity prototypes are commonly used because they enable designing while minimising resource constraints, enabling early-stage testing (Lim et al., 2008; Houde & Hill, 1997). Throughout the complete prototype process, the design challenge and the design principles were always at the top of my mind and remained central to decision-making. Each decision to redesign the tool into a second prototype was evaluated to ensure that the design principles actively shaped the prototype process and addressed the feedback identified in the first test. Since the goal of testing whether the explanation given for the tool was adequate in the prototype was most important, the design of the prototype focuses on content and functional design rather than optimising its visual design (Dow et al., 2011). The outcome of the prototype phase is a prototype that is ready to test whether the design challenge has been overcome, as described in the following chapter.

6.5 Testing design with users

To ensure that the prototype effectively addresses user needs, testing of the prototype is done. The test also identifies refinement opportunities based on user feedback (Brown, 2008). This iteration's test aims to validate whether the design is independently usable for the end users. The outcome of the test could also be that it needs improvement because of usability concerns (Meinel et al., 2011). In this phase of the study, the goal of this test is to reveal whether the instructional design of the second prototype is sufficient for the users to use the tool independently. Here, the methodology for testing, the structure of the test, the sample selection and data collection method, and the process for data analysis are discussed.

6.5.1 Methodology

Participants provide real-time feedback on the design by interacting with the tool's prototype. They can think aloud when using the tool (Nielsen, 1994; Lazar et al., 2017). This method involves participants actively engaging with the tool while providing feedback, which contributes to focusing on identifying areas for improvement during the development phase (Dumas & Redish, 1993). Interactive thinking-aloud collects qualitative insights (Lazar et al., 2017) and is good at naturally capturing the users' experiences because of its approach. While no specific structure was followed during the test, naturally, each test followed the same structure because the tool's design follows a particular sequence. This unstructured approach, where no pre-defined questions were asked, provides spontaneous feedback and allows natural user behaviour to emerge (Lazar et al., 2017). The structure of the test is described in the following chapter.

6.5.2 Structure of the test

As a first step in the test, the participants were provided with an explanation of the goal of the test and the purpose, goal and intended use of the tool. Providing background information to the participant before testing helps users engage with the tool more effectively (Nielsen, 1994), resulting in more profound feedback. After receiving the introduction, participants independently interacted with the tool's prototype, using it as they would in an actual organisation setting for which the tool is designed. The participant was in the lead of this part of the test, filling in the tool, asking questions and making comments as needed. This open-ended approach to testing aligns with a more naturalistic usability testing method, which focuses on observing user behaviour without rigid constraints (Krug, 2014). There was plenty of room created for the participant to share their opinion while filling in the tool. After completing the prototype, participants were asked a few open-ended questions about the tool's usability. These questions were not defined in advance. The questions were tailored to the participants' indications and contraindications during the tests. Examples of questions that were asked are:

What did you think of the tool?

How did you experience using the tool?

This approach allowed for an organic discussion. The participants have the room to express their experiences freely without being constrained by pre-defined questions, resulting in deep qualitative feedback (Lazar et al., 2017). This data collection method also aligns with the design thinking principle that emphasises continuous iterations based on user experience (Brown, 2008).

6.5.3 Sample selection and data collection

Top managers are recruited to test the second prototype of the tool. Additionally, the requirement is that the test participants have not participated in the previous phase of the study, because in the testing stage, researchers observe how the end-users interact with the tool in a real-world setting (Rubin & Chisnell, 2008). The test subjects were recruited using a convenience sampling method. While less strict, this method enabled a quick and efficient selection of participants based on availability (Creswell & Creswell, 2018). Subjects were asked verbally or via e-mail to participate in the test. The first five who were open to participating took the test. Although convenience sampling has limitations regarding generalizability, five highly suitable participants participated in the test. The subjects are highly ideal because of their role in the management team of the organisation they work at, which is the population of this study phase, and because they did not participate in the previous phase of the study. Convenience sampling is commonly used in research where gathering rich qualitative information is the priority (Etikan et al., 2016), which was the goal of this test. A detailed description of the participants in the study is portrayed in the filled-out tools, in Annexe 18.

Three of the five tests were conducted in person, while the other two were online due to time constraints. In addition to verbal cues, the in-person tests effectively capture non-verbal cues (Nielsen, 1994). Online testing, on the other hand, improves accessibility (Lazar et al., 2017). Therefore, both media were suitable for the test and used to enrich the data by leveraging the strengths of both approaches. Testing lasted between 19 and 37 minutes, with an average test time of 25 minutes. Before the test, all the participants signed an informed consent form, which are added in Annexe 14. Additionally, consent was given by all participants to record the conversation for elaboration. Afterwards, the recorded conversations were transcribed verbatim and anonymised using Corbin and Strauss's (2015) suggested strategy (Corbin & Strauss, 2015). This resulted in about 40 pages of test data, which are included in Annexe 13. All tests were taken

in the participants' native language, Dutch. Testing in the native language is considered best practice, ensuring comfort and resulting in more honest and detailed participant feedback (Squires, 2009).

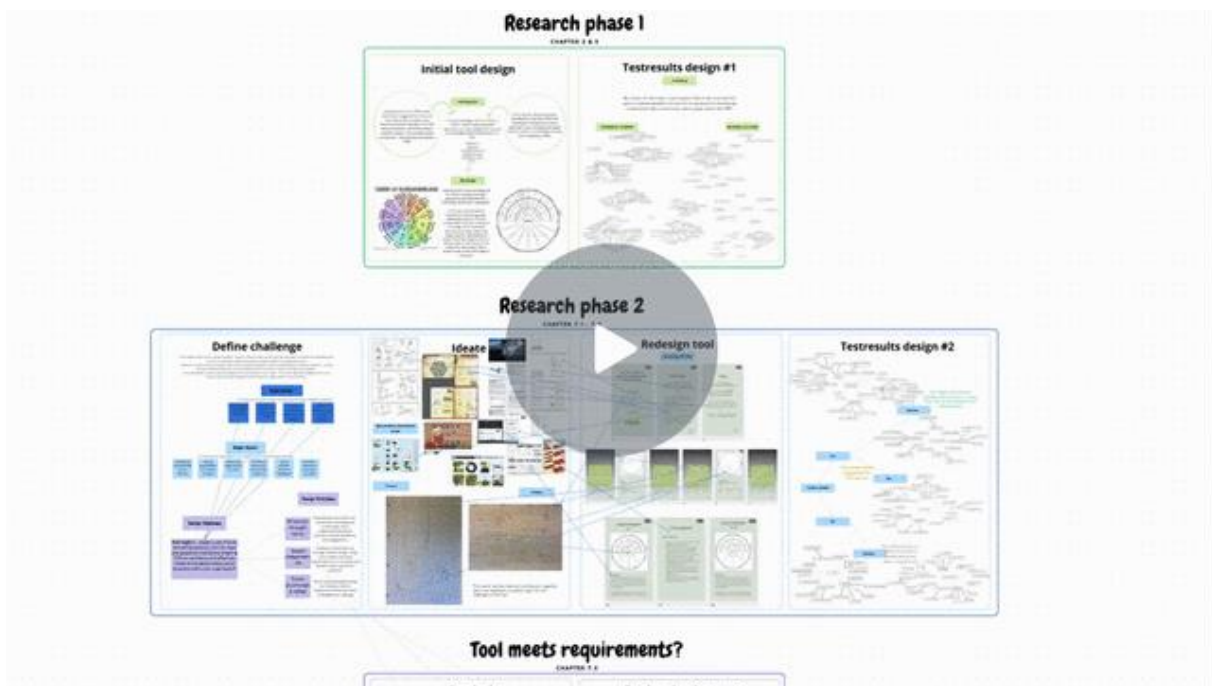
6.5.4 Data analysis

A qualitative approach to data analysis was used to interpret the test and identify usability challenges and areas for improvement from the collected data during the tests. The data analysis stage followed a two-step process after transcribing the audio recordings. Atlas.ti was used to analyse the data. The software has many data documentation and visualisation options to interpret the data effectively (Guthrie, 2021). Step one of the coding process involved an open coding approach. Hereby, the transcripts of the interviews are analysed line by line to identify recurring reactions and suggested improvements (Strauss & Corbin, 1998). Inductive data analysis allowed for a deep understanding of the users' experiences (Braun & Clarke, 2006; Lazar et al., 2017) and ensured that themes emerged directly from the users' input (Miles et al., 2014). During this stage, over 224 quotations were coded by over 130 unique codes. An example of a coded quotation from a test conversation can be found in Annexe 15. The codes from the open coding round are structured in the second step of coding, which is a thematic analysis of the data. In this step, the codes from step one are grouped into themes following the thematic analysis framework (Braun & Clarke, 2006). Annexe 16 shows the data after performing a thematic analysis. The data is visualised by creating networks of codes after grouping the data. The network mapping technique is helpful for visualising relationships between the users' comments (Nowell et al., 2017). Networking is used to find overarching themes in the code groups. The code networks are provided in Annexe 17. When structuring the data in a network, it is easier to validate the design improvements and understand the remaining pain points following the user-centred design approach (Wrigley & Straker, 2017). Chapter 7 shows the result of the actions of each design step.

7 Results phase 2

The reason for further developing the tool, as described in chapter 6, stems from the test results described in chapter 5. Users of the tool received the tool very positively, as the results showed, but they also provided feedback on making the tool more straightforward and valuable. This section describes the results from the research phase, in which the initial design was redesigned to increase independent usability by improving the tool's instructional design. As in chapter 6, the results are presented in the following order: definition of the design challenge, ideation, redesign of the tool, and test results. The last subchapter of this chapter reflects on whether the tool meets the requirements set in the design challenge and the principles of the users.

This chapter shows the results of each step completed to improve the tool using redesign. The video below presents the results from research phase 1, for initial tool development, and phase 2, for redesigning and improving the tool. The video aims to provide a visual insight into the process and briefly presents the most important results of all design steps. This chapter highlights all the results of this iteration. A Canva board is used for the presentation, which is linked to the video below. The video and the link to the video are included in Annexe 11.1. The Canva board with the results and the link to the Canva board are added in Annexe 11.2. In chapters 7.1 – 7.4, the results of the design phases (defining, ideating, prototyping, and testing) of research phase 2 are discussed in detail.



7.1 Define design challenge

The results of research phase 1, which were discussed extensively in chapter 5.2, suggest that although the tool is very valuable when used correctly, users still have much uncertainty about how the tool should be used. These doubts about the use centre on the situation in which or for which the tool is valuable, but the user also lacks sufficient guidance in the initial design on how to fill in the tool. The participants' uncertainty is expressed in direct questions and comments that indirectly capture the user's doubt. During the interviews for research phase 1, the interviewer had an indispensable role in explaining and clarifying the designed tool. In other words, without this knowledge of the tool and the explanations given to the participants before and during the

completion of the tool, the participants would not have been able to complete the tool in the intended manner, resulting in a reduced value. By providing explanations and examples, the interviewer was able to help the participant in the right direction. In short, ‘The wheel of managerial power’ cannot be used independently but has explanatory instructions to promote clarity. Therefore, the initial design of the tool, tested in research phase 1, requires an improved instructional design to foster independent use. The results of the tests in research phase 1, which are depicted in Figure 10, are divided into two categories: must-haves (indicated by the green dots) and might-haves (indicated by the orange dots). These are further discussed in chapters 7.1.1 and 7.1.2. After indicating the must-haves and might-haves, a central design challenge is defined in chapter 7.1.3. The design challenge leads to the three main design principles for the redesign in chapter 7.1.4. The results of this chapter are summarised in Figure 11, which can be found in chapter 7.1.5. Whether the design principles have been applied correctly and sufficiently is tested, the results of which are available in chapter 7.4. Chapter 7.5 reflects on whether the design principles are met in the redesign.

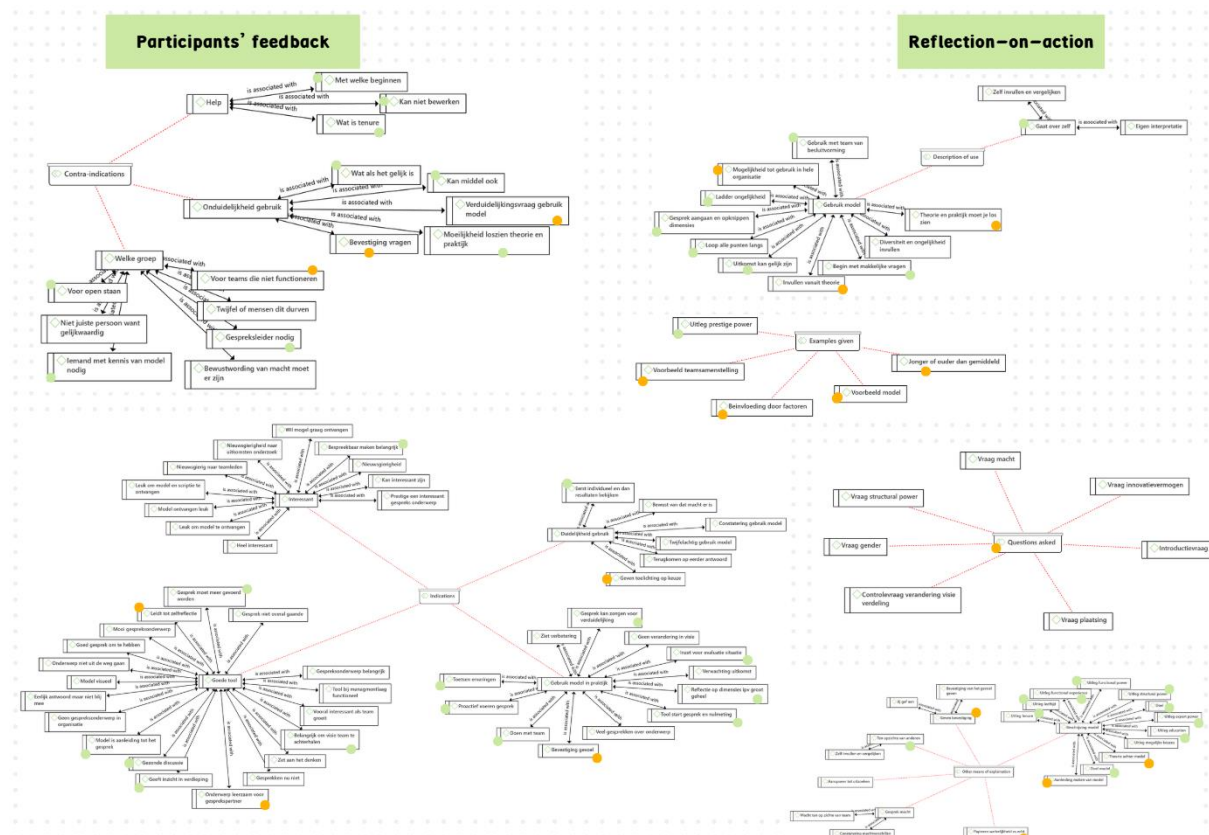


Figure 10: Test results phase 1

7.1.1 Redesign must-have

All codes in Figure 10 under 'participants' feedback' marked with a green dot are the must-haves for the redesign. These quotes indicate that if the participants do not see changes to what they are currently facing, the tool will be useless or unable to be completed correctly. The green dots under 'reflection-on-action' indicate the input from the interviewer necessary to help the test subject start filling in the tool. Four must-haves for the redesign have been formulated by combining all the comments marked with a green dot. Table 3 lists the must-haves, including example codes that served as input for the relevant must-have.

