Gordon Institute of Business Science
University of Pretoria

Determinants of coworking space user needs to optimise user performance

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration.

5th of March 2024

Abstract

Purpose – This research aimed to investigate the relationship between the satisfaction of coworker user needs and individual performance within coworking spaces, utilising the framework of self-determination theory.

Design/methodology/approach – The research employed a quantitative research design to investigate the causal relationship between coworking space user needs and individual performance. A deductive research approach was used, guided by a positivist philosophy. A mono-method quantitative methodology was chosen, with a survey research strategy employed for data collection. Data was gathered cross-sectionally from a diverse range of coworking space users using a questionnaire.

Findings – The results confirm that satisfying coworker user needs directly influences individual performance in coworking spaces.

Research limitations/implications – The research has a few limitations. The sample size may not fully represent the diverse population of coworker space users, and cross-sectional data collection may introduce bias. Non-probability sampling methods were used, potentially limiting generalisability. A longitudinal design could provide stronger evidence of casual relationships.

Practical implications - This research highlights the importance of addressing coworker user needs in the design and management of coworking spaces. By fostering environments that support relatedness, autonomy, and competence, coworking space operators can enhance user satisfaction and ultimately improve individual performance.

Originality/value – The research contributes to enriching knowledge about coworking spaces and their users' needs, an area that has been under-researched. Additionally, it expands the knowledge base of self-determination theory by examining its application in coworking environments.

Paper type - Research paper

Keywords

Coworking spaces, Coworking user, Coworking user needs, Self-determination theory, Individual work performance

Plagiarism Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1. Introduction to Research Problem

This chapter aims to elucidate the research's rationale and objectives, providing an explanation and justification for the research problem/purpose: how does the satisfaction of coworker space user needs, through the lens of self-determination theory, influence individual performance within coworking spaces? This will be explored from both practical and theoretical perspectives.

1.1 Background to the problem and rational for the research

1.1.1 Why was this problem selected?

Unemployment remains high in South Africa officially at 31.9%, with youth between the ages of 15 and 34 at 43.4% as per the Quarterly Labour Force Survey of Quarter 3, 2023 (Statistics South Africa, 2023). The ongoing crisis of high youth unemployment in sub-Saharan Africa is driving many unemployed individuals to turn to entrepreneurship, which is actively encouraged by governments in the region as a solution to address the youth employment crisis (Chigunta, 2017). Entrepreneurs experience lack of legitimacy without a business premises, coworking spaces could assist in appearing more legitimate (Bouncken et al., 2020; Howell, 2022). Coworking spaces have gained increasing popularity over the years and will continue over the next decade due to technology, hybrid working and more flexible employment arrangement (Rådman et al., 2023; Weijs-Perrée et al., 2019). Given the rising prevalence, popularity, and potential for disruptive change associated with coworking spaces, entrepreneurs and other users are increasingly selecting coworking spaces to address specific needs, leading to major investments from investors, thus the research problem remains relevant and largely unexplored due to the rapid rise of this phenomenon (Howell, 2022). When individuals have their needs fulfilled, it is associated with enhanced performance and greater well-being; however, in cases where their needs go unmet, it can result in adverse outcomes (Rådman et al., 2023; Yang et al., 2023).

1.1.2 What evidence verifies the identification of the problem?

Deep (2023) mentioned that coworking spaces are facing challenges and some of them are to maintain coworkers, meeting their needs and building a tight-knit community. When individuals have their needs fulfilled, it is associated with

enhanced performance and greater well-being; however, in cases where their needs go unmet, it can result in adverse outcomes (Rådman et al., 2023; Yang et al., 2023).

1.1.3 What is the relevance of this topic?

Coworking spaces have emerged as integral elements within contemporary work settings (Appel-Meulenbroek et al., 2021). A noteworthy and positive trend has taken shape in the entrepreneurial landscape over the past decade, the rise of coworking spaces (Howell, 2022). Coworking space a decade ago was unheard of, due to popularity it has grown dramatically over the past few years (Howell, 2022; Weijs-Perrée et al., 2019). Global Coworking Survey, Deskmag (2019), found that there were 18,700 coworking spaces in 2018 compared to 8,900 in 2015, members grew globally from 545,000 in 2015 to 1,650,000 in 2018. Deskmag (2019) Global Coworking Survey estimated that by 2020, the number of coworking spaces would be 26,300, that is a 40.64% increase from 2018. Coworker (2024) listed more than 25,000 coworking spaces worldwide in 2023, Figure 1 presents the number of coworking spaces globally. Coworker.com currently has the most comprehensive list of coworking spaces globally (Howell, 2022). Prior to the Covid-19 pandemic coworking spaces were deemed one of the fasted-growing industries globally in Germany (Mayerhoffer, 2021). South Africa had five coworking spaces in 2013 (Moriset, 2013) and currently 236 spaces (Coworker, 2024).

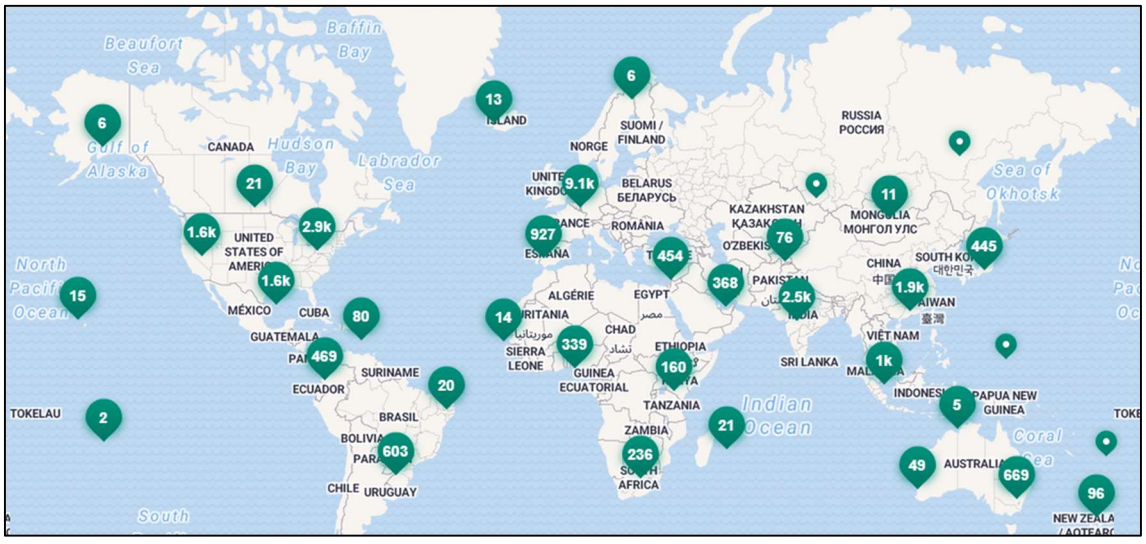


Figure 1: Coworking spaces worldwide (Coworker, 2024)**

**This figure is based on the list of all organisations listed on Coworker.com's website on February 6, 2024.

Given coworking spaces prevalence and transformative potential, the phenomenon of coworking holds increasing relevance for entrepreneurship theory, practice, and policy, yet its rapid ascent has left its implications insufficiently explored, underscoring the need for further research to enlighten proprietors, policymakers, and entrepreneurs about the ramifications of this emergent organisational paradigm (Howell, 2022).

The use of mobile technology has change how we work and where we work significantly over the past decades, allowing employees to work anywhere at any time, however employees still seek environments that foster networking and collaboration, which gives rise to the growing popularity of coworking spaces (Weijs-Perrée et al., 2019).

Despite WeWork's bankruptcy filling in 2023, the coworking space market continued to expand, with the popularised model created by WeWork persisting and gaining momentum through competitors within the coworking space environment (Financial Times, 2023).

1.1.4 What is unique about the proposed research setting?

The research is within the context of South Africa, to date very limited research on the topic had been performed in an African context. Kraus et al. (2022) supports this statement as most research on coworking spaces is related to western countries. The South African context is unique due to the diversity in culture, ethnicity, language, income distribution, unemployment as well as access to infrastructure and the lack of basic service delivery in a single country. What makes the proposed research unique is that the results of the research can be compared to those of studies performed in other parts of the world on different continents and perform a comparison in uniqueness if any. Studies had been performed in the context of the Netherlands, Germany, Czech Republic, USA, UK, Nigeria and Sweden in the context of coworker space user needs (Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Howell, 2022; Memud and Tabibi, 2023; Rådman et al., 2023; Weijs-Perrée et al., 2019).

1.2 Purpose of the research

1.2.1 The business need for the study

The financial success and return on investment of coworking spaces are intricately tied to the user experience (Memud and Tabibi, 2023). However, research on coworking spaces and their users, particularly in South Africa context, remains limited. Kraus et al. (2022) supports this statement as most research on coworking spaces is related to western countries. This study aims to bridge this gap by examining user needs and their satisfaction within the coworking environment, and investigating whether this correlates with individual performance. The ultimate goal is to enhance coworking space design and positioning in South Africa, informed by insights into how user satisfaction influences performance outcomes.

Dissatisfaction among users in coworking spaces often leads to service termination, resulting in significant financial losses. Therefore, understanding the satisfaction level of coworkers' needs is crucial for retaining them as tenants. Identifying which coworker needs have the most significant impact on performance can assist coworkers in decision-making when selecting a coworking space.

As noted by Deep (2023), coworking spaces face challenges in maintaining coworkers and meeting their needs. Sheynkman (2019) underscores that coworking success is equal to worker satisfaction. Recognising user needs and satisfaction of them in coworking spaces is critical in attracting potential new and existing users (Rådman et al., 2023).

The fulfillment of coworker needs is not only relevant for coworking space owners but also directly impacts the profitability of these spaces (Rådman et al., 2023). Understanding and addressing coworker needs can lead to increased user retention and satisfaction, as highlighted by Rådman et al. (2023), ultimately supporting better performance, organisational commitment, and reduced turnover (Gagné et al., 2022).

The research aims to contribute to the improvement of coworking environments by understanding the level of need satisfaction and its potential impact on user performance. This understanding can lead to meeting user expectations, attracting new tenants, and retaining existing ones, ultimately enhancing the financial

performance of coworking spaces, and increasing stakeholder value. This study will follow a quantitative approach in testing to assess the correlation between user needs satisfaction within coworking spaces and individual performance, informing design improvements and strategic positioning to enhance financial success and user retention.

1.2.2 The theoretical need for the study

The research contributes to the body of academic knowledge as not much research had been done on coworking spaces nor their users in the South African environment. While numerous non-academic publications and reports have explored coworking by investigating topics like its definition, participants, and locations, there remains a scarcity of scholarly literature and quantitative studies focused on this subject (Leclercq-Vandelannoitte & Isaac, 2016; Merkel, 2015; Moriset, 2013; Weijs-Perrée et al., 2019). Most research studies focused on management-related topics (Kraus et al., 2022). Research in work organisations has often approach the subject either from the viewpoint of the employees, focusing on their well-being, or from the perspective of the owners, focusing on their profitability (Deci et al., 2017). Oswald and Zhao (2022) suggested that future research should focus more on individual level motivation within the context of coworking spaces.

Oswald and Zhao (2022) performed quantitative research on the impact collaborative learning and individual motivation has on individual work performance and a direct correlation between collaborative learning and individual work performance existed, however it was noted that individual motivation does not correlate with individual work performance. Thus, based on the research conducted by Oswald and Zhao (2022) further research needs to be done on what aspect of individual motivation correlates with or not to individual work performance. Self-determination theory provides insight into understanding individual motivation through fulfilment of basic psychological needs, fulfilment of these needs could predict individual performance outcomes (Deci et al., 2017). Rådman et al. (2023) found that satisfying one user's need might impede the fulfilment of another.

Rådman et al. (2023) performed qualitative research identifying coworker user needs and classifying them within the categories of basic psychological needs. Quantitative research is necessary to validate and quantify the correlation between coworker user

needs classified through the lens of self-determination theory based on basic psychological needs identified by Rådman et al. (2023) and individual work performance, as indicated by the quantitative research of Oswald and Zhao (2022).

This research sheds light through self-determination theory on which aspects of motivation directly impact individuals' performance, thus providing valuable insights for enhancing workplace productivity and motivation strategies for literature. The research also contributes to the development of knowledge from the user perspective in coworking spaces. Most research studies have focused on the owners, landlords, user preference and motivation in joining coworking spaces, very few studies have been done on the user needs (Rådman et al., 2023)

The effect that the level of fulfilment of needs has on performance is understudied (Cerasoli et al., 2016), despite the acknowledgement of the link between need satisfaction and performance in various studies (Deci et al., 1989; Gagné & Deci 2005; Gagné & Forest, 2008), the mechanism linking need satisfaction to performance are seldom investigated (Cerasoli et al., 2016). Self-determination theory has found application in various domains, but there has been limited research on its utilisation concerning physical environments (Rådman et al., 2023; Sjöblom et al. 2016).

In conclusion:

The research aims to make a substantial contribution to the evolving landscape of coworking spaces in South Africa and the broader African continent by accomplishing several key objectives, each strategically aligned with addressing critical aspects of coworking space development and user experience.

Firstly, it seeks to foster future research by serving as a catalyst for future investigations into coworking spaces within the South African and African contexts. By addressing existing gaps in knowledge, this study aims to provide a foundational framework that future researchers can build upon, thereby nurturing a growing body of literature on coworking within the region.

Secondly, at the core of this research is a commitment to enhancing the coworking experience for its users. Through systematically assessing the current user

satisfaction and identification of areas of concern, the study aims to shed light on how coworking spaces can better meet the needs and expectations of their users.

Furthermore, the research emphasises the practical implications for stakeholders in the coworking industry, promoting evidence-based decision-making. By encouraging investors, landlords, managing agents and building professionals to engage with and apply existing research findings in their decision-making processes, this approach can contribute to the creation of coworking spaces that are not only research-informed but also more likely to succeed in meeting the diverse needs of their users.

By addressing these objectives, the research aspires to play a pivotal role in advancing both academic knowledge and industry practices, ultimately benefiting coworking users, investors, professionals, and researchers alike.

A brief outline of the research paper to follow:

The subsequent chapters of the research paper will delve into the literature review, outlining essential concepts relevant to this study, along with the formulated hypotheses. Following the literature review, the research design and methodology are discussed. Finally, the data gathered is exposed, which is then discussed and finally the research is concluded in the final chapter of the research paper. The reference list and appendix follow the conclusion of the research paper.

2. Literature Review

2.1 Introduction

Coworking spaces have gained immense popularity in recent years, offering individuals and teams from diverse backgrounds an alternative to traditional office settings (Howell, 2022, Weijs-Perrée et al., 2019). Recognising coworking user needs could lead to retaining such members (Rådman et al., 2023). Understanding how the fulfillment of basic psychological needs, as proposed by self-determination theory, may influence individual performance in work environments is essential (Gagné et al., 2022).

This chapter aims to conduct a comprehensive literature review to identify existing research that examines specific coworking users' needs and their impact on performance outcomes. Additionally, this chapter seeks to contextualise coworking spaces and users, focusing on understanding and evaluating the satisfaction of coworking space users' needs through the lens of self-determination theory. Specifically, it investigates whether the satisfaction of these coworker user needs, as conceptualised by basic psychological needs in self-determination theory, correlates with positive performance outcomes.

2.2 Defining coworking spaces

Over the past twenty years, shifts in work practices have occurred as a result of the collaborative economy and emerging models of collaboration (Mitev et al., 2019). The consequences of these changes have seen a continuous increase in the prevalence of coworking spaces (Appel-Meulenbroek et al., 2021).

The inspiration for the coworking concept came from open offices of Silicon Valley as well as the social interaction in public libraries, this led to the establishment of coworking space concept (Bilandzic & Foth, 2013; Schopfel et al., 2015). The modern iteration of these cooperative and communal workspaces began to gain prominence in the mid-2000's, notably in San Francisco and London (Merkel, 2015; Waters-Lynch et al., 2016).

Howell (2022) defines coworking spaces as shared and communal environments where individuals and teams from various companies come together, utilising

subscriptions that can span from hourly, daily, weekly, monthly, or yearly. Clifton and Reuschke (2022) support the definition of shared, flexible working space. Kojo and Nenonen (2016) identified six distinct categories of coworking spaces categorised according to their business model and the extent of user access: public offices, third places, collaboration hubs, coworking hotels, incubators, and shared studios. Public offices include free co-working spaces like libraries, while third places refer to public spaces necessitating service purchases, like cafes (Kojo & Nenonen, 2016). Collaboration hubs are public offices emphasising worker collaboration, coworking hotels offer shared office space with brief lease contracts and streamlined services, incubators center on entrepreneurship support, and shared studios involve organisations or entrepreneurs renting office spaces through flexible lease agreements, often with criteria related to community fit (Kojo & Nenonen, 2016).

Spinuzzi et al. (2018) defined coworking spaces as a working environment where independent knowledge workers gather and share a space. Beyond merely offering workspace, coworking spaces create a community of entrepreneurs who independently pursue their own ventures while being physically located in the same space; this unique organisational approach and innovative business model lead to the emergence of fresh solutions for entrepreneurs due to the concentrated environment (Howell, 2022). Social theory places significant emphasis on social foci, coworking spaces embody a novel form of these social foci offering opportunities for individuals to shape their social interactions and can unite individuals who might not have connected otherwise (Howell, 2022). The rise of self-employment, freelancing, and remote work has coincided with the rapid emergence of coworking spaces, where individuals work independently but share a collaborative workspace (Clifton et al., 2022).

In summary, the categorisation of coworking spaces into six distinct types by Kojo and Nenonen (2016) complemented by insights from various authors, underscores the diversity within the coworking landscape available to individuals and teams in the evolving work environment. Coworking spaces are defined as shared and communal environments where individuals or teams from different organisations converge to occupy the provided user space, encompassing a range of business models.

2.3 Coworking space users

Coworking spaces usually attract a diverse range of occupants (Howell, 2022), from diverse backgrounds (Bouncken & Aslam, 2019). These occupants often encompass entrepreneurs, freelancers, remote workers, and various other independent or non-traditional professionals (Howell, 2022). Rådman et al. (2023) expanded this categorisation and included knowledge workers, nomadic workers as well as self-employed workers as coworker space users. Howell (2022) further highlights that coworking spaces offer an appealing alternative to those who may not have the financial means to secure a traditional office setting. Additionally, coworking space users extend to include part-time and full-time employees of organisations, (Bouncken et al., 2021; van Dijk, 2019). Expanding on this diversity Weijs-Perrée et al. (2019) broadens the spectrum of occupants to include students, seniors, and employees representing a wide range of enterprises, ranging from small and medium-sized businesses to large corporations.

In summary, the literature emphasises that coworking spaces function as dynamic environments accommodating a diverse range of users. This inclusivity fosters a rich community that transcends traditional occupational and demographic boundaries, encompassing students, full-time and part-time employees, self-employed individuals, entrepreneurs, retirees, and the unemployed. The multifaceted nature of coworking space communities is evident in their ability to attract users from different age groups, education levels, genders, and market sectors, reinforcing their role as versatile and inclusive workspaces.

2.4 Coworker space user needs

It is essential to comprehend the concept of a need when it comes to identifying coworker user needs. The Oxford Dictionary of English defines a need as “to require something/somebody because they are essential or very important, not just because you would like to have them”.

According to Rådman et al. (2023), their definition aligns with the Oxford Dictionary’s, emphasising a need as “a description of a job, which addresses innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being, to be fulfilled by the product of service” (p.882).

In the context of Self-determination theory, needs, as defined by Deci and Ryan (2014), differ from broader concepts like person motives, desires, or pursuits. Ulwick and Bettencourt (2008) defined a need as an outcome an individual desires to accomplish when using a product or service.

Considering various authors and in the context of coworking spaces, a need can be defined as an inherent psychological requirement crucial for personal development, integrity, and well-being. Individuals seek to fulfil these needs through the utilisation of specific products or services in coworking spaces.

2.4.1 Identifying coworker space user needs

Rådman et al. (2023) conducted a study on needs of members in coworking spaces, the study utilised participant observations, immersions, and interviews for data collection, twenty-one coworker user needs where identified and categorised into five distinct categories: social needs, business networking, knowledge exchange, productivity, and physical wellbeing. These user needs were also acknowledged by various authors, noting similar patterns.

Butcher (2018) identified the need for social interaction through the need for a sense of community as well as support through collaboration. Weijs-Perrée et al. (2019) identified major needs such as networking, collaboration, a workplace away from home, inspiring work environment and affordable space. Appel-Meulenbroek et al. (2021) identified needs such as a vibrant-creative atmosphere, work life balance, affordability, flexibility, community, interaction, supportive environment, and legitimacy through professional appearance. Clifton et al. (2022) identified needs including networking, interaction, creative environment, affordability, infrastructure, social atmosphere, and community.

Rådman et al. (2023) further identified a comprehensive set of needs, including a desire for community, energising workspace, inclusiveness, control over interactions, transparency, impressive workplace, company promotion, member awareness, collaboration, networking, knowledge transfer, non-disruptive interactions, workspace choice, confidentiality, pleasant work experience, and physical well-being.

Memud and Tabibi (2023) in a study conducted in Nigeria, found coworking space user needs related to interaction, office and utility services, advancement in technology, keeping a work-life balance, economic efficiency, flexibility in lease terms, working hours and space, and change in workforce demographics.

Coworkers, according to Brown (2017) aim to separate home from work-life, achieve a better work-life balance, establish a more productive work environment, connect with like-minded professionals, address professional isolation, and foster opportunities for knowledge exchange and support among coworkers. Additionally, individuals join coworking spaces not only to pursue their individual work, maintaining autonomy and independence, but also to cultivate a sense of community with other coworkers in the shared environment (Garrett et al., 2017).

2.4.2 Categorisation of coworker user needs

Social needs

Butcher (2018) emphasises the importance of social interaction and the need for a sense of community in coworking spaces. Coworkers aim to separate home from work-life, achieving a better work-life balance, and establishing a more productive work environment (Brown, 2017). Appel-Meulenbroek et al. (2021) and Rådman et al. (2023) also highlighted the desire for a vibrant-creative atmosphere, inclusiveness, and a supportive community. From the literature, it can be concluded that social need is a category within the needs of coworkers identified by Rådman et al. (2023).

Rådman et al. (2023) identified five needs within the category of social needs that are supported by various authors. First, there is a need “to belong to a community”, (Appel-Meulenbroek et al., 2021; Brown, 2017; Butcher, 2018; Clifton et al., 2022; Garret et al., 2017; Memud and Tabibi, 2023; Rådman et al., 2023; Weijs-Perrée et al., 2019). Second, a need “to have a workplace that gives energy”, (Appel-Meulenbroek et al., 2021; Brown, 2017; Clifton et al., 2022; Rådman et al., 2023; Weijs-Perrée et al., 2019). Third, “to be noticed and feel welcome at one’s workplace”, (Appel-Meulenbroek et al., 2021; Butcher, 2018; Clifton et al., 2022; Rådman et al., 2023). Fourth, “to be in control of social interactions”, (Butcher, 2018;

Clifton et al., 2022; Garret et al., 2017; Memud and Tabibi, 2023; Rådman et al., 2023). Fifth, “to be able to be transparent”, as identified by Rådman et al. (2023).

Business networking

Appel-Meulenbroek et al. (2021) identified the need for a supportive environment as well as interaction. Both Clifton et al. (2022) and Weijs-Perrée et al. (2019) emphasised networking as a major need in coworking spaces. Coworkers join coworking spaces to connect with like-minded professionals and foster opportunities for business networking and support (Brown, 2017). Business networking as a category identified by Rådman et al. (2023) is supported by various authors.

Rådman et al. (2023) identified five needs under the category business networking that are supported by various authors. First, “to have your workplace leave a good impression on guests” (Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Rådman et al., 2023; Weijs-Perrée et al., 2019). Second, “to be able to market one’s business” (Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Rådman et al., 2023; Weijs-Perrée et al., 2019). Third, “to know who the other members are” (Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Butcher, 2018; Garret et al., 2017; Rådman et al., 2023; Weijs-Perrée et al., 2019). Fourth, “to cooperate with relevant actors” (Appel-Meulenbroek et al., 2021; Butcher, 2018; Clifton et al., 2022; Memud and Tabibi, 2023; Rådman et al., 2023; Weijs-Perrée et al., 2019). Fifth, “to meet people that can lead to business opportunities” (Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Memud and Tabibi, 2023; Rådman et al., 2023; Weijs-Perrée et al., 2019).

Knowledge exchange

Knowledge exchange is a recurring theme in literature. Weijs-Perrée et al. (2019) mention collaboration as a major need, while Rådman et al. (2023) highlight collaboration, networking, and knowledge transfer as important elements. Coworkers, according to Brown (2017) aim to cultivate a sense of community and foster opportunities for knowledge exchange and support among coworkers. Knowledge exchange as a category identified by Rådman et al. (2023) is supported by various authors.

Rådman et al. (2023) identified three needs under the category knowledge exchange that are supported by various authors. First need, “to learn new things from peers and events” (Appel-Meulenbroek et al., 2021; Brown, 2017; Butcher, 2018; Clifton et al., 2022; Memud and Tabibi, 2023; Rådman et al., 2023; Weijs-Perrée et al., 2019). Second, “to be able to receive help or input from others” (Appel-Meulenbroek et al., 2021; Brown, 2017; Butcher, 2018; Clifton et al., 2022; Memud and Tabibi, 2023; Rådman et al., 2023; Weijs-Perrée et al., 2019). Third, “To be able to share knowledge” (Appel-Meulenbroek et al., 2021; Brown, 2017; Butcher, 2018; Clifton et al., 2022; Rådman et al., 2023; Weijs-Perrée et al., 2019).

Productivity

Productivity-related needs are evident in various studies. Appel-Meulenbroek et al. (2021) mention a vibrant-creative atmosphere, flexibility, and a supportive environment. Clifton et al. (2022) included in social atmosphere and infrastructure as needs relating to productivity. Coworkers join coworking spaces to achieve a better work-life balance and establish a more productive work environment (Brown, 2017).

Rådman et al. (2023) identified seven needs under the category productivity that are supported by various authors. First need, “To be able to focus on work activities” (Appel-Meulenbroek et al., 2021; Brown, 2017; Garret et al., 2017; Memud and Tabibi, 2023; Rådman et al., 2023). Second, “To have interactions without disturbing others” (Rådman et al., 2023). Third, “To be able to choose a sustainable work area” (Rådman et al., 2023). Fourth, “To be able to manage confidential information securely” (Rådman et al., 2023). Fifth, “To feel an increased productivity from one's workplace” (Appel-Meulenbroek et al., 2021; Brown, 2017; Clifton et al., 2022; Rådman et al., 2023; Weijs-Perrée et al., 2019). Sixth, “To be able to focus on the core business” (Appel-Meulenbroek et al., 2021; Rådman et al., 2023). Seventh, “To be able to work smoothly without technical disruptions” (Clifton et al., 2022; Memud and Tabibi, 2023; Rådman et al., 2023).

Physical well-being

Well-being is highlighted in the literature, with various studies emphasising factors relating to a positive work experience. Appel-Meulenbroek et al. (2021) mention

work-life balance, affordability and supportive work environment. Rådman et al., (2023) included desires for energising workspace, inclusiveness, an impressive workplace and physical well-being. Garrett et al. (2017) pointed out that individuals join coworking spaces not only for autonomy but also to cultivate a sense of community, contributing to overall well-being.

Rådman et al. (2023) identified the need to be healthy under the category physical well-being.

A comprehensive overview in Table 1 highlights the multifaceted nature of coworking space user needs and the supporting literature that contributes to understanding these dynamic users of coworking spaces. The twenty-one coworker user needs identified by Rådman et al. (2023) and supported by various authors are presented in Table 1.

Table 1: Summarised identified coworker user needs

Table 1: Coworking user needs identified and catergorised											
Category	**Coworker User Needs**	**Supporting literature for the need**									
			Brown, (2017)	Garret et al., (2017)	Butcher, (2018)	Weijs-Perrée et al., (2019)	Appel-Meulenbroek et al., (2021)	Clifton et al., (2022)	Memud and Tabibi, (2023)	Rådman et al., (2023)
Social needs	"To belong to a community"		x	x	x	x	x	x	x	x
Rådman et al., (2023)	"To have a worplace that gives you energy"		x			x	x	x		x
	"To be noticed and feel welcome at one's workplace"				x		x	x		x
	"To be in control of social interactions"			x	x			x	x	x
	"To be able to be transparent"									x
Business networking	"To have your workplace leave a good impression on guests"					x	x	x		x
Rådman et al., (2023)	"To be bale to market one's company"					x	x	x		x
	"To know who the other members are"			x	x	x	x	x		x
	"To cooperate with relevant actors"				x	x	x	x	x	x
	"To meet people that can lead to business oppertunities"					x	x	x	x	x
Knowlegde exchange	"To learn new things from peers and events"		x		x	x	x	x	x	x
Rådman et al., (2023)	"To be able to receive help or input from others"		x		x	x	x	x	x	x
	"To be able to share knowledge"		x		x	x	x	x		x
Productivity	"To be able to focus on work activities"		x	x			x		x	x
Rådman et al., (2023)	"To have interactions without disturbing others"									x
	"To be able to choose a sustainable work area"									x
	"To be able to manage confidential information securely"									x
	"To feel an increased productivity from one's workplace"		x			x	x	x		x
	"To be able to focus on the core business"						x			x
	"To be able to work smoothly without technical disruptions"							x	x	x
Physical well-being	"To be healthy"			x			x			x
Rådman et al., (2023)										

Table1 comprises the twenty-one user needs identified by Rådman et al., (2023), classified into the different categories, along with literature that supports each need.

2.5 Self-determination theory

The following section on self-determination theory serves as the cornerstone of the study, shedding light on the rationale behind the choice of theory and its relevance. Firstly, it explains the rationale behind selecting self-determination theory as the foundation of the research. Secondly, it delves into the fundamental principles of the theory, establishing its theoretical framework. Thirdly, it establishes a connection between the 21 identified user needs and the theoretical underpinnings of self-determination theory, specifically focusing on the basic psychological needs. Subsequently, it conducts a comprehensive review of existing literature to explore the relationship between basic psychological needs and individual performance.

Finally, it examines the influence of cultural factors on self-determination theory, enhancing the understanding of its applicability in diverse contexts.

2.5.1 Choosing self-determination theory as a foundation in the study

Self-determination theory has been widely used in the field of organisation psychology to enhance well-being and boost productivity within organisational settings (Deci et al., 2017). The theory has been applied across many and diverse domains ranging from education, healthcare, physical activities, psychotherapy, virtual words, management, and employee work motivation (Deci et al., 2017; Ryan & Deci, 2017). Over the past three decades, this theory has maintained its prominence and remains one of the most cited theories in the realm of human motivation (Cerasoli et al., 2016; Ryan & Deci, 2017, 2022).

Despite its widespread use, there remains a notable gap in the research literature, specifically concerning the application of self-determination theory to physical environments, offering an opportunity for exploration and contribution to an under-researched area (Sjöblom et al., 2016).

The relevance of the theory extends beyond specific cultural and job contexts, as evidenced by consistent results in studying the relationship between motivation types and employee outcomes across different settings (Van den Broeck et al., 2021). What sets self-determination theory apart is its multidimensional view of motivation, providing a comprehensive framework (Van den Broeck et al., 2021). The theory goes beyond most motivation theories as it considers the nature of quality of motivation, where other theories focus primarily on how much one is motivated (Kanfer & Chen, 2016; Kanfer et al., 2017).

Self-determination theory is a motivation theory of the individual, stands in contrast to other theories that evaluate the individual's strength that vary across needs, or based on the pure drive of the individual (Cerasoli et al., 2016). Moreover. unlike theories influenced by unconscious or subconscious desires, self-determination theory is not solely determined by direct, observable outcomes or results of behavior, instead, it places emphasis on three basic psychological needs that are crucial for optimal functioning, these needs remain consistent across individuals, with the

variation lying in the degree to which the surrounding environment facilitates their fulfilment (Cerasoli et al., 2016).

Self-determination theory is a psychological theory that was developed by psychologist Edward L. Deci and Richard M. Ryan, centers on three basic psychological needs whose satisfaction is posited to contribute significantly to an individual's well-being and motivation (Deci et al., 2017). The theory is widely used in organisation psychology (Van den Broeck et al., 2021), with self-determination theory as a motivation theory that regards needs as fundamental and universal psychological elements essential for human well-being, motivation, and performance (Deci & Ryan, 2014). Importantly, the level of fulfillment of these individual needs emerges as a crucial determinant not only for psychological well-being but also for optimal performance (Rådman et al., 2023).

Self-determination theory stands out for its focus on autonomous and controlled forms of motivation in predicting outcomes such as performance, engagement, and well-being, differing from prevalent historical and contemporary approaches to human motivation which tend to oversimplify motivation as a unitary concept with a more-or-less characterisation (Ryan & Deci, 2022). The theory's application extends beyond theoretical considerations, offering key concepts that serve as guiding principles for developing policies, practices, and environments fostering both performance and well-being within organisations (Deci et al., 2017). The theory is relevant to organisation behaviour as it relates to a theory of work motivation (Gagné & Deci, 2005).

2.5.2 Self-determination theory

Self-determination theory is a motivation theory that regards needs as a fundamental and universal psychological element essential for human well-being and performance, the two primary types of motivation are, autonomous motivation and controlled motivation (Deci et al., 2017; Ryan & Deci, 2014, 2017). Autonomous motivation is evident when individuals willingly engage in activities, feeling a sense of choice (Deci et al., 2017; Ryan & Deci, 2014, 2017). It is underpinned by the satisfaction of three basic psychological needs: autonomy, competence, and relatedness, encompassing both intrinsic motivation and self-internalised extrinsic motivation (Deci et al., 2017; Ryan & Deci, 2014, 2017). In contrast, controlled

motivation arises when individuals are compelled by external pressure or rewards and is considered less self-determined (Deci et al., 2017; Ryan & Deci, 2014, 2017). Amotivation, a distinct state characterised by a lack of motivation, does not fall on the continuum between autonomous and controlled motivation, instead, individuals experiencing amotivation lack a clear intention or desire to act (Ryan & Deci, 2017).

Autonomous motivation

Autonomous motivation stands in contrast to controlled motivation, with both exerting distinct influences on individual behaviour (Deci et al., 2017). This form of motivation arises when basic psychological needs are satisfied, prompting individuals to engage in actions through conscious and voluntary choices rather than feeling compelled or controlled (Rådman et al., 2023). Autonomous motivation encompasses both intrinsic and fully internalised extrinsic motivation (Deci & Ryan, 2014).

Intrinsic motivation

Intrinsic motivation refers to the engaging in an activity or behaviour since it is inherently rewarding enjoyable, or satisfying in itself, rather than relying on external factors or rewards (Deci & Ryan, 2014; Van den Broeck et al., 2021). Intrinsic motivation is driven from internal factors such as personal interest, curiosity, or the inherent satisfaction derived from the activity (Van den Broeck et al., 2021).

Extrinsic motivation

Extrinsic motivation is driven by external influences and arises from external pressures or control imposed by others (Van den Broeck et al., 2021). This form of motivation is driven by external rewards, social approval, the pursuit of valued outcomes, or the desire to avoid punishment, extrinsic motivation is related to controlled motivation (Ryan & Deci, 2017).

Internalised extrinsic motivation

Internalised extrinsic motivation refers to voluntary engagement in an activity driven by personal significance or value (Deci & Ryan, 2014). In contrast from extrinsic motivation, which is characterised by external pressures or influenced from others, internalised extrinsic motivation occurs when individuals integrate these external

factors into their own values, shaping a meaningful aspect of their self-identity (Van den Broeck et al., 2021). These internalised motivations may arise from ego-involvement or aligning with social expectations, becoming integrated into an individual's values and sense of self (Van den Broeck et al., 2021). At a deeper level, integrated regulations represent the internalisation of external influences, transforming them into a part of one's identity and true self (Deci & Ryan,2000). Identified and integrated regulations are acknowledged as extrinsic motivational forms, as they are essential for achieving outcomes beyond the activity itself, however, they are predominantly viewed as autonomous motivation due to their voluntary nature, akin to intrinsic motivation (Van den Broeck et al., 2021).

Basic psychological needs

Self-determination theory recognises three basic psychological needs, relatedness competence and autonomy (Deci et al., 2017). The satisfying of these needs lead to autonomous motivation, with positive impacts on individuals, including wellness and performance, nonetheless, the inability to meet these basic psychological needs may result in dissatisfaction, below-average performance, occasionally psychological discomfort (Deci et al., 2017).

Relatedness

Relatedness involves the wish to establish connections with others, showing care and receiving care from others, experiencing a sense of belonging with individuals, and feeling connected to a community (Ryan & Deci, 2002).

Autonomy

Autonomy involves acting from personal interests and integrated values, seeing one's behaviour as self-expression (Rådman et al., 2023). It manifests when individuals engage in activities willingly, driven by a sense of volition and personal choice (Deci et al., 2017). Autonomy encompasses acting wilfully, the exercise of one's own will, the expression of support or agreement, and the freedom to decide based on personal preferences or reasoning, essentially, the act of choosing when faced with two or more possibilities (Ryan & Deci, 2017, 2022). Gagné and Deci (2005) have echoed this concept, arguing that the need for autonomy empowers individuals to participate willingly.

Competence

Competence entails being thoughtful in interactions with the environment, demonstrating one's abilities, and encountering opportunities (Ryan & Deci, 2002).

Controlled motivation

Controlled motivation is propelled by extrinsic factors such as rewards, threats, or external influence, restricting an individual's exercise of their own will (Deci et al., 2017). This form of motivation can lead to short-term results but may have detrimental effects over the long term, especially if the individual lacks autonomous motivation (Deci at al., 2017). Research suggests that while autonomous motivation positively influences performance and well-being, controlled motivation may hinder outcomes, particularly in task requiring intrinsic motivation, (Gagné & Deci, 2005).

2.5.3 Interconnection between coworker user needs and basic psychological needs identified through self-determination theory

Self-determination theory encompass three basic psychological needs that every individual requires to be autonomously motivated (Deci et al., 2017). Rådman et al. (2023) and various other authors have identified twenty-one coworker needs, these needs are classified into the three basic psychological needs, autonomy, relatedness and competence.

Nine of the twenty-one identified needs are categorised as reflecting the individual's need for autonomy. Autonomy, as defined by Deci et al. (2017) and Ryan and Deci (2017; 2022), is the manifestation of an individual's engagement in activities driven by a sense of volition and personal choice. It encompasses purposeful actions, the exercise of one's own will, the expression of support or agreement, and the freedom to make decisions based on personal preferences or reasoning when faced with multiple possibilities (Deci et al., 2017; Ryan & Deci, 2017; 2022). These nine needs are directly linked to autonomy, involving the individual's decision to participate in social action, the choice to be transparent or not, the decision to market one's company, the choice to learn about other coworkers, the control to focus on one's own work, interaction with others without causing disturbance, the decisions to choose one's working environment and space, the ability to manage confidential information, and the decision to prioritise personal health (Rådman et al., 2023).

Four of the twenty-one identified needs are categorised as reflective of the individual's need for relatedness. Relatedness is characterised by the desire to establish connections with others, demonstrating care and receiving care, experiencing a sense of belonging with individuals, and feeling connected to a community (Ryan & Deci, 2002). These four needs include the desire to belong to a community, working in an environment that activates personal energy, feeling welcomed and noticed, and the ability for the workplace to leave a positive impression on guests (Rådman et al., 2023).

Eight of the twenty-one identified needs are categorised as reflective of the individual's need for competence. Competence involves being thoughtful in interactions with the environment, demonstrating one's abilities, and encountering opportunities (Ryan & Deci, 2002). These eight needs include the desire to cooperate with relevant actors, meet other coworkers that can lead to business opportunities, learn from others, receive help and input from others, share knowledge, feel a sense of productivity, focus on the core business, and work without any technical disruptions (Rådman et al., 2023).

Figure 2 summarises the classification on the twenty-one coworker user needs between the basic psychological needs for autonomy, relatedness and competence as discussed above.

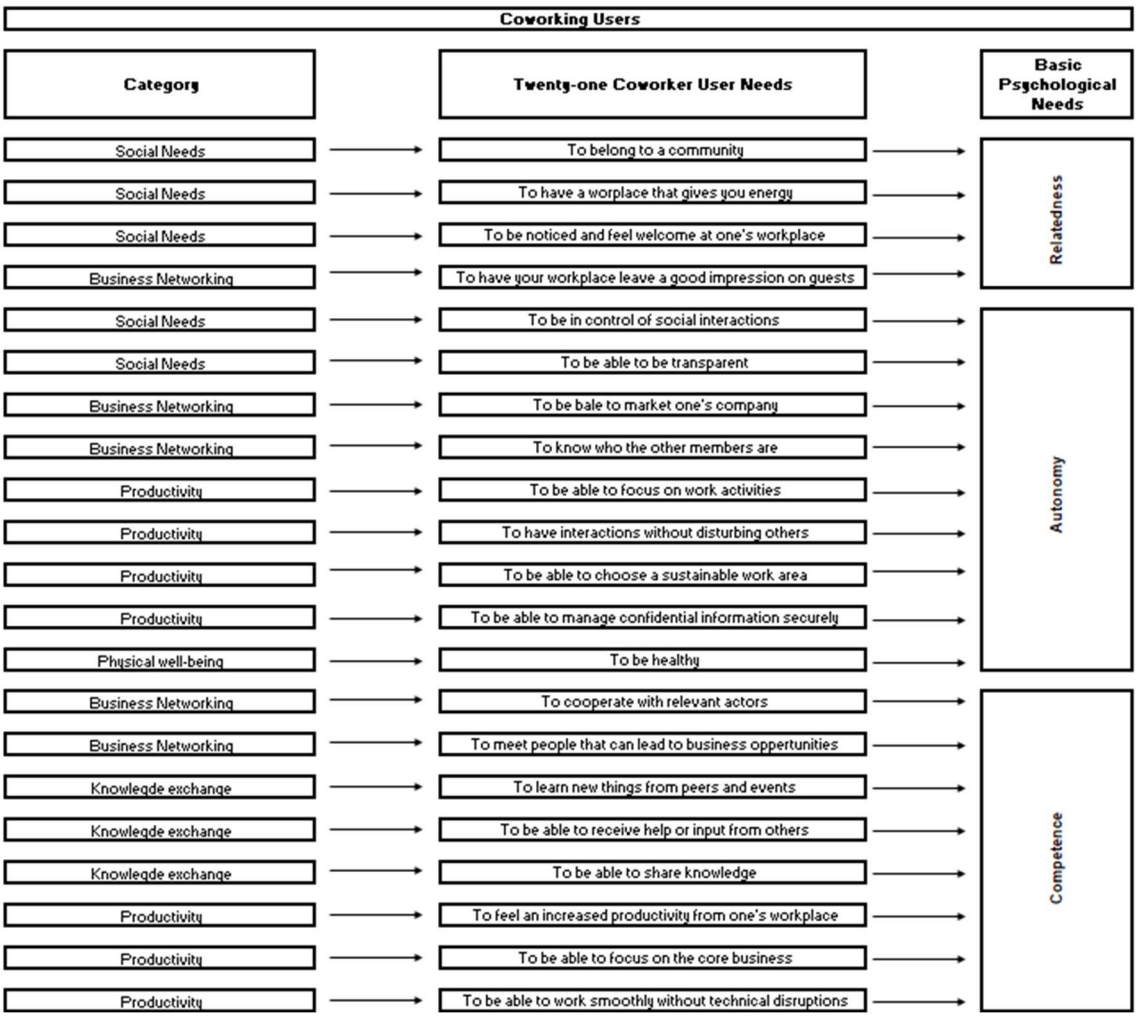


Figure 2: Classification of twenty-one coworker user needs in relation to basic psychological needs for autonomy, relatedness, and competence

2.5.4 Relationship between fulfilment of basic psychological needs and performance

Self-determination theory has been widely used in the field of organisation psychology to enhance performance outcomes within organisational settings (Deci et al., 2017). Individual performance is influenced by both controlled motivation and autonomous motivation; nevertheless, research indicates that autonomous motivation exerts a greater impact on an individual's performance outcomes compared to controlled motivation, therefore, fostering autonomous motivation in the workplace holds greater significance for achieving positive outcomes (Deci et al., 2017). It is well researched and known that when individuals are autonomously motivated either by intrinsic motivation or well-internalised forms of extrinsic

motivation, they display higher level of engagement, excitement, energy and confidence that result in improved performance, creativity, well-being and determination (Ryan & Deci, 2017; 2022). Kuvaas et al. 2017 supports the finding that autonomous motivation, intrinsic motivation has a positive relationship with individual outcomes, such as performance, while controlled motivation, extrinsic motivation, are either negative or unrelated to those outcomes. Nonetheless, the inability to meet the needs that lead to autonomous motivation, relatedness, autonomy, and competence may result in dissatisfaction, below-average performance, and occasionally psychological discomfort (Deci & Ryan, 2014; Deci et al., 2017). The surrounding environment is a significant enabler or disabler of the fulfilment of these basic psychological needs (Cerasoli et al., 2016).

In terms of overall well-being, attitude, and behaviour, intrinsic motivation holds paramount importance; however, when it comes to predicting performance and organisational citizenship behaviour, the more influential factor is the internalised form of extrinsic motivation (Van den Broeck et al., 2021). Each type of motivation has a specific outcome in predicting employee behaviour, well-being and outcomes (Van den Broeck et al., 2021). Most variances in individual outcomes are directly correlated to intrinsic motivation (Van den Broeck et al., 2021). Intrinsic motivation has a higher influence on individual's well-being than identified regulation, but identified regulations have a higher influence on individual behaviour one which is performance (Van den Broeck et al., 2021). Internalised extrinsic motivation that becomes part of an individual's intrinsic motivation was found to correlate with the outcomes from intrinsic motivation (Van den Broeck et al., 2021). Researchers struggled to include a measurement instrument through factor analysis to measure this integrated regulation separately from intrinsic motivation (Gagné et al., 2015; Van den Broeck et al., 2021). The scales developed for integrated regulations overlapped with those of intrinsic motivation (Howard et al., 2017), as researchers found, making it challenging to disguise integrated regulations from intrinsic motivation (Van den Broeck et al., 2021).

To achieve optimal performance and favourable outcomes, an individual must attain full autonomous motivation, indicating the satisfaction of all basic needs (Gagné et al., 2022; Singh et al., 2019). The satisfaction of individual needs for competence, relatedness and autonomy has a direct positive relationship to work performance (; Baard et al., 2004; Deci et al., 2001; Singh et al., 2019). Grolnick and Ryan (1987)

affirmed that parents supporting their child's need for competence, relatedness, and autonomy relating to homework predicted the child's ability to maintain intrinsic motivation, which, in turn, was associated with predicting the child's overall school performance. Conversely, Rådman et al. (2023) found that the inability to fulfil certain needs can lead to frustration, weaker performance, and psychological distress. The need for relatedness generally complements the need for autonomy, although tension can arise due to the work environment, (Rådman et al., 2023). In a workplace context, individuals with a high degree of autonomy often find ways to meet the needs to relatedness and competence, emphasising that autonomy should not be confused with independence (Rådman et al., 2023).

Creating an environment that enables individual choice and recognition impacts intrinsic motivation, as choice addresses the need for autonomy and acknowledgement fulfils the need for competence (Ryan & Deci, 2022). Both negative and positive feedback through acknowledgement can have varying effects on intrinsic motivation (Ryan & Deci, 2022). Extensively research in various domains, including work and organisations, self-determination theory explores the positive effects of autonomy-supportive environments on multiple outcomes, including performance (Ryan & Deci, 2022). However, supporting autonomy alone is inadequate; relatedness and competence are essential in fostering intrinsic motivation and value within these domains (Ryan & Deci, 2022).

As autonomy increases, motivation becomes more positive (Deci & Ryan, 2000). An individual's intrinsic motivation is enhanced when they experience feelings of autonomy and competence within a social context, but factors that diminish these feelings can lead to either external control or a lack of motivation (Gagné & Deci, 2005). The foundation of intrinsic motivation lies in the fundamental needs for competence and autonomy (Gagné & Deci, 2005). It is essential for individuals to experience a sense of competence, where they feel capable and effective in their actions, and autonomy, where they have a feeling of control and independence, to sustain and nurture their intrinsic motivation (Gagné & Deci, 2005).

To achieve complete autonomous motivation, an individual requires satisfaction in all three needs, relatedness, competence, and autonomy (Gagné & Deci, 2005). While the fulfilment of both the needs of autonomy and competence can lead to autonomous motivation, it's essential to note that autonomous motivation won't be

triggered solely by the satisfaction of the need for competence if the need for autonomy is not also fulfilled (Gagné & Deci, 2005).

A study conducted by Black and Deci (2000) found that the autonomy supportiveness of instructors at a university not only predicted an increase in autonomous motivation throughout the semester but also correlated with enhanced course grades, with this effect being particularly significant for students initially low in autonomous motivation. A study performed by Williams et al. (1998) in a medical setting indicated that when healthcare providers support patients' autonomy, it fosters a sense of control and motivation, leading to more sustained changes in health behaviour. Managerial support for autonomy in a work organisation that encourages self-initiation, providing information in a non-controlling way, offering individuals a voice, seen results on individuals having a higher level of trust in management, showing more satisfaction in their job and displaying more positive attitude towards work (Deci et al., 1989).

Cerasoli et al. (2016), like previously mentioned authors, found that the three basic psychological needs significantly influenced individual performance. It was observed that autonomy was consistently associated with competence and relatedness. Notably, no single basic need satisfaction led to performance; autonomy had a correlation of 0.28, competence had a correlation of 0.37, and relatedness had a correlation of 0.25, the remaining 0.10 was attributed to external motivation (Cerasoli et al., 2016).

Cerasoli et al. (2014) highlighted the importance of intrinsic motivation in resulting in higher-quality performance. Intrinsic motivation is crucial for performance, whether incentives are present or not (Cerasoli et al., 2014). The need for autonomy is the most basic desire an individual seeks to be relaxed in the environment they find themselves in (Cerasoli et al., 2016). Individuals lose motivation when they were forced to do things without the perceived free will, autonomy, to do something out of their own (Cerasoli et al., 2016). Cerasoli et al. (2016) noted that three psychological components could explain why autonomy predicts performance; the individual perceives being in control over the action they have taken or the circumstances they found themselves in, which they take action for their decision, associated with a higher level of performance; secondly, an individual will not act out of free-will in performing duties or engaging in a task or action if they believe there efforts will be ineffective or thwarted; thirdly, when an individual believes or perceives they have

freedom of choice when engaging in an action or task, this should improve their performance in such activity.

Research through a meta-analysis performed by Patall et al. (2008) validates that offering non-controlling choices to an individual results in positive motivational consequences, such as task performance and perceived competence. Satisfaction of competence need predicts performance, as demonstrating and improving one's abilities is fundamentally satisfying (Deci & Ryan, 2000). The perception of competence is related to challenge and skill, the individual needs a challenge to prove their skill, and without a challenge, the individual will deem that no skill is required (Cerasoli et al., 2016). On the other hand, if the challenge is overwhelming the individual may see a loss in the perceived competence level (Cerasoli et al., 2016). Satisfying the need of competence depends on feedback and if the source that the feedback is received from is trusted or admired, this will affect the feeling of perceived competence (Cerasoli et al., 2016).

Relatedness is a human desire to be respected, valued and desired by individuals you deem important or seek approval from (Cerasoli et al., 2016). Theories on human nature emphasises the importance of interpersonal relationships, theories such as Maslow's hierarchy of needs theory (Maslow, 1958). The need for relatedness is to have a meaningful relationship with others (Deci & Ryan, 2000). The relationship impacts the individual's desire for growth and exploration (Cerasoli et al., 2016). The desire to grow and the internalisation of behaviour regulations are established by fulfilling the need to (Cerasoli et al., 2016). Satisfying the need for relatedness enhances performance, as individuals improve their emotional wellbeing through the establishment of relationship or attachment with others (Cerasoli et al., 2016). The fulfilment of the need for relatedness influences performance outcomes, given its impact on intrinsic motivation (Cerasoli et al., 2014). Bueno et al. (2018) identified two major contributors to improved performance, the coworking environment and second the social interaction.

Hypotheses:

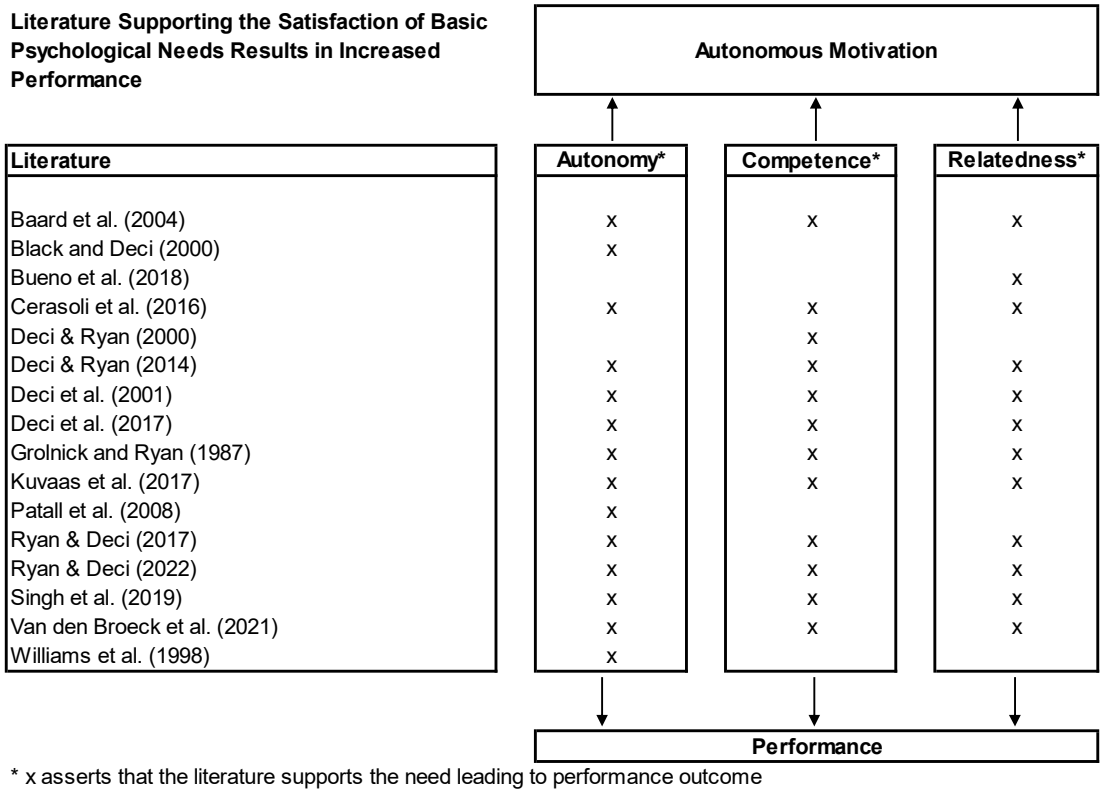
H1: Satisfying the need for relatedness has a direct correlation with user performance.

H2: Satisfying the need for autonomy has a direct correlation with user performance.

H3: Satisfying the need for competence has a direct correlation with user performance.

Table 2 summarises literature supporting the positive relationship between satisfaction of basic psychological needs - relatedness, competence and autonomy - and enhanced individual performance.

Table 2: Literature supporting the satisfaction of basic psychological needs results in increased individual performance



* x asserts that the literature supports the need leading to performance outcome

2.5.5 Cultural difference and the impact on self-determination theory

Self-determination theory has faced criticism for its perceived limited applicability in cultures that prioritise collectivism over individualism, emphasising less value on autonomy (Van den Broeck et al., 2021). The culture itself serves as an extrinsic motivation, when internalised, it influences autonomous motivation, as it becomes part of the individual's value system and self-identity, it continues to impact the basic psychological need for autonomy, the individuals free will to participate in a activity

or not, therefore, its applicability is not demised across different cultures as a motivation theory (Van den Broeck et al., 2021). Self-determination theory is a universal motivation theory (Deci & Ryan, 2000). Basic psychological need satisfaction is as important in both a collective and individualistic culture (Deci et al., 2001).

2.6 Coworker space user performance

Individual performance is impacted by the satisfaction of three basic psychological needs; autonomy, relatedness, and competence (Deci et al., 2017). Performance could be measured in quantity and quality, it is often overlooked in literature, (Cerasoli et al., 2016). This research will focus on perceived performance. For this research once again the type of performance will be overlooked and simplified as overall performance and not delve into types of performance. Motivation is a driving force for improving performance (Paais & Pattiruhu, 2020). Understanding motivation will affect and improve performance (Chen et al., 2012). Kuvaas et al. (2017) argued that the most important outcome from motivation is the effect it has on individual performance. Autonomous motivation is driven by intrinsic and internalised extrinsic motivation, achieved through satisfying an individual's basic psychological needs (Deci & Ryan, 2014; Deci et al, 2017).

2.7 Literature review summary

This chapter presents a comprehensive literature review identifying existing research on specific coworking users' needs and their impact on performance outcomes. Additionally, it contextualised coworking spaces and users, focused on understanding and evaluating the satisfaction of coworking space users' needs through the lens of self-determination theory. According to the literature review, satisfaction of coworker user's needs, conceptualised by basic psychological needs, correlates with positive performance outcomes.

3. Hypotheses

The purpose of the research is to investigate the relationship between the satisfaction of coworker user needs and individual performance within coworking spaces, conceptualised through the lens of self-determination theory. Specifically, the study aims to explore how the fulfillment of basic psychological needs (autonomy, competence, and relatedness) impacts user performance in coworking environments.

To achieve this purpose, the research will test several hypotheses developed and supported by literature using statistical hypothesis testing techniques. The hypotheses formulated from literature, in seeking to answer the research purpose, are as follows:

Hypothesis 1 (H1): Satisfying the need for relatedness has a direct correlation with user performance (Baard et al., 2004; Bueno et al., 2018; Cerasoli et al., 2016; Deci & Ryan, 2014; Deci et al., 2001; Deci et al., 2017; Grolnick & Ryan, 1987; Kuvaas et al., 2017; Ryan & Deci, 2017; Ryan & Deci, 2022; Singh et al., 2019; Van den Broeck et al., 2021).

Hypothesis 2 (H2): Satisfying the need for autonomy has a direct correlation with user performance (Baard et al., 2004; Black & Deci, 2000; Cerasoli et al., 2016; Deci & Ryan, 2014; Deci et al., 2001; Deci et al., 2017; Grolnick & Ryan, 1987; Kuvaas et al., 2017; Patall et al., 2008; Ryan & Deci, 2017; Ryan & Deci, 2022; Singh et al., 2019; Van den Broeck et al., 2021; Williams et al., 1998).

Hypothesis 3 (H3): Satisfying the need for competence has a direct correlation with user performance (Baard et al., 2004; Cerasoli et al., 2016; Deci & Ryan, 2000; Deci & Ryan, 2014; Deci et al., 2001; Deci et al., 2017; Grolnick & Ryan, 1987; Kuvaas et al., 2017; Ryan & Deci, 2017; Ryan & Deci, 2022; Singh et al., 2019; Van den Broeck et al., 2021).

Various authors supported the hypotheses, as summarised in Table 2 on page 28 of Chapter 2. This literature review provides the foundation for the formulation of these hypotheses. Subsequent chapters will aim to provide empirical evidence to explore and validate these hypotheses, thereby contributing to the understanding of

coworking user needs and their impact on user performance. Figure 3 presents a visualisation of the formulated hypotheses.

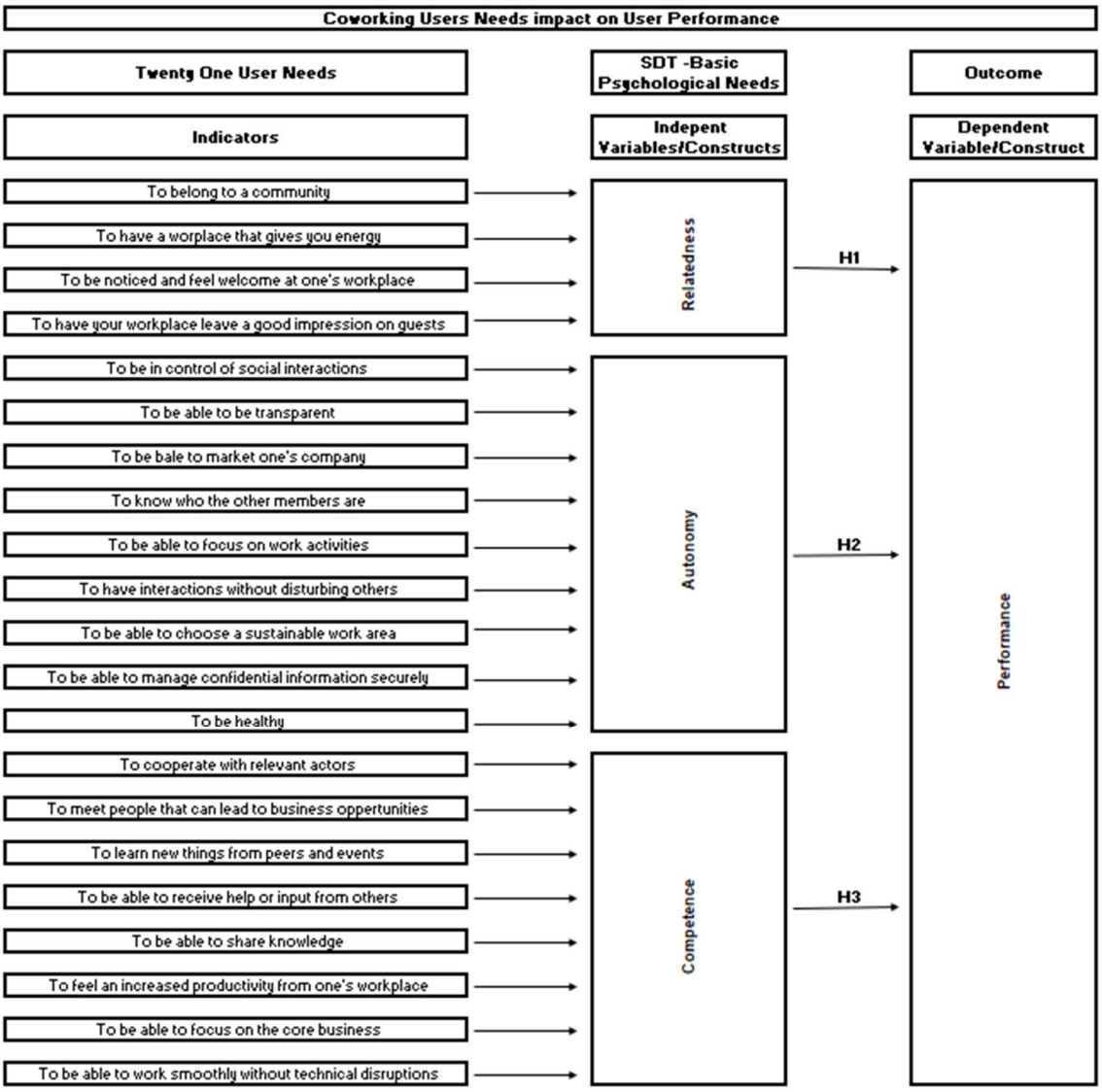


Figure 3: Hypotheses

4. Research Methodology and Design

This chapter provides a detailed description of the research methodology and design employed in the study, offering insights into the methodological framework guiding the research process. It begins by explaining the purpose of the research design, followed by an examination of the underlying philosophy, approach, methodology choice, and research strategy. Additionally, it discusses essential aspects such as the time horizon, target population, unit of analysis, sampling method, sampling size, sampling criteria, along with the selection and utilisation of measurement instruments. Furthermore, it delves into the intricacies of data collection, analysis techniques, quality controls, ethical considerations, and acknowledges the research studies limitations.

4.1 Purpose of research design

The research designs' purpose was explanatory in understand the causal relationship between coworker user needs and coworker user performance in coworking spaces.

The research design laid the groundwork for a broad assessment of coworking spaces, coworking space user needs, and their impact on performance as an outcome. Through an overview of literature review, coworking spaces were defined (Clifton and Reuschke, 2022; Howell, 2022; Kojo and Nenonen, 2016; Clifton et al., 2022; Spinuzzi et al., 2018), their diverse user base was identified (Bouncken & Aslam, 2019; Bouncken et al., 2021; Howell, 2022; Rådman et al., 2023; van Dijk, 2019; Weijs-Perrée et al., 2019), user needs were identified (Appel-Meulenbroek et al., 2021; Butcher, 2018; Howell, 2022; Memud and Tabibi. 2023; Clifton et al., 2022; Rådman et al., 2023; Weijs-Perrée et al., 2019), user needs were categorised using self-determination theory (Deci et al., 2017; Rådman et al., 2023) and coworker space user performance was identified (Deci et al., 2017; Singh et al., 2019). This design then formulated specific hypotheses (Chapter two and three) to empirically investigate the relationship between user needs and user performance in coworking spaces. The overarching goals was to reveal practical insights that can assist coworking space providers in enhancing user satisfaction and fostering a more productive and collaborative workspace for all users.

4.2 Philosophy

The research adhered to a positivism research philosophy, as it involved hypothesis testing to examine the positive correlations between coworker user needs and individual performance outcome in coworking spaces. Existing theory was used to develop these hypotheses, as discussed in Chapter two and three. Quantifiable data was obtained that lent itself to statistical analysis. The reason for selecting positivism as the philosophy in the research approach was aligned with the rational provided by Saunders & Lewis (2018).

4.3 Approach selected

The deductive research approach was adopted in this study, as the researcher formulated hypotheses based on existing theory or knowledge and collected data to validate or refute these hypotheses. According to Saunders and Lewis (2018), deduction was defined as "a research approach involving the testing of a theoretical proposition using a research strategy designed for this purpose." Hypotheses were derived from existing theory, suggesting a positive relationship between user needs and their performance. Through this study, the aim was to empirically test the existence of these relationships and identify which basic psychological need of coworker users is related to individual performance within coworking spaces.

4.4 Methodological choice

The mono-method quantitative research methodology was selected for this research. The choice of a mono-method quantitative research approach is driven by the deductive nature of the research approach, guided by a positivist research philosophy (Saunders et al., 2007). This approach aligned with the research objectives, which involved testing specific hypotheses regarding the relationship between coworking space user needs (autonomy, competence and relatedness) and coworking space user performance indicators among current users. Quantitative methods offered the precision and objectivity needed to quantifiably measure these relationships, employed statistical accuracy for hypothesis testing, and generate data-driven insights.

4.5 Research strategy

The survey research strategy was adopted due to its efficiency, scalability, and capacity to present standardised quantitative data, (Saunders & Lewis, 2018). It provided an objective means of gathering information from a wide range of respondents, with the use of closed-ended questions as well as choice questions limiting interpretation bias. Surveys offered the advantage of anonymity, enabling participants to share information more candidly. As hypotheses were being tested, it was deemed appropriate to use surveys as a strategy.

4.6 Research time horizon

The research adopted a cross-sectional approach as data was gathered from respondents at a single moment in time, which was deemed the most appropriate method since the required data relied on users' previous experiences (Saunders & Lewis, 2018). The data were collected from multiple types of individuals ranging from gender, age, socio-economic classes, level of education, occupational status, working situation and industry, all participants utilising coworking spaces. A survey strategy was used through a questionnaire to collect quantitative data. With the above taken into consideration, a cross-sectional time horizon was deemed appropriate (Memud & Tabibi, 2023)

4.7 Population

Population is defined as the complete set (Saunders & Lewis, 2018), representing the total number of individuals utilising coworking spaces. The size of the population of coworker space users in South Africa could not be determined due to the absence of statistical data at the time of the research. However, according to Coworker (2024), South Africa had 236 coworking spaces. Therefore, the researcher assumed that each coworking space had at least one user, establishing the minimum population at 236.

4.8 Unit of analysis

When defining the unit of analysis, individuals are often considered the primary focus in business research (Kumar, 2018). The unit of analysis refers to "the what or whom being studied" (Babbie, 2016, p. 97). In the context of this study, the focus is on

coworker users to ascertain whether meeting their needs correlates with improved user performance. Thus, the unit of analysis is delineated as the individual user of the coworking space.

4.9 Sampling method, size and criteria

The sampling method employed for this research was non-probability sampling, utilising a method called purposeful sampling (Saunders & Lewis, 2018). Since the population size could not be determined, non-probability sampling was deemed appropriate (Saunders & Lewis, 2018). Consequently, a specific sample size could not be calculated using probability sampling methods, instead, literature and judgment were used to determine the sample size, and as such the findings were generalised (Saunders & Lewis, 2018).

Memud and Tabibi (2023) had a sample size of 60 based on questionnaires, utilising a non-probability sampling method through selective sampling. Clifton et al. (2022) received 76 completed questionnaires back, utilising non-probability sampling. As the total population size of coworker space users in South Africa was not available, a sample size between 60 and 76 was deemed appropriate based on prior research.

A total of 102 surveys were completed by respondents. After ensuring the data met the required criteria, conducting screening and cleaning procedures, a final size of 72 was deemed appropriate based on prior research conducted by Memud and Tabibi (2023) and Clifton et al. (2022).

The survey had two sample criteria that participants needed to meet: being a coworking space user and being older than 18 years of age.

The sample size of 72 was considered suitable for the measurement instrument, as smaller sample sizes between 30 and 50 can be applied in partial least square structural equation modelling (PLS-SEM) (Purwanto, 2021). Hair et al. (2019) confirmed the appropriateness of smaller samples sizes when using partial least square structural equation modelling (PLS-SEM).

4.10 Measurement instruments

The data were collected using an online standardised questionnaire, which was distributed to the sample units within the sample population (see Appendix 3 for the online survey questionnaire). The questionnaire was divided into three sections.

The first section captured demographic information, comprising age, gender, level of education, occupation status, annual salary, industry of employment, geographical location, participation in coworking, employment status, and type of coworking space utilised. The “tick all that apply” method, based on key themes obtained from literature review, was employed, following the approach by Clinton et al. (2022).

The second section of the questionnaire measured satisfaction levels of the coworker space users’ needs, as identified by Rådman et al., 2023 and other authors from literature review in Chapter 3. These questions addressed the 21 coworker user needs identified in the literature review. Questions were derived from Rådman et al., (2023) and were connected to self-determination theory’s needs of relatedness, autonomy and competence (Deci et al., 2017). Responses were recorded on a standard 5-point Likert scale of agreement.

The third section of the questionnaire related to the users’ perceptions of performance in the coworking space, utilising a standard 5-point Likert scale of agreement. Questions were sourced from Oswald and Zhao (2022), focusing on measuring perceived performance in a coworking space working environment.

Prior to making the questionnaire available to participants, pilot testing was conducted to ensure clarity and understanding of the questions (Saunders & Lewis, 2018). The researcher made themselves available to answer any questions and provide clarity on the survey. Participants were asked for their insights on improving the survey (Oswald & Zhao, 2022). The first five surveys were used as part of the pilot testing. All participants understood the questions, the purpose of the survey, the management of the data, and the anonymisation of each respondents’ data. By participating, participants consented and understood the use of their data for the research study (see Appendix 2 for participants consent form). The data received from participants were analysed using descriptive statistics output in IBM SPSS 29 Statistics and SmartPLS4 (Saunders & Lewis, 2018).

4.11 Data gathering process

The questionnaires were self-administered. The development of the questionnaire was performed utilising survey questionnaire software Qualtrics XM (see Appendix 3 for the online survey questionnaire). The link was distributed among the researchers' own network of contacts and shared via LinkedIn, WhatsApp and email. Target sampling was used when sending the link for the survey on one of the platforms mentioned, a request was made to the participant of the survey to forward the link to other qualifying participants, thus utilising the snowball sampling technique as well (Saunders & Lewis, 2018). This approach was selected due to the limited resources and time available to conduct the survey. The survey was available online via a link. The link remained open from the 18th of November 2023 to the 29th of January 2024 for participants to complete the survey. Coworking spaces were contacted, requesting their assistance to distribute the questionnaire to their coworking members. All survey questions were in English and took 5 to 10 minutes to complete.

4.12 Data analysis approach

Data analysis involved preparing the collected data for analysis, employing analysis techniques, and finally interpreting the data (Saunders & Lewis, 2018). This encompassed screening, cleaning, transforming, and modeling data to uncover useful information, draw conclusions, and support decision making. Statistical and computational techniques were utilised to analyse the data comprehensively. The objective of the data analysis, presented in Chapter 5 and further discussed in Chapter 6, was to derive meaningful interpretation from raw data collected, facilitating informed decision-making and enhancing understanding the complexities involved in addressing the research question and hypotheses.

The empirical data collected from participants in the survey was extracted from the survey facilitated software Qualtrics XM into Microsoft Office Excel, where the data was screened and cleaned. The remaining dataset in Excel was then imported into statistical computing software IBM SPSS Statistics version 29 and SmartPLS version 4. The dataset was analysed employing inferential statistical methods, leading to the formulation and presentation of conclusion at the population level.

Data screening and cleaning

Data screening and cleaning are essential process in quantitative research, ensuring the quality, integrity, and reliability of the data being analysed (Pallant, 2020). The screening and cleaning of the data involved two steps: first scrutinising the data for errors, and second, identifying and correcting the errors (Pallant, 2020). These steps were performed before importing the dataset into IBM SPSS Statistics version 29 and SmartPLS version 4. for comprehensive data evaluation.

Descriptive statistics

Through descriptive statistics, insight was gained into both the composition of the sample and the patterns observed within key variables. Descriptive statistics served to summarise the observations collected from the sample, offering a concise portrayal of the dataset (Babbie, 2016). The demographics of survey respondents were presented in both frequency and percentage frequency, enabling the researcher to depict the characteristics and profiles of the participants accurately.

Normality test

A normality test was conducted as part of the data analysis process. Firstly, it aimed to verify whether the data deviated from a normal distribution, a condition for which partial least squares structural equation models (PLS-SEM) are well-suited. Hair et al. (2019) highlighted the relevance of partial least squares structural equation models (PLS-SEM) in addressing concerns related to lack of normality in data distribution. Secondly, the test assisted in determining the most appropriate measure of central tendency for reporting purposes.

The significance of adhering to a normal distribution cannot be overstated, as it serves as a foundational assumption for numerous statistical techniques (Razali & Wah, 2011). When this assumption is breached, the reliability and validity of interpretation and inferences may be compromised (Razali & Wah, 2011). Three prevalent approaches for evaluating whether a random sample of independent observations, conforms to a population with a normal distribution are: graphical methods, numerical methods and formal normality test (Razali & Wah, 2011). Shapiro-Wilk test was chosen to assess the normality of the data as a formal normality test. The test was applicable as it was suitable for small sample sizes and

known for its sensitivity to departures from normality, enabling it to detect even subtle deviations from a normal distribution (Razali & Wah, 2011). This sensitivity was crucial for ensuring the validity of the statistical analysis that assumed normality. Finally, the test is grounded in a solid theoretical foundation, as it was based on the correlation between the data and the corresponding normal scores (Razali & Wah, 2011).

Factor analysis

Exploratory factor analysis was performed prior to establishing the partial least square equation model. The factor analysis was conducted to identify underlying latent variables that explain the correlation among observed variables related to the constructs (Pallant, 2020). The reason for conducting factor analysis was to establish the measurement model by assigning observed variables to the latent construct (Pallant, 2020).

During the factor loading analysis, several criteria were inspected to ensure the quality of the measurement model. Factors such as cross-loadings, low loadings, and redundant items were carefully examined (Oswald & Zhao, 2022). Cross-loadings, where an observed variable has substantial loadings on multiple factors, can indicate construct ambiguity and compromise the validity of the measurement model. Similarly, low loading below a predetermined cut-off value of 0.50 (Hulland, 1999) may suggest poor construct representations and should be considered for removal. Redundant items, which have weak associations with all factors or load highly on multiple factors, were also identified and eliminated to enhance the measurement model's reliability and validity.

Conducting factor loading analysis prior to model establishment ensured that the measurement model accurately represents the relationship between the observed (indicator) and latent (construct) variables (Pallant, 2020). This was essential in developing a robust measurement model (Pallant, 2020). Factor loadings assisted in identifying the underlying latent variables that explain the relationship among observed variables related to the constructs. By assessing the strength and direction of the factor loadings, the researcher determined which observed variables were good indicators of the underlying constructs (Pallant, 2020). Factor loadings assessment assist in refining the constructs by identifying and removing redundant

or poorly performing items, thus enhancing the measurement models reliability and validity (Pallant, 2020). It was recommended to achieve loading factors above 0.708 (Purwanto, 2021; Sarstedt et al., 2021), however Hulland (1999) emphasised that a factor loading cut-off value exceeding 0.50 is satisfactory.

Data analysis

This section details the procedures and techniques employed by the researcher in analysing the data collected. The analysis comprises of two main sections: evaluating the measurement model and examining the structural model utilising partial least square structural equation modeling (PLS-SEM) employing SmartPLS4 software.

Partial least squares structural equation modeling (PLS-SEM) is widely utilised for estimating path models involving latent variables (constructs) and their interrelations (Sarstedt et al., 2021). Partial least squares structural equation modeling (PLS-SEM) combines principal component analysis and regression-based path analysis to estimate the parameters within a set of equations in a structural equation model (Sarstedt et al., 2021). One of the typical objectives in partial least squares structural equation modeling (PLS-SEM) analysis is to pinpoint essential factors for success and sources of competitive advantage concerning target constructs such as user behaviour (Sarstedt et al., 2021). Partial least squares structural equation modeling (PLS-SEM) has gained significant popularity in the social sciences because it constructs and estimates intricate path models involving latent variables and their interconnections (Sarstedt et al., 2021). Partial least squares structural equation modeling (PLS-SEM) enables researchers to use much smaller samples sizes compared to regular factor-based structural equation modeling (SEM) methods for estimating complex models with many latent variables and indicator variables (Sarstedt et al., 2021).

The selection of partial least square structural equation modeling (PLS-SEM) was motivated by several factors, these factors were supported by Hair et al. 2019 as appropriate for selecting partial least square structural equation modeling (PLS-SEM) as the method of analysis:

Firstly, the analysis aimed at testing a theoretical framework with a primary focus on predictive outcomes. Additionally, the structural model under examination was acknowledged to be intricate, comprising 21 final indicators and four constructs, with three being independent and one dependent. The determination of the appropriate sample size was hindered by the ability to measure or establish the population size.

Previous studies in coworking spaces, as referenced by Clifton et al. (2022) Memud and Tabibi (2023), encountered similar challenges, resulting in small survey samples. In the research, after careful screening and data cleaning, the survey sample was ultimately restricted to 72 respondents, reinforcing the consideration of a small sample size.

Furthermore, concerns regarding data distribution arose during the normality test conducted in Chapter 5. Given these specific circumstances – the complexity of the structural model, the limitations on establishing a precise population size, the precedent of small samples sizes in similar contexts, the identified distribution issues, and the testing of a theoretical framework with a primary focus on predictive outcomes – the adoption of partial least square structural equation modeling (PLS-SEM) was deemed appropriate and conducive to addressing the research objectives effectively.

Measurement model evaluation

The evaluation of the measurement model comprised four essential steps, which were crucial for establishing the reliability and validity of the measurement instrument, thereby ensuring the quality and integrity of the research findings (Hair et al., 2019). These steps involved evaluating indicator and internal consistency reliability, as well as convergent and discriminant validity (Hair et al., 2019).

Reliability, refers to the consistency of the measurement model, ensuring that the same results are obtained when the measurement is repeated under similar conditions (Sanders & Lewis, 2007). Validity refers to the degree to which the model accurately represents the theoretical constructs it aims to measure (Sanders & Lewis, 2007).

The first step involved examining the loading indicators (Hair et al., 2019; Sarstedt et al., 2021). It was recommended to achieve loading factors above 0.708, as this

threshold indicates that the construct explained more than 50 percent of the variance of the indicator, ensuring acceptable item reliability (Purwanto, 2021; Sarstedt et al., 2021). Hulland (1999) emphasised that an outer loading cut-off value exceeding 0.50 was satisfactory for partial least squares structural equation modeling (PLS).

The second step entailed assessing the reliability of internal consistency (Hair et al., 2019; Sarstedt et al., 2021). Both composite reliability and Cronbach's alpha were used for this purpose. Jöreskog (1971) composite reliability ρc was commonly employed in PLS-SEM to evaluate internal consistency reliability (Hair et al., 2019; Sarstedt et al., 2021). Higher values of composite reliability ρc indicated greater levels of reliability, with results above 0.70 considered satisfactory (Hair et al., 2019; Sarstedt et al., 2021). Cronbach's alpha assumes the same threshold, considering results above 0.70 satisfactory (Hair et al., 2019; Sarstedt et al., 2021).

The third step involved evaluating the convergent validity of each construct measure (Hair et al., 2019; Sarstedt et al., 2021). Convergent validity assessed the degree to which a construct effectively explained the variance observed in its constituent items (Hair et al., 2019; Sarstedt et al., 2021). The assessment was based on the average variance extracted (AVE) for all items within each construct (Hair et al., 2019; Sarstedt et al., 2021). An average variance extracted (AVE) value of 0.50 or higher was considered acceptable, indicating that the construct accounted for at least 50 percent of the variance among its items (Sarstedt et al., 2021).

The fourth step assessed how distinct the construct was empirically from other constructs within the structural model (Hair et al., 2019; Sarstedt et al., 2021). To evaluate discriminant validity, both the Heterotrait-Monotrait ratio (HTMT) of correlations and the Fornell-Lacker criterion were used. The Fornell-Lacker criterion and cross-loading were prevailing methods used to assess discriminant validity in variance-based structural equation modeling techniques like partial least squares (Henseler et al., 2015). It should be noted that Hair et al. (2019) mentioned that the Fornell-Lacker criterion was not suitable for assessing discriminant validity, as it did not perform well in instances where the indicator loadings on the constructs slightly differed. Henseler et al. (2015) proposed the Heterotrait-Monotrait ratio of correlation instead for assessing discriminant validity. Both the Heterotrait-Monotrait ratio (HTMT) of correlations and the Fornell-Lacker criterion were used in evaluating

discriminant validity due to the concern raised by Hair et al. (2019) and the alternative proposed by Henseler et al. (2015) that supported the use of Fornell-Lacker criterion.

Structural model examination

After the measurement model evaluation was deemed satisfactory, establishing the reliability and validity of the model, the subsequent step in evaluating the results involved the assessment of the structural model. This evaluation comprised four steps: examining collinearity, significance and relevance of the path coefficient, explanatory power, and finally, predictive power (Hair et al., 2019; Sarstedt et al., 2021).

The calculation of the path coefficients connecting the constructs relied on a series of regression analysis (Hair et al., 2019; Sarstedt et al., 2021). Assessing collinearity ensured unbiased regression results, facilitating the identification of potential issues that could compromise the validity and reliability of PLS-SEM model (Hair et al., 2019; Sarstedt et al., 2021). The variance inflation factor (VIF) served as a commonly used metric to quantify collinearity, with values above three indicating multicollinearity among predictor constructs (Hair et al., 2019; Sarstedt et al., 2021). Therefore, testing for collinearity through VIF analysis was essential for ensuring the robustness and accuracy of PLS-SEM analyses results. The optimal VIF value was typically considered to be around three or lower (Hair et al., 2019).

The next step involved evaluating the strength and significance of the path coefficients concerning the hypothesised relationship between the constructs (Hair et al., 2019; Sarstedt et al., 2021). Path coefficients ranged from +1 to -1, with values closer to 1 indicating a stronger predictive relationship with the dependent constructs (Hair et al., 2019; Sarstedt et al., 2021). The examination of the path coefficient tested the hypothesised relationships among the constructs. A significance level of 5% ($p < 0.05$) is assumed, where any p-value below this threshold was considered significant (Hair et al., 2019; Sarstedt et al., 2021). Additionally, effect size values, denoted by f-square, were utilised to assess the impact of exogenous latent variables (Hair et al., 2019; Sarstedt et al., 2021). f-square values of 0.03, 0.15, and 0.35 corresponded to small, medium, and large effects, respectively, while effect sizes below 0.02 indicated negligible impact (Hair et al., 2019; Sarstedt et al., 2021). Hair

et al. (2019) noted that the rank order was often the same when comparing the size of the path coefficient and f-square effect sizes in structural equation modeling.

The third step involved assessing the explanatory ability by examining the R^2 (R-squared) values. R^2 ranged from 0 to 1, with higher values indicating a greater explanatory power (Hair et al., 2019). It measured the proportion of the variance in the dependent variable (performance) explained by the independent variables (autonomy, relatedness, competence).

Finally, the last step involved assessing the model's predictive power using PLS$_{predict}$ procedures with ten folds and ten repetitions. The focus is on the model's key target construct, "performance", and its three indicators, P1, P2 and P3. The results of $Q^2_{predict}$ would indicate the predictive accuracy of the structural model. Additionally, the partial least squares structural equation modeling - root mean squared error (PLS-SEM_RMSE) would be evaluated for predictions.

4.13 Quality controls

The research methodology outlines a comprehensive approach to ensure the quality and integrity of the research study. The reliability and validity of the measurement instrument were addressed using standardised questionnaires, pilot testing and incorporation of established scales and measures from previous literature. This ensured that the data collected accurately reflected the constructs being measured. Additionally, the data collection process was meticulously planned, with specific target populations and sampling criteria defined. Non-probability sampling methods were employed due to the lack of statistical data on the population size, and consistency in data collection procedures was maintained across all participants.

In terms of data analysis, inferential statistical methods were utilised to screen, clean, and analyse the data collected. The measurement model underwent rigorous validation, including factors analysis, assessment of indicator and internal consistency reliability, as well as convergent and discriminant validity. Similarly, the structural model was assessed for collinearity, significance and relevance of path coefficients, explanatory power, and predictive power using partial least squares structural equation modeling (PLS-SEM). This robust analytical approach ensured

that the results were reliable and valid, supporting the research objective and hypothesis.

Furthermore, the methodology choice and design were detailed, providing clear outline of each step in the research design, data collection, and analysis process. Citations to previous literature and methodologies were included throughout the chapter to support the rationale behind the chosen approach and provide context for the research design. The methodology approach and design ensure the quality and integrity of the research findings, contributing to the credibility and validity of the research study's conclusions.

4.14 Ethical considerations

Data confidentiality was ensured by treating each survey as confidential, no personal identifiable information of participants was collected, stored, or disclosed in the survey or in the research report. Survey data was securely stored in electronic format and will only be accessible to authorised research personnel.

Survey responses from participants were kept anonymous, meaning that their individual identities are not linked to their responses. No names, email addresses, or any other identifying information were associated with their survey responses.

All data was stored electronically in the Cloud and on a hard drive, with both storage spaces protected by user access and passwords. Data will be stored for a minimum of 10 years from the date of the research report, in accordance with the research data management policy of the University of Pretoria (University of Pretoria, 2018).

All survey questionnaires were accompanied by an informed consent data letter, refer to Appendix 2, that described the study and its purpose, outlined the type of information participants would be asked to provide and how, explained the time commitment required, and highlighted the benefits of participating in the research. The letter included a statement affirming that participation was voluntary and that participants could withdraw at any time without penalty. It also reassured participants that all data would be anonymous and treated with high confidentiality. Additionally, the contact details of the researcher and supervisor were provided. Participants were not required to sign the informed consent data letter, as completing the survey implied their consent.

4.15 Limitations

The research methodology poses several limitations. Firstly, the sample size may not adequately represent the diverse population of coworker users. Data collected at a specific point in time, cross-sectional, could be influenced by participants' attitudes or feelings, given the subjective nature of the questions posed through closed-ended or choice questions. The use of non-probability sampling methods introduces the risk of sampling bias, potentially limiting the generalisability of the findings to a broader population. The reliance on purposeful sampling methods and prior research studies to determine the sample size may raise questions about its adequacy in capturing the full spectrum of coworking space users. Cross-sectional research design, while useful in capturing a snapshot of the relations between variables, may not account for changes over time or provide insight into causality. A longitudinal design could offer more robust evidence of casual relationships between coworking space user needs and individual performance indicators. The limitations should be acknowledged and considered when interpreting the findings of the research study.

5. Data Findings and Results

5.1 Introduction

Chapter 5 presents the key findings and results obtained from the surveys conducted among users of coworking spaces. An example of the survey questionnaire is provided in Appendix 3: Online Survey Questionnaire. The survey was distributed to participants from diverse backgrounds, including variations in age, gender, education level, employment type, industry, types of coworking spaces used, frequency of use, and employment status. Despite this diversity, all participants share the commonality of utilising coworking spaces. Furthermore, this chapter delves into both descriptive and analytical results, offering insight into the results per the hypotheses formulated in Chapter 2 and 3. It seeks to answer the research question: How does the satisfaction of coworker space user needs, through the lens of self-determination theory, influence individual performance within coworking spaces?

The hypotheses are as follows:

H1: Satisfying the need for relatedness has a direct correlation with user performance.

H2: Satisfying the need for autonomy has a direct correlation with user performance.

H3: Satisfying the need for competence has a direct correlation with user performance.

In summary, Chapter 5 presents the sample description, demographics, evaluates the measurement model for reliability and validity, evaluates the structural model, and concludes on the data findings and results.

5.2 Data screening and cleaning

Data screening and cleaning are essential process in quantitate research, ensuring the quality, integrity, and reliability of the data being analysed (Pallant, 2020). The screening and cleaning of the data involved two steps: first scrutinising the data for errors, and second, identifying and correcting the errors (Pallant, 2020). These steps

were performed before importing the dataset into SmartPLS4 for comprehensive data evaluation.

Scrutinising the data for errors involved removing incomplete surveys. During the data collection period, 102 surveys were obtained, of which 72 surveys were 100% completed, three surveys were between 50 and 90% completed, and 27 were completed below 50% of all survey questions. As part of the data screening and cleaning process, all incomplete surveys were discarded, and only the 72 surveys completed 100% were used in our data analysis and findings. The data were examined to ensure that the unit of measurements for each question was completed, and no errors were found. No data errors were found in the 72 surveys. Thus, the data were deemed appropriate to use in analysing and reporting.

5.3 Description of sample

This section provides a comprehensive overview of the demographic and coworking-related characteristics of the survey respondents. Through descriptive data analysis, insight is gained into the composition of the sample and the patterns observed within key variables. Descriptive statistics serve to summarise the observations collected from the sample, offering a succinct portrayal of the dataset (Babbie, 2016).

The sample consisted of individuals, coworker users, utilising facilities of coworking spaces. Out of the 102 surveys initially received from respondents, 72 met the criteria to be included in the dataset for analysis.

Respondents had from the 18th of November 2023 till the 29th of January 2024 to participate in the research survey. The Figure 4 below shows the cumulative completion of surveys by participants over the period. 53% of completed surveys received were in the first month of the survey's distribution, 18th of November 2023 till 18th of December 2023. One was completed on the 25th of December 2023. The remaining 46% of the completed surveys were received between the 8th of January 2024 and 16th of January 2023. The period between the 18th of December 2023 and 8th of January 2024 is peak vacation period in South Africa as schools close from the 13th of December 2023 and reopened on the 17th of January 2024 (Automobile Association South Africa, 2023), thus the slowdown of survey response rate was predicted during the period.

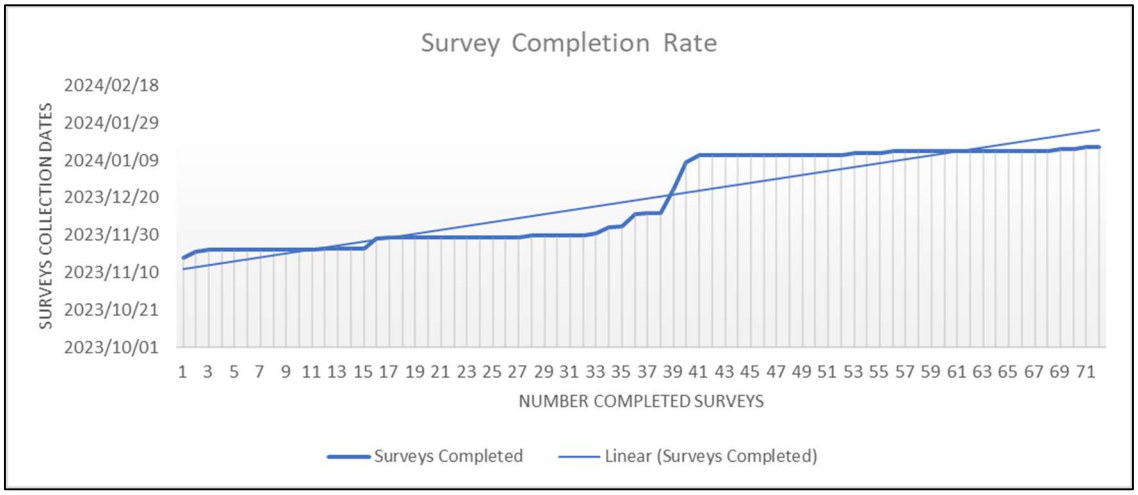


Figure 4: Survey completion rate

5.4 Demographics

5.4.1 Gender distribution

Table 3 and Figure 5 below presents the distribution of respondents by gender. The survey included 54 male respondents, compromising the majority at 75%, followed by female respondents at 23.6%, and non-binary/third gender respondents at 1.4%. It is noteworthy that this distribution differs from the overall gender distribution of employed individuals in South Africa for the year 2023. According to Statista (2023), in the general population, men constituted 56.3% of total employed individuals, while women accounted for 43.7%. As self-determination theory is a universal theory this potential bias will most likely not impact the results.

Table 3: Gender distribution

Gender	Frequency	Percent (%)
Male	54	75.0%
Female	17	23.6%
Non-binary / third gender	1	1.4%
Total	**72**	**100.0%**

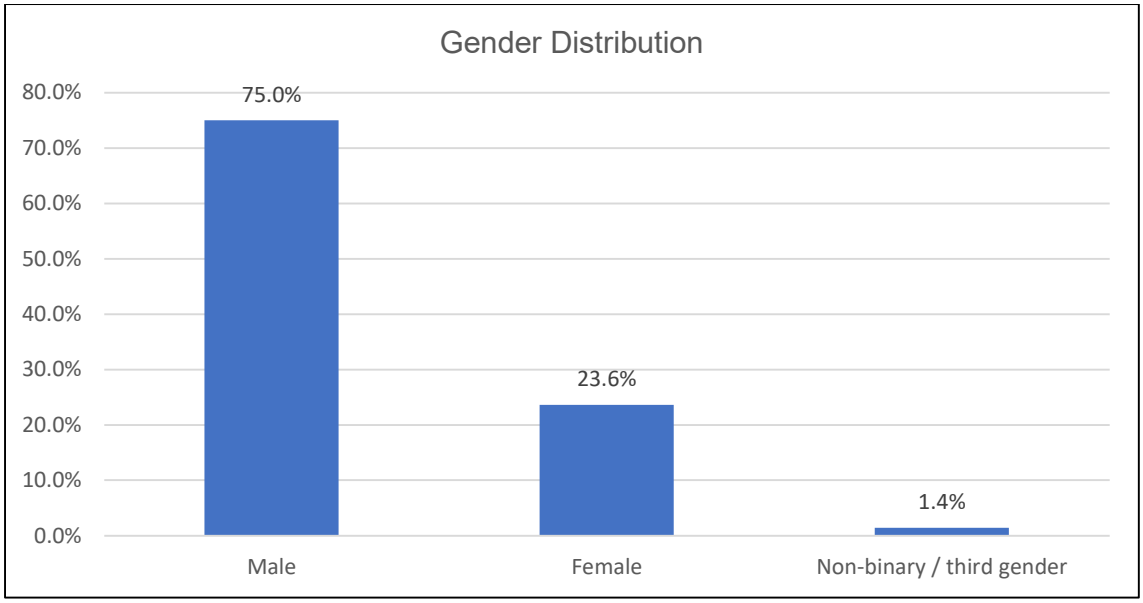


Figure 5: Gender distribution

5.4.2 Age group distribution

Table 4 and Figure 6 below presents respondents by age group. Out of a total of 72 respondents, 61% were between the ages of 35 and 44, making it the largest age group. In contrast, the age group between 55 and 64 comprised only 1% of the sample, representing the lowest percentage.

Table 4: Respondents' age distribution

Age	Frequency	Percent (%)
18 - 24	4	6%
25 - 34	14	19%
35 - 44	44	61%
45 - 54	9	13%
55 - 64	1	1%
Total	**72**	**100%**

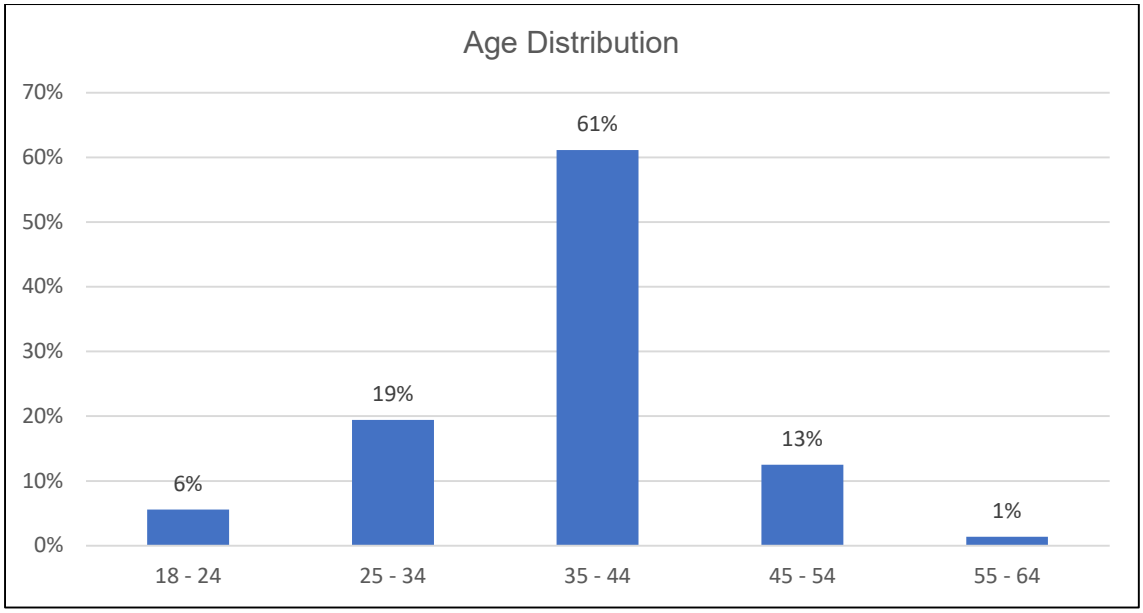


Figure 6: Respondents' age distribution

5.4.3 Level of education distribution

Table 5 and Figure 7 below presents respondents by level of education. The level of education among respondents in the study was diverse, with various educational backgrounds represented. Among the 72 respondents, the majority, compromising 54.2%, held a Bachelor's degree. This suggests a significant proportion of individuals with undergraduate education participated in the study. In contrast, a smaller percentage of respondents, accounting for 9.7%, were high school graduates, indicating a minority within the sample. Additionally, 15.3% of respondents reported having obtained a Master's degree, reflecting a notable presence of individuals with postgraduate education. Furthermore, 20.8% of respondents indicated having either some college education or an associate degree, adding to the range of educational qualifications within the sample. Not one of the survey participants had a Doctorate degree. Overall, the distribution highlights the diversity of educational backgrounds among the respondents, ranging from high school graduates to individuals with advanced degrees.

Table 5: Respondents' level of education distribution

Level of Education	Frequency	Percent (%)
Bachelor's degree	39	54.2%

High school graduate	7	9.7%
Masters's degree	11	15.3%
Some college or associate degree	15	20.8%
Total	**72**	**100.0%**

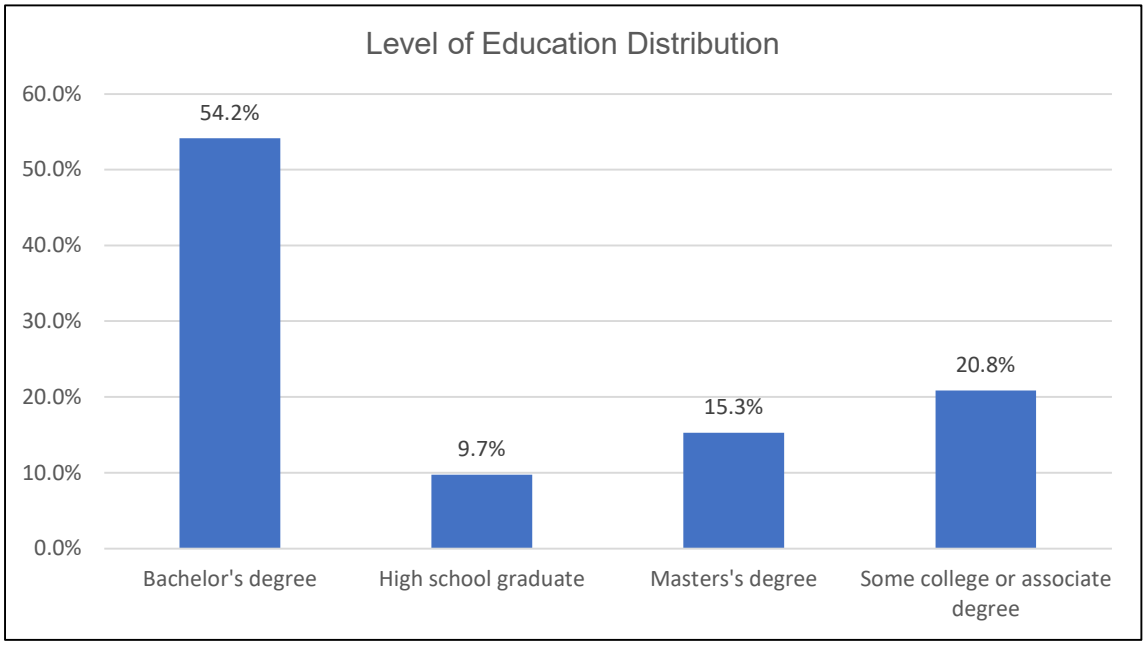


Figure 7: Respondents' level of education distribution

5.4.4 Employment status distribution

The employment status distribution among the respondents, as depicted in Table 6 and Figure 8, reveals a varied representation of individuals' occupational statuses within the sample. The majority of respondents compromising 61.1% of the total sample, reported being employed full time, indicating a significant portion of individuals engaged in full-time employment. Conversely, only one respondent (1.4%) reported being employed part-time, suggesting a smaller subset within the sample involved in part-time work. A notable presence of self-employed individuals or entrepreneurs is observed, with 29.2% of respondents identifying as such. Additionally, a small proportion of respondents, representing 6.9% of the total, reported being students, indicating a subset of individuals currently pursuing academic endeavors. Furthermore, one respondent (1.4%) indicated being unemployed but not actively seeking employment, constituting a minor fraction within the sample. Overall, the employment status distribution provides insight into the

diverse occupational backgrounds of the respondents, ranging from full-time employment to self-employment, student status, and unemployment.

Table 6: Employment status distribution

Employment Status	Frequency	Percent (%)
Employed - Full time	44	61.1%
Employed - Part time	1	1.4%
Self-employed/Entrepreneur	21	29.2%
Student	5	6.9%
Unemployed - Not currently looking for work	1	1.4%
Total	**72**	**100.0%**

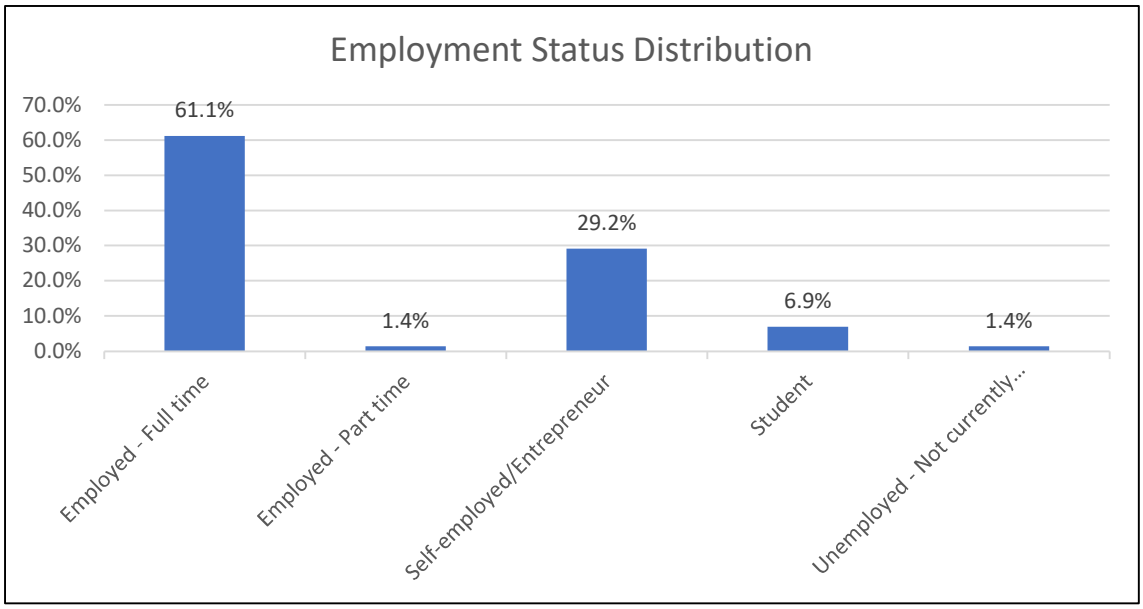


Figure 8: Employment status distribution

5.4.5 Annual salary distribution

The distribution of annual salaries among respondents, as presented in Table 7 and Figure 9, showcases a diverse range of income levels within the sample. The most frequent response “Prefer not to say”, with 25% of respondents choosing this option, indicating a significant portion of individuals in the survey opted not to disclose their annual salary. Among those who provided salary information, the majority fell within the middle to upper-middle income brackets. Specifically, 18.1% of respondents

reported annual salaries ranging from R673,001 to R857,900, while 25% reported salaries between R857,901 and R1,817,000. Additionally, a smaller proportion of respondents reported salaries in the lower income brackets, with 11.1% falling within the range of R237,101 to R370,500 and 6.9% in the range of R370,501 and R512,800. Furthermore, 6.9% of respondents reported salaries above R1,807,001, indicating a subset of individuals with higher income levels. Overall, the distribution of annual salaries highlights the heterogeneity of income levels within the sample, with a notable portion of respondents choosing not to disclose their salary information.

Table 7: Annual salary distribution

Annual Salary	Frequency	Percent (%)
Prefer not to say	18	25.0%
R1 - R237,000	2	2.8%
R237,101 - R370,500	8	11.1%
R370,501 - R512,800	5	6.9%
R512,801 - R673,000	3	4.2%
R673,001 - R857,900	13	18.1%
R857,901 - R1,817,000	18	25.0%
R1,817,001 and above	5	6.9%
Total	**72**	**100.0%**

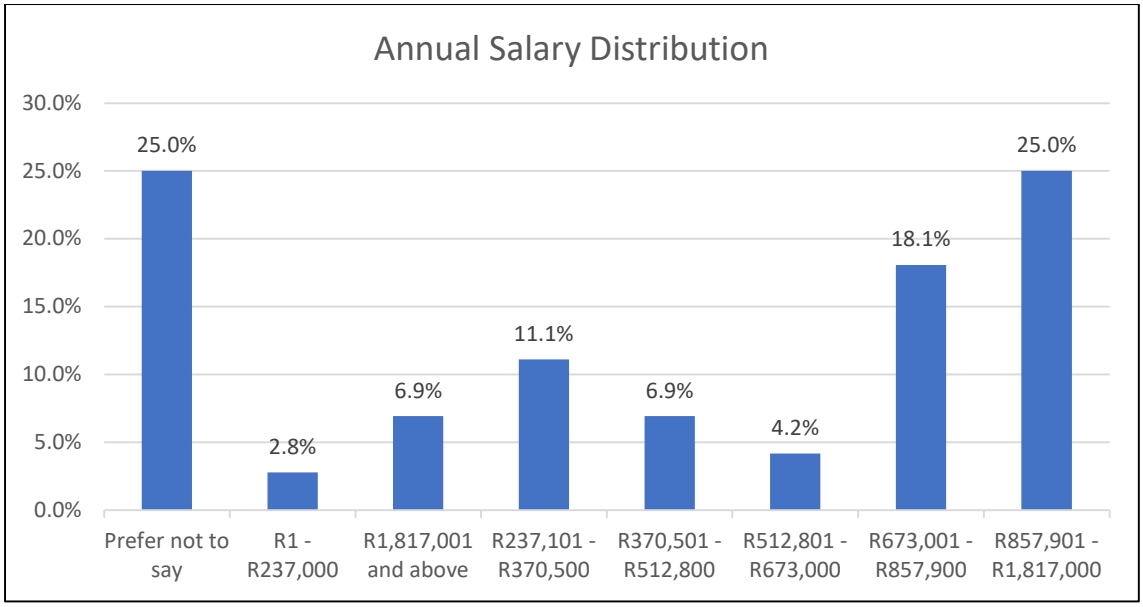


Figure 9: Annual salary distribution

5.4.6 Industry of employment distribution

The distribution of industries of employment among respondents, as presented in Table 8 and Figure 10, illustrates the diverse array of sectors represented within the sample. The highest proportion of respondents reported working in the Information and Communication Technology (ICT) sector, compromising 27.8% of the total sample. This indicates a significant presence of individuals employed in technology-related fields. Additionally, the Finance and Insurance sector accounted for 19.4% of respondents, reflecting a substantial portion of individuals engaged in financial services. Other notable sectors include Education and Training, 12.5%, Professional, Scientific, and Technical Services, 9.7% and Administrative and Support Services 5.6%. Each of these sectors contribute to the overall employment landscape of the sample. Conversely, certain industries exhibited lower representation, such as Healthcare and Social Assistance, 1.4%, Agriculture, Forestry, and Fishing, 1.4%, and Real Estate 2.8%. Furthermore, a small percentage of respondents reported being unemployed, 2.8%, highlighting a subset of individuals currently not engaged in employment. Overall, the industry of employment distribution provides insight into the occupational diversity and employment patterns within the sample population.

Table 8: Industry of employment distribution

Industries	Frequency	Percentage
Accommodation and food services	1	1.4%
Administrative and support services	4	5.6%
Agriculture, forestry and fishing	1	1.4%
Construction	4	5.6%
Education and training	9	12.5%
Finance and insurance	14	19.4%
Healthcare and social assistance	1	1.4%
Information and communication technology	20	27.8%
Mining and quarrying	4	5.6%
Professional, scientific and technical services	7	9.7%
Real estate	2	2.8%
Unemployed	2	2.8%
Wholesale and retail	3	4.2%
Total	**72**	**100.0%**

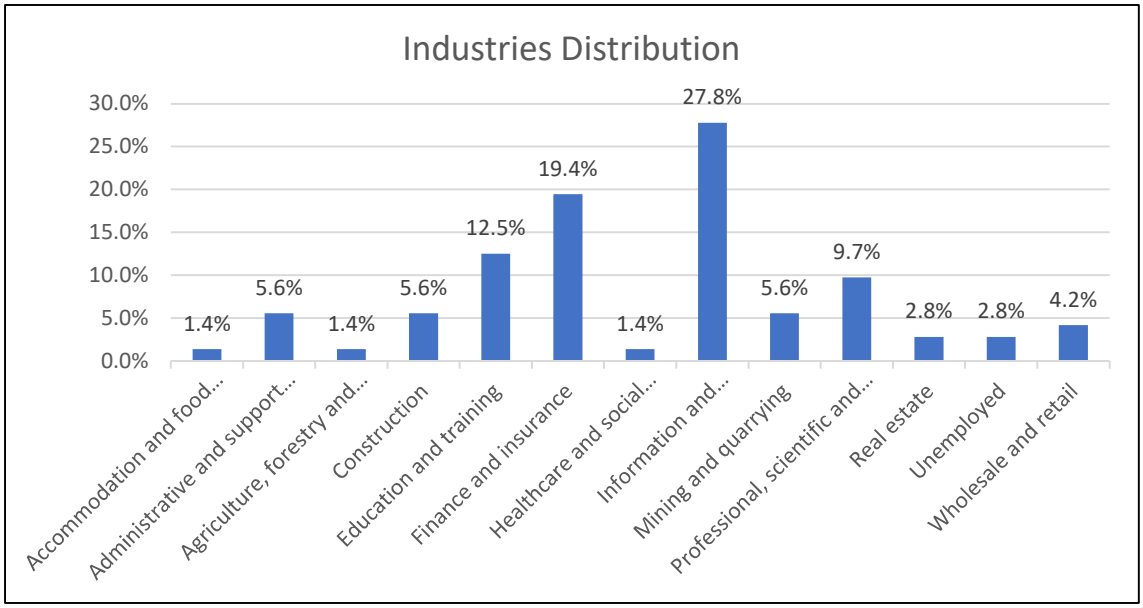


Figure 10: Industry of employment distribution

5.4.7 Geographical region distribution

The distribution of respondents across geographical regions, as presented in Table 9 and Figure 11, reflects a predominantly Southern Arica-centric sample. Southern Africa accounted for the overwhelming majority of respondents, comprising 91.7% of the total sample. This indicates that the majority of participants in the study are located within the South African region. In contrast, smaller percentages of respondents were distributed across other geographical areas, with North America representing 4.2% of the sample, while Asia and Europe each accounted for 1.4%. Additionally, one respondent reported primarily coworking remotely from various locations worldwide, representing another 1.4% of the total sample. The geographical region distribution highlights the regional concentration of respondents within Southern Africa, with smaller proportions distributed across other global regions.

Table 9: Geographical region distribution

Geographical Area	Frequency	Percent (%)
Asia	1	1.4%
Europe	1	1.4%
I primarily coworking remotely from various locations worldwide	1	1.4%
North America	3	4.2%
Southern Africa	66	91.7%
Total	**72**	**100.0%**

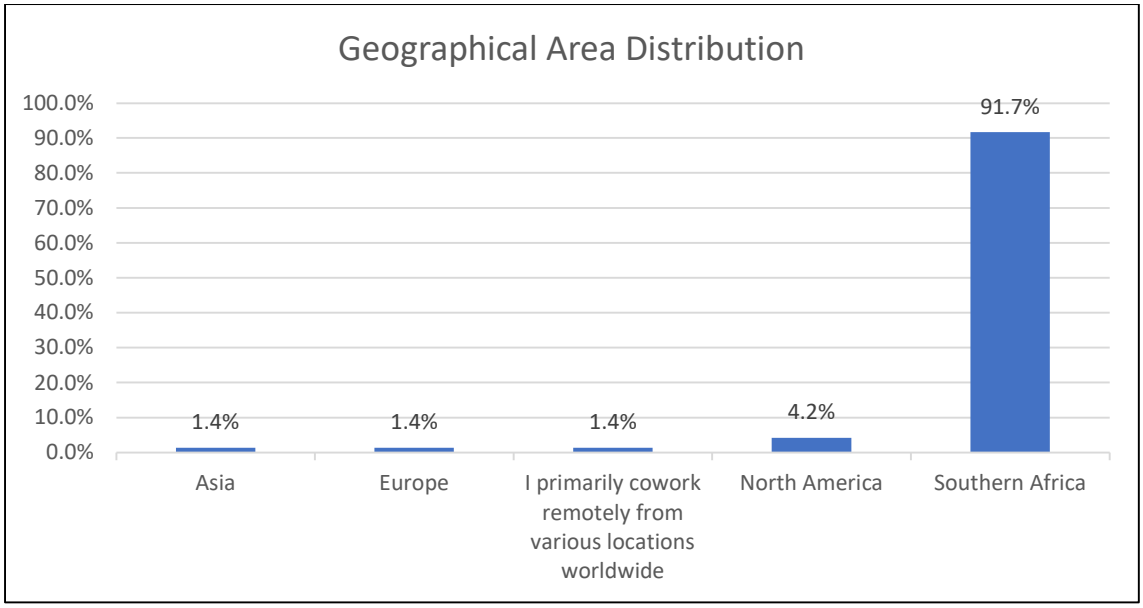


Figure 11: Geographical region distribution

5.4.8 Period coworking distribution

Table 10 and Figure 12 presents the distribution of respondents based on the duration of their usage of coworking spaces. The majority of respondents, comprising 63.9% of the total sample, reported using coworking spaces for more than two years. This suggests a significant presence of individuals with long-term experience in coworking environments. Additionally, 20.8% of respondents reported using coworking spaces for 1 to 2 years, indicating a sizeable portion of individuals with moderate-term usage. Conversely, smaller proportions of respondents reported shorter durations of coworking space usage, with 9.7% indicating usage of less than 6 months and 5.6% reporting usage between 6 months to a year. The period coworking distribution highlights the varying lengths of engagement with coworking spaces among respondents, ranging from short-term to long-term usage patterns.

Table 10: Period coworking distribution

Using Coworking Space	Frequency	Percent (%)
Less than 6 months	7	9.7%
6 months to a year	4	5.6%
1 to 2 years	15	20.8%
More than 2 years	46	63.9%

Total	**72**	**100.0%**

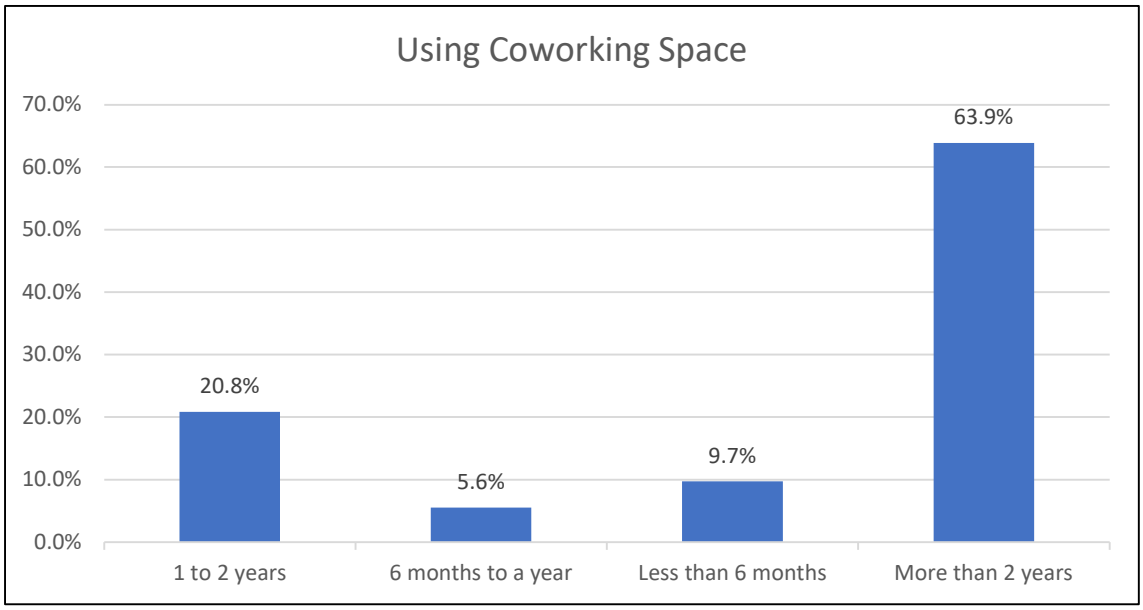


Figure 12: Period coworking distribution

5.4.9 Coworking days a week utilised distribution

Table 11 and Figure 13 provides an overview of the frequency of days utilised weekly by respondents. The majority of respondents, representing 36.1% of the total sample, reported utilising coworking spaces for five days per week. This indicates a significant presence of individuals who utilise coworking spaces on a full-time basis, potentially reflecting a preference for coworking environments as their primary workplace. Additionally, a substantial portion of respondents reported utilising coworking spaces for three days per week, accounting for 23.6% of the total sample. This suggests a notable number of individuals who utilise coworking spaces on a part-time basis, potentially supplementing other work arrangements. Furthermore, smaller portions of respondents reported utilising coworking spaces for two days (16.7%), one day (13.9%), and four days (8.3%) per week. Only one respondent (1.4%) reported utilising coworking spaces for more than five days per week. The distribution of days utilised weekly highlights the diverse utilisation patterns among respondents, ranging from full-time to part-time usage of coworking spaces.

Table 11: Coworking days a week utilised distribution

Days Utilised Weekly	Frequency	Percent (%)
1	10	13.9%
2	12	16.7%
3	17	23.6%
4	6	8.3%
5	26	36.1%
more than 5	1	1.4%
Total	**72**	**100.0%**

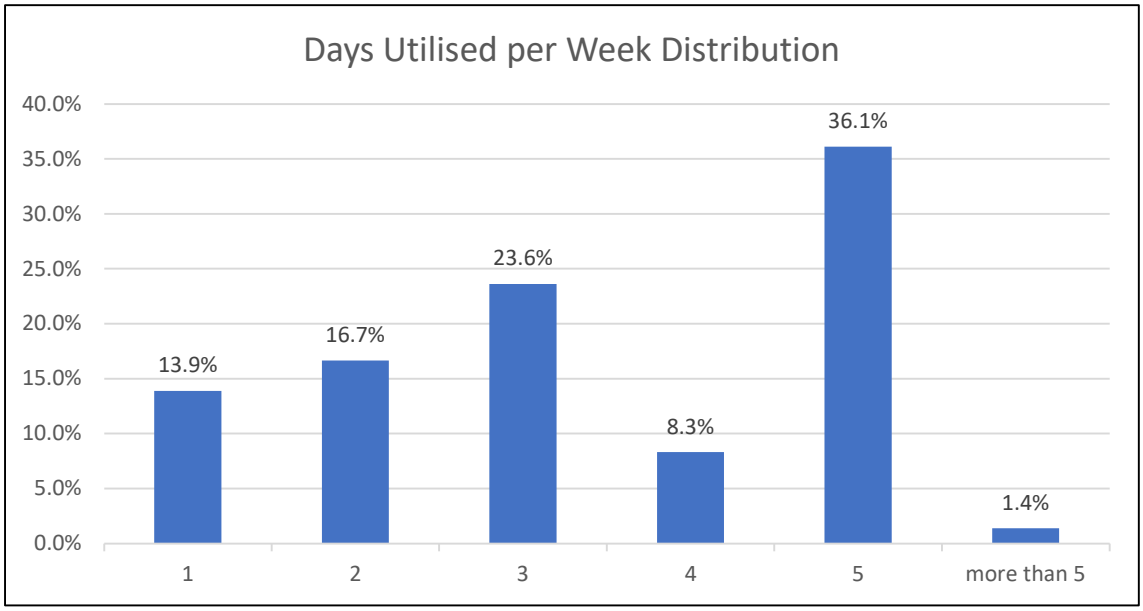


Figure 13: Coworking days a week utilised distribution

5.4.10 Coworker profile distribution

Table 12 and Figure 14 presents the distribution of coworker profiles among respondents, providing insight into the composition of coworking space tenants. The most common coworker profile reported among respondents is “The Remote Employee”, comprising 27.8% of the total sample. This indicates a significant presence of individuals who work remotely and utilise coworking spaces as their primary workspace. Additionally, “Small Businesses” represent 23.6% if respondents, reflecting the participation of entrepreneurial ventures and small-scale enterprises within coworking environments. “Corporate Tenants” accounted for 13.9% of respondents, indicating the involvement of established companies or

organisations as tenants in coworking spaces. Other coworking profiles include "Hybrid Worker" (22.2%), individuals who adopt a combination of remote and in-office work, and "Startups" (5.6%), representing emerging entrepreneurial ventures. Furthermore, "The Freelancer" and "The Student" each represent smaller proportions of respondents at 1.4% and 5.6%, respectively. The coworker profile distribution provides insight into the diverse range of occupational backgrounds and organisational affiliations present within coworking spaces.

Table 12: Coworker profile distribution

Tenants	Frequency	Percent (%)
Corporate Tenants	10	13.9%
Small Businesses	17	23.6%
Startups	4	5.6%
The Freelancer	1	1.4%
The Hybrid Worker	16	22.2%
The Remote Employee	20	27.8%
The Student	4	5.6%
Total	**72**	**100.0%**

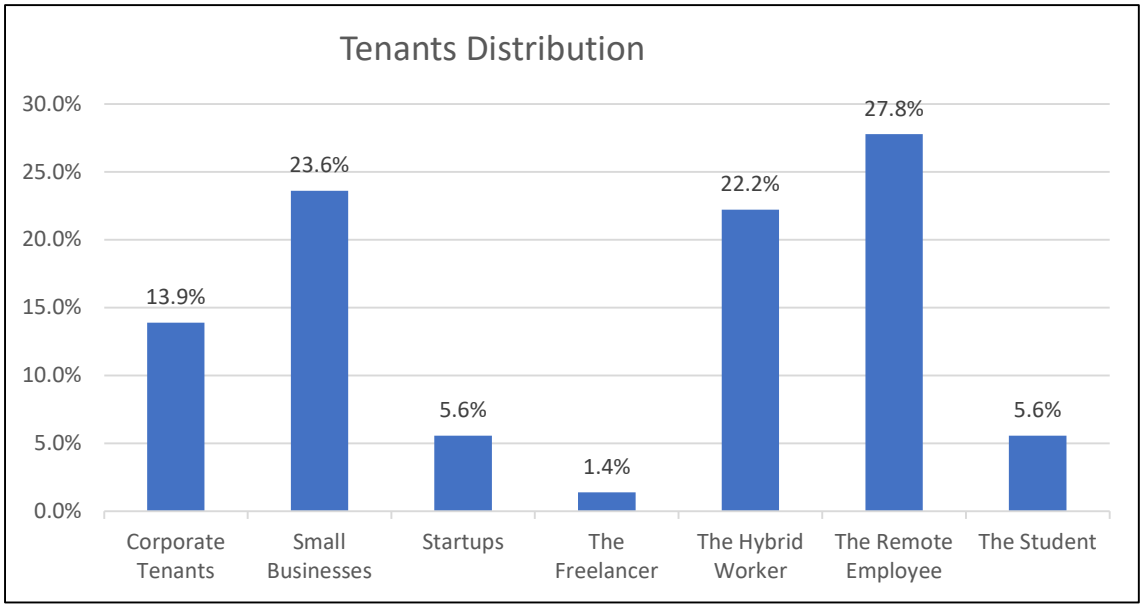


Figure 14: Coworker profile distribution

5.4.11 Type of coworking spaces used distribution

Table 12 and Figure 15 presents the distribution of types of coworking spaces used by respondents, offering insights into the preferences and utilisation patterns within the coworking ecosystem. The most commonly utilised type of coworking space reported among respondents is “Third Places”, representing 34.7% of the total sample. These public spaces, such as cafes, offer individuals the opportunity to work while enjoying services provided by the establishment, combining productivity with social interaction. Following closely behind are “Shared Studios”, accounting for 25% of respondents, which offer flexible lease agreements for office spaces often tailored to community fit. “Collaboration Hubs”, emphasising teamwork and collaboration among workers, represent 18.1% of respondents, reflecting a preference for environments conducive to collaborative work. Additionally, “Public Offices” and “Co-working Hotels” constitute 9.7% and 6.9% of respondents, respectively, offering free coworking spaces in public settings and shared office spaces with brief lease contracts. “Incubators” focusing on supporting entrepreneurship and the development of new businesses, account for 5.6% of respondents. The distribution of types of coworking spaces used provides valuable insights into the diversity of options available to individuals seeking coworking solutions to meet their professional needs and preferences.

Table 13: Type of coworking spaces used distribution

Coworking Space	Frequency	Percent (%)
Collaboration Hubs: Public offices that emphasize collaboration among workers, providing an environment conducive to teamwork.	13	18.1%
Co-working Hotels: Shared office spaces with brief lease contracts and streamlined services, offering flexibility for short-term work arrangements.	5	6.9%
Incubators: Spaces that focus on providing support for entrepreneurship and the development of new businesses.	4	5.6%
Public Offices: These are free coworking spaces like libraries, where individuals can work in a public setting.	7	9.7%

Shared Studios: Organizations or entrepreneurs rent office spaces through flexible lease agreements, often with criteria related to community fit.	18	25.0%
Third Places: Public spaces that require service purchases, such as cafes, where you can work while enjoying services offered by the establishment.	25	34.7%
Total	**72**	**100.0%**

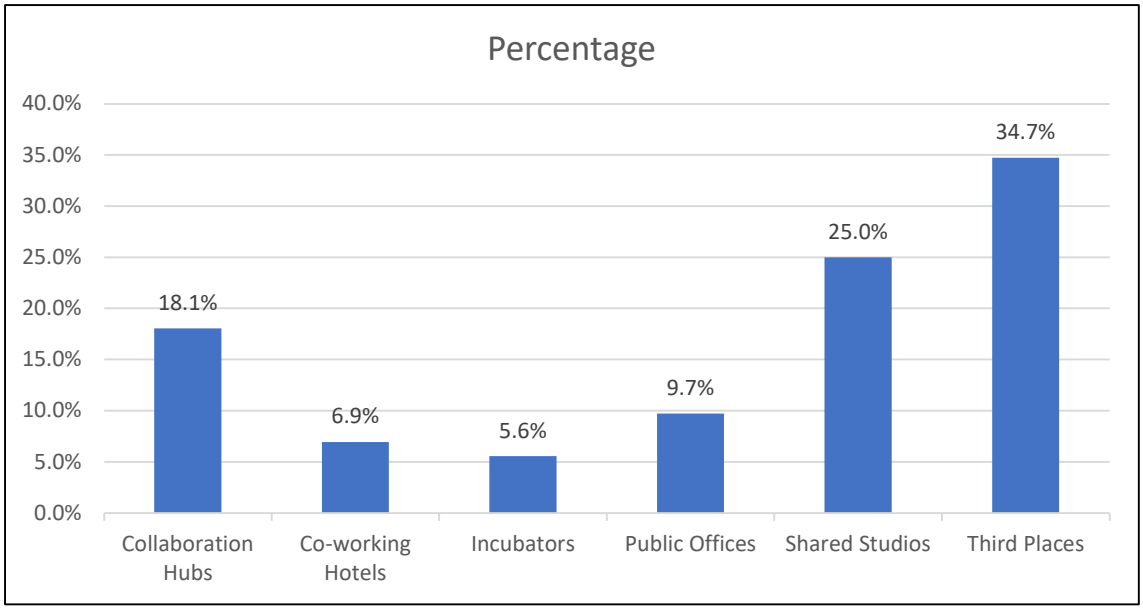


Figure 15: Type of coworking spaces used distribution

5.4.12 Summary of the demographics

Table 14 provides a comprehensive breakdown of the survey respondents' demographics.

Table 14: Demographics breakdown of survey respondents

Category	Subcategory	Frequency	Percent (%)
Gender	Male	54	75.0%
	Female	17	23.6%
	Non-binary / third gender	1	1.4%
	Total	**72**	**100.0%**
Age	18 - 24	4	5.6%

Category	Subcategory	Frequency	Percent (%)
	25 - 34	14	19.4%
	35 - 44	44	61.1%
	45 - 54	9	12.5%
	55 - 64	1	1.4%
	Total	**72**	**100.0%**
Education	Bachelor's degree	39	54.2%
	High school graduate	7	9.7%
	Masters's degree	11	15.3%
	Some college or associate degree	15	20.8%
	Total	**72**	**100.0%**
Employment Status	Employed - Full time	44	61.1%
	Employed - Part time	1	1.4%
	Self-employed/Entrepreneur	21	29.2%
	Student	5	6.9%
	Unemployed - Not currently looking for work	1	1.4%
	Total	**72**	**100.0%**
Annual Salary	Prefer not to say	18	25.0%
	R1 - R237,000	2	2.8%
	R1,817,001 and above	5	6.9%
	R237,101 - R370,500	8	11.1%
	R370,501 - R512,800	5	6.9%
	R512,801 - R673,000	3	4.2%
	R673,001 - R857,900	13	18.1%
	R857,901 - R1,817,000	18	25.0%
	Total	**72**	**100.0%**
Annual Salary (Excluding Prefer not to say)	R1 - R237,000	2	3.7%
	R1,817,001 and above	5	9.3%
	R237,101 - R370,500	8	14.8%
	R370,501 - R512,800	5	9.3%
	R512,801 - R673,000	3	5.6%

Category	Subcategory	Frequency	Percent (%)
	R673,001 - R857,900	13	24.1%
	R857,901 - R1,817,000	18	33.3%
	Total	**54**	**100.0%**
Industries	Accommodation and food services	1	1.4%
	Administrative and support services	4	5.6%
	Agriculture, forestry and fishing	1	1.4%
	Construction	4	5.6%
	Education and training	9	12.5%
	Finance and insurance	14	19.4%
	Healthcare and social assistance	1	1.4%
	Information and communication technology	20	27.8%
	Mining and quarrying	4	5.6%
	Professional, scientific and technical services	7	9.7%
	Real estate	2	2.8%
	Unemployed	2	2.8%
	Wholesale and retail	3	4.2%
	Total	**72**	**100.0%**
Geographical Area	Asia	1	1.4%
	Europe	1	1.4%
	I primarily cowork remotely from various locations worldwide	1	1.4%
	North America	3	4.2%
	Southern Africa	66	91.7%
	Total	**72**	**100.0%**
	1 to 2 years	15	20.8%

Category	Subcategory	Frequency	Percent (%)
Using Coworking Space	6 months to a year	4	5.6%
	Less than 6 months	7	9.7%
	More than 2 years	46	63.9%
	Total	**72**	**100.0%**
Days Utilised Weekly	1	10	13.9%
	2	12	16.7%
	3	17	23.6%
	4	6	8.3%
	5	26	36.1%
	more than 5	1	1.4%
	Total	**72**	**100.0%**
Tenants	Corporate Tenants	10	13.9%
	Small Businesses	17	23.6%
	Startups	4	5.6%
	The Freelancer	1	1.4%
	The Hybrid Worker	16	22.2%
	The Remote Employee	20	27.8%
	The Student	4	5.6%
	Total	**72**	**100.0%**
Coworking Space Utilised	Collaboration Hubs: Public offices that emphasize collaboration among workers, providing an environment conducive to teamwork.	13	18.1%
	Co-working Hotels: Shared office spaces with brief lease contracts and streamlined services, offering flexibility for short-term work arrangements.	5	6.9%

Category	Subcategory	Frequency	Percent (%)
	Incubators: Spaces that focus on providing support for entrepreneurship and the development of new businesses.	4	5.6%
	Public Offices: These are free coworking spaces like libraries, where individuals can work in a public setting.	7	9.7%
	Shared Studios: Organizations or entrepreneurs rent office spaces through flexible lease agreements, often with criteria related to community fit.	18	25.0%
	Third Places: Public spaces that require service purchases, such as cafes, where you can work while enjoying services offered by the establishment.	25	34.7%
	Total	**72**	**100.0%**

5.5 Normality test

A normality test was conducted as part of the data analysis process. Firstly, it aimed to verify whether the data deviated from a normal distribution, a condition for which partial least squares structural equation models (PLS-SEM) is well-suited. Hair et al. (2019) highlighted the relevance of partial least squares structural equation models (PLS-SEM) on addressing concerns related to lack of normality in data distribution. Secondly, the test assisted in determining the most appropriate measure of central tendency for reporting purposes.

The null hypothesis (H0) posits that the variable is normally distributed, while the alternative hypothesis (H1) suggests otherwise. If the p-value is less than or equal to 0.05, the null hypothesis should be rejected, indicating that the variable is not normally distributed. Conversely, if the p-value exceeds 0.05, then null hypothesis should be retained, suggesting that the variable can be considered normally distributed.

The results presented in Table 15 indicate that all constructs exhibit significant departures from normality, as evidenced by Shapiro-Wilk test results with p-values less than 0.05, thus the H0 is rejected and the H1 alternative hypothesis is accepted which indicates that the variable is not normally distributed Therefore, the median is deemed the appropriate measure of central tendency for reporting purposes.

Table 15: Tests of normality

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Performance	0.204	72	< 0.001	0.891	72	< 0.001
Autonomy	0.210	72	< 0.001	0.865	72	< 0.001
Relatedness	0.115	72	0.020	0.940	72	0.002
Competence	0.134	72	0.003	0.950	72	0.006
a. Lilliefors Significance Correction						

Central tendency measure (median) in responses to the measurement questions

The medians for the answers by the respondents are presented in Table 16, Table 17, Table 18, Table 19. The median in the tables is presented on a five-point Likert scale, where: one (1) being strongly disagree, two (2) disagree, three (3) neither disagree or agree, four (4) agree and five (5) strongly agree.

Table 16: Autonomy median response

Construct	Data Reference Number	Median	Measurement Question
Autonomy	N4	4	I have control over my social interactions in the coworking space.
	N5	4	I can be transparent and open in my interactions within the coworking space.
	N7	3	My coworking space provides opportunities for marketing my company.
	N8	4	I am familiar with other members in my coworking space.
	N14	4.5	I can focus on my work activities in my coworking space.
	N15	4	I can have interactions without disturbing others in my coworking space.
	N16	4	I have the flexibility to choose a suitable work area in my coworking space.
	N17	4	I feel that I can manage confidential information securely in my coworking space.
	N21	4	My coworking space contributes to a healthy work environment.
	Average	**4**	**Average overall score of median per questions**

Based on the data presented in Table 16, it is evident that the majority of respondents tend to agree with the statements related to autonomy. This is reflected in the overall high autonomy score of 4.

Table 17: Competence median response

Construct	Data Reference Number	Median	Measurement Question
Competence	N9	4	I have opportunities to cooperate with relevant individuals or organizations in my coworking space.
	N10	3	I have met people in my coworking space who have led to business opportunities.
	N11	4	I have opportunities to learn new things from my peers and events in my coworking space.
	N12	4	I can receive help or input from others in my coworking space.
	N13	4	My coworking space provides a platform for me to share knowledge with others.
	N18	4	I experience increased productivity as a result of my coworking space.
	N19	4.5	My coworking space allows me to focus on the core aspects of my business.
	N20	5	I can work smoothly without facing significant technical disruptions in my coworking space.
	Average	**3.94**	**Average overall score of median per questions**

Based on the data presented in Table 17, it is evident that the majority of respondents tend to agree with the statements related to competence. This is reflected in the overall high competence score of 3.94.

Table 18: Relatedness median response

Construct	Data Reference Number	Median	Measurement Question
Relatedness	N1	4	I feel a sense of belonging to a community in my coworking space.
	N2	4	My workplace energizes me.
	N3	4	I feel noticed and welcomed in my coworking space.
	N6	3	I believe my coworking space leaves a positive impression on guests.
	Average	**3.75**	**Average overall score of median per questions**

Based on the data presented in Table 18, it is evident that the majority of respondents tend to agree with the statements related to relatedness. This is reflected in the overall high relatedness score of 3.75.

Table 19: Performance median response

Construct	Data Reference Number	Median	Measurement Question
Performance	P1	4	As a result of being at the co-working space my work quality has increased.
	P2	4	As a result of being at the coworking space my job knowledge has increased.
	P3	4	Being a member of the co-working space has helped me increase my job skills.
	P4	4	Being a member of the co-working space has increased my work efficiency.
	Average	**4**	**Average overall score of median per questions**

Based on the data presented in Table 19, it is evident that the majority of respondents tend to agree with the statements related to performance. This is reflected in the overall performance score of 4.

5.6 Data referencing – constructs and measurement questions

Table 20 presents the data reference number used in the factor analysis, measurement model and structural model.

Table 20: Constructs and measurement questions

Construct	Question Number	Data Reference Number	Measurement Question
Autonomy	Q4	N4	I have control over my social interactions in the coworking space.
	Q5	N5	I can be transparent and open in my interactions within the coworking space.
	Q7	N7	My coworking space provides opportunities for marketing my company.
	Q8	N8	I am familiar with other members in my coworking space.
	Q14	N14	I can focus on my work activities in my coworking space.
	Q15	N15	I can have interactions without disturbing others in my coworking space.
	Q16	N16	I have the flexibility to choose a suitable work area in my coworking space.
	Q17	N17	I feel that I can manage confidential information securely in my coworking space.
	Q21	N21	My coworking space contributes to a healthy work environment.
Construct	**Question Number**	**Data Reference Number**	**Measurement Question**
Competence	Q9	N9	I have opportunities to cooperate with relevant individuals or organizations in my coworking space.
	Q10	N10	I have met people in my coworking space who have led to business opportunities.

	Q11	N11	I have opportunities to learn new things from my peers and events in my coworking space.
	Q12	N12	I can receive help or input from others in my coworking space.
	Q13	N13	My coworking space provides a platform for me to share knowledge with others.
	Q18	N18	I experience increased productivity as a result of my coworking space.
	Q19	N19	My coworking space allows me to focus on the core aspects of my business.
	Q20	N20	I can work smoothly without facing significant technical disruptions in my coworking space.
Construct	**Question Number**	**Data Reference Number**	**Measurement Question**
Relatedness	Q1	N1	I feel a sense of belonging to a community in my coworking space.
	Q2	N2	My workplace energizes me.
	Q3	N3	I feel noticed and welcomed in my coworking space.
	Q6	N6	I believe my coworking space leaves a positive impression on guests.
Construct	**Question Number**	**Data Reference Number**	**Measurement Question**
Performance	P1	P1	As a result of being at the co-working space my work quality has increased.
	P2	P2	As a result of being at the coworking space my job knowledge has increased.
	P3	P3	Being a member of the co-working space has helped me increase my job skills.
	P4	P4	Being a member of the co-working space has increased my work efficiency.

5.6 Factor analysis

Exploratory factor analysis was performed prior to establishing the partial least square equation model. The factor analysis was conducted to identify underlying latent variables that explain the correlation among observed variables related to the constructs (Pallant, 2020). The reason for conducting factor analysis was to

establish the measurement model by assigning observed variables to the latent construct (Pallant, 2020).

During the factor loading analysis, presented in Table 21, several criteria were inspected to ensure the quality of the measurement model. Factors such as cross-loadings, low loadings, and redundant items were carefully examined (Oswald & Zhao, 2022). It was recommended to achieve loading factors above 0.708 (Purwanto, 2021; Sarstedt et al., 2021), however Hulland (1999) emphasised that a factor loading cut-off value exceeding 0.50 is satisfactory. Based on the factor loading out of the 25 indicators seven were removed, thus reducing the indicators to 21. Four indicators (N10, N18, N19, N20) were removed due to poor factor loadings, thus <0.50. Three were removed due to significant cross-loadings (N7, N16, P4).

Table 21: Factor loadings

Construct	Data Reference Number	Factor 1	Factor 2	Factor 3	Factor 4
Autonomy	N4	0.866	-0.067	-0.193	-0.071
	N5	0.783	-0.174	0.369	0.136
	N7	0.526	0.604	-0.017	0.532
	N8	0.575	0.417	0.399	-0.470
	N14	0.807	-0.205	-0.326	-0.176
	N15	0.769	-0.119	-0.482	-0.060
	N16	0.626	-0.590	0.271	0.255
	N17	0.649	0.333	-0.294	0.010
	N21	0.726	0.066	0.433	-0.045
Competence	N9	-0.015	0.811	0.158	-0.391
	N10	0.158	0.486	0.810	0.281
	N11	-0.375	0.861	-0.128	0.045
	N12	-0.353	0.887	-0.130	0.092
	N13	-0.349	0.839	-0.181	0.054
	N18	0.695	0.408	-0.300	0.438
	N19	0.868	0.304	-0.108	-0.024
	N20	0.730	0.432	0.026	-0.363
Relatedness	N1	0.607	0.182	0.774	-0.008
	N2	-0.331	0.264	0.864	0.272
	N3	-0.237	0.034	0.893	-0.382
	N6	0.032	-0.453	0.882	0.127
Performance	P1	0.337	-0.437	0.085	0.830
	P2	-0.348	0.009	-0.316	0.882
	P3	-0.515	0.157	0.264	0.800
	P4	0.667	0.346	-0.004	0.660

5.7 Partial least square structural equation modelling (PLS-SEM) analysis

Partial least squares structural equation modeling (PLS-SEM) is widely utilised for estimating path models involving latent variables (also known as constructs) and their interrelations (Sarstedt et al., 2021). PLS-SEM utilises a combination of principal component analysis and regression-based path analysis to estimate the parameters within a set of equations in a structural equation model (Sarstedt et al., 2021). This method is categorised as variance-based, as it considers the entire variance and utilises this total variance to make parameter estimations (Hair et al., 2019).

One of the typical objectives in PLS-SEM analysis is to pinpoint essential factors for success and sources of competitive advantage concerning target constructs such as user behaviour (Sarstedt et al., 2021). PLS-SEM has gained significant popularity in the social sciences because it constructs and estimates intricate path models involving latent variables and their interconnections (Sarstedt et al., 2021). PLS-SEM enables researchers to use much smaller samples sizes compared to regular factor-based structural equation modeling (SEM) methods for estimating complex models with many latent variables and indicator variables (Sarstedt et al., 2021).

The conceptual framework created included three independent variables and one dependent variable. The three independent variables are autonomy, competence, and relatedness, the dependent variable is individual performance. For the independent variables' autonomy, competence, and relatedness empirically tested indicators by Van den Broeck et al. (2010) were tailored, used, and adapted in the context of coworking space user needs identified by Rådman et al. (2023). For the dependable variable individual performance four empirically tested indicators were used (Oswald & Zhao, 2022).

PLS-SEM has two stages in evaluating the results, the first is to evaluate the measurement models, if satisfied, the second stage is to evaluate the structural model (Hair et a.,2017; 2018).

5.7.1 Measurement model – results on reliability and validity

The evaluation of the measurement model has four steps presented in Figure 16 that are essential for establishing the reliability and validity of the measurement instrument, ensuring the quality and integrity of the research findings (Hair et al.,

2019).

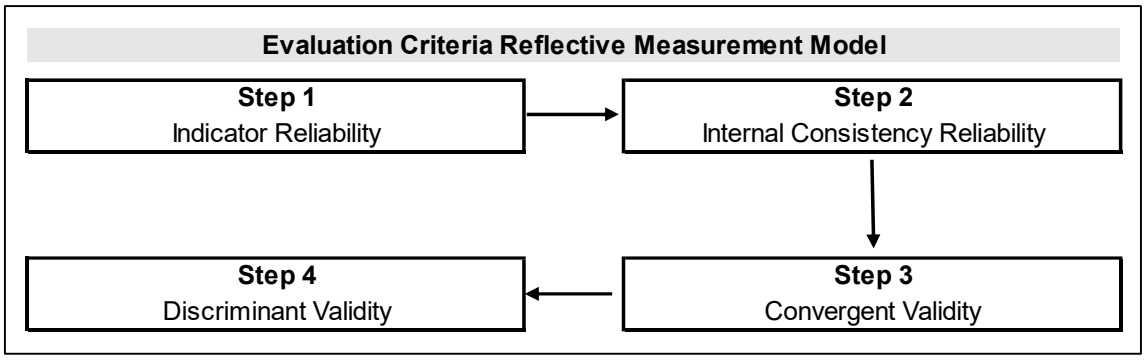


Figure 16: Evaluation criteria of the measurement model (Hair et al., 2019; Sarstedt et al., 2021)

Reliability refers to the consistency of the measurement model, ensuring that the same results are obtained when the measurement is repeated under similar conditions (Sanders & Lewis, 2007). Validity refers to the degree to which the model accurately represents the theoretical constructs it aims to measure (Sanders & Lewis, 2007).

The first step in assessing the reflective measurement model, as presented in Figure 16, involves examining the loading indicators (Hair et al., 2019; Sarstedt et al., 2021). It is recommended to achieve loading factors above 0.708, as this threshold indicates that the construct explains more than 50 percent of the variance of the indicator, ensuring acceptable item reliability (Purwanto, 2021; Sarstedt et al., 2021). Hulland (1999) emphasises that an outer loading cut-off value exceeding 0.50 is satisfactory for partial least squares structural equation modeling (PLS). The structural equation model presented in Figure 17 and Table 22 presents the loading factor per indictor. The lowest observed outer loadings are 0.641 (N17 <- Autonomy) and 0.465 (N8 <- Autonomy), while all other outer loadings exceed 0.708, indicating a satisfactory level of reliability across all indicators. Additionally, all constructs demonstrate average outer loadings exceeding 0.708, ranging from 0.743 (Autonomy) to 0.897 (Competence), further confirming the reliability of the measurement models.

The second step in assessing the reflective measurement model, as presented in Figure 16, involves assessing the reliability of internal consistency (Hair et al., 2019; Sarstedt et al., 2021). Both composite reliability and Cronbach's alpha will be used for this purpose. Jöreskog (1971) composite reliability ρc is commonly employed in

PLS-SEM to evaluate the internal consistency reliability (Hair et al., 2019; Sarstedt et al., 2021). Higher values of composite reliability ρc indicate greater levels of reliability, with results above 0.70 considered satisfactory (Hair et al., 2019; Sarstedt et al., 2021). Table 22 presents the results for composite reliability and Cronbach's alpha of the structural equation model presented in Figure 17. The composite reliability ρc values range from 0.897 to 0.944, surpassing the minimum threshold of 0.70. Additionally, the Cronbach's alpha values range between 0.825 and 0.919, which are also deemed satisfactory. The results indicate that the construct measures of Autonomy, Relatedness, Competence and Performance demonstrate satisfactory levels of internal consistency reliability, evidenced by the composite reliability and Cronbach's alpha values exceeding 0.70 threshold. Therefore, internal consistency reliability was achieved.

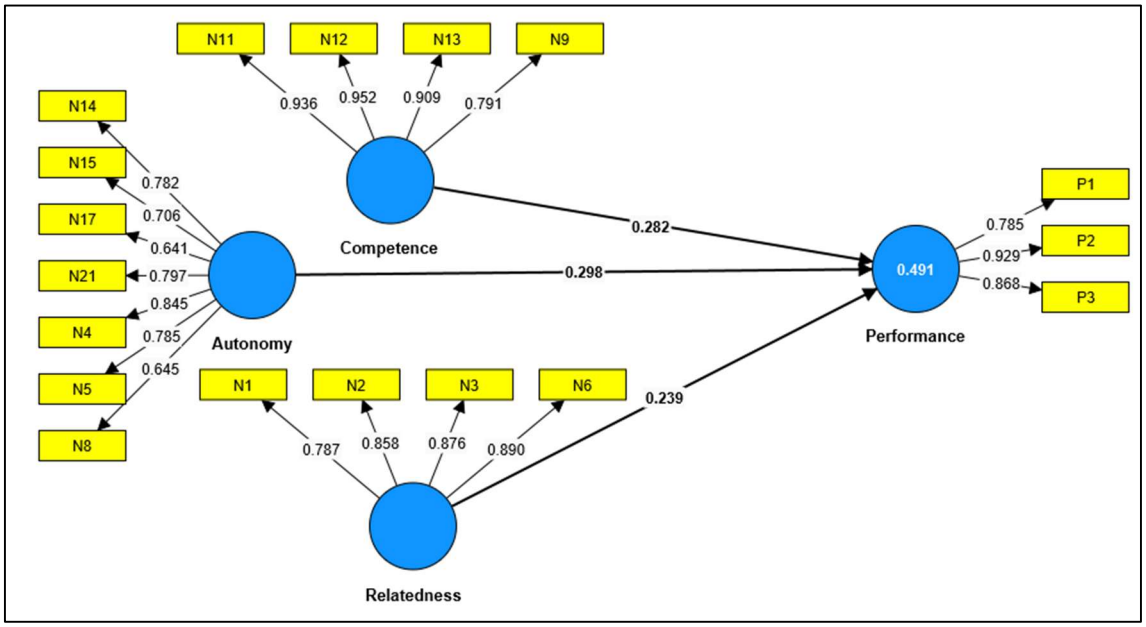


Figure 17: Structural equation model

Table 22: Results of reflective measurement model

Construct / Latent Variables	Items / Indicators	Outer Loadings > 0.50%	Average Outer Loadings > 0.70	Cronbach's Alpha (CA) 0.70 < 0.95	Composite reliability (CR) 0.70 < 0.95	Average Variance Extracted (AVE) > 0.50
Autonomy 9(7)	N14	0.782	0.743	0.869	0.897	0.557
	N15	0.706				
	N17	0.641				
	N21	0.797				
	N4	0.845				
	N5	0.785				
	N8	0.645				
Competence 8(4)	N11	0.936	0.897	0.919	0.944	0.809
	N12	0.952				
	N13	0.909				
	N9	0.791				
Relatedness 4(4)	N1	0.787	0.853	0.876	0.915	0.729
	N2	0.858				
	N3	0.876				
	N6	0.890				
Performance 4(3)	P1	0.785	0.861	0.825	0.897	0.744
	P2	0.929				
	P3	0.868				

The third step in assessing the reflective measurement model, as presented in Figure 16, focuses on evaluating the convergent validity of each construct measure's (Hair et al., 2019; Sarstedt et al., 2021). Convergent validity assesses the degree to which a construct effectively explains the variance observed in its constituent items (Hair et al., 2019; Sarstedt et al., 2021). The assessment is based on the average variance extracted (AVE) for all items within each construct (Hair et al., 2019; Sarstedt et al., 2021). An average variance extracted (AVE) value of 0.50 or higher is considered acceptable, indicating that the construct accounts for at least 50 percent of the variance among its items (Sarstedt et al., 2021). In the model results presented in Table 22, the average variance extracted (AVE) exceeded 0.50, demonstrating that the model, presented in Figure 17, explains at least 50 percent of the variance of the items. This finding provides strong support for the convergent validity of the measures.

The fourth step in evaluating discriminant validity, as presented in Figure 16, which assesses how distinct the construct is empirically from other constructs within the

structural model (Hair et al., 2019; Sarstedt et al., 2021). To evaluate discriminant validity, both the Heterotrait-Monotrait ratio (HTMT) of correlations and the Fornell-Lacker criterion are used. The Fornell-Lacker criterion and cross-loading are prevailing methods used to assess discriminant validity in variance-based structural equation modeling techniques like partial least squares (Henseler et al., 2015). It should be noted that Hair et al. (2019) emphasised that the Fornell-Lacker criterion is not suitable for assessing discriminant validity. Fornell-Lacker criterion does not perform well when in instances where the indicator loadings on the constructs slightly differ, thus the Heterotrait-Monotrait ratio correlation was proposed (Henseler et al., 2015). The indicator loadings are presented in Table 22. For autonomy the indicator loadings range from 0.641 to 0.845, with some variability but no extreme outliers. The indicator loadings for competence range from 0.791 to 0.952, presenting some variability but not extreme outliers. The indicator loadings for relatedness range from 0.787 to 0.890, exhibiting moderate variability. The indicator loadings for performance range from 0.785 to 0.929, with a similar level of variability as the other constructs. It can be concluded that the indicator loading for the most constructs differs slightly, therefore both the Heterotrait-Monotrait ration of correlations and the Fornell-Lacker criterion are used.

The results presented in Table 23 of the Heterotrait-Monotrait (HTMT) ratio of correlations reveal the degree of discriminant validity between constructs in the model, Figure 17. Autonomy exhibits Heterotrait-Monotrait (HTMT) ratios of 0.534 with competence, 0.67 with performance, and 0.722 with relatedness. Similarly, competence exhibits Heterotrait-Monotrait (HTMT) ratios of 0.668 with performance and 0.696 with relatedness. Performance exhibits a Heterotrait-Monotrait (HTMT) ratio of 0.72 with relatedness. These results indicate that the Heterotrait-Monotrait (HTMT) ratios for all pairs of constructs are below the threshold of 0.85 (Hair et al., 2019), suggesting sufficient discriminant validity between constructs. Specifically, autonomy exhibits discriminant validity with all other constructs, while competence and performance exhibit discriminant validity with each other and with relatedness. In summary, the Heterotrait-Monotrait (HTMT) ratios provide evidence of adequate discriminant validity among the constructs in the model, Figure 17.

Table 23: The Heterotrait-Monotrait (HTMT) ratio of correlations

Heterptrait-monotrait ratio (HTMT)				
Construct	**Autonomy**	**Competence**	**Performance**	**Relatedness**
Autonomy				
Competence	0.534			
Performance	0.67	0.668		
Relatedness	0.722	0.696	0.72	

Table 24 presents the results of the Fornell-Larcker criterion, which was utilised to assess discriminant validity. The Fornell-Larcker criterion compares the square root of the average variance extracted (AVE) for each construct with the correlations between that construct and others. For discriminant validity to be established, the square root of the AVE for a construct should surpass the correlations of that construct with other constructs (Fornell & Larcker, 1981). Comparing the square roots of the average variance extracted (AVE) for each construct with the correlations between constructs, discriminant validity is evident. Autonomy exhibits discriminant validity with its square root of average variance extracted (AVE) of 0.747 surpassing its correlations with competence 0.511, performance 0.602, and relatedness 0.672. Similarly, competence exhibits discriminant validity with a square root of average variance extracted (AVE) of 0.899, exceeding its correlations with autonomy 0.747, performance 0.584, and relatedness 0.625. Performance confirms discriminant validity with a square root of average variance extracted (AVE) of 0.863, surpassing its correlations with autonomy 0.747, competence 0.511, and relatedness 0.615. Moreover, relatedness demonstrates discriminant validity with a square root of average variance extracted (AVE) of 0.854, exceeding its correlations with autonomy 0.747, competence 0.511, and performance 0.602. The evaluation indicates that discriminant validity is supported for all constructs in the model. Autonomy, competence, relatedness, and performance each displayed sufficient empirical distinctiveness from one another, as demonstrated by their square root of average variance extracted (AVE) surpassing their correlations with other constructs. The findings underscore the validity of the measurement model, affirming that each construct exhibits clear separation from the others.

Table 24: Fornell-Larcker criterion

Fornell-Larcker criterion				
Construct	**Autonomy**	**Competence**	**Performance**	**Relatedness**
Autonomy	0.747			
Competence	0.511	0.899		
Performance	0.602	0.584	0.863	
Relatedness	0.672	0.625	0.615	0.854

In conclusion, the evaluation of the measurement model aimed at establishing the reliability and validity of the measurement instrument. Following a systematic process outlined in Figure 16, through four crucial steps, the model's reliability and validity have been examined. First, the loading indicators were assessed, with all constructs exhibiting satisfactory levels of item reliability, as indicated by average outer loadings exceeding the recommended threshold. The second step assessed the internal consistency reliability, utilising composite reliability and Cronbach's alpha, both of which surpassed the acceptable threshold, affirming the reliability of the autonomy, relatedness, competence, and performance measures. The third step focused on convergent validity, revealing that the model effectively explains at least 50 percent of the variance observed in its constituent items, as demonstrated by average variance extracted (AVE) values exceeding the acceptable threshold. Finally, the fourth step rigorously assessed discriminant validity, utilising both the Heterotrait-Monotrait ratio (HTMT) of correlations and the Fornell-Larcker criterion. The results underscore the distinctiveness of each construct within the structural model, providing compelling evidence of adequate discriminant validity.

5.7.2 Structural model – statistical results per hypothesis

The measurement model evaluation is satisfactory, the next step in evaluating the results is assessing the structural model. The evaluation of the structural model has four steps, presented in Figure 18, first step is examining collinearity, second step the significance and relevance of the path coefficient, third step explanatory power and final step the predictive power (Hair et al., 2019; Sarstedt et al., 2021).

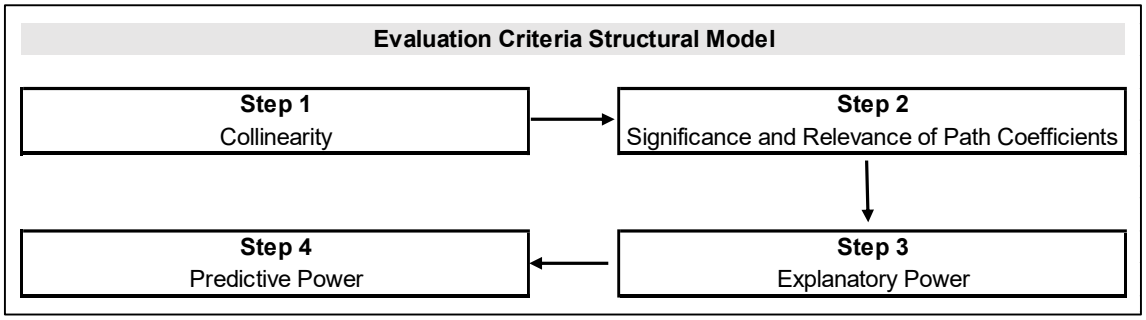


Figure 18: Evaluation criteria of the structural model (Hair et al., 2019; Sarstedt et al., 2021)

The calculation of the path coefficients connecting the constructs relies on a series of regression analysis (Hair et al., 2019; Sarstedt et al., 2021). Assessing collinearity ensures unbiased regression results, enabling the uncovering of potential issues that may compromise the validity and reliability of PLS-SEM model (Hair et al., 2019; Sarstedt et al., 2021). The variance inflation factor (VIF) is a commonly used metric to quantify collinearity, with values above three indicating multicollinearity among predictor constructs (Hair et al., 2019; Sarstedt et al., 2021). Therefore, testing for collinearity, through VIF analysis, is essential for ensuring the robustness and accuracy of PLS-SEM analyses results.

The optimal VIF value is typically considered to be around three or lower (Hair et al., 2019). The VIF of each predictor construct is below the conservative threshold of three, as presented in Table 25, therefore the conclusion is that collinearity is not an issue in the structural model.

Table 25: Collinearity statistics (VIF)

Hypothesis	VIF
Autonomy -> Performance	1.87
Competence -> Performance	1.683
Relatedness -> Performance	2.27

As multicollinearity is not an issue, the second step in the valuation criteria presented in Figure 18, is evaluating the strength and significance of the path coefficients regarding the relationships hypothesised between the constructs (Hair et al., 2019; Sarstedt et al., 2021). Path coefficients range from +1 to -1, with values closer to 1 indicate a stronger predictive relationship with the dependent constructs (Hair et al.,

2019; Sarstedt et al., 2021). The examination of the path coefficient tests the hypothesised relationships among the constructs. A significance level of 5% ($p < 0.05$) is assumed, where any p-value below this threshold is considered significant (Hair et al., 2019; Sarstedt et al., 2021). Additionally, effect size values, denoted by f-square, are utilised to assess the impact of exogenous latent variables (Hair et al., 2019; Sarstedt et al., 2021). f-square values of 0.03, 0.15, and 0.35 correspond to small, medium, and large effects, respectively, while effect sizes below 0.02 indicate negligible impact (Hair et al., 2019; Sarstedt et al., 2021). Hair et al. (2019) noted that the rank order is often the same when comparing the size of the path coefficient and f-square effect sizes in structural equation modeling (Hair et al., 2019; Sarstedt et al., 2021).

Table 26 presents the results of the survey, establishing the independent variable's (autonomy, competence, and relatedness) predictive effects on the dependent variable (performance). The results support all three hypotheses, hypothesis H1, H2 and H3, indicating that all three basic psychological needs (autonomy, competence, and relatedness) are indeed positively related to performance.

Table 26: Results of hypothesis testing

Hypothesis	Path	Path Coefficient	T Statistics	p-Value	f-square	Supported
H1	Relatedness -> Performance	0.239	2.391	0.017	0.049	Yes
H2	Autonomy -> Performance	0.298	2.626	0.009	0.093	Yes
H3	Competence -> Performance	0.282	2.909	0.004	0.093	Yes

Hypothesis H1: Satisfying the need for relatedness has a direct correlation with user performance.

The path coefficient of 0.239 indicates a moderate positive relationship between the level of relatedness and performance. This suggests that as the sense of interpersonal connection or social support increases, performance also tends to improve. The relationship is statistically significant as the p-value of 0.017 is less than 0.05. The f-square value of 0.049 suggests a moderate effect size. Hypothesis H1 is therefore supported.

Hypothesis H2: Satisfying the need for autonomy has a direct correlation with user performance.

The path coefficient of 0.298 indicates a moderate positive relationship between the level of autonomy and performance. This implies that individuals who experience a higher degree of autonomy or free will in decisions tend to perform better. The relationship is statistically significant as the p-value of 0.009 is less than 0.05. The f-square value of 0.093 suggests a moderate effect size. Hypothesis H2 is therefore supported.

Hypothesis H3: Satisfying the need for competence has a direct correlation with user performance.

The path coefficient of 0.282 indicates a moderate positive relationship between the level of competence and performance. This suggests that individuals who perceive themselves as more competent tend to achieve higher levels of performance. The relationship is statistically significant as the p-value of 0.004 is less than 0.05. The f-square value of 0.093 suggests a moderate effect size. Hypothesis H3 is therefore supported.

The third step involves assessing the explanatory ability by examining the R^2 (R-squared) values, as presented in Table 27. R^2 ranges from 0 to 1, with higher values indicating a greater explanatory power (Hair et al., 2019). It measures the proportion of the variance in the dependent variable (performance) explained by the independent variables (autonomy, relatedness, competence) depicted in Figure 17.

Table 27 reports an R^2 value of 0.491, with an adjusted R^2 value of 0.468. This indicates that approximately 49.1% of the variance in performance can be explained by the independent variables (autonomy, relatedness, and competence). The R^2 value falls within the moderate range (Hair et al., 2019), suggesting that the model captures a moderate amount of the variability in performance. This indicates that the predictors (autonomy, relatedness, and competence) collectively have a moderate explanatory power in explaining the variation in performance.

	R-square	R-square adjusted
Performance	0.491	0.468

Table 27: R^2 value

The next step and final step involve assessing the model's predictive power using PLSpredict procedures with ten folds and ten repetitions. The focus is on the model's key target construct, "performance", and its three indicators, P1, P2 and P3.

The results in Table 28 demonstrate that all three indicators achieve Q^2predict values larger than zero, indicating predictive accuracy of the structural model (Hair et al., 2019). Specifically, the Q^2predict values suggest moderate predictive relevance across three dependent variables (P1, P2, P3). Additionally, the partial least squares structural equation modeling - root mean squared error (PLS-SEM_RMSE) values range from 0.716 to 0.788, indicating reasonably accurate predictions.

Comparatively, the PLS-SEM_RMSE values outperform the linear regression model (LM_RMSE), which ranges from 0.824 to 0.931. This affirms the effectiveness of the PLS-SEM approach in explaining and predicting the relationship between variables.

Table 28: PLSpredict resulst

	Q^2predict	PLS-SEM_RMSE	LM_RMSE
P1	0.321	0.788	0.876
P2	0.338	0.716	0.824
P3	0.274	0.762	0.931

5.8 Summary of data findings and results

In conclusion, Chapter 5 provided a comprehensive analysis of the survey results obtained from participants using coworking spaces, addressing the research question of the effect satisfying coworker user needs has on individual performance within coworking spaces, conceptualised through the lens of self-determination theory. The chapter encompasses a sample description and demographics, along with an evaluation of both the measurement and structural models.

The evaluation of the measurement model confirmed its reliability and validity, ensuring the robustness of the instrument used to assess coworker user needs and individual performance. Furthermore, the structural model analysis supported all formulated hypotheses, revealing significant positive correlations between the satisfaction of relatedness, autonomy, and competence, on individual performance.

6. Discussion of Results

6.1 Background to discussion of the results

The persistently high unemployment rate in South Africa, officially reported at 31.9% (Statistics South Africa, 2023), has led many unemployed individuals to turn to entrepreneurship as a means of livelihood (Chigunta, 2017). However, entrepreneurs often face challenges in establishing legitimacy without dedicated business premises, a gap that coworking spaces effectively address (Bouncken et al., 2020; Howell, 2022). Moreover, advancements in technology and the increasing flexibility and cost-effectiveness of alternative working arrangements have fueled the popularity of coworking spaces among diverse groups of individuals and business over the years (Howell, 2022; Rådman et al., 2023; Weijs-Perrée et al., 2019).

Coworking spaces were virtually unheard of two decades ago (Howell, 2022; Weijs-Perrée et al., 2019), but have since become an integral component of contemporary work settings (Appel-Meulenbroek et al., 2021). Coworking spaces have experienced significant growth both internationally and in South Africa (Coworker, 2024). However, it is important to acknowledge that coworking spaces encounter challenges, including maintaining a diverse community of coworkers, fulfilling their needs, and aligning with user preferences (Deep, 2023). These challenges were underscored by the bankruptcy filing of WeWork, a leader in the coworking industry, in late 2023, nevertheless, despite these setbacks, coworking spaces continue to expand and grow, often adopting the popularised model established by WeWork (Financial Times, 2023).

Individuals opt for coworking spaces to fulfill specific needs (Rådman et al., 2023). These needs encompass social interactions, business networking, knowledge exchange, productivity, and physical well-being needs (Rådman et al., 2023). The financial success and return on investment of coworking spaces are intricately linked to the experience of the coworkers, which contributes to fulfilling their needs (Memud & Tabibi, 2023). Addressing and understanding these needs not only enhances user retention and satisfaction but also leads to improved performance and organisational commitment (Gagné et al., 2022; Rådman et al., 2023).

Academic research on coworking spaces in the southern hemisphere is limited (Kraus et al. 2022). Studies on work organisations have predominantly approached the topic either from the employee-centric perspective, emphasising well-being, or from an owner-centric standpoint, prioritising profitability (Deci et al., 2017). Rådman et al. (2023) observed that most research has centered on owners, landlords, user preferences, and motivations in joining coworking spaces, limited attention to user needs. Oswald and Zhao (2022) conducted a quantitative study on the impact collaborative learning and individual motivation has on individual performance, revealing a direct correlation between collaborative learning and individual performance, however, no significant correlation was found between individual motivation and individual performance, suggesting a need for future research to delve deeper into individual level motivation within the coworking space context.

Considering the aforementioned factors, the primary aim of this research is to investigate the influence of coworker space user needs satisfaction on individual performance within coworking spaces. The study involved an extensive review of literature pertaining to the definition of coworking spaces, the characteristics of users, and their needs. Relevant theories were identified and applied to understand the relationship between user needs satisfaction and individual performance. Self-determination theory was selected as the theoretical framework to elucidate this correlation. Thus, the research question was refined to inquire: How does the satisfaction of coworker space user needs, viewed through the lens of self-determination theory, impact individual performance within coworking spaces?

The research formulated three hypotheses to address the research purpose:

Hypothesis 1 (H1): Satisfying the need for relatedness has a direct correlation with user performance (Baard et al., 2004; Bueno et al., 2018; Cerasoli et al., 2016; Deci & Ryan, 2014; Deci et al., 2001; Deci et al., 2017; Grolnick & Ryan, 1987; Kuvaas et al., 2017; Ryan & Deci, 2017; Ryan & Deci, 2022; Singh et al., 2019; Van den Broeck et al., 2021).

Hypothesis 2 (H2): Satisfying the need for autonomy has a direct correlation with user performance (Baard et al., 2004; Black & Deci, 2000; Cerasoli et al., 2016; Deci & Ryan, 2014; Deci et al., 2001; Deci et al., 2017; Grolnick & Ryan, 1987; Kuvaas et

al., 2017; Patall et al., 2008; Ryan & Deci, 2017; Ryan & Deci, 2022; Singh et al., 2019; Van den Broeck et al., 2021; Williams et al., 1998).

Hypothesis 3 (H3): Satisfying the need for competence has a direct correlation with user performance (Baard et al., 2004; Cerasoli et al., 2016; Deci & Ryan, 2000; Deci & Ryan, 2014; Deci et al., 2001; Deci et al., 2017; Grolnick & Ryan, 1987; Kuvaas et al., 2017; Ryan & Deci, 2017; Ryan & Deci, 2022; Singh et al., 2019; Van den Broeck et al., 2021).

A quantitative study was conducted to investigate these hypotheses, utilising data collected through research questions completed by participants actively utilising coworking spaces, all aged 18 and above. These surveys were cross-sectional, capturing data at a single point in time. The collected data underwent rigorous screening and cleaning, factor analysis, and assessment of the measurement model for reliability and validity. Subsequently, the structural model was assessed to generate research results. The following section of this chapter will discuss the results, addressing the hypotheses relating to the research question and comparing the findings with the literature review.

6.2 Discussion of hypotheses

6.2.1 Hypothesis 1 (H1): Satisfying the need for relatedness has a direct correlation with user performance.

The data analysis indicates a positive correlation between fulfilling the need for relatedness and individual performance, thereby supporting the hypothesis.

The path coefficient of 0.239 suggests a moderate positive relationship between relatedness and individual performance. Importantly, the p-value of 0.017, being less than 0.05, confirms the statistical significance of the relationship between relatedness and user performance. Moreover, the effect size, denoted by the f-square value of 0.049, indicates a moderate impact of relatedness on performance.

Although relatedness exhibits the lowest path coefficient and T statistics of the three basic psychological needs, suggesting a lesser impact on performance compared to autonomy and competence, it remains statistically significant. Thus, relatedness demonstrates a direct influence on the performance of coworker users.

These findings align with the assertions of Butcher (2018) and Brown (2017), who emphasise the important role of social interaction and a need for a sense of community in coworking spaces, fostering a more productive work environment and enhancing in individual performance. Additionally, Cerasoli et al. (2016) support the notion that fulfilling the need for relatedness positively affects individual performance, attributing it to the enhancement of emotional well-being through establishing connections with others. Furthermore, Gagné et al. (2022) affirm meeting the need for relatedness leads to favourable performance outcomes, though they underscore the importance of fulfilling all three basic psychological needs for optimal performance. Similarly, Deci et al. (2001) and Baard et al. (2004) provide support for the idea that satisfying the need for relatedness correlates with performance outcomes.

The desire for relatedness, rooted in the human need to be respected, valued, and connected with others, as outlined by Cerasoli et al. (2016), is echoed in theories of human nature such as Maslow's hierarchy of needs theory (Maslow, 1958). This need for relatedness significantly impacts an individual's emotional well-being, which, in turn, affects performance outcomes (Cerasoli et al., 2016).

Considering this research outcome and the supporting literature, it can be concluded that fulfilling the need for relatedness does indeed impact individual performance, thereby confirming the theoretical framework.

6.2.2 Hypothesis 2 (H2): Satisfying the need for autonomy has a direct correlation with user performance.

The data analysis reveals a positive correlation between fulfilling the need for autonomy and individual performance, thereby supporting the hypothesis.

The path coefficient of 0.298 suggests a moderate positive relationship between autonomy and individual performance. Importantly, the p-value of 0.009, being less than 0.05, confirms the statistical significance of the relationship between autonomy and user performance. Additionally, the effect size, indicated by the f-square value of 0.093, signifies a moderate impact of autonomy on performance.

Autonomy exhibits the highest path coefficient and second highest T statistics among the three basic psychological needs, suggesting autonomy has the most significant

impact on performance compared to relatedness and competence. Therefore, autonomy directly influences the performance of coworker users.

Several studies corroborate these findings. Deci and Ryan (2000) argue that increased autonomy leads to heightened motivation, resulting in improved performance. Gagné and Deci (2005) assert that maintaining control is essential in satisfying the need for autonomy which is fundamental in boosting motivation. Ryan and Deci (2022) emphasised that an increase in motivation results in enhancing performance. Black and Deci (2000) found that satisfying the need on autonomy among students led to higher academic grades, underscoring the positive impact on student performance. Similarly, Williams et al. (1998) found that empowering patients to make informed decisions regarding their health, satisfying the patients need for autonomy, resulted in better health behaviors, in other words, better performance in their health results.

In the context of coworking environments, where individuals have the freedom to choose their workplace, autonomy plays crucial role. Cerasoli et al. (2016) highlighted three psychological components explaining why autonomy predicts performance: individuals feel in control of their actions, believe their efforts will lead to effective outcomes, and perceive freedom of choice when engaging in tasks. These components were reflected in the questions posed to survey participants, with the results affirming their significance.

Concluding the support of the hypothesis, the research findings, and literature indicated that satisfying the need for autonomy positively impacts individual performance, thereby confirming the theoretical framework.

6.2.3 Hypothesis 3 (H3): Satisfying the need for competence has a direct correlation with user performance.

The data analysis indicates a positive correlation between fulfilling the need for competence and individual performance, thereby supporting the hypothesis.

The path coefficient of 0.282 suggests a moderate positive relationship between competence and individual performance. Importantly, the p-value of 0.004, being less than 0.05, confirms the statistical significance of the relationship between

competence and user performance. Additionally, the effect size, denoted by the f-square value of 0.093, indicates a moderate impact of competence on performance.

Although competence exhibits a slightly lower path coefficient than autonomy, it boasts the highest T statistics among the three basic psychological needs, signifying a strong and statistically significant relationship with performance. This underscores the crucial role of competence in influencing individual performance, alongside autonomy and relatedness.

Deci and Ryan (2000) confirmed the research hypothesis, stating that satisfying the need of competence predicts performance. Competence, defined as an individual's feeling of capability and effectiveness, is essential to experience positive outcomes such as performance (Gagné & Deci, 2005). Moreover, perceived competence has positive motivational consequences (Patall et al., 2008), and motivation itself has a direct impact on individual performance (Deci et al., 2017). Satisfaction of competence need predicts performance (Deci & Ryan, 2000). Cerasoli et al. (2016) found that not one basic psychological need fulfillment alone leads to an increase in individual performance, emphasising the necessity for all three needs to be present for optimal performance.

Based on the research outcome and the support of literature for the finding, it can be concluded that satisfying the need of competence impacts individual performance, thereby confirming the theoretical framework.

6.2.4 Satisfying the needs for Relatedness (H1), Autonomy (H2), and Competence(H3) has a direct correlation with user Performance.

The data analysis indicates a positive correlation between satisfying the basic psychological needs of autonomy, relatedness, and competence and user performance, thereby supporting the hypotheses H1, H2, and H3. With an R-square (R^2) value of 0.491 and an adjusted R^2 value of 0.468, nearly 49.1% of the variance in performance can be attributed to these independent variables (Relatedness, Competence, Autonomy). This suggests that collectively meeting these needs moderately contributes to explaining the variation in performance.

These findings resonate with prior research across diverse domains. Deci et al. (2017) found that fulfilling basic psychological needs directly impacts performance.

Likewise, Cerasoli et al. (2016) reported positive correlation between autonomy, competence, and relatedness and individual performance, with observed correlations of 0.28, 0.37, and 0.25, respectively. While path coefficients may differ, the alignment with previous research such as Cerasoli et al. (2016) underscores the robust relationship between these variables.

The fulfillment of these needs fosters autonomous motivation, which includes intrinsic and internalised extrinsic motivation, in turn, directly influences individual performance (Ryan & Deci, 2017, 2022). Additionally, Grolnick and Ryan (1987) emphasised the pivotal role for supporting autonomous motivation (competence, relatedness, and autonomy) has in predicting overall performance. However, it is crucial to recognise that supporting autonomy alone falls short; relatedness and competence are equally important in nurturing autonomous motivation (Ryan & Deci, 2022). Thus, to optimise performance, all three basic psychological needs must be adequately addressed.

Based on the research outcomes and the support provided by literature, it can be concluded that satisfying the basic psychological needs of coworker users impacts individual performance, thereby confirming the theoretical framework.

6.3 Theoretical implications

This research confirms that meeting basic psychological needs is associated with improved performance, indicating that fulfilling the needs of coworker users contributes to enhanced performance. The research study enhances our understanding of coworking spaces within the South African context by addressing a notable gap in academic literature as mentioned by Kraus et al. (2022). Despite the proliferation of non-academic publications exploring various aspects of coworking, scholarly research on this subject remains scarce, particularly in quantitative studies (Leclercq-Vandelannoitte & Isaac, 2016; Merkel, 2015; Moriset, 2013; Weijs-Perrée et al., 2019).

This research attends to the gap in the research literature noted by Sjöblom et al. (2016), specifically to the application of self-determination theory in different physical environments, such as the rising prevalence of coworking spaces noted by Howell

(2022). Therefore, this study extends research in the field of self-determination theory and contributes to the body of academic knowledge.

Through the lens of self-determination theory, the research investigates the relationship of coworker user needs, classified into the three basic psychological needs, and individual performance in coworking spaces. This theoretical framework provides a solid foundation for understanding coworking space user needs and the result it has on performance outcomes, allowing the study to examine how coworker needs classified in categories of relatedness, competence, and autonomy influence user performance. By empirically testing these relationships, the research not only validates the applicability of self-determination theory in coworking environments but also sheds light on the specific mechanisms driving individual performance within these spaces.

The study's alignment with existing literature and theoretical frameworks strengthens the theoretical foundation in this area and contributes to building a more comprehensive understanding of coworking dynamics. By synthesising previous research and extending it to the South African context, the study not only advances theoretical knowledge but also provides a basis for future research endeavors in this field.

6.4 Practical implications

The research commenced by identifying the business needs associated with coworking spaces, underlining the necessity for this study. Memud and Tabibi (2023) emphasised the close link between the financial success of coworking spaces and the quality of user experience. Challenges in maintaining coworker satisfaction (Deep, 2023), along with the direct correlation between success and worker contentment (Sheynkman, 2019), further emphasise the crucial role of recognising and satisfying user needs in coworking spaces (Rådman et al., 2023). Addressing coworker needs is essential for enhancing user retention, satisfaction, and organisational commitment, ultimately reducing turnover rates (Gagné et al., 2022). Therefore, understanding and fulfilling coworker needs are vital for the financial viability and success of coworking spaces.

The research investigated how the satisfaction of coworker user needs impacts individual performance, through the lens of self-determination theory. By categorising each of the 21 user needs identified in the literature into the basic psychological needs of relatedness, autonomy, and competence, as summarised by Rådman et al. (2023), the study highlighted their direct impact on individual performance.

The practical implications of the research are significant. By recognising the correlation between user needs satisfaction and individual performance in coworking spaces, the study offers valuable insights into optimising coworking space design and amenities to enhance user experience and performance. Understanding coworker needs, as identified by Rådman et al. (2023), and their impact on individual performance can guide coworking space owners and landlords in tailoring their offerings more effectively.

Addressing the needs for autonomy, competence, and relatedness, which correlate with performance, can help coworking space owners better retain tenants, reduce churn rates, and mitigate financial losses associated with user dissatisfaction and turnover. Aligning coworking space design and services with user needs can differentiate coworking spaces in the market, leading to increased user satisfaction, enhanced performance, and ultimately attracting more tenants, thereby increasing financial gains. The research, based on an evidence-based approach, lends credibility to how satisfying coworker user needs relates to individual performance within coworking spaces, emphasising the importance of considering this in the product offering and design of coworking spaces in business settings.

In practical terms, coworking spaces can incorporate the following examples into their product offering and design based on the study's findings and literature review. To ensure the financial success and sustainability of coworking spaces, it is imperative to prioritise user satisfaction and address their diverse needs (Gagné et al., 2022; Rådman et al., 2023). By fostering a sense of community (Brown, 2017; Garret et al., 2017; Butcher, 2018; Weijs-Perrée et al., 2019; Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Memud & Tabibi, 2023; Rådman et al., 2023), offering energising work environments (Brown, 2017; Weijs-Perrée et al., 2019; Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Rådman et al., 2023), and facilitating transparency (Rådman et al., 2023), coworking spaces can attract and retain tenants

more effectively in addressing these social needs related to relatedness. Additionally, providing opportunities for professional development, such as ability to learn from others (Brown, 2017; Butcher, 2018; Weijs-Perrée et al., 2019; Appel-Meulenbroek et al., 2021; Clifton et al., 2022; Memud & Tabibi, 2023; Rådman et al., 2023), ability to share knowledge (Brown, 2017; Butcher, 2018; Weijs-Perrée et al., 2019; Appel-Meulenbroek et al., 2021; Clifton et al., 2022;; Rådman et al., 2023), ability to focus on ones work (Brown, 2017; Garret et al., 2017; Appel-Meulenbroek et al., 2021; Memud & Tabibi, 2023; Rådman et al., 2023), while minimising disruptions (Rådman et al., 2023), supporting wellness initiatives (Garret et al., 2017; Appel-Meulenbroek et al., 2021; Rådman et al., 2023), relating to the need for competence and autonomy, further enhances the value proposition for members, ultimately contributing to the overall success and differentiation of coworking spaces in the market. Aligning the design, amenities, and services of coworking spaces with the identified user needs not only enhances user satisfaction and performance but also strengthens the financial viability and competitiveness of these spaces in the long run.

6.5 Limitations of the research

The research methodology poses several limitations. Firstly, the sample size may not adequately represent the diverse population of coworker users. Data collected at a specific point in time, cross-sectional, could be influenced by participants' attitudes or feelings, given the subjective nature of the questions posed through closed-ended or choice questions. The use of non-probability sampling methods introduces the risk of sampling bias, potentially limiting the generalisability of the findings to a broader population. The reliance on purposeful sampling methods and prior research studies to determine the sample size may raise questions about its adequacy in capturing the full spectrum of coworking space users. Cross-sectional research design, while useful in capturing a snapshot of the relations between variables, may not account for changes over time or provide insight into causality. A longitudinal design could offer more robust evidence of casual relationships between coworking space user needs and individual performance indicators. The limitations should be acknowledged and considered when interpreting the findings of the research study.

6.6 Future research

The research proposes several opportunities for future research. Firstly, the established structural model could benefit from expansion and further testing. By increasing the sample size, the model's robustness could be assessed more comprehensively, allowing for generalisation of findings across a broader population of coworkers and confirming the results on this research.

Secondly, there is potential for further research into the basic psychological needs of relatedness, competence, and autonomy, particularly regarding how intrinsic and internalised extrinsic motivations impact each need of these needs. Thirdly, given that 49.1% of the variance in individual performance is explained by these three needs, it would be valuable to explore the influence of other factors, such as controlled motivation. Deci et al. (2017) observed that controlled motivation has a smaller impact than autonomous motivation on performance, suggesting a need for further examination particular in coworking spaces.

Fourthly, there's an opportunity to refine the measurement of individual performance. While this study relied on participant perceived performance, Cerasoli et al. (2016) highlighted the importance of considering both quantity and quality aspects of performance. Therefore, further research on performance measurement, particularly within coworking spaces, could contribute and enhance the theoretical knowledge base.

Lastly, future studies could focus on demographic factors, specifically examining users of different types of coworking spaces, industries, and educational backgrounds, and how the needs of these various groups affect individual performance. This research would offer a more nuanced understanding of coworking dynamics and their implications on performance outcomes.

6.7 Summary

This chapter provided an overview of the research results presented in Chapter 5, focusing on the hypotheses formulated to address the research question, which served as the primary aim of this study. These findings were complemented by the literature reviews in Chapter 2 and the hypotheses outlined in Chapter 3. The outcomes from Chapter 5 supported the hypotheses established in Chapter 3, further

validated by the literature. Theoretical implications were explored, highlighting the contribution of this research to the existing body of knowledge by extending the application of self-determination theory to the positive outcomes observed in individual performance, and in the context of coworking spaces. This expanded the diversity of self-determination theory's applicability and deepened understanding of the relationship between coworker user needs satisfaction to performance outcomes.

Furthermore, the practical implications of the findings were discussed, emphasising the significance of addressing user needs in the design and offerings of coworking spaces. This approach could confer a competitive edge and lead to improved financial performance. The chapter concluded with a discussion on the limitations outlined in chapter 4 and proposed potential avenues for future research studies.

7. Conclusions and Recommendations

In this chapter, the focus shifts to the core of the study, exploring what was researched and why it carries importance. The chapter delves into the research context, existing knowledge, specific questions addressed, findings, interpretations, contributions to scholarly debate, practical relevance, and suggestions for future research.

7.1 What was studied and why does this matter?

The research focused on investigating the influence of satisfying coworker user needs on individual performance, viewed through the lens of self-determination theory. This study holds relevance because coworking spaces, once unheard of two decades ago (Howell, 2022; Weijs-Perrée et al., 2019), have now become integral contemporary work settings (Appel-Meulenbroek et al., 2021). However, despite their growing popularity, coworking spaces encounter significant challenges such as member retention, needs fulfillment, and alignment with user preference (Deep, 2023). These challenges were further highlighted by the bankruptcy filing of WeWork, a prominent player in the coworking industry, in late 2023 (Financial Times, 2023). Nevertheless, coworking spaces continue to expand and grown (Financial Times, 2023).

Coworkers opt for these spaces to fulfill their needs (Rådman et al., 2023), and as this research indicates that meeting these needs leads to enhanced performance. The financial success of coworking spaces depends on satisfying user needs (Memud & Tabibi, 2023). From a business perspective, this study is relevant as it sheds light on the importance for coworking space owners and landlords to design their facilities and offerings around user needs. Meeting these needs can lead to increased performance for coworker users, subsequently reducing churn and attracting new members due to the appealing nature of coworking spaces. Consequently, this would result in better financial performance of coworking spaces.

From a theoretical standpoint, the necessity of this research arises from the predominant focus of existing studies on coworking spaces, which tend to center around owners, landlords, user preferences, and motivations for joining such spaces, often neglecting the crucial aspects of user needs (Rådman et al., 2023). Research

within organisational context has traditionally approached the subject from either the perspective of employees, focusing on their well-being, or from the perspective of the owners, focusing on their profitability (Deci et al., 2017). Despite the wide applicability of self-determination theory across various domains, its utilisation within physical environments has been underexplored (Rådman et al., 2023; Sjöblom et al. 2016).

Therefore, this study holds significance as it contributes to enhancing our understanding of coworking spaces by addressing the gap in research concerning user needs. It sheds light on the importance of relatedness, competence, and autonomy in fostering higher performance among coworker users. From a theoretical standpoint, this study extends and confirms the applicability of self-determination theory in the context of coworking environments. Moreover, it provides empirical evidence supporting the pivotal role of user needs in shaping the design and offerings of coworking spaces, thereby benefiting various stakeholders including coworking users, investors, professionals, and researchers.

7.2 What was the research context and why does it matter?

Given the practical and theoretical importance of the study, its relevance within the South African context cannot be overstated. South Africa has not been immune to the global phenomenon of coworking spaces, experiencing a remarkable growth from just five coworking spaces in 2013 (Moriset, 2013), to 236 in 2024 (Coworker, 2024). However, it is noteworthy that research on coworking spaces and their users, particularly within the South Africa context, remains limited (Kraus et al., 2022).

Furthermore, the research context encompassed all types of coworking spaces as defined by Kojo and Nenonen (2016), including participants aged 18 and above utilising coworking spaces on a part-time or full-time basis, representing various industries, educational backgrounds, income levels, and gender identities. This broad context was essential for obtaining a comprehensive understanding of the impact of satisfying coworker user needs on performance. By including diverse participants, the researcher aimed to generalise the findings to the broader population of coworker users.

7.3 What did the researcher already know and not know?

Drawing from existing literature, the researcher identified coworker user needs, summarised by Rådman et el. (2023), encompassing 21 user needs. Understanding the important role of satisfying user needs in enhancing motivation which has an direct impact on performance (Deci et al., 2017), the researcher noted a discrepancy in the findings by Oswald and Zhao (2022), that suggested a lack correlation between individual motivation and performance. This contradiction prompted further investigation into the motivation aspect.

Self-determination theory posits that autonomous motivation stems from fulfilling basic psychological needs, including relatedness, competence, and autonomy, which are considered universal (Deci et al., 2017). Building upon this theory and applying the 21 coworker user needs identified by Rådman et el. (2023), the research aimed to explore whether the satisfaction of these needs, viewed through the lens of self-determination theory, particularly basic psychological needs leading to autonomous motivation, influences individual performance outcomes.

7.4 What specific questions were answered?

Hypotheses were developed to address the research question: how does the satisfaction of coworker space user needs, through the lens of self-determination theory, influence individual performance within coworking spaces? These hypotheses were formulated based on existing literature, resulting in the following:

Hypothesis 1 (H1): Satisfying the need for relatedness has a direct correlation with user performance.

Hypothesis 2 (H2): Satisfying the need for autonomy has a direct correlation with user performance.

Hypothesis 3 (H3): Satisfying the need for competence has a direct correlation with user performance.

7.5 How did the researcher answer these questions?

A quantitative study was conducted to investigate these hypotheses, utilising data collected through research questions completed by participants actively utilising

coworking spaces, all aged 18 and above. These surveys were cross-sectional, capturing data at a single point in time. The collected data underwent rigorous screening and cleaning, factor analysis, and assessment of the measurement model for reliability and validity. The structural model was assessed to generate the research results. The hypotheses were all supported from the results.

7.6 What was found, and how was it interpreted?

The hypotheses proposed that relatedness, autonomy, and competence would positively correlate with performance, respectively. The results support these hypotheses, demonstrating statistical significance of the relationship between relatedness, autonomy, and competence individually and user performance. However, while statistically significant, the strength of these relationships is moderate, suggesting that additional factors may also influence performance outcomes. These findings underscore the importance of cultivating environments that foster relatedness, autonomy, and competence to improve performance in coworking spaces.

Relatedness, competence, and autonomy encompass various coworker user needs, and implementing strategies to address these needs by coworking space owners and landlords can positively impact user performance outcomes, potentially reducing churn and increasing tenant satisfaction, thereby improving the financial position of coworking spaces. For coworkers, ensuring satisfaction of there needs could moderately predict their performance within the coworking space.

From an academic perspective, these results confirm the versatility of self-determination theory and its applicability in various context, expanding on the research surrounding coworking spaces, particularly regarding user needs and their outcomes when satisfied. Theoretical implications highlight the extension of self-determination theory's application to coworking environments, enriching our understanding of the relationship between user needs satisfaction and performance.

7.7 How does this add to the current scholarly debate?

The study contributes to the scholarly debate by addressing the gap in academic literature, particularly to the lack of research regarding coworking spaces in the south hemisphere (Kraus et al., 2022), as well as limited research on coworker user needs

from a quantitative nature (Leclercq-Vandelannoitte & Isaac, 2016; Merkel, 2015; Moriset, 2013; Weijs-Perrée et al., 2019).

7.8 What is the practical relevance of the research findings?

The practical implications of the research are significant. By recognising the correlation between user needs satisfaction and individual performance in coworking spaces, the study offers valuable insights into optimising coworking space design and amenities to enhance user experience and performance. Understanding coworker needs, as identified by Rådman et al. (2023), and their impact on individual performance can guide coworking space owners and landlords in tailoring their offerings more effectively.

7.9 What are the suggestions for future research?

The research proposes several opportunities for future research. Firstly, the established structural model could benefit from expansion and further testing. By increasing the sample size, the model's robustness could be assessed more comprehensively, allowing for generalisation of findings across a broader population of coworkers and confirming the results on this research.

Secondly, there is potential for further research into the basic psychological needs of relatedness, competence, and autonomy, particularly regarding how intrinsic and internalised extrinsic motivations impact each need of these needs. Thirdly, given that 49.1% of the variance in individual performance is explained by these three needs, it would be valuable to explore the influence of other factors, such as controlled motivation. Deci et al. (2017) observed that controlled motivation has a smaller impact than autonomous motivation on performance, suggesting a need for further examination particular in coworking spaces.

Fourthly, there's an opportunity to refine the measurement of individual performance. While this study relied on participant perceived performance, Cerasoli et al. (2016) highlighted the importance of considering both quantity and quality aspects of performance. Therefore, further research on performance measurement, particularly within coworking spaces, could contribute and enhance the theoretical knowledge base.

Lastly, future studies could focus on demographic factors, specifically examining users of different types of coworking spaces, industries, and educational backgrounds, and how the needs of these various groups affect individual performance. This research would offer a more nuanced understanding of coworking dynamics and their implications on performance outcomes.

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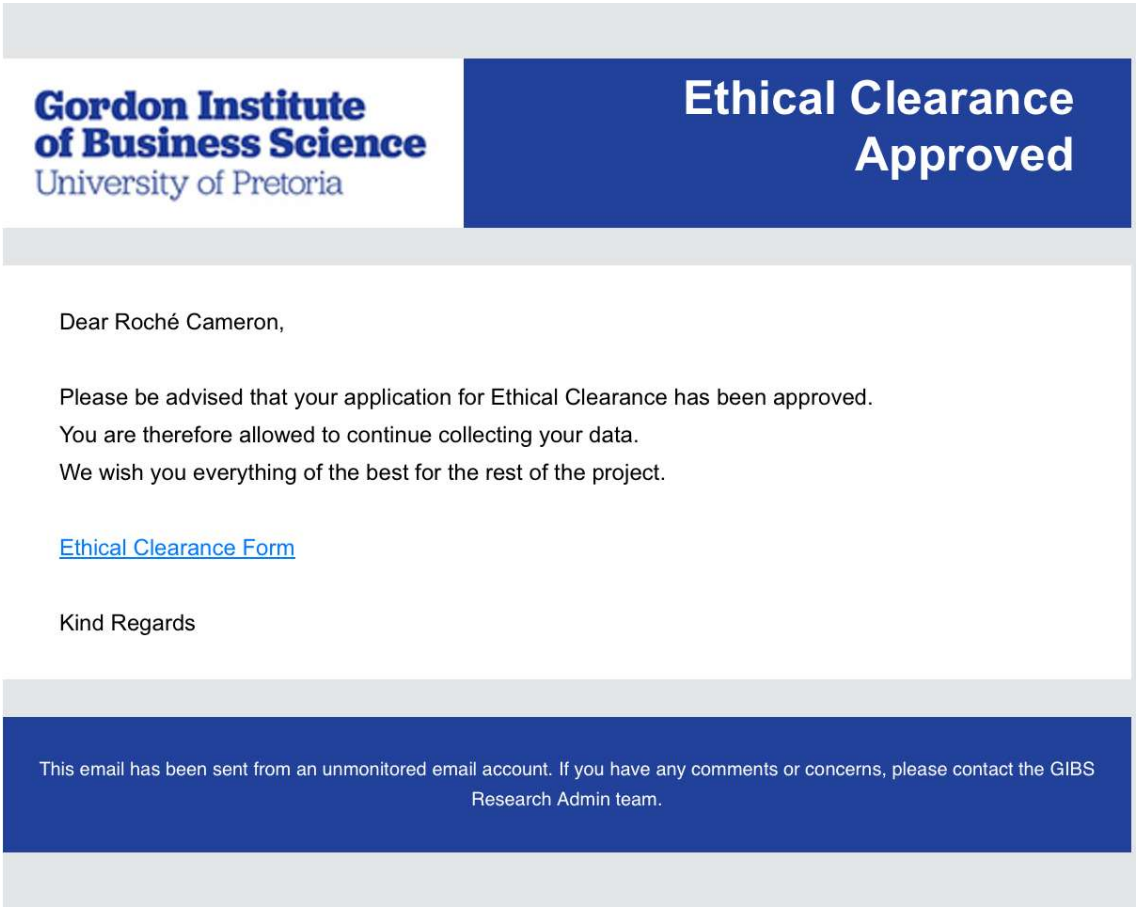
Appendices

Appendix 1: Ethical Clearance



Gordon Institute of Business Science
University of Pretoria

Ethical Clearance Approved

Dear Roché Cameron,

Please be advised that your application for Ethical Clearance has been approved.
You are therefore allowed to continue collecting your data.
We wish you everything of the best for the rest of the project.

Ethical Clearance Form

Kind Regards

This email has been sent from an unmonitored email account. If you have any comments or concerns, please contact the GIBS Research Admin team.

Appendix 2: Participant Consent Form

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Coworker Satisfaction and Performance Evaluation Survey

Start of Block:

Dear respondent,

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA.

I am conducting research on the relationship between coworking space user needs and performance indicators among current coworking space users.

The survey is divided into three sections, first section is demographic information (e.g. Age, Gender, Industry Sector), second section is the satisfaction level of coworkers, third section is questions relating to coworkers motivation, learning and performance.

The **survey questionnaire** is expected to take **5 to 10 minutes to complete** and will help us in understanding the relationship between coworker user needs satisfaction and performance.

By completing this questionnaire, you voluntarily consent to use the data you provide for this study. Your privacy and confidentiality are of utmost importance to us. **All information you provide will be anonymised and treated with strict confidentiality. Your participation is voluntary,** and you can withdraw at any time without penalty. All data will be reported without identifiers.

By **clicking 'Next page'** you indicate that your participation is voluntarily in this research and you: Are a user of Coworking Spaces, and Are 18 years of age, or older
If you have any concerns, please contact my supervisor or me. Our details are provided below:

Researcher name: Roché Cameron (email: 23012278@mygibs.co.za)
Supervisor name: Dr. Theresa Onaji-Benson (email: OnajiT@gibs.co.za)

Thank you for your valuable contribution to our research.

End of Block:

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Appendix 3: Online Survey Questionnaire

UNIVERSITEIT VAN PRETORIA
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Coworker Satisfaction and Performance Evaluation Survey

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By **clicking 'Next page'** you indicate that your participation is voluntarily in this research and you: Are a user of Coworking Spaces, and Are 18 years of age, or older
If you have any concerns, please contact my supervisor or me. Our details are provided below:

Researcher name: Roché Cameron (email: 23012278@mygibs.co.za)
Supervisor name: Dr. Theresa Onaji-Benson (email: OnajiT@gibs.co.za)

Thank you for your valuable contribution to our research.

End of Block:

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UNIVERSITEIT VAN PRETORIA
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Start of Block: Section 1 - Coworking User Demographical Information

Q1 Please select your age group:

- 18 to 24 (1)
- 25 - 34 (2)
- 35 - 44 (3)
- 45 - 54 (4)
- 55 - 64 (5)
- 65+ (6)

Q2 What is your gender:

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)

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Q3 What is your highest level of education:

- ○ Less than high school (1)
- ○ High school graduate (2)
- ○ Some college or associate degree (3)
- ○ Bachelor's degree (4)
- ○ Masters's degree (5)
- ○ Doctorate (6)

Q4 What best describes your current occupational status:

- ○ Student (1)
- ○ Employed - Full time (2)
- ○ Employed - Part time (3)
- ○ Self employed/Entreprenuer (4)
- ○ Retired (5)
- ○ Unemployed - Looking for work (6)
- ○ Unemployed - Not currently looking for work (7)

Page Break

UNIVERSITEIT VAN PRETORIA
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Q5 Please select your approximate annual salary range:

- ○ R1 - R237,000 (1)
- ○ R237,101 - R370,500 (2)
- ○ R370,501 - R512,800 (3)
- ○ R512,801 - R673,000 (4)
- ○ R673,001 - R857,900 (5)
- ○ R857,901 - R1,817,000 (6)
- ○ R1,817,001 and above (7)
- ○ Prefer not to say (8)

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Q6 Select the industry that best describes the industry in which you operate:

- ○ Accomodation and food services (1)
- ○ Admistrative and support services (2)
- ○ Agriculture, forestry and fishing (3)
- ○ Arts, entertainment and recreation (4)
- ○ Construction (5)
- ○ Education and training (6)
- ○ Finance and insurance (7)
- ○ Healthcare and social assistance (8)
- ○ Information and communication technology (9)
- ○ Manufacturing (10)
- ○ Mining and quarrying (11)
- ○ None profit (12)
- ○ Professional, scientific and technical services (13)
- ○ Public administration and defence (14)
- ○ Real estate (15)
- ○ Transportation and storage (16)
- ○ Unemployed (17)
- ○ Wholesale and retail (18)

Q7 In which geographical region do you primarily engage in coworking activities?

- ○ Southern Africa (1)
- ○ Other regions in Africa (2)
- ○ Europe (3)
- ○ North America (4)
- ○ South America (5)
- ○ Asia (6)
- ○ Australia/Oceania (7)
- ○ I primarily cowork remotely from various locations worldwide (8)

Q8 How long have you been a coworking member?

- ○ Less than 6 months (1)
- ○ 6 months to a year (2)
- ○ 1 to 2 years (3)
- ○ More than 2 years (4)

Q9 How many days a week do you utilize coworking spaces?

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- more than 5 (6)

Q10 Please select the user profile that best fits your current coworking situation:

- The Freelancer (1)
- The Remote Employee (2)
- The Hybrid Worker (3)
- The Digital Nomad (4)
- The Student (5)
- Corporate Tenants (6)
- Startups (7)
- Small Businesses (8)
- Non-Profits, NGOs (9)

Q11 Please select the coworking space category that best applies to your preference:
Instructions: Below are different categories of coworking spaces. Please read the descriptions and choose the category that best fits your preference.

- ○ Public Offices: These are free coworking spaces like libraries, where individuals can work in a public setting. (1)
- ○ Third Places: Public spaces that require service purchases, such as cafes, where you can work while enjoying services offered by the establishment. (2)
- ○ Collaboration Hubs: Public offices that emphasize collaboration among workers, providing an environment conducive to teamwork. (3)
- ○ Co-working Hotels: Shared office spaces with brief lease contracts and streamlined services, offering flexibility for short-term work arrangements. (4)
- ○ Incubators: Spaces that focus on providing support for entrepreneurship and the development of new businesses. (5)
- ○ Shared Studios: Organizations or entrepreneurs rent office spaces through flexible lease agreements, often with criteria related to community fit. (6)

End of Block: Section 1 - Coworking User Demographical Information

Start of Block: Section 2 - Coworking User Needs Satisfaction

These questions consists of statements related to various aspects of coworking. Please read each statement carefully. Indicate your level of agreement with each statement using the provided scale.

Q1 I feel a sense of belonging to a community in my coworking space.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q2 My workplace energizes me.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q3 I feel noticed and welcomed in my coworking space.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q4 I have control over my social interactions in the coworking space.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q5 I can be transparent and open in my interactions within the coworking space.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q6 I believe my coworking space leaves a positive impression on guests.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q7 My coworking space provides opportunities for marketing my company.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q8 I am familiar with other members in my coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q9 I have opportunities to cooperate with relevant individuals or organizations in my coworking space.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q10 I have met people in my coworking space who have led to business opportunities.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

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Q11 I have opportunities to learn new things from my peers and events in my coworking space.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q12 I can receive help or input from others in my coworking space.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

Q13 My coworking space provides a platform for me to share knowledge with others.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q14 I can focus on my work activities in my coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q15 I can have interactions without disturbing others in my coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q16 I have the flexibility to choose a suitable work area in my coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q17 I feel that I can manage confidential information securely in my coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q18 I experience increased productivity as a result of my coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q19 My coworking space allows me to focus on the core aspects of my business.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q20 I can work smoothly without facing significant technical disruptions in my coworking space.

- Strongly disgaree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

Q21 My coworking space contributes to a healthy work environment.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

End of Block: Section 2 - Coworking User Needs Satisfaction

Start of Block: Section3 - Coworking Experience

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CL1 Members at this co-working space often teach each other skills.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

CL2 Members at this co-working space work together on tasks.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

CL3 Members commonly give each other feedback on work-related tasks.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

CL4 When a member needs help for a task, the community will help him.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

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ML1 I am interested in learning new skills.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

ML2 I am interested in learning from others

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

ML3 I am happy to teach skills to other members at this coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

ML4 I am eager to work together with other members at this coworking space.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

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P1 As a result of being at the co-working space my work quality has increased.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

P2 As a result of being at the coworking space my job knowledge has increased.

- ○ Strongly disagree (1)
- ○ Somewhat disagree (2)
- ○ Neither agree nor disagree (3)
- ○ Somewhat agree (4)
- ○ Strongly agree (5)

P3 Being a member of the co-working space has helped me increase my job skills.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

P4 Being a member of the co-working space has increased my work efficiency.

- Strongly disagree (1)
- Somewhat disagree (2)
- Neither agree nor disagree (3)
- Somewhat agree (4)
- