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Beyond Physical Proximity: The Moderating Role of Working from Home on Social Networks and Intrapreneurship

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Abstract

Intrapreneurship, the act of entrepreneurship within established organizations, offers a tool for navigating markets and achieving growth. Social networks are well-documented as facilitators of intrapreneurship by fostering collaboration and knowledge sharing. However, the recent shift towards working from home (WFH) has introduced new dynamics that may moderate the relationship between social network diversity and intrapreneurial behavior. This study investigates how WFH influences the way employees utilize their social networks to engage in intrapreneurship. We employed a quantitative approach through a cross-sectional survey distributed to 60 employees in the ICT department of a Dutch hospital. Hierarchical multiple regression analysis revealed no significant relationship between network diversity and intrapreneurial behavior. Additionally, WFH did not moderate this relationship. Our findings challenge existing theories and suggest organizational context is crucial. This study contributes to a more nuanced understanding of how social network diversity influences intrapreneurial behavior within organizations. We argue that the influence of WFH on network diversity and intrapreneurship warrants further investigation across different organizational contexts to develop a more comprehensive understanding of its dynamics. Additionally, the findings of this study showed that network diversity is positively related to risk propensity.

Keywords: Intrapreneurial Behavior, Network Diversity, Working From Home, Remote Work, Organizational Context

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1. Introduction

The concept of intrapreneurship, which refers to entrepreneurship within an organization, can offer established organizations a tool to navigate the market and grow their businesses (Antoncic & Hisrich, 2001). While established companies benefit from economies of scale and brand recognition, their very size can lead to inertia (Shimizu & Hitt, 2005). Unburdened by complex procedures and legacy systems, startups can adapt quickly and respond to emerging market needs. This allows them to carve out specialized niches and become leaders in specific areas. Organizations that cling to traditional methods risk being left behind by agile competitors who embrace new ideas and seize emerging opportunities. A study by McKinsey showed that in the late 1970s organizations in the S&P500 index had been there for approximately 35 years on average, while in 2019 the average time of organizations being listed was closer to 20 years (Hillenbrand et al., 2019). Performance crises can trigger organizations to embrace intrapreneurship as a strategic response (Kuratko, 2010). For organizations to survive or achieve long-term growth, it is essential to remain innovative, and fostering strong internal social networks can be a key driver of intrapreneurship by facilitating collaboration, knowledge sharing, and the exchange of ideas necessary to bring new ventures to life (Baer et al., 2015; Perry-Smith, 2006; Sosa, 2010).

During the COVID-19 pandemic, many organizations were encouraged by governments to reduce physical contact by working from home (WFH) (Yoo & Managi, 2020). The measures implemented by governments heavily impacted the ways in which employees work (Hadjielias et al., 2022). While the pandemic has now eased, the effects of the pandemic are still present. Research by Bloom (2021) showed that 70% of interviewed organizations (e.g., Apple, Google, and Citi) plan to implement hybrid working to let employees combine working on-site and working from home. Bloom also found that, even after the COVID-19 pandemic, most employees with children under 12 would prefer to work

2 to 4 days from home. Remote working has grown as a new mode of work and organizations are increasingly implementing it. In the field of intrapreneurship, many studies have found that employees' social networks influence intrapreneurial behavior (e.g. Baer et al., 2015; Kelley et al., 2009; Sequeira et al., 2007). WFH causes the collaboration networks of employees to become more static and isolated, which affects their social networks (Yang et al., 2022). When working from home, employees do not run into each other during lunch breaks or while simply grabbing a coffee, which can pose a higher barrier to contacting other colleagues (Jämsen et al., 2022). Moreover, the efficacy to transfer information varies across different communication media and people are communicating via other media when WFH (Daft & Lengel, 1986). Therefore, the shift to WFH may alter the efficacy of social networks in fostering intrapreneurial behavior.

Current literature has extensively explored the role of social networks in facilitating intrapreneurial behavior, highlighting how access to diverse and non-redundant knowledge can spur innovation (Baer et al., 2015; Burt, 1992). Moreover, having diverse connections can be effective in accessing scarce or limited resources (Baer et al., 2015; Rodan & Galunic, 2004). The diversity in social networks can provide employees with several benefits. However, maintaining network ties does come at a cost (Burt, 1992; Hansen, 1999). Although in current literature the impact of employees' social networks on intrapreneurship has been studied, the context of WFH introduces new dynamics that have not been fully examined. Remote working changes how colleagues collaborate and communicate. For example, the communication media used by people working from home, such as email and video/audio calls, are less suitable for conveying and processing complex information compared to face-to-face communication while working on-site (Yang et al., 2022). Since the COVID-19 pandemic, considerable research has been conducted on WFH. However, the potential impact of WFH on the relationship between individuals' social networks and

intrapreneurship has not received enough attention yet. This triggers the need for further research.

This study aims to examine how the shift toward WFH influences the relationship between network diversity and intrapreneurial behavior within organizations. This involves exploring whether WFH facilitates or hinders employees' utilization of social networks to engage in intrapreneurship. We employed a quantitative approach through a cross-sectional survey distributed to employees in the ICT department of a hospital in the Netherlands. We utilized validated scales to assess intrapreneurial behavior and controlled for several potentially influential variables. A hierarchical multiple regression analysis was conducted to test the hypotheses, examining the independent and interactive effects of network diversity and WFH on intrapreneurial behavior.

The results of our study present an intriguing contrast to existing theories, which often suggest positive relationships between network diversity and intrapreneurial behavior. Firstly, our results challenge previous research that indicated that diverse networks can catalyze creativity and innovation by exposing individuals to varied knowledge and perspectives (Perry-Smith & Shalley, 2003; Rodan & Galunic, 2004). Our findings challenge the universality of this relationship, particularly within organizational contexts that emphasize established procedures and structured protocols. Secondly, the study unveils a non-significant moderating effect of WFH on the relationship between network diversity and intrapreneurial behavior. We attribute this non-significance to the contextual nuances within our research sample, where WFH dynamics might interact differently with network diversity compared to other organizational settings. Despite the widespread adoption of WFH, its influence on network dynamics and intrapreneurship remains understudied, emphasizing the need for nuanced examination in various organizational contexts. Lastly, the findings highlight a positive association between network diversity and risk propensity, suggesting that being part

of a diverse network enhances individuals' willingness to take risks, irrespective of specific central positions within the network. This insight expands our understanding of how social networks influence decision-making processes and underscores the importance of network diversity in fostering risk-taking behaviors (Perry-Smith & Shalley, 2003).

2. Literature Background

2.1 Intrapreneurship

Intrapreneurship is defined as entrepreneurship within organizations and it refers to an ongoing process in organizations that foster the creation of new ventures as well as other innovative activities such as the development of new products, services, technologies, administrative techniques, strategies, and competitive postures (Antoncic & Hisrich, 2001). In the highly competitive market of today, intrapreneurship is increasingly being recognized as a means to achieve better performance (Neessen et al., 2019; Zahra, 1991).

Intrapreneurship as a strategy has been employed for many different reasons, including achieving better profitability. According to Elfring (2005), organizations try to foster intrapreneurial behavior as a part of their strategy to gain and maintain a competitive advantage. Creating an environment where employees can behave entrepreneurially is essential for organizations to retain their innovative edge. For corporations to adopt a corporate entrepreneurial strategy, it is essential to carefully cultivate entrepreneurial mindsets among their employees (Kuratko et al., 2023).

Intrapreneurship can be illustrated as a process with multiple steps (Kuratko, 2010). The first step is a transformational trigger, which causes executive management to pursue an intrapreneurship strategy. Such transformational triggers include environmental factors like hostility, dynamism, and heterogeneity, as well as specific events such as management changes, mergers, technological advancements, shifts in consumer demand, and economic fluctuations (Kuratko, 2010; Zahra, 1991). As a response to a transformational trigger, an intrapreneurship strategy can be chosen, which consists of a set of commitments and actions that are framed around intrapreneurial behavior to gain competitive success (Ireland et al., 2003). Kuratko (2010) highlights the importance of fostering both induced and autonomous strategic behavior within organizations to effectively leverage intrapreneurship for competitive success.

It is important for organizations that want to be entrepreneurial, that they excel in the dimensions that characterize intrapreneurial behavior, and past research has found many antecedents of intrapreneurial behavior. Some important internal organizational factors that influence intrapreneurial behavior include appropriate reward systems (Antoncic & Hisrich, 2001; Hornsby et al., 2002), organizational structure (Dess et al., 1999), culture (Brazeal, 1993), and CEO ideology (Chin et al., 2021). While these factors are internal and can be influenced by an organization's management team, there are also external factors that relate to the environment in which the organization operates. These include environmental hostility (Zahra & Covin, 1995), technological opportunity (Zahra, 1996), and demand conditions (Narayanan et al., 2009).

Intrapreneurial behavior is the most important step in the intrapreneurship process presented by Kuratko (2010). Organizations with entrepreneurial attitudes are opportunistic and willing to take on high-risk projects with chances of very high returns. Intrapreneurial behavior was found to be characterized by three dimensions: risk-taking, innovativeness, and proactiveness (Covin & Slevin, 1991). Later, two more dimensions were identified; autonomy and competitive aggressiveness (Lumpkin & Dess, 1996). These five dimensions do not only characterize intrapreneurial attitudes on an organizational level but they can also be considered as reflections of intrapreneurial behavior on an individual level. Clark et al. (2023) argue that intrapreneurial behavior on an individual level embodies the conceptualization of intrapreneurial behavior on an organizational level. Although the field initially studied intrapreneurship on an organizational level, a lot of research has been conducted on an individual level as well (Clark et al., 2023; Covin & Lumpkin, 2011; Lumpkin & Pidduck, 2021). A combination of research on intrapreneurship on the individual level combined with organizational level research deepens our understanding of intrapreneurship within organizations.

The last step in the intrapreneurship process consists of the outcomes of intrapreneurial behavior (Kuratko, 2010). Outcomes on the individual level can be evaluated based on subjective measures like social recognition or on objective measures like monetary rewards or promotion. Organizational-level outcomes are assessed through financial and behavioral criteria, with success measured by factors such as increased sales, productivity, and innovation (Kuratko, 2010). Positive outcomes at both levels reinforce the continuation of intrapreneurial behavior and its integration into the firm's strategy for sustained competitive advantage. Research by Kuratko et al. (2005) provides empirical support for the relationship between environmental antecedents and outcomes, highlighting the significance of management support, work discretion, and rewards in fostering intrapreneurial behavior and organizational success.

Research in the field of intrapreneurship initially focused mainly on organizational-level factors to affect intrapreneurial behavior. However, as the body of knowledge expanded, researchers also started studying the role of individual-level variables in driving intrapreneurship within organizations. Many different individual-level factors that influence intrapreneurial behavior have been identified since then. Some psychological traits include perceived managerial support (Wu & Parker, 2014), self-efficacy (Sequeira et al., 2007), risk propensity (Fellnhöfer et al., 2017), and proactivity (Glaser et al., 2016). This research will focus on intrapreneurship at the individual level.

2.2 Social Network Effects on Intrapreneurial Behavior

Social networks encompass the connections and interactions between individuals or groups, shaping the flow of information and resources within a system (Nahapiet & Ghoshal, 1998). These networks serve as conduits for accessing both actual and potential resources, forming the foundation of social capital (Brass et al., 2004). Within social networks,

investments in social connections cultivate goodwill, characterized by elements such as sympathy, trust, and forgiveness, which in turn facilitate the exchange of information, influence, and support (Adler & Kwon, 2002). In organizational contexts, social networks play a crucial role in transferring knowledge within and between teams. Maintaining relationships with employees in other departments of teams can give access to information that otherwise was not available. Therefore, social networks can give access to novel and diverse information and also enable employees to exchange this information, for example about job opportunities or industry trends. Social networks foster trust in organizations, which is essential because it determines the reliability of information exchanged and the extent to which contacts look out for each other's interests (Burt, 1992).

A network tie represents a relationship between two individuals through which information can flow and tie strength represents the quality of the connection. The strength of an interpersonal tie comprises the amount of time, the emotional intensity, the intimacy, and the reciprocal services that characterize the tie (Granovetter, 1973). Repeated interactions of longer duration strengthen relationships and facilitate dyads to become more efficient in exchanging complex information; additionally, individuals who interact frequently over extended periods are more inclined to feel obligated to maintain the relationship and reciprocate favors (Baer et al., 2015). Strongly tied networks tend to be dense networks of similar individuals, where most of the actors have some type of connection to one another (Granovetter, 1973). Dense networks can be inefficient in that individuals in the network know the same as the other people in the network know, which leads to discovering the same opportunities at the same time (Burt, 1992). Although strong ties can be inefficient because of the amount of redundant information, several researchers have found that strong ties are also beneficial for innovation because of the benefits strong ties provide for coordination and support (Baer et al., 2015; Kijkuit & van den Ende, 2010). As opposed to dense networks,

sparse networks consist of weak ties and such networks provide more information benefits as the information there is more diverse (Burt, 1992).

According to structural holes theory from Burt (1992), intrapreneurship is limited in dense networks due to a lack of non-redundant information. In such networks, there are often several clusters of specialized individuals who are connected through bridges—individuals who link otherwise unconnected groups (Burt, 2004). Burt calls network positions where two clusters are not connected structural holes and individuals that occupy this position are called brokers. People in sparse networks communicate with colleagues who do not directly communicate with each other, so they occupy the structural holes in the network and brokerage is high in this situation. Burt (2004) argues that individuals who occupy strategic positions bridging structural holes have access to diverse sources of information and they can control the flow of information, which gives them the advantage of accessing novel ideas and exerting influence over the network. He found that “people whose networks occupied structural holes were more likely to express an idea and to discuss it with colleagues, have the idea engaged by senior management, and have it judged valuable”. Therefore, people in brokerage positions are more likely to be creative and generate new ideas (Burt, 2004; Fleming et al., 2007).

In contrast to sparse networks with high brokerage, another network characteristic to consider is closure. Network closure can be defined as the extent to which employees invest their time and energy into a single group of closely connected colleagues (Burt, 1992). Network closure is high in small networks where employees are strongly connected to each other (dense networks). According to Obstfeld (2005), individuals in dense networks may be more prone to conformity, potentially hindering the sharing or introduction of new ideas. Coleman (1990) further argues that closed networks can cultivate strong social norms, potentially discouraging individuals from taking risks associated with proposing or

implementing new ideas. Although strong ties can have advantages for innovation, network closure has negative effects on innovation (Baer, 2015).

More recently, scholars have found that people in different positions in a network can leverage their positions in different ways. Rhee and Leonardi (2018) found that in highly dense networks, individuals can generate valuable ideas by selectively focusing their attention on information shared by specific ties, enabling them to thoroughly examine and interrogate information, thus fostering the generation of innovative ideas. He argued that focused attention is a cognitive alternative to structural holes when employees are not in brokerage positions. Further, closed networks are found to be beneficial not for the creation of ideas, but not for the implementation of ideas (Obstfeld, 2005). Carnabuci and Diószegi (2015) found that cognitive style moderates the effect of social networks on intrapreneurial behavior, where people with an adaptive cognitive style benefit from networks with many structural holes, while people with an innovative cognitive style benefit from closed networks. Although closed networks can provide benefits compared to open networks, there is broad consensus in the literature that occupying a brokering network position has an overall positive effect on individuals' innovative performance (Burt 2005). Though researchers have shown that employees can compensate for a lack of non-redundant information, employees in closed networks are not able to reach exceptional levels of individual innovation (Breet, 2022).

Beyond the network structure itself, the diversity of people within a network can also influence intrapreneurial behavior. Network diversity can encompass a variety of characteristics, which can be categorized as task-oriented and relations-oriented aspects (Jackson & Ruderman, 1995). Relations-oriented aspects are immutable and associated with social categorization processes, such as gender, race/ethnicity, and age (Joshi & Roh, 2009). In contrast, task-oriented aspects are associated with skill-based and informational

differences among individuals, such as education, function, and tenure (Joshi & Roh, 2009). Task-oriented aspects are assumed to constitute a team's cognitive resource base and are associated with information-sharing processes, such as the exchange of information and perspectives among group members, individual-level information processing, gaining feedback, and integrating information and perspectives (Joshi & Roh, 2009). While brokerage relies on strategic positioning to control information flow, network diversity offers a broader spectrum of perspectives and knowledge. This is particularly valuable in today's knowledge-intensive environments, where innovation depends on integrating diverse inputs and ideas (Rodan & Galunic, 2004). Moreover, network diversity has a more inclusive and widespread impact than brokerage, enhancing idea generation and implementation across an organization, rather than benefiting only a few well-positioned individuals.

Researchers have found that having access to diverse sources of information and knowledge might increase an individual's awareness of current environmental needs, thus enhancing the chances of identifying opportunities for innovation and innovative performance (Perry-Smith & Shalley, 2003; Rodan & Galunic, 2004). Accordingly, Perry-Smith (2006) observed that having more diverse contacts in terms of task-oriented aspects is positively correlated with creativity. Furthermore, diverse knowledge among contacts aids in implementing new ideas, particularly in multifaceted tasks, by helping managers understand complex systems and gain support from expert advocates, thus enhancing project success (Rodan & Galunic, 2004). This is also supported by findings of research by Sosa (2010), who found that ties that convey a broad spectrum of knowledge domains within a single tie foster creative idea generation when exchanges take place frequently enough.

Although maintaining contact with other teams within an organization provides valuable information benefits, these relationships also incur costs. Individuals in a subunit must invest time in cultivating relationships with other teams and processing the incoming

information (Hansen, 1999). Due to these costs, people can rarely afford to maintain strong relations with many other teams, which are better at transferring complex information. Conversely, Hansen (1999) noted that weak inter-unit ties are better for transferring less complex information. Because of the costs related to maintaining relationships and transferring information, the upside potential of diverse networks on intrapreneurial behavior is limited.

Based on these arguments, I predict that network diversity is positively related to intrapreneurial behavior as a more diverse network can be beneficial for both idea generation and idea implementation.

H1: Network diversity is positively related to intrapreneurial behavior

2.3 The Moderating Role of WFH

WFH typically refers to a form of flexible work arrangement characterized by the absence of fixed physical or temporal constraints on where and when work tasks are performed. This can be the usual way of working for some jobs (for example sales, maintenance, etc). In this study, WFH is understood as working from home with the aid of communications technology (Microsoft Teams, Email, etc.). Besides remote working, other terms that refer to working outside the office are telework, telecommuting, e-working, or work from home. Those terms are often used interchangeably.

During the COVID-19 pandemic, governments in many countries required companies to have their employees work from home. This has led to a rapid acceleration in the adoption of remote working and the associated technological developments that were necessary to communicate with each other. Although the pandemic has eased, remote working is likely to stay as a form of work as many organizations plan to implement hybrid working, where

employees can combine working from the office and remotely (Bloom, 2021; Walz et al., 2023). Bloom (2021) found that, even after the COVID-19 pandemic, most employees with children under 12 would prefer to work 2 to 4 days from home. This preference reflects a growing recognition of the benefits of remote work in balancing professional and personal responsibilities. Employees now treat the option of WFH as a core privilege to which any employee is entitled instead of an exclusive perk given by the manager (Smite et al., 2023).

There are many benefits to working remotely for employees, but also for organizations. Increased flexibility and less time spent on commuting are found to be beneficial to employees (Smite et al., 2022), while organizations can save on real estate as there is less office space required (Bailey & Kurland, 2002). Also, remote working increases autonomy, which can alleviate family-related challenges while working from home (Charalampous et al., 2019; Donthu & Gustafsson, 2020). Some research pointed out that employees also experienced better ability to focus and fewer distractions (Smite et al., 2022). However, other employees complained that their focus was worse while working from home (Russo et al., 2021). A drawback of remote work is an increase in feelings of loneliness due to social isolation (Bailey & Kurland, 2002; Walz et al., 2023). Findings from a national working conditions survey in the Netherlands revealed that employees favor WFH due to its facilitation of work-life balance, increased productivity, and reduced commuting costs and time (TNO, 2024). Conversely, individuals prefer working at the office for social interactions, meetings, and heightened awareness of the immediate environment.

In remote work, the frequency and modes of contact are different than in the office. Employees cannot run into each other while grabbing a coffee or during lunch breaks, and there are no spontaneous encounters in the hallways. The absence of such interactions can lead to an increased threshold to contact others, which leads to more difficulty in creating and maintaining relationships with colleagues (Jämsen et al., 2022). Instead of transferring

information via in-person communication, remote workers communicate digitally via video/audio calls. According to media richness theory, different modes of communication vary in the capacity to process rich information, which refers to the ability of the information to change understanding within a time interval (Daft & Lengel, 1986). Daft and Lengel (1986) argue that rich communication media like in-person communication are best for sharing complex information and ideas. Furthermore, media synchronicity theory proposes that communication media that are synchronous such as video calls are better for converging on the interpretation of complex information, while asynchronous media such as email or other forms of text messaging are better for conveying information (Dennis et al., 2008).

2.4 The Interplay of Network Diversity, WFH, and Intrapreneurial Behavior

A well-established body of research points to a positive relationship between network diversity and intrapreneurial behavior. Social networks serve as a critical platform for exchanging information, accessing resources, and fostering collaboration within organizations (Nahapiet & Ghoshal, 1998). The diversity of these networks, encompassing a variety of backgrounds, experiences, and expertise (both in terms of social categories like gender or age, and task-oriented aspects like skills and knowledge), plays a key role in influencing intrapreneurial behavior (Jackson & Ruderman, 1995; Joshi & Roh, 2009).

Networks rich in diversity provide a broader range of information and perspectives, acting as a wellspring of creative fuel. This diversity is considered to be a key component of a team's cognitive resource base (Joshi & Roh, 2009). Within diverse networks, individuals engage in a richer exchange of information and perspectives (Adler & Kwon, 2002). This includes sharing knowledge, seeking and receiving feedback, and integrating diverse viewpoints. These processes are crucial for both generating innovative ideas and navigating the challenges of bringing those ideas to fruition (Perry-Smith & Shalley, 2003; Rodan & Galunic, 2004). Exposure to diverse knowledge and perspectives within a network can

enhance an individual's awareness of current needs and opportunities within the environment (Perry-Smith & Shalley, 2003). This heightened awareness can spark creative problem-solving and the identification of novel solutions. Furthermore, diversity in skills and knowledge can be instrumental in the implementation of new ideas, particularly complex ones (Rodan & Galunic, 2004). A network rich in diverse expertise can provide the necessary support for navigating intricate systems and garnering support from specialists within the organization, ultimately increasing the chances of project success. In summary, the richness of information, perspectives, and expertise found in diverse networks fosters a supportive environment for innovation and creativity, leading to a positive relationship between network diversity and intrapreneurial behavior.

While social network diversity lays a strong foundation for intrapreneurial behavior, the way employees interact within these networks can significantly influence the impact. The rise of remote work introduces a new layer of complexity. Yang et al. (2022) found that in-person communication lost by shifting to remote work was not fully replaced by other rich and synchronous communication like video or voice calls, but also by asynchronous media like emails or instant messages. This lack of rich interaction can hinder the effectiveness of even diverse networks. Research has shown that digital knowledge-sharing tools and strategies can play a crucial role in facilitating effective information exchange and collaboration within remote teams (Davidavičienė et al., 2020). By leveraging these tools effectively, employees can bridge the gap left by limited in-person communication. Digital knowledge sharing is of crucial importance for the creative performance of employees who are working from home (Tønnessen et al., 2021).

Furthermore, remote work can lead to a stronger reliance on communication with close colleagues, and a decrease in interactions with those with weaker ties (Yang et al., 2022). According to Burt (1992), weak ties are particularly important for accessing non-

redundant information within a network. With less interaction with people in these weaker ties, employees working remotely may miss out on diverse perspectives and novel information that could spark innovation. In essence, while diverse networks offer a strong foundation for innovation, the limitations imposed by remote work on communication and interaction patterns can hinder employees from fully leveraging this diversity.

While the limitations imposed by remote work on communication and interaction can hinder employees from fully leveraging a diverse network, the effects might be even more pronounced in low-diversity settings. In high-diversity networks, some level of interaction and information exchange might still occur even with remote work arrangements. However, in networks where diversity in backgrounds and expertise is lacking, the challenges posed by remote work on communication become especially pronounced. In these low-diversity networks, employees may have a smaller pool of colleagues with heterogeneous perspectives to draw from in the first place. The obstacles posed by remote work in promoting interaction and knowledge sharing may further hinder access to the already limited diverse viewpoints, potentially resulting in a more significant reduction in intrapreneurial behavior.

The established positive relationship between network diversity and intrapreneurial behavior can be significantly affected by how employees interact within their networks. While diverse networks offer a rich foundation for innovation, the limitations imposed by remote work on communication and interaction patterns pose a challenge.

H2: WFH moderates the relationship between network diversity and intrapreneurial behavior such that the relationship is weaker for those who work from home.

2.5 Conceptual Model

Based on the theoretical framework and posed hypotheses, a conceptual model has been developed to visualize all the proposed relationships. In the conceptual model, we propose a primary relationship between *network diversity* and *intrapreneurial behavior*, positing that a more diverse network leads to more intrapreneurial behavior. We hypothesize that WFH moderates this relationship, influencing the strength of the relationship. Our model aims to elucidate the nuanced mechanisms underlying the relationship between network diversity and intrapreneurial behavior by considering the interactive effects of WFH, which is anticipated to remain a prevalent mode of work in many organizations (Bloom, 2021).

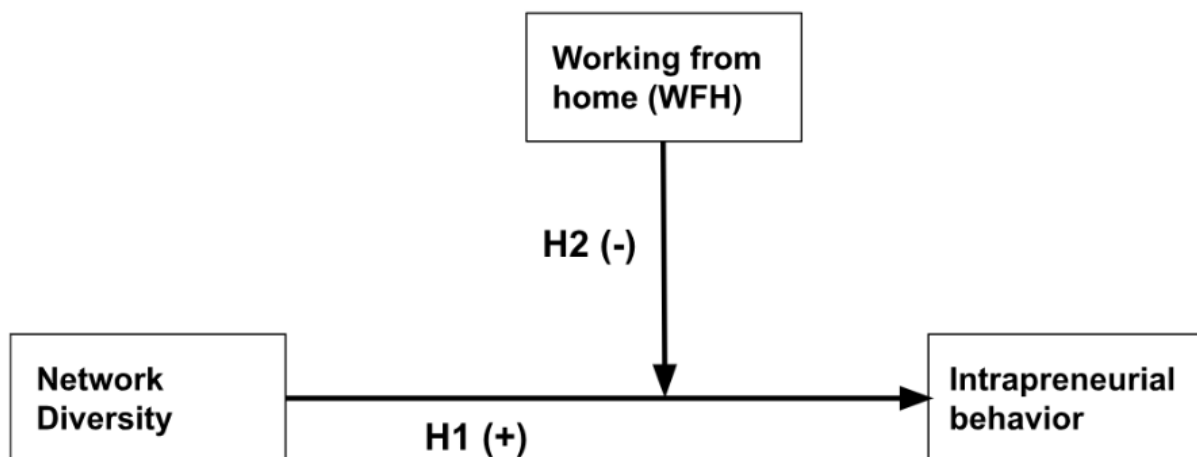


Figure 1:

Conceptual Model

Table 1:

Summary of the Combined Effects of Network Diversity (high or low) and Working From Home (high or low) on Intrapreneurial Behavior.

Network Diversity	Extent of working from home	
	<i>Employees working mainly from the office</i>	<i>Employees working mainly from home</i>
	<ul style="list-style-type: none"> • A lot of face-to-face contact with colleagues 	<ul style="list-style-type: none"> • Contact with colleagues through voice/video calls
<i>High network diversity</i>	<i>Employees with diverse networks working mainly from the office</i>	<i>Employees with diverse networks working mainly from home</i>
Access to diverse information and heterogeneous perspectives	Physical proximity facilitates interaction and knowledge exchange within a diverse network, fostering a robust environment for intrapreneurial behavior. Employees can easily tap into a wide range of expertise and perspectives, leading to a higher probability of generating novel solutions and a higher chance of successful implementation.	While a rich network foundation exists, remote work can make it challenging to leverage the full benefits of diverse perspectives. This might lead to a situation where employees struggle to build rapport and trust with colleagues from different teams, hindering effective collaboration on innovative projects. However, some communication tools and strategies might mitigate this effect.
<i>Low network diversity</i>	<i>Employees with non-diverse networks working mainly from the office</i>	<i>Employees with non-diverse networks working mainly from home</i>
<ul style="list-style-type: none"> • Information redundancy and homogeneous perspectives 	Even with limited network diversity, minimal remote work allows for some in-person interaction, potentially fostering some level of idea exchange and knowledge sharing. However, the limited variety of perspectives might still hinder the generation of truly novel ideas.	Remote work can significantly restrict access to the already limited diverse perspectives in a low-diversity network, hindering innovation and intrapreneurial behavior. Employees struggle to generate novel ideas and to find support and resources to bring ideas to life.

3. Methods

3.1 Research Setting

This study will use a quantitative research approach to test the proposed hypotheses. A cross-sectional survey will be used to collect data. The survey was spread in the ICT department of a Dutch hospital named Rijnstate. Conducting the survey at only one company ensures data consistency in factors like company size and organizational structure, which strengthens the internal validity of the research. With its role in supporting a complex healthcare environment, the ICT department of Rijnstate fosters a diverse network of professionals with 7 subdivisions (e.g. business intelligence and data analytics) where innovation is required to address the evolving needs of the hospital. Moreover, a hybrid working environment is used in this department of Rijnstate in terms of working from home and at the office. For these reasons, the ICT department of Rijnstate makes a good organization for data collection to test the hypothesis proposed in this research.

3.2 Data Collection

The survey was shared with all employees in the ICT department of the company via email and employees were asked to fill out the survey individually. Filling out the survey was voluntary, and the participants were ensured that their answers would remain anonymous, as personal data (like names or email addresses) was not recorded. The survey is cross-sectional, meaning that participants will be surveyed only once at a single point in time to capture a snapshot of their attitudes and behaviors (Kesmodel, 2018). It was designed and distributed using Qualtrics software. The survey was in Dutch as this is the first language of most employees in the organization. For the whole survey see Appendix A. Firstly, the survey was spread via email to each employee within the ICT department. After a week, a reminder was sent. The employees were given 3 weeks to complete the survey. The total population in the department comprises 122 employees of which 60 people filled out the survey, resulting in a response rate of 49%. Having an adequate sample size is critical in research as it ensures that

research findings are reliable and can be generalized to a wider population. According to Hair et al. (2018), having at least a sample size of 50 is required for multiple regression analysis. The minimum ratio of observations per variable is 5 to 1, however, Hair et al. (2018) recommend 15 to 20 observations per independent variable for reliable outcomes. Therefore, a sample size of 60 is just enough to conduct our analyses.

3.3 Measurements

The constructs that will be measured with the survey are network diversity, WFH, and intrapreneurial behavior. Only validated measurement scales will be utilized to assess the constructs to ensure robustness.

The dependent variable *intrapreneurial behavior* will be measured using the scale of Stull (2005). This scale covers three elements that are related to entrepreneurial orientation, namely risk-taking behavior, proactiveness, and innovativeness. This scale is relevant to measure intrapreneurial behavior because the elements covered are dimensions of intrapreneurial behavior (Antoncic & Hisrich, 2001). The setting of this research fits well with this measurement scale because it captures the key concepts of intrapreneurial behavior and the questions are appropriate for the people working at Rijnstate. The scale comprises 15 items, with 5 items allocated to each dimension. Respondents provide answers on a 5-point Likert scale, where 1 corresponds to "strongly disagree" and 5 to "strongly agree".

Network diversity is measured based on the measurement of knowledge heterogeneity by Rodan and Galunic (2004). We adopt their core concept of network diversity but adapt their methodology to suit our research context. While Rodan & Galunic (2004) utilize a comprehensive approach involving both self-reported information and ego-network data collection to construct adjacency and knowledge distance matrices, we opt for a simplified approach. Our research focuses on understanding how the variety of functional backgrounds within an employee's network might influence intrapreneurship. In correspondence with a

staff member from Rijnstate, we decided that network diversity is best represented by measuring the extent of contact with other subdivisions in the ICT department plus the extent of contact with other departments within Rijnstate. Therefore, we ask employees to indicate the extent of their contact with each subdivision within the ICT department and with each department at Rijnstate. Respondents provided their answers on a 5-point Likert scale for each subdivision or department where 1 corresponds to “never” and 5 to “daily”. For our analysis, numerical values were assigned to each option, where “never” corresponds to a score of 0 and “daily” corresponds to a score of 4. Based on this information, we calculate a network diversity score by summing up the total scores per subdivision or department. This score provides a basic measure of the heterogeneity of an employee's network in terms of functional composition. This aligns well with my research question by directly capturing the variation in functional backgrounds within an employee's network. I acknowledge that this adaptation captures a limited aspect of network diversity compared to the multifaceted approach of Rodan & Galunic (2004). It doesn't account for factors like knowledge dissimilarity or the strength of ties within the network, however, this approach balances the need for robust data with practical considerations for our specific research context and timeframe.

Working from home (WFH) is measured using the same measurement approach as Golden and Veiga (2005). They asked participants the number of hours that they worked per week and the number of hours that they worked remotely per week. With these numbers, they calculated the percentage of working hours that were worked from home, where 0% means that an employee works fully in the office while 100% means that an employee works all hours from home. Using this measure we can do analysis using WFH as a continuous independent variable.

3.3.1 Control Variables

There are also control variables used in this study because they have the potential to relate to the dependent variable and they can have confounding effects. An effective control variable is highly correlated with the independent variable, in our case intrapreneurial behavior, but not correlated with the independent variables (Hair et al., 2018). Including control variables helps to account for potential confounding factors, making the analysis of the effect of the independent variables on the dependent variable more accurate. The control variables in this study include *age*, *job tenure*, and *gender*, as those variables influence intrapreneurial behavior in organizations (Fleming et al., 2007; Ibarra, 1993; Parker, 2011). Motivation for intrapreneurial behavior decreases with age, which can be attributed to less openness to change and new experiences (Jong et al., 2011; Terracciano et al., 2005). Also, people with longer organizational tenure are less likely to exhibit intrapreneurial behavior (Parker, 2011). Furthermore, research has found that women are less likely to engage in intrapreneurial activities (Parker, 2011).

3.3.2 Measurement Reliability

Internal consistency refers to the extent to which all of the items in a test measure the same construct and are thus linked to the test's interrelatedness. To ensure this research's validity, the internal consistency should be validated. Cronbach's alpha (Cronbach, 1951) was used to measure the internal consistency of multi-item scales that measured the constructs used in this study. A Cronbach's alpha value between $\alpha = 0.7$ and $\alpha = 0.9$ is commonly reported as "acceptable", "satisfactory", or "good" in papers in leading science education journals (Taber, 2018). The variable intrapreneurial behavior showed a Cronbach's alpha value of 0.806. Although the analysis shows that Cronbach's alpha can still be slightly higher after deleting certain items, we decided not to delete more items because the current value is already good. Deleting more items would reduce the weight of the risk-propensity-

related items for the construct intrapreneurial behavior. For more details about the reliability analysis, see Appendix B.

3.4 Analytical Approach

Since the number of dependent variables studied is one, and the independent variables are measured on scales, a regression analysis is appropriate to test the hypotheses in this study. Because we want to analyze more than one independent variable and want to control for other variables, a hierarchical multiple regression analysis was most relevant (Hair et al., 2018). The dependent variable in the regression analysis was intrapreneurial behavior, while the independent variables were network diversity and WFH. For control variables that were non-metric (i.e. Gender), dummy variables were created. Also, an interaction term was created to assess the combined effects of network diversity and WFH on intrapreneurial behavior. Before performing the analysis 4 assumptions had to be met. Those were (1) checking if variables were normally distributed, by assessing Kurtosis and Shapiro-Wilk statistics, (2) checking for outliers, (3) detect for multicollinearity, by assessing the Tolerance and VIF, and lastly (4) checking for the normality, linearity, and homoscedasticity of residuals, which can be done by visualizing a P-P plot and scatterplot. After this, the multiple regression analysis was performed in SPSS.

The results of the regression analysis will show the proportion of variance in intrapreneurial behavior that is explained by network diversity, WFH, and the interaction term of those variables. This proportion is represented by the R^2 value which ranges from 0 to 1, where a 1 means that the independent variables fully explain the variance in the dependent variable. The statistical significance of the regression model is represented by the F statistic. To examine the significance of the independent variables in the regression model, the p values will be analyzed. Multiple linear regression models were run on SPSS to analyze the results from the control variables and the predictor variables separately and combined. The

first model includes only the control variables to establish a baseline for intrapreneurial behavior by controlling for extraneous factors. The second model adds the independent variables to assess the individual effects of the independent variables. The last model adds the interaction term of the independent variables network diversity and WFH. This model allows us to test whether the effect of network diversity on intrapreneurial behavior depends on the level of WFH.

3.5 Ethical Considerations and Limitations

Saunders et al. (2009) highlight that ethical considerations in research settings pertain to the responsible conduct of researchers toward individuals impacted by the research. It is widely recognized, including in educational research, that prioritizing ethical considerations is very important during research. In this manner, research stays within the boundaries of academic standards, ensuring a secure environment for participants involved in the research project. Additionally, this entails that participants should not experience embarrassment, harm, or disadvantage as a result of the research process or findings. Hence, this research project will incorporate various measures to ensure an ethical research design.

The participants in the survey were well informed on how their data and the outcomes would be treated. Firstly, the aim of the project was communicated to the participants before they filled out the survey. Secondly, permission was asked to use participants' data for this research. Additionally, the survey contained information on how their privacy is ensured, and how their response remains anonymous. To ensure this, no personal information, like names or email addresses, was recorded of the participants. Lastly, the participants were thanked for their participation and they had the opportunity to ask questions or give suggestions for the survey. They were also given the option to receive the results of my study when the research is finished. Those measures were implemented to adhere to the key principles of scientific ethics which include privacy, objectivity, openness, confidentiality, honesty, responsible

publication, respect for colleagues, social responsibility, legitimacy, and safety of those involved in research (Resnik, 2007).

This study design has several limitations. First of all, the results of this study rely on self-reports of intrapreneurial behavior, instead of behavioral measures or ratings from others. Research by Dang et al. (2020) showed that there is only a small correlation ranging from 0 to 0.20 between self-report and behavioral measures of the constructs risk preference and creativity, which are both aspects of intrapreneurship. Measuring the construct intrapreneurial behavior in different ways would increase the reliability of results.

Another limitation of this study is that participation was voluntary which can lead to self-selection bias which could result in skewed or unrepresentative results because the characteristics of voluntary participants may not be representative of the target population (Bethlehem, 2010). With only 60 out of 122 employees filling out the survey, the response rate of 49% is relatively low. Unfortunately, due to limited access to the company and a limited timeframe, the response rate was lower than anticipated which may affect the representativeness and generalizability of the findings.

Lastly, we believed that using subdivision as a control variable could have increased the accuracy and validity of the results. Different subdivisions may have distinct cultures and expectations with regard to risk-taking behavior, creativity, or collaboration. However, since there are 7 different subdivisions in the department where the survey was shared this would mean that 6 different dummy variables had to be created. This would increase the complexity of the model and reduce the degrees of freedom in our analysis, impacting the power to detect significant effects. Due to the limited sample size, we decided to not include employee subdivision as a control variable.

4. Results

In a multiple linear regression analysis, all variables must be numerical. This was the case for all variables except gender. To still include this variable in the analysis, dummy variables had to be created. Since past research has found that men are more likely to engage in intrapreneurial behavior than women (Parker, 2011), we chose “male” to be the reference category for gender. Therefore, a value of 0 corresponds to a male respondent and a value of 1 corresponds to a female respondent.

Out of 71 recorded responses, 60 respondents completed the whole survey. Incomplete responses missed data for the variables intrapreneurial behavior, network diversity, and WFH. To determine if the missing data in our dataset were missing completely at random (MCAR), Little’s MCAR test was conducted. This test assesses the null hypothesis that the missing data is missing completely at random, meaning that it does not depend on the values themselves. A p-value greater than 0.05 indicates that the null cannot be rejected. Therefore, our results indicated that the data can be considered to be missing completely at random ($\chi^2(6) = 8.25, p = .42$). The completion rate for respondents with missing data ranged between 10% and 40%. To increase the validity of this study, respondents with missing data were excluded from the sample.

Descriptive statistics, including skewness and kurtosis, were calculated to assess the distribution of the data. Skewness values indicate the asymmetry of the distribution while kurtosis values measure the tailedness of the distribution. According to George and Mallery (2003), values for skewness and kurtosis between -2 and +2 are considered acceptable to prove normal univariate distribution. This range is slightly exceeded by gender with a kurtosis of -2.07. It is important to note that these measures are not typically applicable to categorical variables such as gender. The high kurtosis value observed for gender likely reflects its binary nature rather than indicating a distribution shape issue. The sample

consisted of 31 males (52%) and 29 females (48%). The descriptive statistics and Skewness and Kurtosis values can be seen in Table C1 in Appendix C.

Table 2 presents the correlation matrix for the variables in this study. Notably, the correlations between the independent variables (network diversity and WFH) and intrapreneurial behavior were not significant. For instance, the correlation between network diversity and intrapreneurial behavior was $r = 0.03, p > 0.05$, and the correlation between WFH and intrapreneurial behavior was $r = 0.12, p > 0.05$. Furthermore, two significant correlations were found between the other variables. Gender was positively correlated with WFH ($r = .32, p = .013$), meaning that female employees work more hours from home than male employees. Additionally, a positive correlation between age and tenure shows that people who have been employed for longer are older ($r = .29, p = 0.025$).

Table 2

Means, Standard Deviations, and Correlations Among Study Variables

Variable	M	SD	1	2	3	4	5	6	7
1. Intrapreneurial behavior (Winsorized)	3.53	.49	-						
2. Network diversity	20.3	6.43	.03	-					
3. WFH	43.5	25.1	.12	-.21	-				
4. Network diversity X WFH	-33.4	135.6	-.01	.17	-.01	-			
5. Tenure ^a	3.80	1.44	-.17	.15	-.11	.16	-		
6. Gender ^b	.480	.504	.10	-.05	.32*	-.05	.11	-	
7. Age	45.2	10.1	-.25	-.08	-.07	.05	.29*	-.20	-

^a 1 = “Less than a year”, 2 = “1 to 2 years”, 3 = “2 to 5 years”, 4 = “5 to 10 years”, 5 = “10 to 25 years”, 6 = “Longer than 25 years”.

^b 0 = “male”, 1 = “female”

* $p < .05$; ** $p < .01$

Despite the lack of significant zero-order correlations, we proceeded with the multiple linear regression analysis. This approach allows us to assess the combined and unique contributions of the predictor variables to the dependent variable, which may reveal significant relationships that are not apparent in the bivariate correlations. Before performing the regression analysis, the assumptions had to be met.

In line with the skewness and kurtosis statistics from Table C1 in Appendix C, a graphical assessment of the continuous variables showed that the normality assumption is met for our data. The Stem-and-Leaf plots in Figure C1 and Figure C2 in Appendix C are all roughly symmetrical and bell-shaped, indicating that all variables are normally distributed. Additionally, Figure C2a shows that there are outliers for intrapreneurial behavior. After applying several transformations to intrapreneurial behavior, the number of outliers increased, indicating that transformation may not be appropriate for our data. Therefore, to mitigate the impact of the outliers, we applied Winsorization which is a technique where extreme values are replaced with the nearest values within a specified percentile range. This method helps in reducing the influence of outliers while maintaining the overall distribution of the data (Dixon & Tukey, 1968). The new Stem-and-Leaf plot after Winsorization can be seen in Figure C2b.

The multicollinearity assumption can be assessed with tolerance and variance inflation factor (VIF) values. Predictor variables with tolerance $< .1$ are multicollinear with

one or more other predictors and cause for concern. Menard (2002) argues that predictor variables with a tolerance of $< .2$ warrant closer inspection. Since VIF is equal to $1/\text{tolerance}$, we are satisfied with $\text{VIF} < 5$. Table C2 in Appendix C shows that the VIF values are below 5 and tolerance values are above $.2$, meaning that the multicollinearity assumption is satisfied.

The Durbin-Watson test is employed to determine if the residuals and observations are correlated. A value of 2 for the Durbin-Watson statistic indicates that residuals are uncorrelated, while values closer to 0 indicate a more positive correlation, and values closer to 4 indicate a more negative correlation (Field, 2018). Our sample showed a Durbin-Watson value of 2.021, which means that the error term is independent.

Furthermore, a P-P plot is used to assess whether we can assume that the residuals are normally distributed. Figure C3 in Appendix C shows that the points on the Normal P-P plot cling reasonably tightly to the diagonal line. Therefore, we assume the normality of residuals. Lastly, a scatterplot was used to assess the linearity and homoscedasticity of the residuals. The scatterplot in Figure C4 in Appendix C shows that there is a fairly even spread of points and a lack of discernible patterns. Therefore, assumptions of normality, linearity, and homoscedasticity have all been met.

Three models were developed for the regression analysis. The first model includes only the control variables tenure, gender, and age. The second model consisted of both the control variables and the independent variables network diversity and WFH. The third model also added the interaction term network diversity X WFH. Table 3 shows the results of the regression model.

Regarding hypothesis 1, which proposed that network diversity is positively related to intrapreneurial behavior, the results indicate otherwise. In Model 1, the control variables tenure, gender, and age accounted for a non-significant 7.6% of the variance in

intrapreneurial behavior ($R^2 = .076$, $F(3, 56) = 1.540$, $p = .214$), indicating that these control variables alone do not significantly explain the variance in intrapreneurial behavior. When network diversity was added in Model 2, it accounted for an additional non-significant $\Delta.7\%$ of the variance ($\Delta R^2 = .007$, $\Delta F(2, 54) = .215$, $p = .807$). In combination, the five predictor variables explained 8.4% of the variance in intrapreneurial behavior ($R^2 = .084$, adjusted $R^2 = -.001$, $F(5, 54) = .984$, $p = .436$). The coefficient for network diversity was non-significant ($\beta = .05$, $p = .701$). This suggests that network diversity does not significantly predict intrapreneurial behavior, leading to the rejection of hypothesis 1.

Hypothesis 2 proposed that the effect of network diversity on intrapreneurial behavior is moderated by WFH. In Model 3, the interaction term between network diversity and WFH was added to test this moderation effect. The inclusion of the interaction term did not increase the explainability of the variance in intrapreneurial behavior ($R^2 = .084$, adjusted $R^2 = -.02$, $F(6, 53) = .807$, $p = .569$). The interaction term was non-significant ($\beta = .01$, $p = .916$), indicating that WFH does not moderate the relationship between network diversity and intrapreneurial behavior. Therefore, hypothesis 2 is not supported.

Overall, the results of the regression analysis indicate that neither the independent variables nor the interaction term significantly contribute to explaining the variance in intrapreneurial behavior beyond the control variable.

Table 3

Regression Models of Intrapreneurial Behavior

Variable	Model 1	Model 2	Model 3
Tenure	-.12 (.05)	-.12 (.05)	-.12 (.05)
Gender	.07 (.13)	.05 (.14)	.05 (.14)
Age	-.20 (.01)	-.19 (.01)	-.19 (.01)
Network diversity		.05 (.01)	.05 (.01)
WFH		.08 (.00)	.08 (.00)
Network diversity X WFH			.01 (.00)
R^2	.076	.084	.084
Adjusted R^2	.027	-.001	0.020
F	1.540	.984	.807
ΔF	1.540	.215	.011
N	60	60	60

* $p < .05$; ** $p < .01$

Since intrapreneurial behavior is a multidimensional construct, we decided to perform a follow-up analysis to see if there were any significant relationships between our independent variables and the different dimensions of intrapreneurial behavior. The dimensions embedded in the intrapreneurship scale used in this study are risk-propensity, proactiveness, and innovativeness (Stull, 2005). Regression models were run with each dimension as the dependent variable. A detailed description of the regression analyses and the results can be found in Appendix D.

The results of the follow-up analysis show that there were significant findings regarding risk propensity. The first model, including only control variables, did not significantly explain risk propensity ($R^2 = .124$, $F(3, 56) = 2.64$, $p = .058$). However, after including network diversity and WFH, the regression model's explanatory power significantly increased, explaining an additional 16% of the variance in risk propensity ($R^2 = .281$, $F(5, 54) = 4.22$, $p = .005$). Thus, network diversity has a significant and positive impact on risk propensity ($\beta = .28$, $p = .023$), providing partial support for hypothesis 1.

Furthermore, the findings show a positive relationship between WFH and risk propensity ($\beta = .36$, $p = .005$). However, the hypothesized moderating effect of WFH on the relationship between network diversity and risk propensity was not supported. This suggests that WFH directly influences risk propensity, independent of its interaction with network diversity.

Unlike the findings for risk propensity, the regression analyses for proactiveness and innovativeness did not yield any significant relationships. Neither network diversity nor WFH emerged as significant predictors of these dimensions. The results from the regression for each dimension can be seen in Table D3 in Appendix D.

5. Discussion

The purpose of this study was to investigate how the shift toward WFH impacts the relationship between network diversity and intrapreneurial behavior within organizations. By employing a cross-sectional survey distributed to employees in the ICT department of a hospital in the Netherlands, the study used hierarchical multiple regression analysis to explore these effects. The findings of this study show that there was no relationship between network diversity and intrapreneurial behavior. Additionally, no moderating effect of WFH on this relationship was observed. However, a follow-up analysis examining specific dimensions of intrapreneurial behavior showed that a more diverse network is associated with higher risk propensity.

5.1 Theoretical Implications

This lack of significant results in this study presents an interesting contrast to existing theories, which often suggest positive relationships between network diversity and intrapreneurial behavior. Former research suggests that exposure to diverse knowledge and perspectives through network connections can be a catalyst for creativity, innovation, and the identification of new opportunities (Perry-Smith & Shalley, 2003; Rodan & Galunic, 2004). Previous research highlights how exposure to a variety of perspectives and knowledge bases can spark new ideas and approaches to problem-solving (Perry-Smith, 2006). Furthermore, diverse networks are argued to be instrumental in implementing novel ideas by facilitating a deeper understanding of the system and garnering support from relevant experts (Rodan & Galunic, 2004). Our findings challenge the universality of existing theories concerning network diversity and its impact on intrapreneurial behavior. Previous research consistently points to a positive relationship, yet our study within a hospital ICT department yielded no such connection. This difference in outcomes leads us to believe that context plays a significant role in shaping this relationship. The context, like the focus on established protocols in a hospital ICT department, can influence how much network diversity fuels

intrapreneurial behavior. In environments prioritizing routine tasks or established procedures, the need for radically new ideas might be lower, reducing the impact of diverse networks.

Similarly to the insignificant relationship between network diversity and intrapreneurial behavior, WFH did not emerge as a significant moderator of this relationship. This alignment is unsurprising given the weak main effect of network diversity. Just as a dimmer switch does not affect an unplugged lamp, WFH does not moderate a non-existent relationship between network diversity and intrapreneurial behavior in our study. This null finding regarding WFH's moderating effect should not overshadow the potential influence of WFH on network dynamics and intrapreneurship in general. Considering organizational context alongside WFH as moderators is crucial. While WFH might not have a significant effect in environments like our hospital ICT department with its focus on established protocols, we still expect WFH to moderate the relationship between network diversity and intrapreneurship in settings that place a higher premium on creative problem-solving. We expect that a loss of in-person communication can hinder the rich exchange of ideas and perspectives that flourishes in diverse networks, potentially dampening the positive influence of network diversity on intrapreneurial behavior in these innovation-driven environments. Based on our findings, we expect that the impact of the shift to hybrid working arrangements on the relationship between network diversity and intrapreneurial behavior is also dependent on organizational context. Future research should explore this conditional relationship in more detail to inform the design of WFH policies that foster intrapreneurship in diverse organizational settings.

Furthermore, the impact of WFH on network dynamics and innovation might be contingent on various contextual factors not explored in this study. For instance, the frequency of WFH arrangements, the type of work being done remotely, and the organizational culture surrounding WFH could all influence how WFH moderates the

relationship between network diversity and innovation. For example, in our sample, it was mandatory for many employees to partially work from home due to limited office space. Future research with larger and more diverse samples could delve deeper into these contextual factors and their potential interactions with WFH practices. By employing more sophisticated research designs, such as social network analysis techniques, researchers could gain a more dynamic understanding of how WFH shapes network interactions and impacts intrapreneurial behavior within different organizational settings.

Moreover, our follow-up analysis showed that there was a positive relationship between network diversity and risk propensity. This finding aligns closely with Perry-Smith and Shalley (2003) assertion that actors occupying central positions within a network are more likely to engage in informed risk-taking due to their broad access to diverse information and connections. They suggest that such central individuals benefit from increased awareness and higher status, which fosters an environment for taking calculated risks. Our results extend this notion by demonstrating that the diversity of the network itself, irrespective of specific central positions, significantly enhances risk propensity. This indicates that being part of a diverse network empowers individuals to take more risks. These findings emphasize how important network diversity is in shaping risk-taking behaviors, offering a better understanding of how social networks influence decision-making processes.

5.2 Practical Implications

In light of our findings, organizations should reassess their approach to promoting intrapreneurship. While network diversity has often been seen as a catalyst for innovation, our study suggests that its direct impact on intrapreneurial behavior may be limited within certain organizational contexts. Specifically, we suggest that organizations operating in environments characterized by established procedures, and structured protocols should not

promote intrapreneurial behavior by increasing their employees' network diversity. We think that such organizations are better off when they focus on other proven factors to increase intrapreneurial behavior.

However, for organizations primarily concerned with fostering risk-taking behavior among employees, promoting network diversity can be a valuable strategy. Encouraging cross-functional collaboration, organizing networking events, and providing platforms for knowledge exchange can help build diverse networks within the organization, thereby facilitating informed risk-taking. By aligning strategies with the specific needs and characteristics of their organizational context, companies can effectively nurture intrapreneurship and enhance their capacity for innovation.

5.3 Limitations

Our research design possesses several limitations that influence the generalizability of the findings and necessitate further investigation. Firstly, there were limitations related to our sample. With a sample of 60 respondents, our sample size came short of the preferred sample size of 75 for an analysis with 5 predictors, recommended by Hair et al. (2018). The relatively small sample size in this research limits the generalizability of the findings. Additionally, the statistical power of the test decreases, making it less likely to detect significant relationships, thus increasing the probability of committing a Type II error. Furthermore, the limited sample size also constrained our ability to incorporate respondents' subdivision as a control variable, as that necessitated the inclusion of 6 dummy variables. Including them as control variables would have dramatically decreased the degrees of freedom and statistical power. Besides the size of the sample, filling out the survey was voluntary, introducing the possibility of self-selection bias. Employees who chose to participate might differ systematically from those who did not, potentially biasing the results. For instance, individuals with more extensive networks or a stronger interest in

intrapreneurship might have been less likely to volunteer, leading to an underestimation of the actual relationships between network diversity and intrapreneurial behavior within the hospital ICT department. With a response rate of 49%, this could have influenced the results of our analysis.

The reliance on self-reported intrapreneurial behavior in this study presents another limitation. Relying on self-reporting to assess intrapreneurial can introduce subjective bias. Individuals might overestimate their own initiative or downplay their risk aversion, leading to a potentially inflated perception of intrapreneurial behavior. Research by Dang et al. (2020) suggests a weak correlation (0-0.20) between self-reported and behavioral measures of constructs like risk preference and creativity, both relevant to intrapreneurship. Employing alternative measures or a combination of measures, such as behavioral data or supervisor ratings, could enhance the reliability of the findings regarding intrapreneurial behavior.

The limited time frame in which this research had to be carried out caused some limitations in our research design. While this study adapts the concept of network diversity from Rodan and Galunic (2004) to ensure feasibility and encourage respondents to finish the survey, this adaptation presents several limitations. Firstly, the simplified approach used to measure network diversity, which relies on the frequency of contact with different subdivisions and departments, does not capture the full complexity of network structures. Unlike comprehensive network analyses that involve constructing adjacency and knowledge distance matrices, this method does not account for the structural properties of networks such as density, centrality, or the strength of ties between contacts. Consequently, it overlooks important aspects like the strength and quality of relationships and the extent of knowledge dissimilarity within the network, which have been theorized to influence an individual's access to diverse knowledge and resources, potentially leading to increased opportunities for identifying and implementing innovative ideas (Kijkuit & van den Ende, 2010; Rodan &

Galunic, 2004). This limited scope means that the network diversity score primarily reflects the variety of functional backgrounds within an employee's network but does not fully capture the intricate patterns of interaction and knowledge flow that a more detailed network analysis would reveal. Therefore, while the chosen method balances the need for robust data collection with practical considerations, it inherently constrains the depth of insights that can be drawn about the role of network diversity in fostering intrapreneurial behavior

Lastly, this study was conducted solely within the hospital ICT department of a healthcare organization in the Netherlands. This limits the generalizability of the findings to other organizational contexts. Company cultures, industry practices, and departmental structures can vary significantly, potentially influencing the relationships between network diversity, WFH, and intrapreneurial behavior. Furthermore, cultural norms regarding work practices, such as WFH arrangements, can differ across geographical locations. Future research that incorporates a broader sample of organizations from different industries and geographical locations would be necessary to establish a more generalizable understanding of these relationships.

6. Conclusion

This study aimed to explore the impact of network diversity and working from home (WFH) on intrapreneurial behavior within the ICT department of a hospital in the Netherlands. Contrary to existing theories which found a positive relationship between network diversity and intrapreneurial behavior, our findings did not support such a relationship. Moreover, WFH was not found to moderate the relationship between network diversity and intrapreneurial behavior. These results suggest that the influence of network diversity on innovation may be more context-dependent than previously thought. The practical implications of this study indicate that organizations should reconsider the emphasis placed on network diversity in promoting intrapreneurship, but focus on other proven factors like brokerage and closure. Moreover, future research should address the identified limitations to provide deeper insights into the contextual factors influencing the relationship between network diversity, WFH, and intrapreneurial behavior across different organizational settings. This study highlights the need for a better understanding of how organizational context shapes the dynamics of intrapreneurship, offering valuable insights for both scholars and practitioners aiming to foster intrapreneurial behavior in diverse work environments.

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Appendices

Appendix A: The Survey Onderzoek ondernemend gedrag

Start of Block: Intro

Beste deelnemer, Hartelijk dank dat u bereid bent deel te nemen aan mijn afstudeeronderzoek! Ik ben een student van Strategic Management aan de Radboud Universiteit. Mijn onderzoek richt zich op de relatie tussen netwerkdiversiteit en ondernemend gedrag, en hoe thuiswerken deze relatie beïnvloed. Het doel van dit onderzoek is om te begrijpen hoe de diversiteit van uw professionele netwerk en uw werkplek (thuis of op kantoor), uw neiging tot ondernemend gedrag beïnvloeden.

De vragenlijst bevat vragen over hoe u uw werk benaderd, over hoeveel u thuiswerkt, en over uw contact met collega's van andere afdelingen/teams binnen Rijnstate. Het invullen van de vragenlijst zal naar schatting zo'n 7 minuten duren. Uw tijd wordt enorm gewaardeerd!

Met vriendelijke groet,

Bas van de Wetering

End of Block: Intro

Start of Block: Block 2

Anonimiteit en instemming met deelname.

Voordat u verder gaat met het invullen wil ik u vragen de volgende informatie goed door te lezen:

- Uw antwoorden worden veilig en anoniem opgeslagen in een database van de universiteit, uw antwoorden zijn niet individueel naar u te traceren.
- Uw antwoorden zullen alleen gebruikt worden voor academische onderwijs- en onderzoeksdoeleinden.
- U kunt op elk moment stoppen met het onderzoek.
- U geeft toestemming dat de gegevens gebruikt worden voor de doeleinden die hierboven beschreven staan en dat deze tot 10 jaar na het afronden van het onderzoek bewaard worden (1-5-2034).

Voor verdere vragen met betrekking tot het onderzoek kunt u mij bereiken via

Bas.vandewetering@ru.nl. Ik zal uw vraag zo spoedig mogelijk beantwoorden. Succes bij het invullen van de vragenlijst! Klik hieronder op “ja” als u deel wilt nemen aan het onderzoek.

Dit betekent dat u genoeg gelegenheid gehad heeft om te overwegen of u mee wilt doen aan de studie en dat u begrijpt dat er geen consequenties aan de deelname verbonden zijn.

Ik ga akkoord

Ja (1)

Nee (2)

End of Block: Block 2

Start of Block: Default Question Block

Wat is uw leeftijd in jaren?

Wat is uw gender?

- Man (1)
- Vrouw (2)
- Anders (3)
- Zeg ik liever niet (4)

Hoelang werkt u al bij Rijnstate

- Kortere dan een jaar (1)
 - 1-2 jaar (2)
 - 2-5 jaar (3)
 - 5-10 jaar (4)
 - 10-25 jaar (5)
 - Langer dan 25 jaar (6)
-

Wat is de mate waarin u vanaf thuis werkt ten opzichte van het totaal aantal uren dat u werkt?
(Geef een gemiddelde schatting in percentage)

Page Break

Hieronder staan diverse stellingen die beschrijven hoe u uw werk benadert. Geef voor elke stelling aan of je ermee eens of oneens bent. Let op, sommige vragen lijken misschien sterk op elkaar, maar dit is normaal en het is prima om vergelijkbare antwoorden te geven als ze op jou van toepassing zijn.

Tijdens mijn werk,	Sterk mee oneens (1)	Mee oneens (2)	Neutraal (3)	Mee eens (4)	Sterk mee eens (5)
Benader ik nieuwe projecten of activiteiten voorzichtig. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doe ik dingen die een kans hebben om te mislukken (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vermijd ik het nemen van geinformeerde risico's. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doe ik mee aan activiteiten die een kans hebben om niet te werken. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Neem ik vooraf bekende risico's ondanks de mogelijkheid van	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

falen. (5)

Anticipeer ik
vooraf op
veranderingen in
plaats van erop te
reageren. (6)

Los ik actief
dingen op of
verbeter ze als ik
ze niet leuk vind.

(7)

Handel ik in
anticipatie op
toekomstige
problemen,
behoefden of
veranderingen.

(8)

Neem ik het
initiatief om
projecten te
starten. (9)

Neig ik ernaar
veranderingen
door te voeren
voordat ze nodig
zijn. (10)

Genereer ik
bruikbare nieuwe
ideeën. (11)

Ontwikkel ik
nieuwe
processen,
diensten of
producten. (12)

Benader ik
werkgerelateerde
taken op
innovatieve
manieren. (13)

Vind ik nieuwe
manieren om
dingen te doen.
(14)

Doe ik vaak
dingen op unieke
manieren. (15)

Binnen welke van de hieronder genoemde afdelingen bent u momenteel zelf werkzaam

▼ Medische Techniek & Klinisch Fysica (1) ... Innovatie en Zorgtransformatie (7)

Gemiddeld gezien, hoe vaak heeft u contact met collega's van de volgende afdelingen?	Nooit (1)	Minder dan 1 keer per maand (2)	Eens per maand tot eens per week (3)	Meerdere keren per week (4)	Dagelijks (5)
Medische Techniek / Klinische Fysica (MT&KF) (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business Intelligence en Data Analytics (BIDA) (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Functioneel Beheer Zorgapplicaties (FBZ) (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Advies en Realisatie (A&R) (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ICT (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Virtueel Zorgcentrum (VZC) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovatie en Zorgtransformatie (IZC) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Buiten het IMT om, met welke afdelingen binnen Rijnstate heeft u dan nog meer contact en hoe vaak is dit contact?

	Minder dan 1 keer per maand (1)	Eens per maand tot eens per week (2)	Meerdere keren per week (3)	Dagelijks (4)
Afdeling 1 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afdeling 2 (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afdeling 3 (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afdeling 4 (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afdeling 5 (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afdeling 6 (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afdeling 7 (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix B: Reliability Analysis

Table B1

Cronbach's Alpha of the Construct Intrapreneurial Behavior

Cronbach's Alpha	N of items
.806	15

Table B2

Item-Total Statistics of the Construct Intrapreneurial Behavior

Variable	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Approach new projects or activities in a cautious manner	48.52	51.00	-.18	.834
Do things that have a chance of not working out	48.00	45.80	.23	.808
Avoid taking calculated risks	48.50	48.19	.05	.820
Engage in activities that have a chance of not working out	48.15	45.59	.23	.809
Will take calculated risks despite the possibility of failure	47.97	42.54	.49	.789
Keep ahead of changes instead of responding to them	47.77	43.13	.51	.788
Actively fix or improve things I don't like	47.55	42.12	.55	.785
Act in anticipation of future problems, needs, or changes	47.65	42.77	.54	.786

Take the initiative to start projects	47.95	41.51	.57	.783
Tend to implement changes before they are needed	48.23	42.45	.47	.791
Generate useful new ideas	47.50	43.48	.47	.791
Develop new processes, services or products	47.82	43.34	.49	.790
Approach business tasks in innovative ways	48.07	40.67	.67	.775
Find new ways to do things	47.77	40.56	.77	.770
Often do things in unique ways...	48.17	42.62	.52	.787

Appendix C: Assumptions Testing

Table C1

Descriptive Statistics for Study Variables

Variable	N	M	SD	Skewness	Kurtosis
Intrapreneurial behavior (Winsorized)	60	3.53	.49	-.60	.129
Network diversity	60	20.33	6.43	-.04	.164
WFH	60	43.47	25.05	-.33	-1.01
Network diversity X WFH	60	-33.4	135.6	-.13	-.344
Tenure ^a	60	3.80	1.44	-.28	-.68
Gender ^b	60	.48	.50	.07	-2.07
Age	60	45.22	10.07	.10	-.81

^a 1 = “Less than a year”, 2 = “1 to 2 years”, 3 = “2 to 5 years”, 4 = “5 to 10 years”, 5 = “10 to 25 years”, 6 = “Longer than 25 years”.

^b 0 = “male”, 1 = “female”

Table C2

Multicollinearity Statistics

Variable	Tolerance	VIF
Network diversity	.842	1.188
WFH	.899	1.113
Network diversity X WFH	.947	1.056
Tenure ^a	.821	1.218
Gender ^b	.819	1.221
Age	.844	1.184

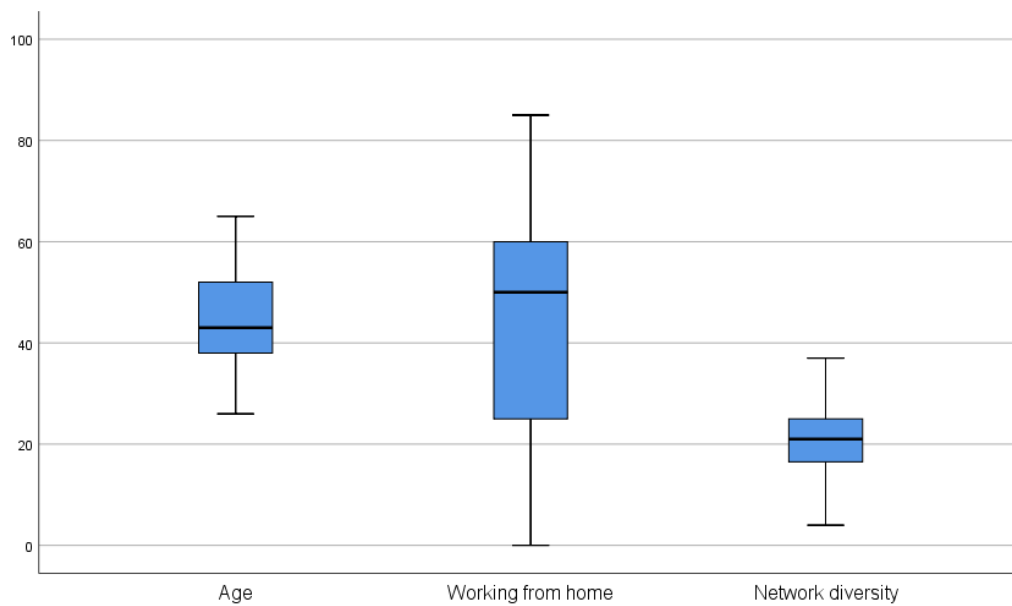


Figure C1

Stem-and-Leaf Plots of the Variables Age, WFH, and Network Diversity

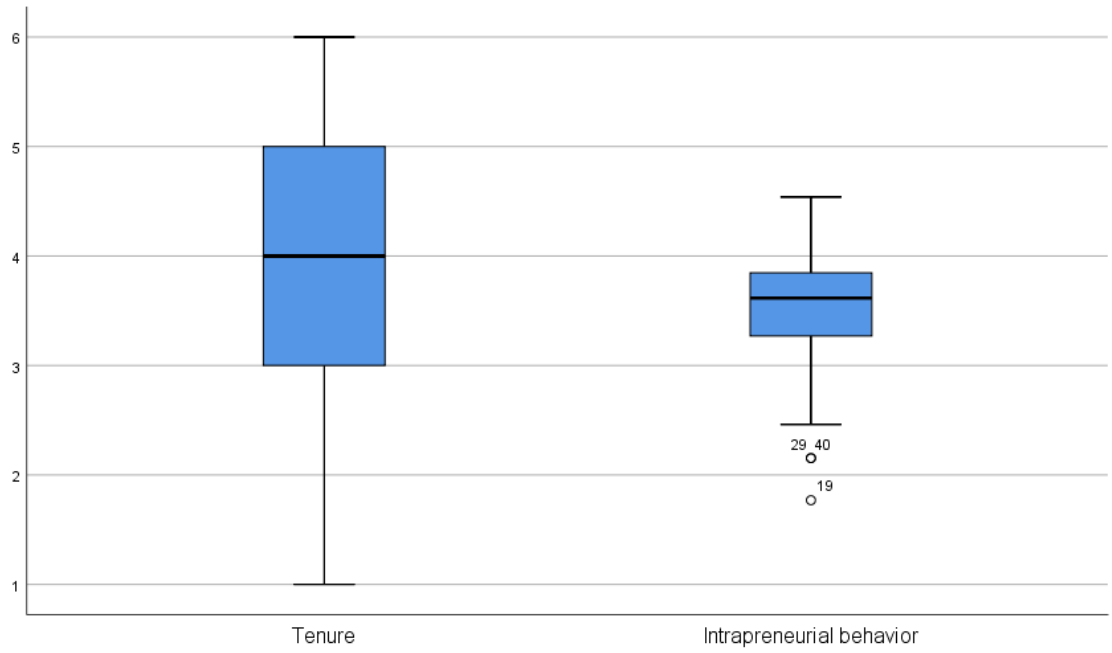


Figure C2a

Stem-and-Leaf Plots of the Variables Tenure and Intrapreneurial Behavior

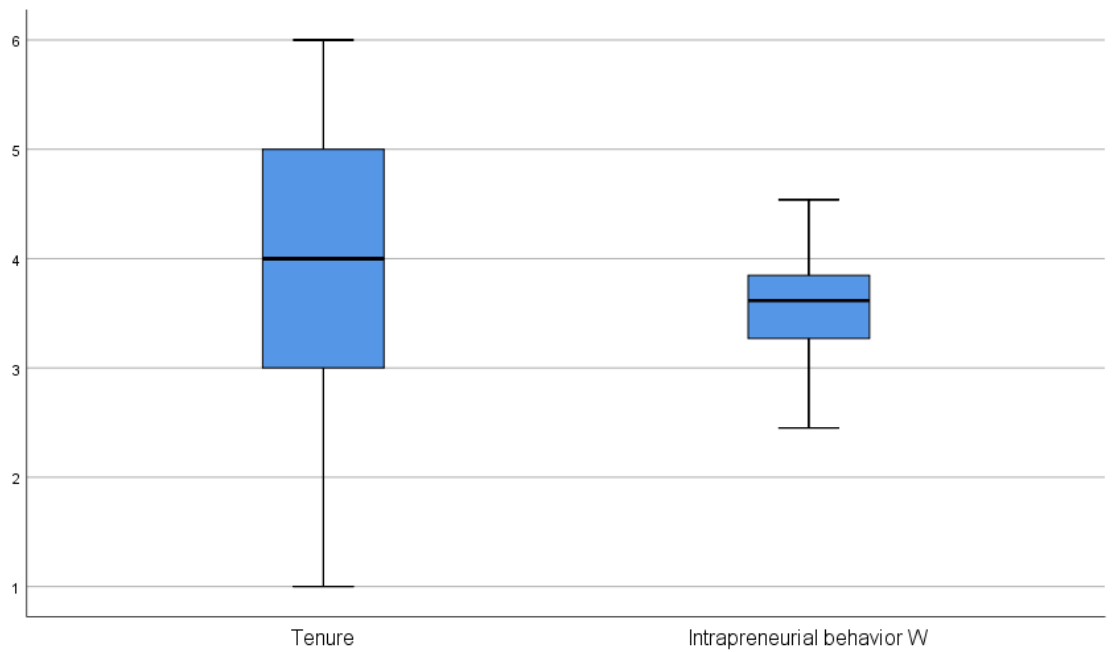


Figure C2b

Stem-and-Leaf plots of the Variables Tenure and Intrapreneurial Behavior (Winsorized)

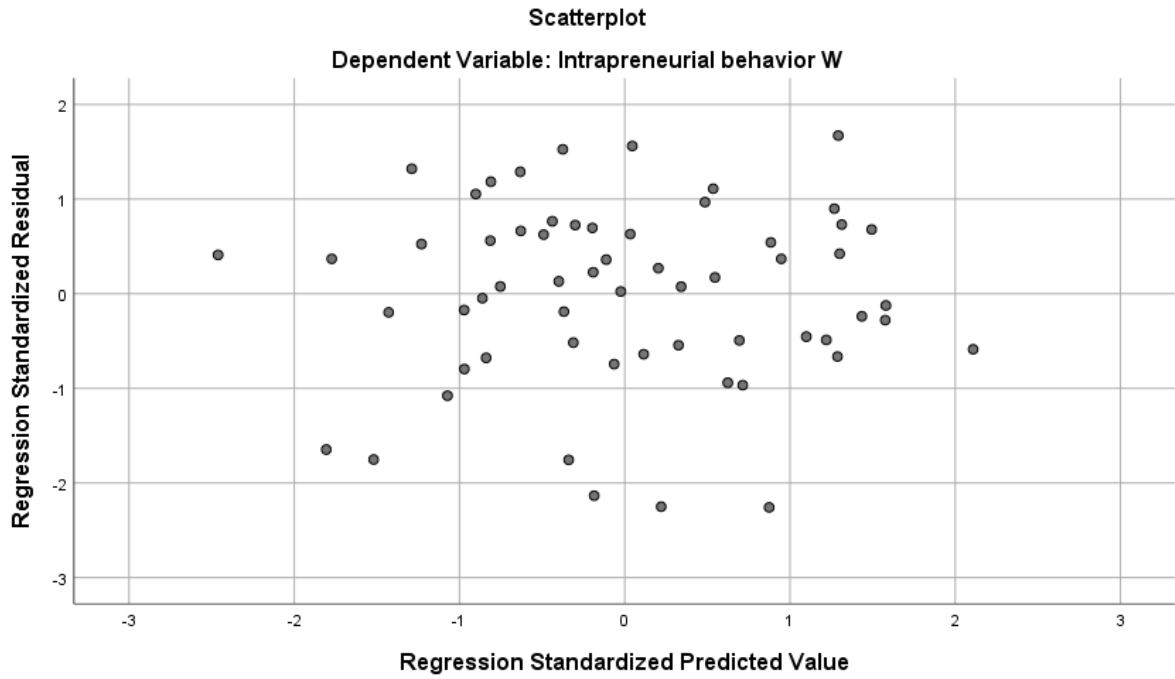


Figure C3

Scatterplot

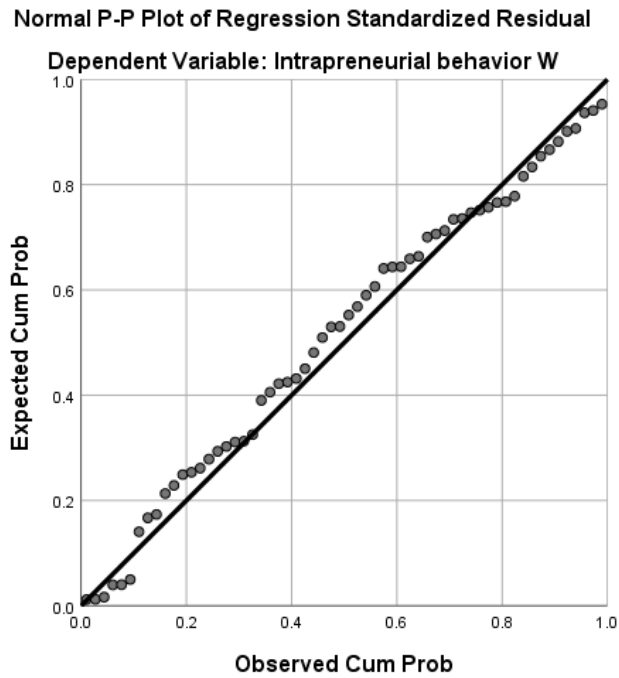


Figure C4

Normal P-P plot

Appendix D: Follow-up Analysis

Before performing the regression analyses, the assumptions had to be tested again. The Skewness and Kurtosis values show that the normality assumption is also met for the newly created variables risk-propensity, proactiveness, and innovativeness. Additionally, the Stem-and-Leaf plots in Figure D1 are all roughly symmetrical and bell-shaped, indicating a normal distribution. Due to outliers, Winsorization was applied again, and the Stem-and-Leaf plots after Winsorization can be seen in Figure D2. The distributions of the other variables can be seen in Appendix C. Furthermore, the P-P plots and scatterplots for the regression analyses looked similar to those in Appendix C, indicating the normality of residuals, linearity, and homoscedasticity.

Table D1

Descriptive Statistics for Study Variables

Variable	N	M	SD	Skewness	Kurtosis
Risk-propensity	60	3.17	.48	.18	.45
Proactiveness	60	3.57	.64	-.78	-.04
Innovativeness	60	3.54	.67	-.98	1.63
Network diversity	60	20.33	6.43	-.04	.164
WFH	60	43.47	25.05	-.33	-1.01
Network diversity X WFH	60	-33.4	135.6	-.13	-.34
Tenure ^a	60	3.80	1.44	-.28	-.68
Gender ^b	60	.48	.50	.07	-2.07
Age	60	45.22	10.07	.10	-.81

^a 1 = “Less than a year”, 2 = “1 to 2 years”, 3 = “2 to 5 years”, 4 = “5 to 10 years”, 5 = “10 to 25 years”, 6 = “Longer than 25 years”.

^b 0 = “male”, 1 = “female”

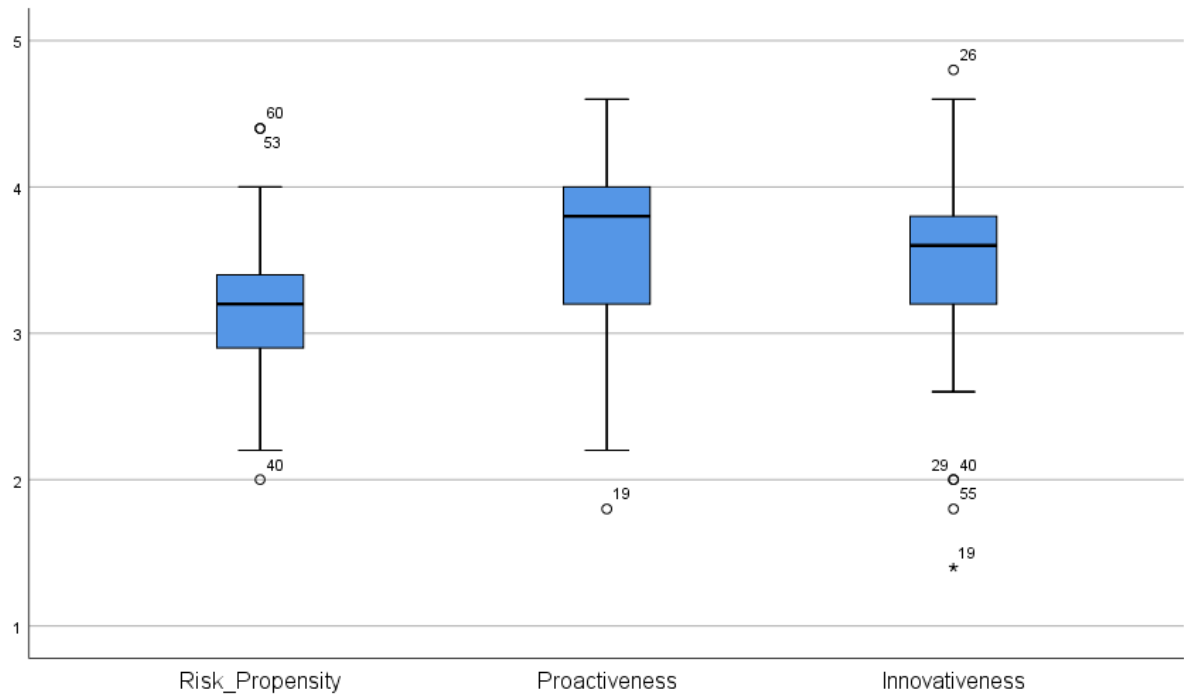


Figure D1

Stem-and-Leaf Plots of the Dependent Variables

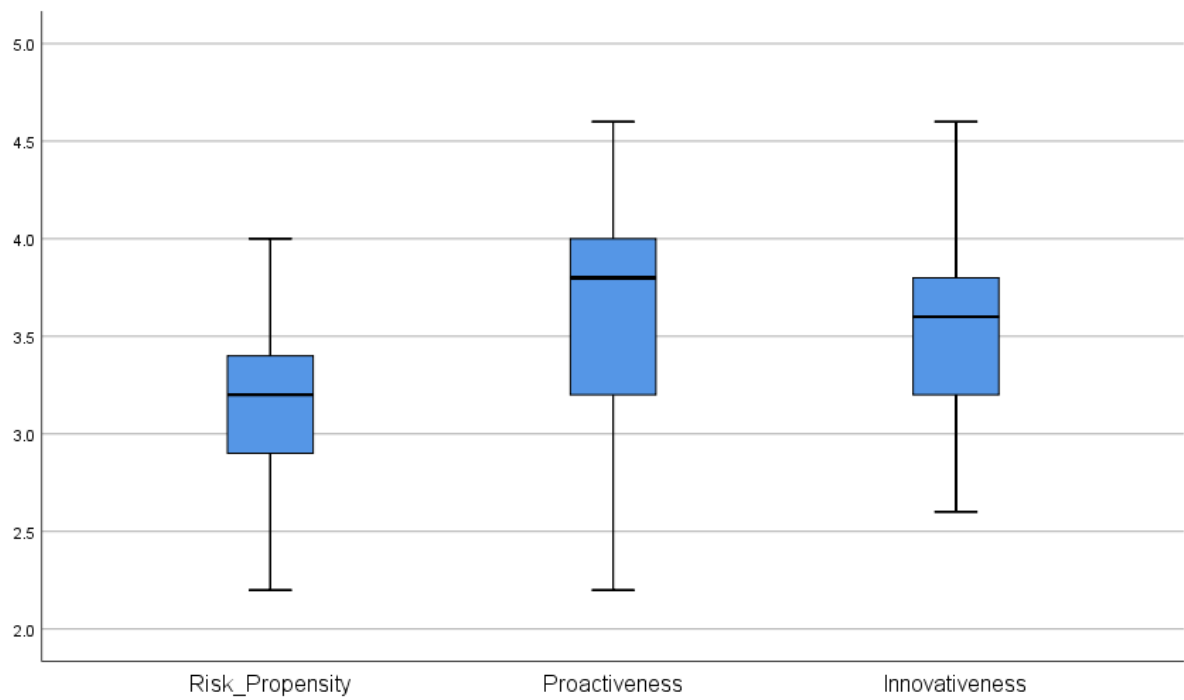


Figure D2

Stem-and-Leaf Plots After Winsorization

The correlations in Table D2 show that there is one significant correlation between the independent variable WFH and the dependent variable risk propensity ($r = .26, p = .017$). Other significant correlations are between control variables and dependent variables. There were significant correlations between tenure and risk propensity ($r = -.26, p = .048$), age and risk propensity ($r = -.30, p = .018$), and age and proactiveness ($r = -.33, p = .010$).

Table D2

Correlations Among Study Variables

Variable-	261	2	3	4	5	6	7	8	9
1. Risk propensity	-								
2. Proactiveness	.26*	-							
3. Innovativeness	.18	.71**	-						
4. Network diversity	.20	-.04	-.09	-					
5. WFH	.31*	.08	.04	-.21	-				
6. Network diversity X WFH	.14	-.01	-.08	.17	-.01	-			
7. Tenure ^a	-.26*	-.02	-.12	.15	-.11	.16	-		
8. Gender ^b	.03	.11	.17	-.05	-.32*	-.05	.11	-	
9. Age	-.30*	-.33**	-.10	-.08	-.07	.05	.29*	-.20	-

^a 1 = “Less than a year”, 2 = “1 to 2 years”, 3 = “2 to 5 years”, 4 = “5 to 10 years”, 5 = “10 to 25 years”, 6 = “Longer than 25 years”.

^b 0 = “male”, 1 = “female”

* $p < .05$; ** $p < .01$

The results from the regression analyses with dependent variables risk propensity, proactiveness, and innovativeness can be seen in Table D3.

Table D3

Regression Models: Risk-propensity, Proactiveness, and Innovativeness

Variable	Model	Model	Model	Model	Model	Model	Model	Model	Model
	1	2	3	4	5	6	7	8	9
	Risk propensity			Proactiveness			Innovativeness		
Tenure	-.18 (.05)	-.18 (.04)	-.21 (.05)	.08 (.06)	.10 (.06)	.10 (.06)	-.13 (.07)	-.12 (.07)	-.12 (.07)
Gender	-.00 (.12)	-.10 (.12)	-.09 (.12)	.03 (.17)	.01 (.18)	.01 (.18)	.18 (.18)	.19 (.19)	.19 (.20)
Age	-.25 (.01)	-.22 (.01)	-.23 (.01)	-.35* (.01)	-.36* (.01)	-.36* (.01)	-.03 (.01)	-.03 (.01)	-.03 (.01)
Network diversity		.28* (.01)	.26* (.01)		-.08 (.01)	-.08 (.01)		-.08 (.01)	-.07 (.02)
WFH		.36** (.00)	.36** (.00)		.05 (.00)	.05 (.00)		-.05 (.00)	-.05 (.00)
Network diversity X WFH			.15 (.00)			.00 (.00)			-.04 (.00)
R^2	.124	.281	.301	.117	.126	.126	.049	.055	.057
Adjusted R^2	.077	.214	.222	.070	.045	.027	-.002	-.032	-.050
F	2.64	4.22**	3.80**	2.47	1.56	1.27	.952	.630	.531
ΔF	2.64	5.90**	1.50	2.47	.275	.000	.952	.188	.091
N	60	60	60	60	60	60	60	60	60

* $p < .05$; ** $p < .01$