Must-haves	Example codes
1. Clarity about the purpose of the tool	Making it open for discussion and providing insight and depth is essential.
2. Terms used should not raise questions or doubts	What is tenure? Explanation of prestige power, explanation of age
3. A clear explanation of how to use the tool	What if it is equal? Difficulty separating theory and practice, cannot edit, compared to others.
4. What is needed to use the tool properly	Be open-minded, do it with the team, and use it in decision-making with the team.

Table 3: Design must-haves

7.1.2 Redesign might-haves

The orange dots in Figure 10 indicate all other participants' feedback that could improve the tool, but is not directly necessary. The interviewer might have provided the solution or input to overcome these, which is highlighted by the orange dots under 'reflection-on-action'. Six might-haves for the redesign have been formulated by combining all the comments marked with an orange dot. Table 4 lists the might-haves, including example codes that input the possible might-haves.

Might-haves	Example codes
1. Completing the tool leads to self-reflection	Leads to self-reflection, the educational topic for discussion with a partner
2. Confirming hesitant answers	Ask for confirmation, and confirm your feelings.
3. Answering questions on the spot	Clarification question using the tool
4. The theory behind the tool has been explained	Theory and practice should be seen as separate, with theory behind the tool.
5. Use of broader context is highlighted	For teams that do not function properly, there is an option to use throughout the organisation.
6. Example situations have been provided	Example team composition, younger or older than average

Table 4: Design might-haves

7.1.3 Design challenge

Combining the most essential conditions for the redesign, the four must-haves lead to the following design challenge:

How might I design a user-friendly, self-explanatory tool with clear and accessible instructions that enables TMTs to confidently and effectively initiate conversations about power dynamics within their organisation?

7.1.4 Design principles

The design principles flow from the must, might-haves, and the design challenge. The rules that must be followed with every adjustment to the current, initial design are to correctly process the

user feedback and increase the tool's value and usability. Three design principles have been formulated by translating the must-haves and challenges into actionable guidelines that can be implemented in every step of the redesign of the tool. The uncertainties that the participants faced in test phase 1 revealed that the tool's effectiveness could be increased by improving the clarity of the instructions, increasing independent usability, and fostering a safe environment for discussion. The principles aim to eliminate confusion and uncertainty, reduce reliance, increase self-assurance, and create a secure environment for all team members to participate. These are summarised in Table 5, briefly explaining each principle.

Design principles	Explanation
1. Empower through clarity	Empowering users with clear instructions, unambiguous terminology, and a progressively disclosed structure to build confidence and engagement.
2. Enable independent use	Enabling independent use through intuitive design, FAQs, and example scenarios allows users to use the tool without requiring external guidance.
3. Fostering psychological safety	Fostering psychological safety by creating a neutral, supportive environment with nonjudgmental language.

Table 5: Design principles

7.1.5 Summary chapter 7.1

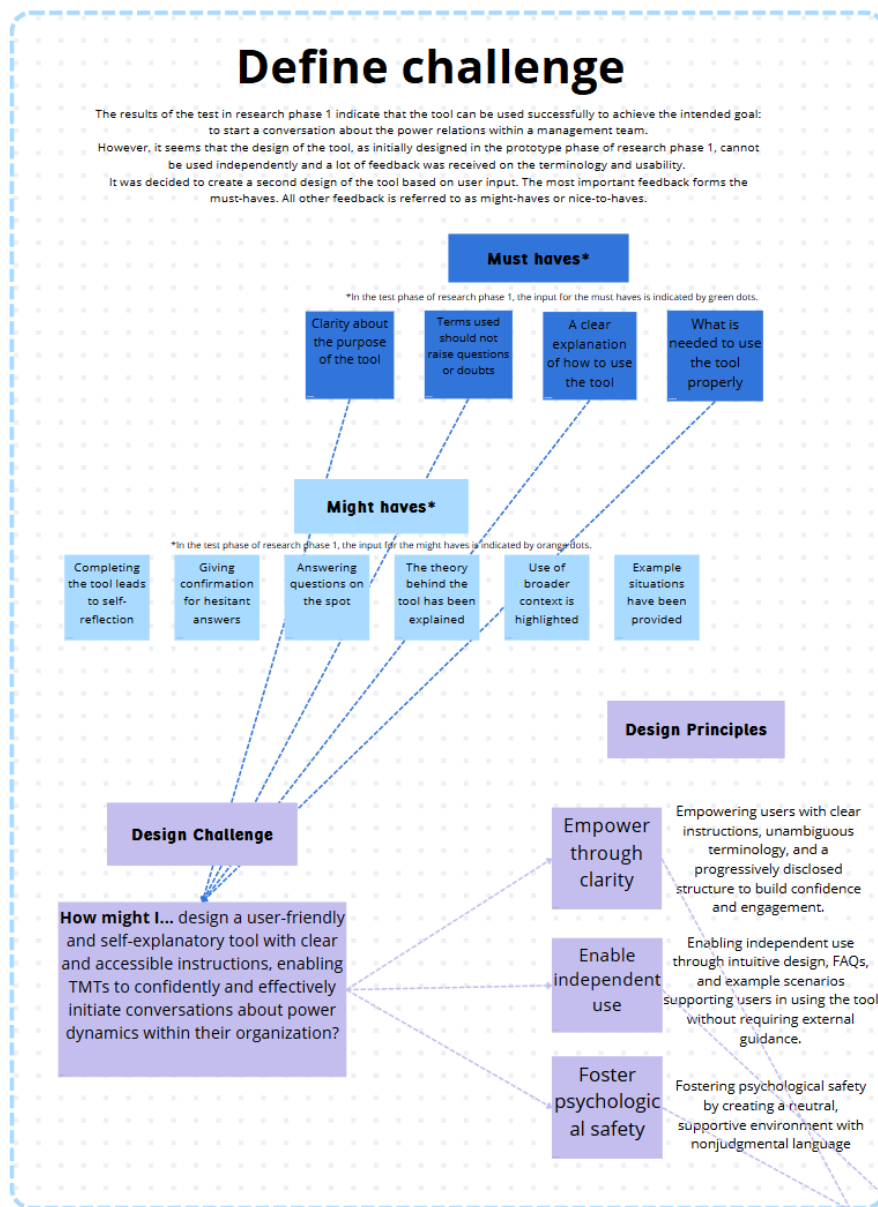


Figure 11: Summary chapter 7.1

7.2 Ideate

The first step for gathering information for the redesign of the tool is researching and collecting the best instructional design practices to best reflect the feedback and principles in the tool's new design in the form of instruction. After collecting the best practices, a visual representation of the tool's design was made using a Crazy 8 technique, in which the ideas for the design of the instruction were incorporated into the tool's design. After this, the SCAMPER technique was applied to develop the new design further by improving all parts of the design step by step based on the established principles and inspired by the research results into best practices. The results of each step of the ideation phase are included in chapters 7.2.1 – 7.2.4. Chapter 7.2 ends with the chapter summary in chapter 7.2.5, which is added in Figure 15.

7.2.1 Best practices in instructional design

The initial design of the tool did not include instructions. Therefore, the path to designing these instructions is still open and has been approached comprehensively. For example, online instructions, such as videos and web pages, and offline instructions, such as game explanations and manuals for assembling cabinets, have been considered. Some instructions were given in written text, others with images, but spoken instructions were regarded as possible input. In addition, some explanations present the information to the user step by step, while others give the user complete instructions at once. The goals of the instructions studied also varied greatly. One helps the user understand the steps needed to assemble a cabinet to create a complete cabinet, another instruction describes a process the user must go through to create value in the form of knowledge and insight, and yet another explanation aims to introduce the user to the strategy that could lead to winning a game. The study's results on best practices in instructional design are shown in Figure 12.

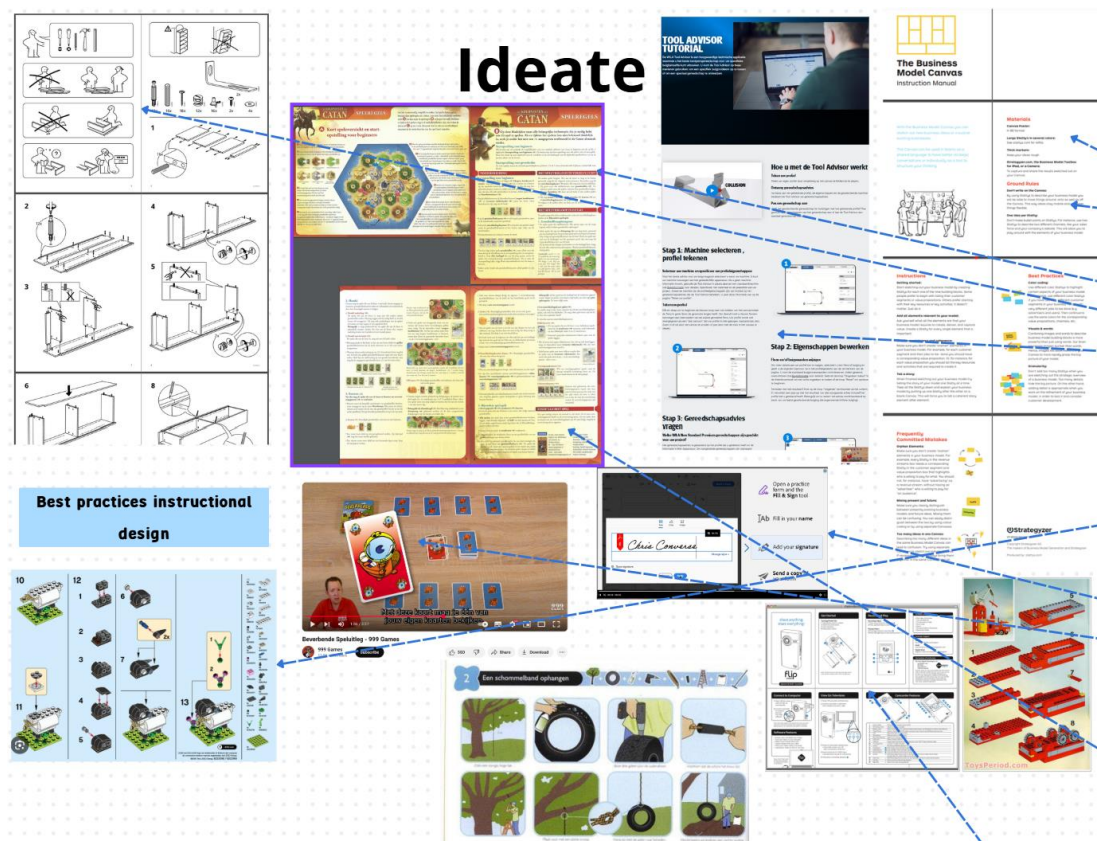


Figure 12: Best practices in instructional design

From concise to in-depth, visual to textual, the research results into best practices for instructional design show that appropriate instruction is highly dependent on the purpose of the instruction and the target group being addressed. The study did not lead to a single direct solution for adding the tool's instructions to the design, but it did provide a better picture of the possibilities for instructions. The purpose of investigating best practices was to find inspiration to solve the instructional design issue of this iteration by coming up with better ideas and applications based on proven best practices. Using a Crazy 8 technique, which is discussed in detail in the following chapter, the possibilities for the instructions are linked to the goals of the instructions for this tool and the user's wishes.

7.2.2 Crazy 8

By applying the Crazy 8 technique, six ideas were devised for filling in the instructions in the tool's new design, which can be seen in Figure 13. All six ideas were considered, with inspiration from best practices noted. The first idea to emerge from Crazy 8 is to offer users the tool's dimensions individually instead of the whole tool simultaneously, as in the first design. This idea comes from the instructions for assembling a cupboard or a Lego car, where the explanation is divided into steps. The idea of providing answer options for the questions about diversity, included in the upper half of the wheel, is also retained. Option two also shows that the questions must be presented to the user in a fragmented way and that the user must know which step he is on to create an expectation of how long they will be filling it in. This is reflected, for example, in the video, where you can see exactly how long the explanatory video lasts. The third idea was to digitise the tool instead of the manuscript version of the first design. For example, this is reflected in the explanation accompanying filling in the Business Model Canvas or the instructions for inserting a signature in a PDF form. The fourth idea arose from the manual for the game Catan, which describes apparent examples of situations or moves. It indicates your options in your turn in the game. The idea now is to develop example situations for each question in the tool, which will help the user to choose between the answer options. The fifth idea stems from a common denominator in all the instructions from the best practices. All the instructions studied describe what the user needs to start building a cabinet, playing a game or using a tool. This would be a good addition to the tool instructions. The last idea comes from the instruction manual of the Business Model Canvas, which focuses on the 'ground rules', or what is essential for using the tool so that the results are valuable.

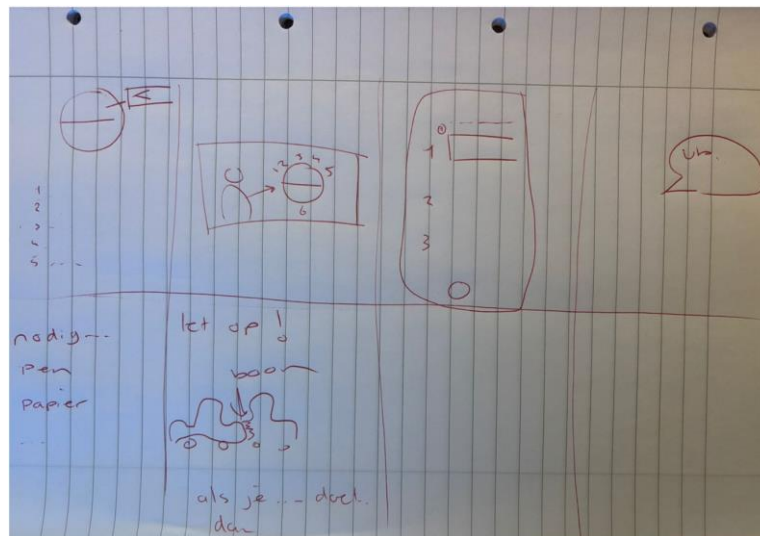


Figure 13: Results Crazy 8

Implementing the Crazy 8 technique was more difficult than expected. Linking the best practices and applying them to the tool required much thought. The difficulty of the Crazy 8 technique was that it was impossible to develop and improve the tool's instructions step by step. The Crazy 8 technique did not lead to several possible final designs, but to six sub-designs that all touch on a part of the problem to be solved. After implementing the Crazy 8 technique, the SCAMPER technique was used to combine all the small focus parts of the six ideas from the Crazy 8 to the tool's redesign and to design it as well as possible based on the principles and ideas from the best practices research.

7.2.3 SCAMPER

The SCAMPER technique has led to seven ideas that have been elaborated on in much greater detail than the ideas of the Crazy 8 technique. Figure 14 shows the ideas that arise from the SCAMPER technique. The ideas are based on the results of the Crazy 8 technique and are discussed one by one. Each concept is based on rethinking a part of the design.

- S** In the first step of the SCAMPER, the decision was made to **substitute** the manuscript version of the initial design with a digital version because this offers more possibilities for both the redesign and the possible further development of the tool.
- C** For the second step of the SCAMPER, the idea arose to **combine** the questions with the explanation instead of providing the reason and then asking the user. This could offer more focus because the user cannot read all the explanations simultaneously. It could also make filling in the form more straightforward, as the user would not have to remember the instructions for long.
- A** The third option was to **adapt** the wheel's display. When the question is presented, only the dimension being addressed is shown, and only after filling in all the questions, when the results are displayed, does the user see the entire wheel. The idea is that this contributes to focus, but can also benefit the users' objectivity because they do not yet immediately see how they position themselves about power in the centre of the wheel.
- M** Part of the initial design was **modified** by (partially) replacing the word "power" with "influence" in the tool. This adjustment will contribute to fostering psychological safety.
- P** The next idea, **put to another use**, has not been applied to the design of the instruction or the tool but rather to the process surrounding its use. It could be interesting to use the tool in a group other than the top management team, on which the literature behind the design of the wheel is based.
- E** The **'eliminate'** options are filling in the tool on the manuscript and using an instruction video, as this is expected to be less effective than digitising the tool and writing out the instructions with the questions. The following sequence was devised as an idea: an explanation with the question; the explanation is clicked away (eliminated from the screen), and then the focus is on the question. If uncertainty exists, the explanation can be called up again, or an example can be used.
- R** The last step of SCAMPER has also been used to develop further an idea about the process associated with the tool. For example, the idea is that the team can also discuss power first and then fill in the tool instead of vice versa. **Reversing** the process leads to the following new process: after filling in the tool, the conversation can be retaken to discuss the vision changes. It may also be an idea to have users fill in the tool first without sharing the purpose of the process. This can result in more honest answers because individuals may not yet have been influenced by the impact of their answers on the degree of power they have in the team.

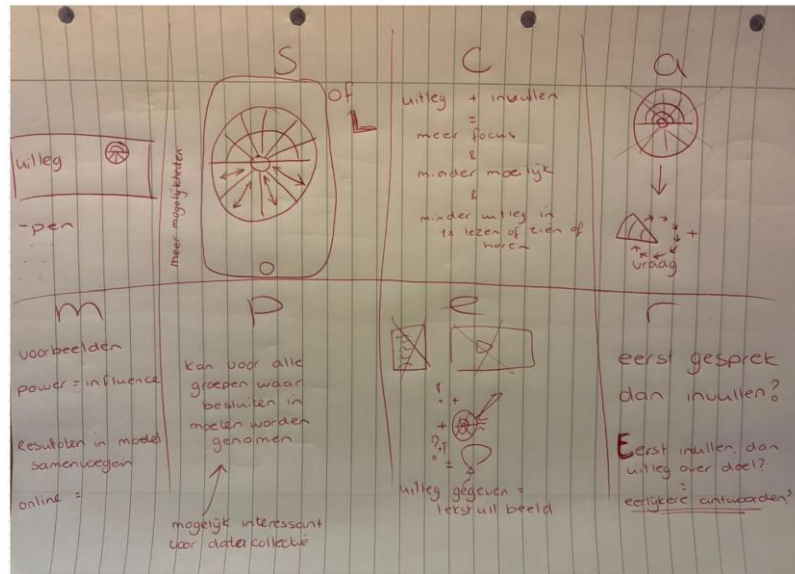


Figure 14: Results SCAMPER

7.2.4 Summary chapter 7.2



Figure 15: Summary chapter 7.2

The techniques used in this phase of redesigning the tool have led to various sources of inspiration, six abstract ideas, and seven more concrete elaborations. The results of this ideation step will be used in the next chapter to create a prototype of the tool's redesign, focusing on instructional design.

7.3 Redesign of the tool

In this chapter, a selection of the results of the new prototype is shown in the images, and the complete redesign prototype is included in Annexe 12.2. Designing the prototype of the tool redesign revolves around connecting the users' feedback on the first design, the design principles and the inspiration for instructional design in a design suitable for testing with users. First of all, it was decided to make the tool digital. This not only contributes to simplifying the use of the tool but, above all, offers many possibilities for further designing and personalising the tool and using the results. A PowerPoint presentation was chosen for testing, and the tool has an app format. The new design consists of three phases, which is also the order of this chapter: first, users receive

general instructions for using the tool, then the questions and corresponding information are presented, and finally, users receive the results of the tool and instructions on how they can use these results to have a conversation with the team about power dynamics and power distribution. The chapter summary is added in chapter 7.3.4, in Figure 19.

7.3.1 General Instruction

The design of the general instructions of the tool is added in Figure 16. The first slide of the design introduces what the tool contributes to. The goal is highlighted, and the result that the tool contributes to is known. This slide is based on how the instructions studied often begin their manual: Why would you do what you need the manual for? What purpose does it serve? The second slide of the instruction goes into a little more detail about this question of why, but also pays attention to how the tool works, i.e. the steps one must take to obtain the tool's results. Providing a step-by-step plan is a standard part of most instructions, as examined in chapter 7.2. These steps are reflected in, for example, the instruction booklet for assembling a cupboard or a game manual, in which the steps of a player's turn are described. Finally, on the second slide of the general explanation, attention is paid to the requirements for filling in the tool. Whereas the initial prototype required a pen to tick the answers, a digital version does not require a pen. What is needed is that the person be part of a team in which all members will fill out the tool, and the person must have an open attitude towards having a conversation about influence. Among other examples, the instruction manual for the Business Model Canvas clearly states what a person or team needs to get started with the Business Model Canvas. This ensures that people are well-prepared to get started. The third and final slide of the general explanation focuses on the most important rules for completing the tool, namely that the questions about oneself should be completed about the other team members and that the questions should be answered truthfully to ensure the value of the results. These kinds of ground rules are also described in the Business Model Canvas, but can also be found in the in-game instructions, which explain what is allowed in the game and what is considered cheating. Finally, the user is referred to additional explanations and examples that are present while completing the questions. This is common for explaining a tool on a web page, but the manual for a camera also offers additional explanations for each step, for example, about what a part is or what each button is for. All general instructions have now been given. Next, the user will begin answering the questions.

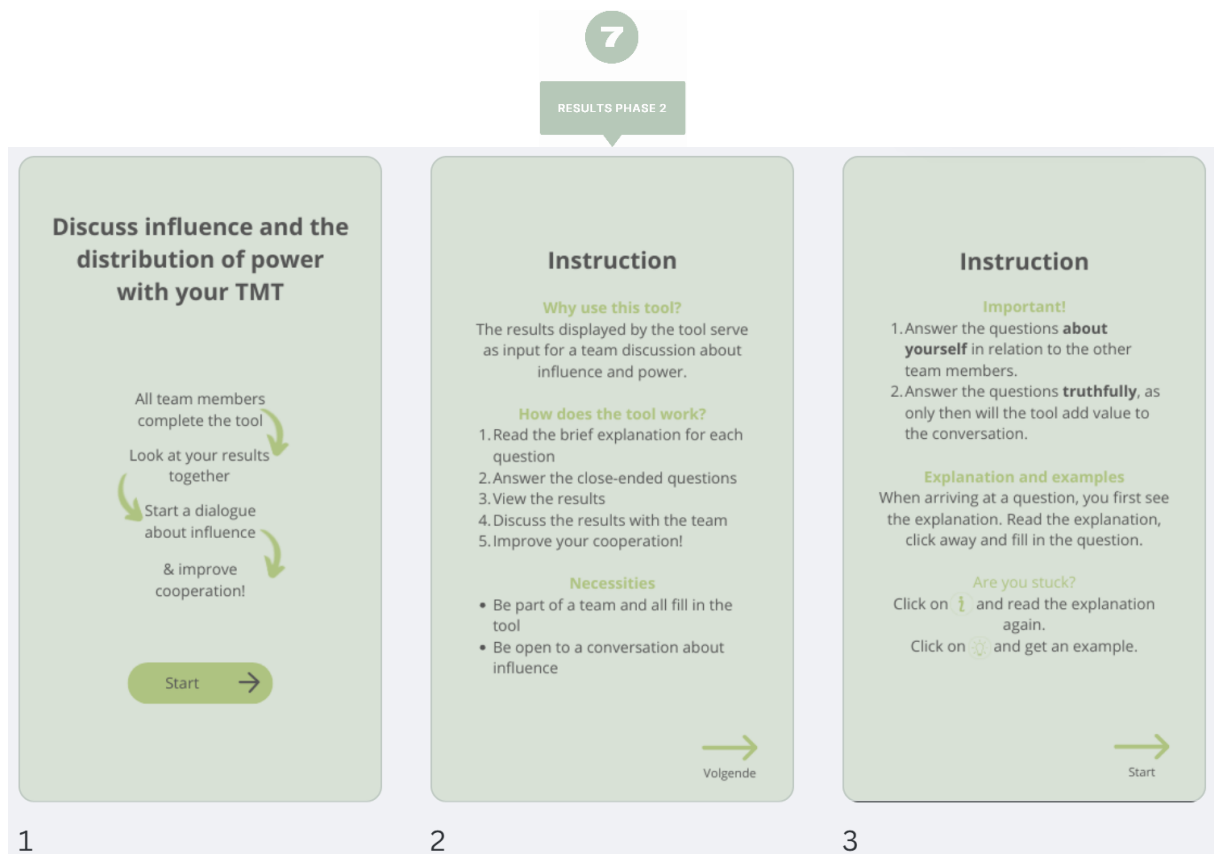


Figure 16: Design general instructions

7.3.2 Questions and specific explanations

Examples of the questions' designs are added to Figure 17. Before each question, users receive specific information about the question they will answer. This clarifies the terminology. A similar explanation is given in the instructions for a card game. This is because it deals specifically with each card's value, as seen in the video instructions for the game. This method of explanation is also used in the manual for making a cupboard. This deals with the various materials needed to make the cupboard. After reading this question-specific explanation, the user can click away from the explanation and fill in the question. The tool uses two types of questions: multiple-choice questions for the question dimensions that relate to recording the horizontal differences between people (diversity) and a slider for the question dimensions that relate to recording the vertical differences between people (inequality). These question types have remained the same as in the initial design. What has changed is how the questions are answered. People now answer a question, but no longer on the wheel itself. This ensures they have less insight into the result of the question they have responded to and, therefore, answer the questions more objectively. With each question, the participant can see what they are filling in and anticipate how long it will take. This is comparable to the video explanation for a game, where the length of the video creates the expectation. Games also indicate the length of the playing time. The instructions on adding a signature to a PDF document also indicate which step you are taking as a user. Information about what you are filling in and how long you expect to work on it contributes to your focus while filling in the questions. If the user does not immediately succeed in answering a question, they have the option of rereading the explanation. There is also the option of viewing an example. This example outlines a situation and provides the most suitable answer options for the specific question. This is the same approach used in-game instructions and the instructions for assembling a cupboard. By zooming in on a minor situation, this small problem is tackled, allowing the user to quickly proceed to the next step, which, in the case of the tool, is filling in the questions. After answering a question, the user clicks through to the next question, where the explanation, questions and

examples are presented similarly. Once all questions have been answered, the user will receive insight into their results, presented in 'The wheel of managerial power'.



Figure 17: Example of the design of the questions

7.3.3 Results and use of the results

Examples of the designs of the results and instructions about the use of the results are added in Figure 18. Completing all 10 questions results in a completed wheel of managerial power used to display the tool's results. The user can see the results of their answers about power in the team at a glance in the tool. This is similar to the initial design of the tool, but instead of filling in the dimensions in the wheel, it is a product of combining the given answers to the questions. This type of instruction, or a way to show the result, is also used in manuals for building a toy car or putting together a cupboard. In these manuals, images are usually used to show the intended result of the step a person must take. Adding pictures like these makes it easier to interpret the results. The tool explains what the user sees in the 'completed managerial power wheel' in these research manuals. The explanation is intended to guide users on how the results should be interpreted and help them use them to improve cooperation in a team by reducing power differentials. It ensures that input is given significance, for example, by having much power in one dimension or, conversely, very little, and makes it possible to easily compare results with the results of other team members by placing the wheels next to each other or by drawing in the same wheel. It is good to mention that the results plotted on the wheel are those of a fictitious person who shared the answers he gave in the examples outlined. If the tool is workable, the results displayed would be those of the person entered into the tool. The second slide that accompanies the results expands on the interpretation of the results and offers users example questions that can be asked to get the conversation going within the team based on the results the tool has produced. A similar method of providing information is used in the game manual, in which the user is advised on the next turn to play or the next move to make based on the outcome of the other players' turns. Because the results, the attitude towards the results, the conversation and the goal of the process to reduce the power differences in a team are very different in each situation, we have opted for generic questions that could help start a conversation in any situation. The teams can then go into more depth about their pain point to reduce it. With the tool's results, the introduction and the stepping stone to a conversation, it is expected that the users will be able to start using the tool independently. This is being tested.

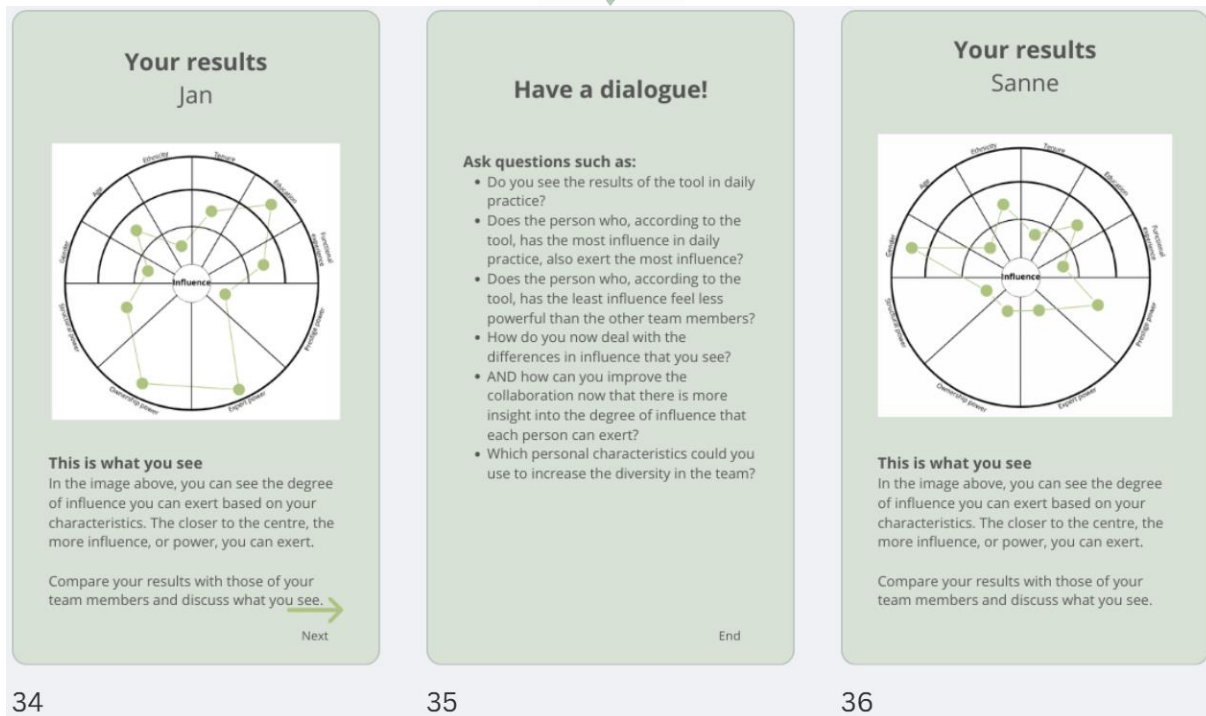


Figure 18: Design of the results and further instructions

7.3.4 Summary chapter 7.3

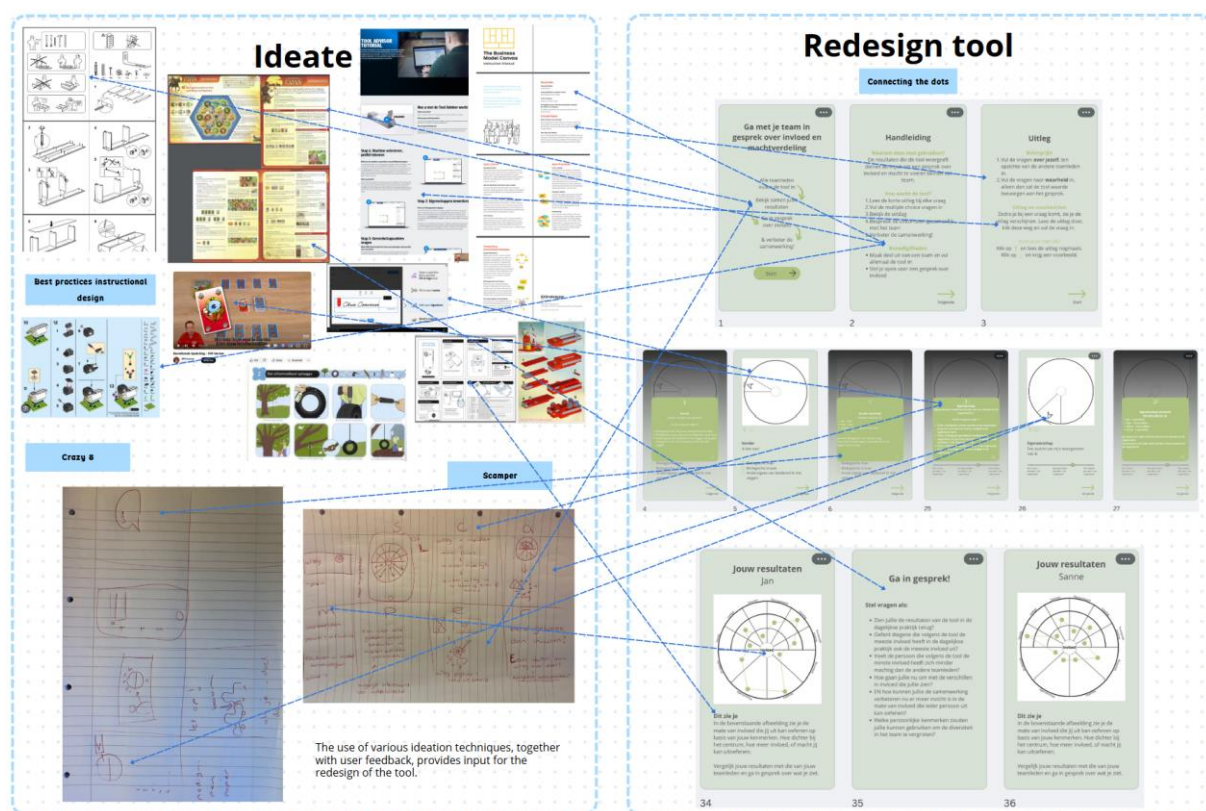


Figure 19: Summary chapter 7.3

7.4 Test results design #2

The prototype of the tool redesign is tested, and the results reveal whether the tool is valid and usable for the test participants. This chapter divides the test results into positive feedback, suggestions for improvement, and concerns. The summary of the results can be found in chapter 7.4.4, in Figure 20.

7.4.1 Positive feedback & indications for understanding

Over 30 unique codes were used to record the participants' positive comments on the tool's design and use. The positive feedback from participants is very varied and addresses the tool's purpose, ease of use, and design. All participants indicated at some point that the tool's purpose and the topic of conversation discussed during the test, namely influence and power distribution, was exciting to them. Participant 10, whose persona, among the other four participants of the test, is included in Annexe 18, expressed the following about this interest:

“I also think it would be exciting to have this filled in by other team members to see how they feel about it.” - (Participant 10)

Participant 9 shows interest in the subject in the broadest sense because he believes that power and influence are at the heart of every organisation.

“I think it is a fascinating subject, because the core of everything going on now is team cooperation, whether start-ups or scalable organisations. The influence of those people, so to speak, plays a role in how you keep the team dynamic, be agile, and ensure that you remain innovative. Yes, the role that power plays is exciting.” – (Participant 9)

The results indicating positive feedback and understanding of the tool are divided into topics: importance of the topic and added value, suggestions for using the tool, usability of the tool, and indirect indications.

7.4.1.1 Importance of the topic and added value of the tool

The participants generally agree that power and influence are essential roles in an organisation or a team. The participants refer to the tool as a 'nice image' to depict the power dynamics within an organisation and to start working on reducing power differences to promote the organisation's (innovative) performance. The added value of the tool for Participant 7 is that it provides insight into what is going on within a team, and that action can be taken based on this. Others also reveal that it is undoubtedly a tool that can be useful in a management team:

“If it works well, then the MT or a team could use it if they interpret it and say, Wow, that person has much influence, that is healthy for our organisation. So it is a tool that people can use. Yes.” – (Participant 7)

Participant 9 said the following about the added value of the tool for his organisation:

“Yes, I think that certainly helps. It helps to make something more objective. It gives an image, which helps, because otherwise that same dominant person will start shouting again. Then you hope this is a tool to change that and gain other insights.” – (Participant 9)

7.4.1.2 Suggestions for using the tool

When the test subjects talk about using the tool in practice, several suggest combining the designed tool with other personality tests to get a complete picture of individuals and their behaviour. Participant 7, for example, sees a connection and deepening of the results of different

tools, while participant 6 has the following vision about using the tool in addition to another personality test:

“But you have diversity in the sense of what kind of personality you have. So those colourful associations of red, blue, yellow, and green. Moreover, if you put these next to each other, you get a very nice picture of where you stand as a team.” – (Participant 6)

7.4.1.3 Usability of the tool

The test subjects also generally agree on the usability of the tool. The tool has a nice design and is laid out. The tool's design contributes to the possibility of filling it in independently. Participant 7 says the following about this:

“I think it is very easy to fill in independently.” – (Participant 7)

Others share this opinion, indicating that the design is well laid out, making it simple to fill in. Participant 10 also shared his opinion about the level of the questions, which is good enough because they made him think deeply about the appropriate response. He also shared the following about his experience when filling in the tool:

“I had a moment of doubt with one question, but that was it.” – (Participant 10)

His statements suggest that the questions have enough depth to be of great value, but are easy enough to interpret correctly and answer independently. While participant 6 ended the interview by stating that he thinks it is an entertaining tool to work with, participant 9 summarised his experience with filling in the tool as follows:

“Intuitive, easy and good to fill in.” – (Participant 9)

7.4.1.4 Indirect indications

Then, when interpreting the test results, the indirect indications the test subjects gave are examined, showing that the tool was working correctly. These indications vary from the explanation that belongs to the given answer to being able to answer the questions without additional instructions or showing that they understand the added value of the tool's results. For example, all test subjects showed they understood what was expected of them by answering the question after reading the explanation, but without asking the interviewer for additional explanation. Participants 7 and 10, for example, told the following before they started filling in the questions:

“You say you will talk to your team about power distribution, and all team members fill in the tool, look at the results together, start a dialogue, and improve cooperation. Okay, that is a clear start.” – (Participant 7)

“We could all fill in this tool at a meeting, and the results would just come out. So yes, we can start then and move on to the next one.” – (Participant 10)

The participants only used the available example situations in the tool a few times, indicating that the explanation and the questions were clear enough to encourage independent completion. When the examples were used, the results showed that they achieved their intended purpose and helped the participants to fill in the tool. For example, participant 8 said he had gained clarity after reading the example, which allowed him to continue answering the questions. From how and the content of the explanation that the participants give when filling in the questions, it can be concluded that, in general, the test subjects, when filling in the tool, have a good understanding of what they are doing, what the purpose of the tool is and which answer best fits the situation

they are in. There are numerous example statements to choose from. However, the following three from participants 8, 7 and 10 are a good representation of the statements that show that test subjects appear to understand what they are doing:

“That is also an excellent question, because someone has not been working here as long as I have, but not as long as anyone else. So I would say an average length of service.” – (Participant 8)

“Let me see, because you mentioned the formal role. Yes, I think everyone is equal there. Then I would say average because I think the entire management team is responsible. The entire management team must care for the entire company, so I would say average.” – (Participant 7)

“That is an average age, because we have a relatively young team, but it is about the same for everyone.” – (Participant 10)

Lastly, several participants' behaviour suggests that the tool's added value is recognised and that people can see what can be done with its results. For example, Participant 10 discusses that team members may see themselves as experts. In contrast, the rest of the team may feel differently about this, or vice versa, which may reveal that some people underestimate themselves compared to the other team members. This latter result can serve as food for thought and give these insecure people more confidence.

7.4.2 Suggestions for improvement

In addition to the redesign receiving much praise during the tests with the five participants, all participants also made suggestions to improve various aspects of the tool. These suggestions for improving the tool fall outside the scope of the redesign's objective, which is based on the must-haves, the design challenge and the resulting design principles, but would increase the value or usability of the tool according to the participants. A total of 30 unique codes were used to indicate these suggestions for improvement in the interviews. The recommendations for improvement are divided into the following topics: development from prototype to MVP, formulating and handling questions, deepening insights, and usability of the results. Suggestions for improvement by the participants fall outside the scope of improving the initial design as proposed in chapter 7.1.

7.4.2.1 Development from prototype to MVP

Firstly, the test subjects experienced some difficulty operating the tool prototype. Although the interviewer assisted with the controls where possible during the test, participants still indicated that they had difficulty with the fact that the prototype did not work as the final design would. While the idea for the final design, which was recreated as closely as possible in the prototype, was considered very intuitive, the comments show that further development of the prototype for the test could have been valuable. For example, the question was asked why filling in and clicking through does not work. Participant 9 describes the following situation about how filling in the form looks in the prototype:

“What you don't have now is that you press those icons. Then filling in the form is a bit more difficult because you have to go through it step by step.” – (Participant 9)

7.4.2.2 Formulation and handling of the questions

Most suggestions for improvement concern the content and wording of the questions. Participant 9, who has extensive experience in building digital applications and user experience, doubts the effectiveness of the current answer options.

“Yes, you now have the lowest, highest and average. I find those dangerous.” – (Participant 9)

He also provides a detailed description of how he thinks the question formulation could be improved and yield a more objective and perhaps more valuable result:

“I think you need to specify or clarify what it means. You could overcome this by adding some nuance, relatively little, proportionally little. Then you can get a better objective picture of something that has not been thought about much yet. I think that will elicit clearer answers than the extremely extreme questions.” – (Participant 9)

On the other hand, the other four respondents did not hint at an improvement in the question, as indicated by Participant 9, nor did they even suggest that the current question is sufficiently good, as the results in the chapter outline show. When the questions regarding inequality (the lower half of the tool) are presented, participant 9 makes the following observation:

“A slider gives me options. That makes it easier than when you ask about extremes. The question is, how extreme will people fill this in?” – (Participant 9)

However, he indicates that he would prefer the same type of questions. Currently, multiple-choice questions are used for questions about diversity, and a slider is used for questions about inequality. Participant 9 suggests standardising the questions to make them more user-friendly:

“For the user, it is easiest if you have the same ways of asking questions, to which you give the same type of answer. Now I have to go and see how that works. I would consider weighing up consistency in the type of questioning. You could overcome that by giving five options, indicating categories.” – (Participant 9)

Participant 9's feedback mainly focused on the tool's user-friendliness, but he was not the only one who made suggestions for improving it.

7.4.2.3 Deepening the insights

Participants 8 and 10 provided valuable input on deepening the results by expanding the tool and asking more questions per dimension instead of the single question per dimension about the current approach.

“Perhaps I should ask some more questions. You have had 10 already, I would add a few more.” – (Participant 8)

“I'm just thinking, you know, these are, of course, overarching things. If you want to have another part in the deepening, which is a little less about behaviour but then again a little more about it, then you go in the direction of expertise and what people are strong in.” – (Participant 10)

However, the person proposing this idea also proposes adding other, separate questions, such as how important a person considers themselves within the organisation. According to the person suggesting this idea, this could be an interesting addition because it says a lot about a person's motivation and behaviour.

So, while one participant wants to use the tool to gain a deeper understanding, another suggests using the tool with another personality test to gain even more insight. This indicates a proposal for improvement regarding the situation in which the tool is applied, and less about the use or content of the tool itself.

“It's funny, because when you compare it to people's personalities, you gain much insight into where you stand as a team.” – (Participant 6).

7.4.2.4 Usability of the results

The participants are all enthusiastic about the digital tool. It allows them to save the results and makes it easier to fill in the questionnaire. The participants, therefore, express various wishes regarding the ability to view the tool's results. An essential theme in this regard is seeing the results of all team members at a glance. 'Overlaying' the results after everyone has filled in the tool would be a solution. Participant 6 expresses this wish and describes the ideal situation:

“It would be great if you could all log into that tool, fill it in and then at some point after the end, you can overlay the results so that everyone can see their wheel first, and then, a click further on, you can overlay them. However, anyway, we will make it a lot more complex.” – (Participant 6)

While this does not seem necessary, it would simplify the interpretation of the results for the conversation after completing the tool. Although not yet explicitly tested, Participant 6 proposed using the tool's results in the discussion about power. During the interview, the tool's purpose was explained and what the results can be used for. The independent use of the tool and the organisation's follow-up process were briefly highlighted. The details of discussing power with the team based on the tool's results have not yet been worked out. Participant 6 advises, after the brief explanation, not to have the conversation about power take place entirely independently because there is a chance that the person with the most power will overrule it. He says the following about using an independent person to guide the conversation:

“I think you quickly realise you need someone to chair the meeting. Someone who is truly impartial and not part of the team. Otherwise, the strongest person will quickly take over. So I would advise doing it that way.” – (Participant 6)

Participant 6 highlights a potential risk for the conversation or the process after completing the tool, but the participants also sometimes express concerns about the tool itself. The following chapter discusses the comments that criticise the achievement of the proposed design challenge and principles.

7.4.3 Concerns

During the interviews, the participants highlight various pitfalls of the tool or comment on themes related to the established design principles that the tool should comply with after the redesign. The concerns are formed based on feedback on the tool that jeopardises the achievement of the design challenge and the incorporation of the design principles in the redesign. The outcome is that the design challenge and the resulting design principles for the redesign may not have been fully realised. The direct and indirect indications for concerns are divided into the following topics: unclear terminology, the target group of the tool, guarding psychological safety, and lack of nuance.

7.4.3.1 Unclear terminology

According to participant 9, the lack of clarity now mainly lies in how 'things' are described in the explanation of the questions. He experienced this lack of clarity in the question about his share in the organisation.

“That does indicate the lack of clarity. I would look at what you mean by ‘share’, you need to specify what share is better.” – (Participant 9)

The terminology also revealed doubts, such as when participants asked for additional explanation of a question or wanted to see the explanation again.

7.4.3.2 The target group of the tool

While others experienced difficulties with specific terms, Participant 8 had concerns about the tool's accessibility in general.

“I also think that depending on the level of the person you are going to ask something like this, certain words or questions might be more accessible.” – (Participant 8)

Alternatively, the fact that direct comparisons must be made with team members with whom one works closely. One risk is that answers are given based on different perceptions, which means that the answers lack objectivity. This could pose a threat to the subsequent discussion about power. Another pitfall, because people base their answers on the characteristics of the group, is that the users do not know all the characteristics of the team members. Participant 9 shares this concern:

“Imagine that I don't know the ages of my team members. How would I fill it in?” – (Participant 9)

Others also contributed their thoughts on how the tool can be applied. Participant 8, for example, hints that he has questions about whether the tool adds value in smaller organisations. He indicates he is part of a smaller organisation with about 15 employees. Although his enthusiasm about the tool was predominant in the interview, he concluded that using the tool in his organisation does not add value, in his opinion. The statements of participant 8 suggest that the tool is valuable for large organisations where teams with the same expertise work together, such as marketing or sales, rather than in his small organisation, where there are no specialised departments but where, for example, only one person is responsible for the marketing activities of the organisation.

7.4.3.3 Guarding psychological safety

Another important theme that relates to the terms used is psychological safety. The decision has now been made to use the term 'influence and power' in the tool, whereas the first design only referred to power. Participant 9 shared his views on this choice:

“I have a problem with the word power, so I prefer the word influence. So I would call it influence instead of power because of the connotations.” – (Participant 9)

The other participants were also asked about power and the connotations of power. They expressed no doubts when the tool used the word power and did not appear to share the same vision as Participant 9. All participants agree that feeling safe when truthfully filling in the tool is very important. According to them, that is the only way the tool's results are truly valuable. Participant 7 shares the following on this theme:

“I think the keyword awareness is very present.” – (Participant 7)

Before filling in the tool, the team must be open to having the associated discussion, which is where the value is truly created. Participant 6 expresses a concern about this:

“But I also understand that having that discussion is, I think, again. Yes, that's always the case with these kinds of things, whether people are open to it. That's difficult.” – (Participant 6)

7.4.3.4 Lack of nuance in the questions

Other doubts that have been raised concern the questions, which, according to the results, lack nuance. For example, some questions are considered risky or harmful because of the answer categories used (most and least):

“Someone is going to say, or say to themselves, as an average management team member, ‘I have little knowledge and little expertise’. Nobody is going to fill in that option. You should know it because then you will understand how something works. So how dare people fill this in honestly?” – (Participant 9)

The following and last chapter of this results chapter reflects on whether the test results show that the requirements of the redesign, in the form of the design challenge and the design principles formulated in chapter 7.1, are met, which would show the redesign's construct validity and usability. The suggestions for further improvement are also discussed outside the scope of the current iteration, for which the participants' suggestions for improvement can serve as input.

7.4.4 Summary chapter 7.4

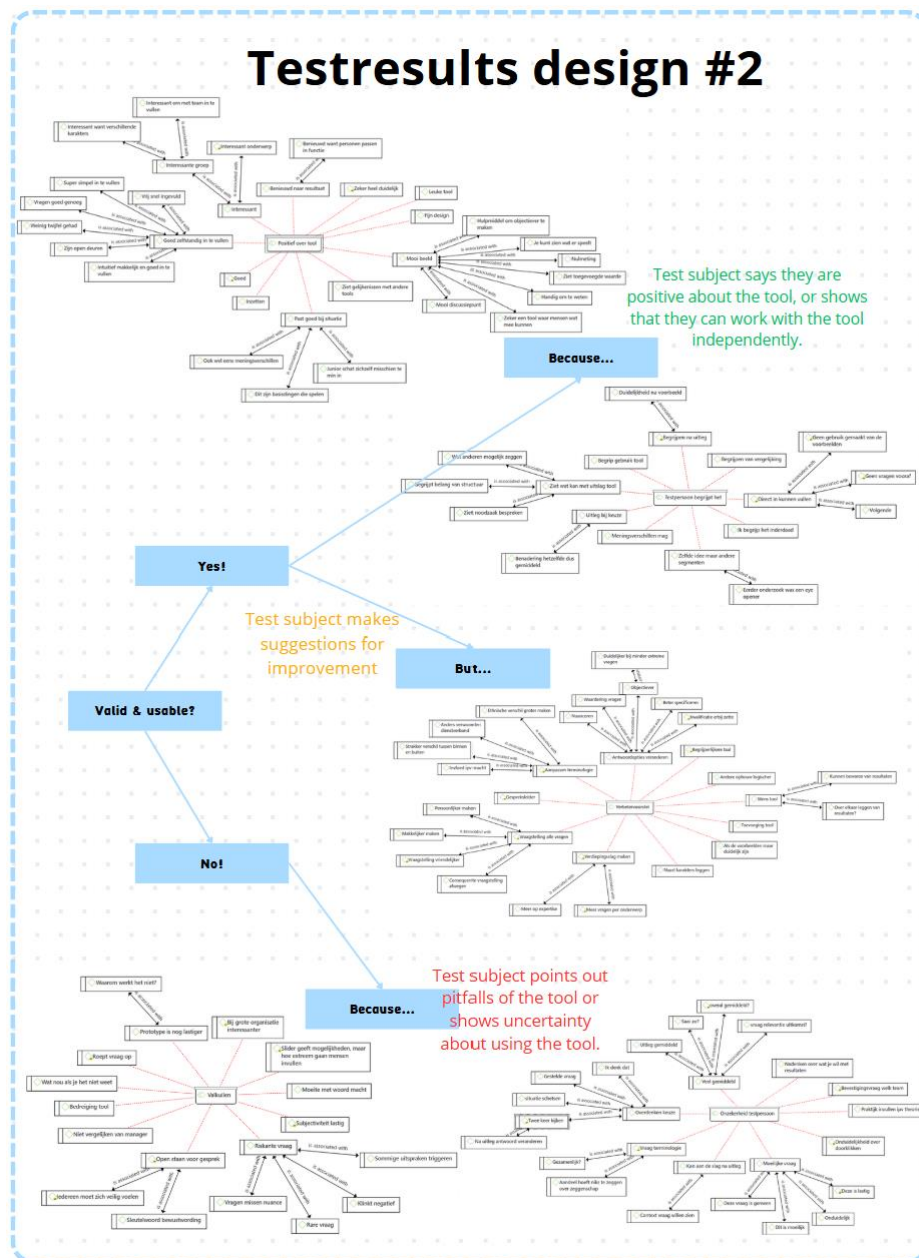


Figure 20: Summary chapter 7.4

7.5 Does the tool meet its requirements?

With the results described in the previous chapter, this chapter reflects on the progress made regarding the established design principles and discusses the possibilities for further developing the tool. Figure 21 adds a summary of the conclusion.

7.5.1 Conclusion

The first design principle, which was established in chapter 7.1, is **empowerment through clarity**. Most feedback on the tool shows that users find the tool easy to use, but there were also indications that users lacked clarity in some regions of the tool. For example, more straightforward language was suggested to make the tool accessible to a larger group of users. A few users considered the question difficult because of the terminology or because they needed to compare with the team members. Choosing one type of question was also suggested to

increase clarity further. Based on the results, it is likely that this principle has been partially achieved, but it can certainly be developed further. As the tool designer and the person who tests it, I see the lack of clarity among the test subjects and the need to explain things to help them. Therefore, clarifying the terms that confuse the participants during the tests is essential. This can be done in the explanation before the question and in the available example. I doubt the suggestion to choose one type of question, but it is crucial to investigate whether this is desirable and a possibility. The most significant development was clarifying that the questions about the other team members should be completed. This requires further development.

The following design principle **enables independent use**. The results, which indicate the possibilities of using the tool independently, make it reasonable to conclude that this principle has been met. The test subjects appear to be very satisfied with the digital version of the tool, describing the design as intuitive and easy to fill in independently. According to the results, the instructions and examples also contribute to the independent completion of the questions.

Finally, we assess the design principle of **promoting psychological safety**. The results show both upbeat and less positive indications regarding incorporating this design principle in the redesign of the tool. Although the participants all show interest in the subject of power dynamics and differences, some wonder whether people would dare to fill in such a tool. It is proposed to eliminate the word power from the tool to promote safety regarding the subject among users. However, there is agreement that the tool would certainly be one that people could use. The likely conclusion is that this design principle has been partially achieved. The conclusion indicates that not all design principles have been fully realised in developing the tool's redesign. However, according to the results, the tool has been improved for the user compared to the first design. Altogether, leaving the word 'power' out of the equation is an option to make the tool more accessible to more teams because more people would be open to using it, its results, and the discussions it generates. However, I strongly question whether this would not detract from the tool's purpose. To get started with the tool's results, those involved must recognise that there is power within their team, that this power may be unequally distributed, and that this influences the team's cooperation. An open culture is needed to talk about power. I suggest not removing the word power from the tool entirely, but working with an independent discussion leader who helps the group towards better cooperation by overcoming the adverse effects of unequal power distribution, of which the tool is a part.

7.5.2 Further development

The conclusion suggests that it would benefit the tool's design to use a subsequent iteration of the design process to incorporate the user feedback obtained in this second iteration into the tool's design, to implement further the two design principles that do not appear to have been fully realised. I support this because I would like to see the tool developed further and become more valuable and accessible. In addition to achieving the design principles, the participants made various recommendations for further improvements and developments to the tool to increase its value further. These recommendations include deepening the results by increasing the number of questions per dimension. This would also contribute to improving the objectivity of the results. In my opinion, it is a delightful suggestion. Measuring a dimension using several questions could make the questions more manageable and ensure that the prejudices of the users are less likely to influence the results. However, this makes the tool longer and requires research to determine how the dimensions can be measured using several questions. I would like to see this investigated, as it would be a very valuable addition to the tool.

In addition, it is proposed that questions and terms used be made less risky, allowing the tool to be used more widely. Given that the tool is aimed at top management teams, I do not believe this suggestion applies, as the individuals in these positions are sufficiently qualified to complete the tool and interpret the results. An important topic for further development is to make it easier to compare the results of the different team members, for example, by allowing the wheels to be superimposed. It is a good addition to the results. After all, the tool is designed to enable the results of all team members to be compared. Furthermore, the users show interest in testing with a working design so that the controls can be examined more closely. The next step would be to process the feedback and additional suggestions and develop the tool into a working design.

Finally, the participants made several suggestions for improving the process, of which filling in the tool is one step. According to the organisations that spoke, using the tool alongside other tests would offer great value, which I will always encourage. It is expected that using a moderator during the conversation about power with the team, for which the tool's results are the input, is essential to have an equal conversation within a team. These last suggestions aim to design the process, not just the product, the 'Wheel of managerial power'. Given the participants' subjectivity and lack of reflective ability when filling in the tool, it seems advisable to use a discussion leader when using the tool and discussing the results. However, the process surrounding the tool needs to be further investigated and shaped. Testing whether using a moderator is of additional value could be part of this study.

7.5.3 Summary chapter 7.5

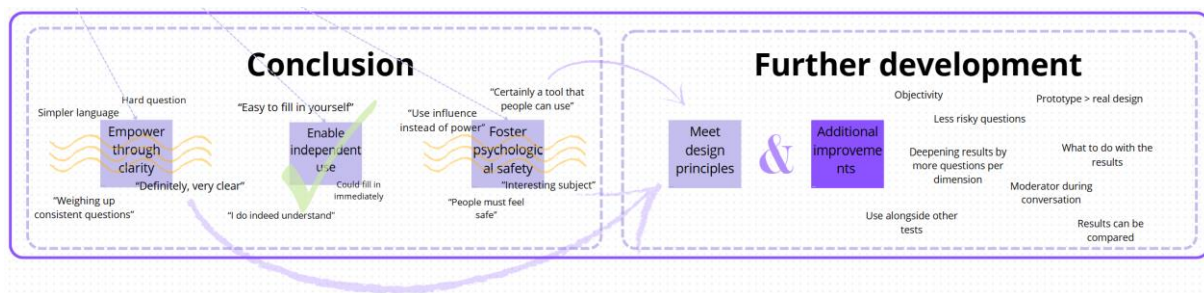


Figure 21: Summary chapter 7.5

8 Final tool design

The literature review in chapter 2 showed that power inequality negatively affects innovation. Power is always relative to another social actor (a person's team members) and is distributed among the members of a TMT using horizontal and vertical interpersonal differences. Horizontal differences are related to a person's demographic characteristics, while vertical differences are related to a person's formal status. While diversity in demographic characteristics leads to a higher degree of power distribution, which negatively affects innovation, the direct effect of diversity in demographic characteristics on innovation is positive. A dilemma, named the diversity/inequality dilemma, is revealed in this study. To drive innovation, the adverse effects of the power dynamics in a TMT on innovation must be mitigated. To overcome power differences, a team's power distribution must be transparent. This study proposes the tool 'The wheel of managerial power' as the first step towards overcoming the diversity/inequality dilemma by giving the teams insight into how decision-making power is distributed in their TMT. The tool's results, the design of which is explained in detail in chapter 8.1, are only the beginning of creating a team in which power plays a minor role and cooperation is promoted. The tool provides insight into the distribution of power. Still, after using the tool, it is essential that a team discusses these results and draws up a cooperation strategy that contributes to overcoming power differences and the abuse of power, which will benefit the organisation's innovative capacity. The process in which the tool can be a part is explained in chapter 8.2.

8.1 The tool in detail

The design of the tool has evolved during the study. The initial design of the tool is primarily inspired by Sperber's wheel of power/privilege, which can be read in chapter 3.1. The first design, shown in Figure 6, consisted of a fill-in sheet, emphasising mainly providing insight into the power differences between TMT members, and where the tool's user-friendliness, layout and effectiveness were given less value. The final design of the tool is in the form of an app that can be completed digitally. Thus, the final design presented in this chapter combines the tool's proven value with an excellent user experience and possibilities for further development or personalisation due to the possibilities of digital development. This chapter discusses all the user phases of the tool in detail. The choices made are explained, and the processes highlighted. The first chapter, 8.1.1, reveals the design choices and control of the tool. Chapter 8.1.2 focuses on the introduction of the tool to the user and the instructional design of the tool, given before filling in the questions. In chapters 8.1.2 - 8.1.4, the tool's body is highlighted, in line with the two-dimensional survey: demographic characteristics and formal positions. Finally, in chapter 8.1.5, the results are combined, and attention is given to explaining the process that initiates the tool's results. The original design of the tool was written in Dutch, the native language of the test subjects and the language spoken during the tests. The figures used in this chapter to explain the tool's design have been translated into English. Although the tool's final design is an MVP, the test results in chapter 7 show that it achieves the intended result.

The tool was developed and redesigned in the study by validating it with real users and using their feedback for improvement. The results of the multiple iterations for designing the tool are a management tool with proven value for capturing power distribution within management teams to improve collaboration strategies, overcome power differences, and increase organisational innovativeness. The situation in which the tool is expected to yield the most results is when all team members are open to discussing power and when they all feel safe in the team to discuss this. A closed attitude towards the subject can result in an abuse of power during the process in which the tool is a part, preventing the tool from having a positive effect. Insecurity clouds the

results because people do not dare to speak out, so the analysis may not be complete. The advice is therefore to use the tool proactively to find out how power is distributed in a team at a given moment, and not to use the tool when the adverse effects of power differences are significant and the tool is used as a solution. The tool is designed for top management teams of organisations that wish to enhance innovation and are open to discussing power in their team. Due to the widespread use of Sperber's tool, on which this tool is based, the tool might have potential for broader use, aiming to expose and reduce power differentials in teams. However, this study did not investigate the various situations in which the tool can be valuable.

8.1.1 Design & control

This prototype of the tool was designed using Canva. The decision was made to use a web application familiar to the designer to build the visualisation of the MVP so that the learning curve of a new system would not affect the creativity that went into developing an MVP in a short period. As the version suggests, the tool's minimal design does not contain visuals, shadows, surprising elements or other attractive images. The primary focus was on the MVP's function and operation and the tool's instructional design, which received the most critical feedback during the test in phase 1. A digital version of the tool was chosen, which users can complete digitally. Compared to a paper version, a digital tool offers users advantages such as accessibility. Going digital also has a significant advantage regarding further development options. For example, the visual design can be more attractive, but the tool's functionalities can be expanded. An app format has been chosen for the display. It is expected that users will experience an app that is the most user-friendly and accessible. For example, the test can be completed on a mobile phone or laptop due to its appropriate design.

Regarding the choice of colours, a friendly and accessible look has been chosen by using the colour green and using it in different shades throughout the design. No additional accent colours have been used. The texts are black when the background is light green, while the texts are white when the background is a darker green. This contrasts nicely and ensures that the texts are easy to read. The choice of a 'clean' font also contributes to the readability of the texts. Furthermore, the information is enriched by using several icons that reappear throughout the tool. This creates unity and guides the user through the steps. The following icons are used:



The arrow guides the user in navigating to the next screen of the tool (further referred to as 'Arrow').



The 'i' offers the user the option to request an explanation of the question (further referred to as 'i').



The lamp allows the user to view a sample answer to the question (further referred to as 'Lamp').



The cross helps the user navigate away from the explanation or example so that the question can be filled in (further referred to as 'X')

Images support the questions. These show the user which question he is filling in and his progress. This allows the user to estimate how long it will take to fill in the questions, forming their expectation and contributing to the user's motivation. The results are also displayed in an image. Based on the answers entered by the user, the formed image gives the user insight into the amount of power or influence he has in the team. By comparing the results of all team members, it is also easy to see at a glance what the power dynamics in the group are, after which action can be taken.

The app's control, which was experienced as intuitive and user-friendly by the test users in test 2, is based on simplicity. The goal is to retrieve information from team members about power distribution in the most accessible way possible, and the control of the app should not be a factor that hinders them in this. Therefore, intuitive and comprehensible controls for all users are used. On the home screen, the user can easily navigate to the explanation of the tool by selecting 'Start'. After reading the explanation, the user can go to the second screen with instructions by pressing 'Next'. On the second screen with instructions, the user receives information about using the 'i' and 'Lamp' buttons. This information about using the tool guides the user when requesting explanations or examples for the upcoming questions. Once the second screen with instructions has been read, the user starts the questions by selecting 'Start'. Before each question, the user is shown an explanation of the question. Once this has been read, the explanation can be closed by pressing 'X', and the question can now be answered. Suppose the user manages to answer the question by selecting one of the given options (multiple choice) for the first six questions or by sliding the slider to the answer's position for the last four questions. In that case, they can navigate to the next question by clicking 'Next'. If the user needs more explanation or an example to answer the question, they can choose, as explained in the instructions, to click 'i' if he or she want more explanation, or 'Lamp' if they want to see an example. After reading the explanation or example, the user can click 'X' to dismiss it. Once the user has completed the last question, they click on 'View results' to see the results of the completed questions. The results and the follow-up to the results are divided over two screens. The user can easily navigate to the next screen by selecting 'Next'. The last screen informs the user that the test has been completed by displaying 'End', thus avoiding ambiguity.

8.1.2 Introduction and general instructions

It is assumed that when a team starts using the designed tool, the team will see or experience that power dynamics are at play in the team. The team is expected to be aware of this and open to discussing it with each other. Introduction to power dynamics comes from experiencing power differences or being made aware of them. When designing the tool, it was assumed that the users are familiar with the concept of power and its adverse effects on team cooperation. The tool, therefore, starts with three screens that build on the user's knowledge, which form the introduction to the tool and general instructions for using it, and can be seen in Figure 16. These screens inform users about the most important things they should know before filling in the tool. The instruction answers various essential questions that the user might have. Question by question, the information the first three screens provide to the user and, therefore, what user questions will be answered through these screens, is highlighted.

User question 1: To what does the tool contribute?

Before the user fills in the tool, they are presented with what the tool contributes to, namely discussing influence and power distribution with their team. The ultimate goal is to improve cooperation within the team by reducing the differences in influence and decision-making power. This information is mainly displayed on the tool's home screen and is intended to encourage the user to start working with the subject using the tool.

User question 2: Why use the tool?

The second question that is answered is why it is valuable to start using this tool. This vital information, which contributes to convincing users to engage in a dialogue about influence and power through the results of this tool, can be found at the top of the second screen. If teams want to discuss power, they need a starting point and direction to take the debate. That is what the tool

offers. The instruction answers the following question: *‘The results displayed by the tool serve as input for a team discussion about influence and power’*. This answer reveals the guiding nature of the tool.

User question 3: What is the purpose of the tool?

The instructions also show that the tool contributes to a more extensive process in which the discussion about power is also held. The purpose of the tool in this process is to provide team members with the necessary information to have a structured and informed discussion about power within the team. The tool is, therefore, the starting point for reducing the adverse effects of power dynamics on cooperation.

User question 4: Who is the tool designed for?

It is included on the homepage to ensure that the tool appeals to the right target group. The first page reveals that the tool is designed for top management teams and therefore appeals to them directly. In addition, the instructions repeatedly refer to using the tool in teams. The answers to the questions must be related to the other team members. It is also essential that the other team members complete the tool so that the results can be compared. It is precisely in comparing the results of the tests of all team members that the tool's added value lies. From the tool's instructions, it is clear that the tool is for teams, and specifically for top management teams.

User question 5: How do you, as a user, work with the tool?

After that, attention is paid to how the user utilises the tool. The instructions focus on the steps the user goes through while filling in the questions, all the way to viewing the results. The user is presented with an explanation for each question, after which he has the opportunity to answer the closed question in the explanation. This process is then repeated until all questions have been answered. The user then views the results that have been compiled based on the answers he provided. The user then receives input for the conversation with the team about the power dynamics in the group, in which the tool's results serve as input. The steps end with highlighting the goal to which the tool contributes, namely, improving cooperation in the team.

User question 6: What do you need to fill in the tool?

There are several essentials that the users of the tool must fulfil to use the tool successfully. These ‘necessities’ are presented to the user in the instructions, so they can prepare themselves for them before filling them in. The first necessity is that the user must be part of a team, and they must all fill in the tool. The second necessity is that the user must be open to discussing influence and power with the other team members. If the user is not open to this discussion, there is a greater chance that the user will start filling in the tool with preconceptions. This may result in contaminated answers and not be a good starting point for the follow-up discussion.

User question 7: What rules must be observed when filling in the tool?

The necessities lead directly to the user's rules when filling in the tool. These rules are highlighted as ‘Important!’ at the start of the third screen of the instructions. The two critical points given to the user here are that the answers should be given about him or herself relative to the other team members. This means that the user's answers always depend on the composition of the team the user is part of and with which the tool is being completed. Secondly, the user is reminded of the necessity of answering the questions truthfully. This instruction emphasises that the questions should be filled in based on facts, rather than the users' experiences. During the discussion of the

results, there is room for the team members to explain their experiences about the insights and answers and to discuss these.

User question 8: What information is available to help you answer the questions?

Users may need more explanation or an example while filling in the questions to help them find the answer that best fits their situation. Before answering the questions, users know the options to request information. This information is presented to give users more confidence before answering the questions. The steps towards completing the questions are mentioned again, and the possibilities for additional explanation are presented using the same icons as those found when completing the questions to create recognisability for the user.

The instructions have given the user insight into the importance of filling in the tool, how best to do this to maximise the tool's value, and how to provide them with confidence in filling in the tool so that the focus is on the content and not the use. The instruction results in practical guidance that helps the user complete the questions.

8.1.3 Question-specific explanation and examples

Before the tool user can enter a question, he is presented with an explanation, as visible in Figure 22. This explanation is written explicitly for the next question and appears before all questions. As for the design, a pop-up that covers the question is designed to present the question-specific explanation. This means the next screen, where the question is filled in, is partially visible. A pop-up to present question-specific information ensures the user intuitively links the information to the next question. It also encourages the user to click through to the question. This is expected to contribute to an increase in the completion rate of the following question.



Figure 22: Question-specific explanation

The structure of the explanation pop-up for all questions is the same, which ensures recognisability and certainty. The user sees the corresponding 'i' icon at the top of the popup. As explained earlier, the 'i' is used to indicate a piece of information. The user is already familiar with

the icon from the general instructions, so he can immediately recognise that it explains a question. The user is always presented with the information in the same order in the pop-up. The title is the subject of the question; the subtitle describes the definition of the subject so that the question is framed and can be completed in a targeted and objective manner by the user. The user is then shown the answer options and answer suggestions. The answer options are listed and contain information about the situation for which this answer option is best suited. This information guides the user to choose the answer that best fits their situation. After scanning the information, the user can easily navigate away to answer the question by choosing the 'cross' icon.

If the user cannot complete the question after reading the explanation, they can reread it or view a sample answer. As described earlier, these can be accessed via the 'i' for more information and the 'lamp' for a sample. If the user chooses the information, they will again be shown the initial explanation to review it. If the user chooses the example, they will see a pop-up with example answer options, as visible in Figure 23. The design and layout of the pop-up is the same as the design and layout of the pop-up with the question-specific explanation. At the top of the popup, you will see the familiar 'lamp' icon, which the user will recognise after reading the general instructions. The title tells the user which topic the example relates to. This is followed by an example situation in which the outline of a team of four people has been worked out. The key characteristics of the people essential to answering the question are included in the example and assigned to the team members. For example, for the gender question, the gender of the example team members is shown after their name. The example ends with the answer options that two of the four team members would choose when answering the question. The tool user can click away the example and return to the question to fill it in by clicking the familiar 'Cross' icon.



Figure 23: Example answers

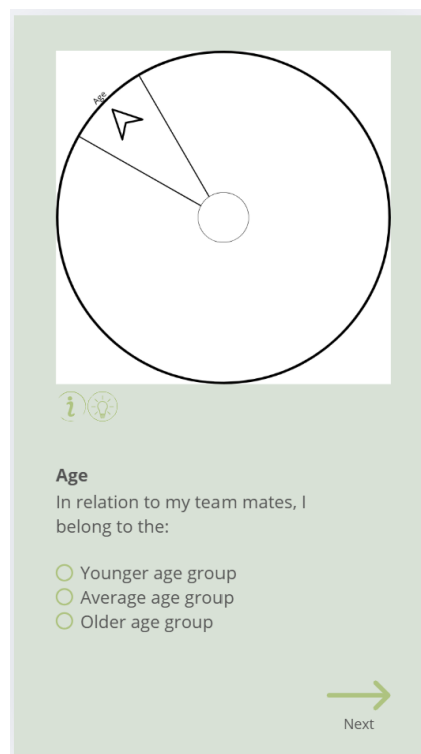
The examples given are fictitious and not based on an existing team. The same four people have been used to form the team in all examples. This again ensures recognisability for the users. In each example, two different answer options are developed, which means that the tool user is

more likely to relate to one of the two answer options, or neither of them, leaving the other option to choose. In addition, the same team was selected for each example so that the two example persons whose answer choices have been worked out can be included as an example in the results for testing the tool.

A concise description with examples has been chosen for both the explanation and the popup. This way, the tool's simplicity is maintained, even though the theory on which the tool is based does not allow for this. The tool should make it easier for users to discuss a complex subject. If the tool is complex, there is a greater chance that the user will give up on the power and influence while filling in the tool, which would have the opposite effect. In addition, the unambiguous and concise explanation is intended to encourage users to fill in the tool based on facts rather than experiences. Objectivity when filling in the tool is essential, while the conversation after filling in the tool discusses the experiences and opinions of the team members.

8.1.4 Question type 1: Demographic characteristics

After reading the introduction, general instructions, and the question-specific explanation, the user arrives at the first question in the tool. In total, the tool consists of 10 questions divided into two dimensions. Each question dimension has its own type of question. Question type 1 contains the questions regarding the dimension 'demographic characteristics'. The question type belonging to the dimension 'formal positions' is explained in chapter 8.1.5. The 'demographic characteristics' dimension consists of six single-choice questions that are all included similarly in the tool, of which an example is added in Figure 24. The topics about which a question is asked in this dimension are: gender, age, ethnicity, tenure, education, and functional background. These topics correspond with the factors that explain the horizontal differences between persons, as highlighted in chapter 2.5.2.



The screenshot shows a mobile application interface for a question. At the top, there is a large circular diagram with a smaller circle in the center and two lines extending from the center to the outer circle, forming a sector. Below the diagram are two icons: an information icon (i) and a lightbulb icon. The question text is 'Age' followed by 'In relation to my team mates, I belong to the:'. There are three radio button options: 'Younger age group', 'Average age group', and 'Older age group'. At the bottom right, there is a green arrow pointing right with the word 'Next' below it.

Figure 24: Example question type 'demographic characteristics'

All screens with questions about this dimension display a simplified version of the 'The wheel of managerial power' tool. As explained earlier, this image helps manage the user's expectations

about how long it will take to complete the tool and how many questions there will be. In addition, the image indicates the focus of the question. Using the icons familiar to the user directly below the picture, the user can easily navigate back to the explanation of the question or the example of the subject. The user then sees the subject of the question and directly below it, the question. The single-choice questions always have three answer options or categories, with one clear answer for each. As the type of question indicates, the users can select one answer option. The user selects the answer that fits their situation by clicking on the box next to one of the answers. All the controls associated with the questions are strategically placed at the bottom of the screen so that these buttons are easily accessible if the user uses the app via their phone. This also contributes to increasing the completion rate.

Only the essential information to answer the question is included on the screen with the question. Additional information about the question is included in the explanation or example described in chapter 8.1.3. The screen with the question is kept 'clean' to allow the user to focus on answering the question. Focusing on the purpose for which the user is using the tool and what he has to do on the screen is essential to lowering the threshold for filling in the question.

8.1.5 Question type 2: Formal position

After finishing all questions in the 'demographic characteristics' dimension, the questions in the 'formal position' dimension immediately follow. This dimension consists of four questions on the following subjects: formal role, ownership, expertise and prestige. These subjects correspond with those belonging to vertical differences presented in chapter 2.5.1. The user unnotices the transition from one dimension to the other. The two dimensions are not presented to the user. Knowing which dimensions the user will be sketched out by filling in the questions may be uncomfortable to the user because of the 'heaviness' of the subject, as was apparent from the test results discussed in chapter 5. As with the previous dimension, the user sees the question-specific explanation before all questions when arriving at the 'formal positions' questions. The question follows directly after this explanation, of which an example is shown in Figure 25.

Formal role
Compared to my teammates, I have:

The lowest formal role An average formal role The highest formal role

Next

Figure 25: Example question type 'formal position'

The screen layout with the question is the same as that with the questions in the previous dimension. The tool is at the top, focused on the subject corresponding to the question. The icons below the image provide access to the explanation and the example. This is followed by the topic and the specific question related to the topic. A question type other than single choice has been chosen for the questions belonging to this dimension. These questions are filled in using a slider, making it unnecessary to create predefined categories. The user is guided in filling in his answer by including the values of the slider's beginning, middle and end below the slider. This way, he can easily determine where he is on the slider when he compares his position with his team members. The question is answered by dragging the dot on the slider to the place on the slider where the user places themselves relative to the other team members. As soon as they release the dot, the answer is given.

An open question type has been chosen because the questions in this dimension are less suitable for division into 'boxes'. The questions are more nuanced, and the user's opinion and experience will shine more in the answers than in single-choice questions. Although this type of question does not guarantee the objectivity that single-choice questions are so good at, the subjectivity of the answers to these questions provides additional topics of conversation based on the results. For example, when a team member has filled in the questionnaire and explained that he believes he has no more power than the other members because of his role as director. In contrast, the other team members may think differently about this. Once the user has completed the last question in this dimension, the user has finished the questions in the tool. The user now chooses to go to the next step, namely viewing the results, by clicking the 'Arrow' icon.

8.1.6 Results and next steps

After filling in the questions, the user immediately sees their results. The results are presented to the user as portrayed in Figure 26. At the top of the screen, he can see that he has arrived at the results by the title of the page, namely 'Your results'. Then the completed wheel containing the user's results appears on the screen. The design of the results is recognisable to the user, as it corresponds to the accompanying images included with the questions. In the wheel, the user can immediately see what effect their characteristics have on the amount of power or influence he has in the team. The design of the results in the wheel form, as it were, is his power profile relative to the other team members. The presentation of the results in a form recognisable to the user ensures that he can concentrate on the content of the results. In addition, the results are presented concisely, and the interpretation of the results, which may differ between team members, can be discussed with the team.

The test results in the tool are based on the answers the user has given to the questions asked. The results form a user profile that can be read in 'The wheel of managerial power'. As soon as the user arrives at the results, he can see his profile at a glance and easily relate the answers he has given to the results because the themes of the questions are incorporated 1-on-1 in the wheel. Throughout the MVP, example situations have been used to guide the user in answering the questions. These example situations have been elaborated on based on the results of the example persons. In the prototype, the example results are characterised by the name of the fictitious team member.

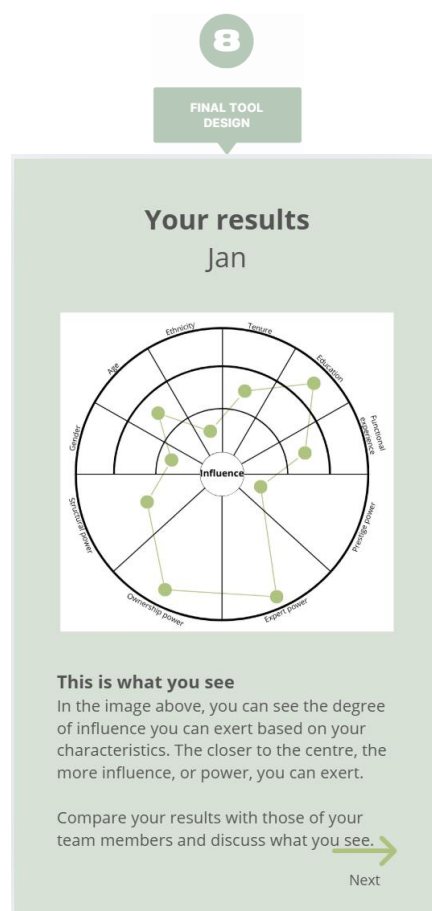


Figure 26: Example presentation of results

Below the image with the results, a short text supports the visual results. The text describes what the user sees in the image and discusses how the given answers have been translated into the user's profile. In addition, attention is paid to the interpretation of the results. A brief explanation of what the results mean is given. It is then up to the user and their team to determine whether the situation outlined by the tool is the case in practice within the team by discussing it. The screen with the results concludes by outlining the next step after all team members have completed the tool. Users are encouraged to work with the results by comparing the results of all team members. The user can then go to the next screen by choosing 'Next', which contains the accompanying questions for discussing the results with the other team members, which are added in Figure 27.

The tool's final screen offers users input for a discussion about power and the results of the tests that all team members have completed. Users are encouraged to engage in a dialogue with the team and are given several tools in the form of questions they can ask to bring out each other's interpretation of the results. The next step is to test whether the results correspond with what is happening in practice within the team. The tool also gets the team thinking about what to do after the tool and implementing the insights gained into an improved cooperation strategy. The proposed questions, therefore, mainly focus on formulating action points for the team based on the tool's results and the ensuing discussion.

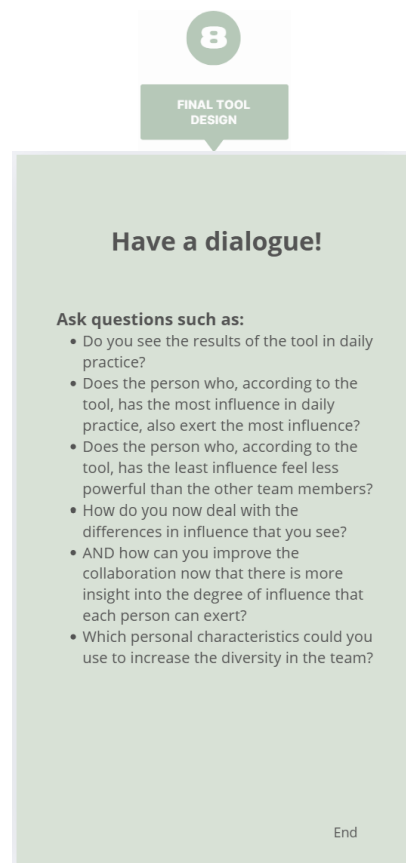


Figure 27: Example questions for discussion

8.2 The process of working towards equality

The tool is part of a larger process, a multi-step process that leads to improved collaboration based on data-driven choices, resulting in increased innovative capacity. Although the process has not been thoroughly researched and designed in this study, it can be broadly outlined with the results obtained. The outline of the process is included in this chapter. First, we will discuss what the process contributes and thus the advantages of following this process, after which we will discuss the steps in general terms.

8.2.1 Contribution & results

The results of the literature review revealed a dilemma, referred to in this study as the diversity/inequality dilemma, which describes how diversity in a team contributes to innovation capacity on the one hand, and on the other hand, contributes to inequality, which hurts the innovation capacity of a team. In an ideal situation, a team can create a perfect composition of people to drive innovation. In practice, this is often not possible. The solution is to work together according to a strategy that overcomes the adverse effects of the diversity/inequality dilemma by not acting from a power point of view. The results of chapter 7 suggest that highly innovative companies can overcome these power dynamics naturally, resulting in a high degree of innovation. For less innovative organisations, there is the possibility of gaining value in the area of cooperation because the composition of team members in the team is not optimal for innovation, and the associated cooperation strategy cannot overcome the adverse effects of the dilemma. Working towards equality for innovation is valuable for organisations in this second category. The result of completing the process with the TMT is an understanding of the distribution of power among the individuals in the team based on their demographic characteristics and formal positions, based on which the team can have a substantive discussion about power and influence and ultimately work towards a collaborative strategy in which decision-making is not based on power, but on knowledge.

8.2.2 Process steps

The process consists of four phases or steps. The first and perhaps most important phase is the phase of **recognition**. This means that the team, or the team leader, recognises that the power dynamics in the team may negatively influence the innovative capacity of the team and the organisation. The results of test 1 in chapter 5 suggest that to increase the tool's value, users must be aware of what is going on in the team to recognise the dynamics and act on them. All team members must also be open to discussing power differences and distribution in the team, which, according to the participants, is a complex topic of conversation. Before all team members completing the tool, which would be step two of the process, it is therefore imperative that all team members recognise that power dynamics play a role in the team and that they are all open to discussing power and changing the cooperation strategy to overcome the adverse effects of the diversity/inequality dilemma.

As soon as the decision has been made to address the diversity/inequality dilemma in the team, the team can **use the tool**. All team members will use the tool as described in chapter 8.1. The result is an understanding of the team's power dynamics based on the team members' characteristics. A direct translation of the diversity/inequality dilemma has been made, giving the team the input to address and overcome it directly. As already stated, the tool is not an end but a starting point for **discussing** power in the team. During the second test, the suggestion was made that involving a discussion leader during this process step could have a significant positive influence and added value. The independent discussion leader should ensure equality between the team members during the discussion. The goal of a discussion leader is to take the power away from the most powerful person in the team during this discussion and to ensure that power does not play a role in the debate. This discussion leader must guard the open culture to increase the value of the tool's results and the discussion. This suggestion, however, has not yet been elaborated or validated.

The discussion leads to a conclusion and possibly to action points for the team that improve cooperation to promote innovation. The conclusion focuses on the possible presence of power differences and the impact of power dynamics on collaboration in the team. Suppose the conclusion is drawn that this negatively influences the cooperation between the members, thus impeding innovation. In that case, the team can take action based on the input the tool's results provide. The deliverables of the entire process are then: insight into the power dynamics in the team, distributed among the team members and based on their demographic characteristics and formal positions, a conclusion of the influence of the distribution of power within the team on the cooperation and innovation, and finally an adjusted cooperation strategy aimed at overcoming the diversity/inequality dilemma by acting less power-oriented, but by making decisions based on knowledge of the team members.

-- END OF STUDY PHASE 2 --

9 Discussion, contribution and conclusion

This study started from the observation that the influence of a single TM on innovation is not only dependent on individual willingness and/or ability to influence but rather on the scope of influence bestowed on the single TM. Therefore, Sperber (2021) suggested that the process of decision-making within the TMT and the allocation of decision-making power needed to be addressed further (Sperber, 2021). This study contributed to the literature on TMT composition and power dynamics by exploring and creating a deeper understanding of the characteristics of TMS and the composition of these characteristics of an innovative top management team. Additionally, this study examined the relationship between TMT demographic characteristics, power distribution, and collaboration strategies in organisational innovativeness while also developing and validating a practical tool, 'The wheel of managerial power', to facilitate discussions on power dynamics within teams. The research comprised two data collection and analysis phases: theory deepening and tool validation through qualitative interviews with top managers of highly innovative firms, tool refinement using a design thinking approach, and testing with top managers from various organisations. The results of the literature review showed that while diversity in TMT demographic characteristics can enhance innovativeness (Wang et al., 2022; Bunderson & Van der Vegt, 2018), it simultaneously creates power imbalances (Smith et al., 2006) that can hinder effective decision-making (Greer et al., 2018), leading to the central dilemma that this study contributes to overcome. While Gschmack et al. (2015) study that a higher degree of demographic diversity is the key to better organisational outcomes, such as innovation, the results reveal a nuance (Gschmack et al., 2018).

The study's results suggest that diversity in TMTs of highly innovative organisations occurs mainly when considering the managers' functional and educational background rather than focusing on demographics such as age, gender, and ethnicity, showing significant similarities (Bantel & Jackson, 1989). Thus, the TMTs of highly innovative organisations interviewed during the study focus mainly on diversity in professional background when composing the TMT and placing less value on diversity in personal background. These outcomes are similar to the findings of Simons et al. (1999), whose study revealed that there was no direct correlation found between heterogeneity in shallow-level factors (such as gender and age) and innovative performance, while heterogeneity of deep-level factors (such as career experience and education background) does reveal a positive correlation with organisational innovativeness (Simons et al., 1999; Wang et al., 2022). In addition, this result shows a deviation from Social Identity Theory, which suggests that TMT member identity heterogeneity increases the likelihood of conflicts, resulting in lower efficiency (Wang et al., 2022), by revealing that while being diverse, experiencing little or no conflict, and these disagreements are even treated as valuable. The theory from Wang et al. (2022) was not empirically tested. It did not assume mediating variables like collaboration strategies, as this study did, which may have caused the inconsistency with the results of this study.

Unexpectedly, the study's results suggest that, while composing the TMT of an innovative organisation, a manager's attitude and personality are seen as equally important as their demographic characteristics, if not more important. The conversations with the participants revealed that the managers in the TMT of highly innovative organisations included in the study have an inquisitive and proactive attitude towards innovating. Because of this insight, and in comparison to Sperber's hypothesis, this research calls for an addition to the comprehensive framework by capturing the relationship between the manager's attitude and organisational innovativeness. This deviation between the results may have occurred because Sperber established the framework using a literature review. At the same time, this study sought deeper

insights by speaking to subjects through a qualitative approach and uncovered additional insights. Opposite to the assumption from the Upper Echelons Theory that power is equally distributed among members of the TMT (Hambrick & Mason, 1984), the results reveal power differences among members of the TMT of the researched organisations.

The study results show that members of these teams are not identical when considering managers' formal roles, ownership, expertise or prestige level. This study's results strengthen prior research that found a complex and dynamic power structure within TMTS (Schulze et al., 2001), meaning that power is unequally distributed (Peng & Ma, 2018). In line with the hypothesis that demographic diversity could lead to inequality, the study's results reveal that the examined TMTS experience power inequality among the members of their team, which can partially be explained by the demographic diversity of their members (Bunderson & Reagans, 2011; Bunderson & Sutcliffe, 2002). However, the main finding about diversity and inequality challenges the theory of Bunderson and van der Vegt (2018) (Bunderson & van der Vegt, 2018). The study's results show that the interviewed top managers of highly innovative organisations do not act from a power point of view but from a knowledge or expertise point of view, trusting each other's professionalism. Indeed, according to interviewees, power does not play a role; it is more about ownership over a problem, task, or solution, which comes with a certain degree of influence and responsibility. The results, therefore, show that, in an innovative environment, influence in decision-making must come from knowledge rather than from characteristics such as formal role, age or ownership. This result aligns with previous research stating that a team member must have enough power to influence the process with their experience and knowledge (Bunderson, 2003; Buyl et al., 2010). In other words, knowledge must give a team member the power to convince others. To interpret this result, it is crucial to consider the context of the collected data. The participating organisations are all Dutch. The Netherlands is recognised as a knowledge-based economy. In The Netherlands, intellectual capital is seen as an essential measure of organisational functioning and a source of power (Thelen, 2019). The emphasis on knowledge as a power source may differ from other countries, where functional roles or formal hierarchy may be more significant determinants of power within TMTS. Therefore, the finding that 'knowledge is power' in innovative Dutch organisations aligns with the expectation, but it might limit the generalisability to different contexts.

Contrary to the hypothesis that power inequality negatively affects an organisation's innovation ability (Iglesias, 2023), the surveyed organisations are known for their innovative performance while experiencing power differences. This result adds nuance to Buyl et al.'s (2010) theory that power inequality leads to inefficient processes (Buyl et al., 2010), showing that power inequality does not always harm an organisation's innovative performance. Examining these results raises the following question: What do these highly innovative organisations do that prevents the adverse effects of power inequality from being reflected in their performances? The findings of this study answer the question by gaining insights into the collaboration strategy of these TMTS. The results hypothesise that there is a correlation between TMT collaborative performance and organisations' innovativeness. More so, the results suggest that the ability to collaborate is an important measure to include alongside demographic diversity to predict organisational innovativeness, which cannot be overlooked. This result has many commonalities with the theory of equitable collaboration, which explains how the partnership of the included TMTS is characterised by trust, openness, equality, and mutual respect and is an effective partnership (Davies & Marmot, 2019).

Findings suggest that highly innovative organisations adopt unstructured collaboration strategies to mitigate the adverse effects of power disparities and optimise team effectiveness using collaboration (Smith et al., 2006; Wang et al., 2022). The strategies include cooperative principles, such as trust and openness, and the structures under which decisions are made based on mutually agreed goals and acting from a sense of ownership, leading to strategic consensus. Even this expertise of knowledge mainly gives power in the included sample, rather than formal roles or prestige having a significant share in the degree of influence a person can carry out. The results suggest that the person with the most knowledge of the specific field has the most impact in deciding the topic. The strategy is based on a person's responsible attitude towards the team and the sense of accountability this person has for their role. All together, these principles foster a collaborative culture where innovation can develop.

Where the studied innovative organisations seem to have mastered overcoming the negative impact of power inequalities through collaboration strategies, less innovative organisations might not. This is also where the value of the designed tool is added by exposing power distribution within a team, after which the team can overcome the inequalities by forming a collaboration strategy. The tool is based on existing literature. By synthesising this literature into one tool, the tool provides a comprehensive view of the elements of power within a team that contributes to understanding the literature, but also contributes to practice by making power more discussable within a team, as revealed by the validation study. The main finding from the tool validation in phase 1 confirmed that 'The wheel of managerial power' effectively initiates discussions on power dynamics, indicating that the tool can be used in practice for the purpose for which it was developed. The results also reveal that the tool is not independently usable for teams. The tool validation in phase 1 showed that the tool required additional instructional elements to improve independent usability. This aligns with prior findings that clear facilitation in team-based assessments is necessary (Nielsen, 1994; Lazar et al., 2017). The results from phase 1 served as input for the tool refinement in method phase 2. This tool-refinement process produced a prototype of a new tool design, focusing on the feedback's central themes: clarity, independent use and safety. The main findings of the prototype test in phase 2 of the study were that the tool's design is improved so that clarity and independent use are improved, but safety remains an issue. The results in this phase indicate that the tool design is suitable for independent use by teams in practice. The clarity in the explanation that is added to the tool's first design and the simplicity of the design have contributed to this improvement.

9.1 Practical implications

The TMT composition is crucial in driving innovation effectively. (Sperber, 2021). Top managers are among the most decisive shapers of all innovation concerns within the organisational context (Daellenbach et al., 2002; Sperber, 2021; Wong, 2013). Team power distribution is among the most influential factors in explaining top managers' influence on organisational innovativeness (Sperber, 2021). The study's results contribute on several levels to confirm and nuance existing theories on team diversity and power distribution regarding organisational innovativeness.

For organisations aiming to be innovative, the results suggest that it is essential to compose a TMT while focusing on deep-level diversity, which is diversity in functional backgrounds and educational backgrounds of the managers, instead of driving diversity in shallow-level demographic factors such as age, gender, or ethnicity. Additional insights reveal that a team member's approach to innovation and collaboration might be as crucial for driving innovativeness as the person's characteristics. When recruiting and selecting employees, the organisation would benefit from assessing the person's mindset and attitude regarding innovative TMT. Another pitfall

might be focusing too much on diversity in characteristics or the team's attitude and neglecting the decision-making structure within the team. The study results suggest that in the ideal situation for innovation, power is evenly distributed among all members of the TMT. If this is not a natural distribution, the team can exert influence by adopting an appropriate attitude and promoting a collaboration in which core values such as trust and knowledge sharing are of great importance. To help the TMTs understand how decision-making power is distributed among their team members, 'The wheel of managerial power' is designed. Besides the study's key contribution to theory, this study holds significant practical implications, mainly through designing the earlier-mentioned tool. The tool translates the strong theory-based insights for the literature review into an actionable strategy for teams to analyse power dynamics and improve collaboration by overcoming the negative impact of power. This bridges the gap between research and real-world application. For TMTs wishing to foster innovation by enhancing the collaboration strategies in the TMT, it is advisable to integrate the tool when strategic discussions are held. The tool allows management teams to start having structured conversations about power distribution in their team. Given that power is always relative to other social actors, such as other team members (Pfeffer, 1992), the added value is its ability to serve as a practical intervention to discuss someone's ability to influence others (Pfeffer, 1992), fostering awareness. The tool's results are the most effective when used proactively. The goal is to assess and rebalance the power dynamics rather than to solve conflicts and issues in the team. In the latter situation, the potential for a closed, unsafe psychological environment is higher. This is a significant pitfall of the tool because power, as highlighted in the test results, is a sensitive topic. Teams should ensure that all members feel safe and comfortable sharing their perspectives and contributing to the conversation about power dynamics. Therefore, using an external facilitator to ensure equality in the discussion might be preferable. This leads to the following advice on the tool's usage: not using the tool's output as a result but as input for a constructive discussion that improves the collaboration strategy.

9.2 Limitations and future research

The study's results offer valuable contributions to theory development and practice, but also have limitations. First, the study focused on part of Sperber's comprehensive framework, where the analysis does not include the mediating factor 'network dynamics'. The study focuses on the direct effect of the TMT on organisational innovativeness, which can be directly explained by assessing the demographic characteristics and TPD while excluding factors mediating the direct relationship between TMT influence and organisational innovativeness. The study's ability to capture the entire interaction between diversity and power dynamics on organisational innovativeness is limited since the study focuses on part of Sperber's (2021) comprehensive framework. Future research should explore these network interactions for a more holistic understanding of TMT's influence on innovation.

Then, the study focused on measuring the observable demographic characteristics, excluding psychological and behavioural factors. The results strongly indicate that attitude and personality significantly impact team innovation. Future research could address this gap by integrating psychological perspectives into the study of TMT characteristics and innovation. Further research results in a more nuanced understanding of how TMTs manage power and decision-making (Edmondson, 1999). Another consideration is the role of privilege and homogeneity among the sample and their team. The possibility that power did not emerge as a strong challenge in this study is that the participants primarily belonged to similar socio-economic backgrounds (Kanter, 1977). Valuable future research would explore the role of power distribution in a more diverse

context where gender or ethnicity vary. Additionally, the managers involved show little reflective attitude, and the completed tools show that these managers have a high degree of influence within their top management teams. The managers interviewed may, therefore, be biased, so objectivity cannot be guaranteed. Further research could focus on a sample involving an entire management team, reducing the managers' subjectivity.

Furthermore, the method of research has its limitations. First, while a sample of five participants captures up to 85% of the unique results (Knapp et al., 2016), the relatively small sample size that focused on highly innovative organisations in The Netherlands may have limited the generalizability of the findings. While the results show a certain degree of saturation in the main factors, the context-dependent factors, which add nuance to the results in general, require in-depth research. This is because the results of the research show many situation-specific differences. A subsequent study that includes a larger sample size across different countries and that focuses on explaining the context-dependent factors could offer a broader understanding of how power dynamics and collaboration strategies impact innovation (Guest et al., 2006). The decision to include only highly innovative organisations in the study may have suggested that power differences play a less significant role in decision-making, as these firms already have a strong collaboration strategy that benefits innovation. Comparing highly innovative and less innovative organisations would assess whether power inequalities are more or less present in different contexts.

Additionally, while the approach to data collection of only doing virtual interviews in phase 1 ensured inclusivity, it may have resulted in the interviews lacking the nuances of in-person interactions. In-person interviews would positively affect the richness of the data (Brinkmann & Kvale, 2015) of future studies. Second, while the qualitative research design of the study effectively generated highly informative data, it did not allow for statistical generalisation (Creswell & Creswell, 2018). Further quantitative research could quantify the identified impact of diversity and power dynamics on innovation. Lastly, the design sprint methodology in phase 2 has its limitations. For example, when using a design sprint, strict time constraints limit the deep exploration of concepts, unlike the traditional design thinking approach, where time is less of a pillar (Knapp et al., 2016). On the other hand, the sprint approach led to quick solutions for the received feedback, in which user validation remains highly important because of the rapid iterations. In contrast, when using traditional design thinking, continuous user engagement with the prototype and in the iterations might lead to even more user-focused solutions (Brenner & Uebernickel, 2016). Because of the limitations, the prototyping and testing stages could benefit from additional iterations to increase the tool's effectiveness (Brown, 2009; Liedtka, 2015).

9.3 Conclusion

In the context of highly innovative organisations, TMTs must balance demographic diversity and power distribution to drive innovation effectively. Prior research suggested that demographic diversity enhances organisational innovativeness but also contributes to creating power imbalances between the managers in the TMT that have the potential to negatively affect decision-making, leading to the diversity/inequality dilemma. The study's first phase indicates that these highly innovative organisations prioritise functional and educational diversity over diversity in demographic characteristics such as age, gender, and ethnicity. This finding is consistent with the notion that deep-level diversity, as opposed to shallow-level diversity, exerts a more pronounced positive influence on team performance, as previously theorised. Contrary to the prevailing assumption that inequality inherently leads to conflict, the results of this study demonstrate that these TMTs encounter minimal interpersonal conflict and instead leverage

diverse expertise to drive innovation, suggesting these innovative organisations have found a strategy to overcome the diversity/inequality dilemma, in contrast to organisations that are not necessarily described as innovative. To minimise the adverse effects of the dilemma within non-innovative organisations, an intervention was implemented by way of the development of a tool, 'The wheel of managerial power'. This tool was designed to facilitate discussions on power dynamics within TMTs. The first tool's test suggested that it effectively revealed the power distribution in a team. On the other hand, the participants required instructional support from the interviewer to fill in the tool. This suggests that the tool is not yet independently usable.

In study phase 2, the tool was redesigned using a design thinking approach. The participant feedback from the first test enhanced the tool's clarity, usability, and psychological safety in the second iteration. The redesign significantly improved stability. Participants also confirmed its potential for practical application in TMTs. Innovative organisations strive to eliminate power inequalities that may obstruct innovation. They implement structured collaboration strategies to manage power distribution within teams effectively. The interviewees highlight the importance of expertise-based influence. In the studied organisations, decision-making power is divided based on knowledge. Thus, team members' sense of ownership and accountability is high, which leads to independence. The study also highlights the significance of psychological safety when discussing power dynamics within top management teams. While the improved instructional design increased user-friendliness, participants expressed concerns about the open attitude required for discussing power dynamics. These comments underscore that the process and tool refinement are needed for constructive and inclusive power conversations, which could be an area for further improvement. This study offers a nuanced theoretical perspective on how TMT composition and power distribution influence organisational innovativeness. The findings suggest that structured collaboration strategies are essential for balancing power dynamics to increase organisational innovativeness. Openness and trust are crucial for effective decision-making that drives innovation. Additionally, The wheel of managerial power encourages transparency in power dynamics, offering valuable insights for management teams aiming to enhance discussions about power.

In conclusion, the study's findings suggest that the composition of TMTs and power distribution significantly influence organisational innovativeness. Understanding how diversity and inequality play a crucial role in fostering organisational innovativeness is deepened. The results suggest deep-level diversity is more significant in promoting innovation than shallow-level diversity. Additionally, the results challenge existing literature by showing that power inequalities do not inherently harm innovation. Instead, power differences and innovating can coexist when teams adopt collaboration strategies grounded in trust, openness, and knowledge-based influence. Thus, the study introduces a more nuanced view on how diverse TMTs can innovate by overcoming the diversity/inequality dilemma through adopting the suggested collaboration strategy. The wheel of managerial power is received as a practical solution for addressing the diversity/inequality dilemma within TMTs by mitigating power differences. Using the tool enables organisations to promote equal decision-making power, which improves the driving of innovation.

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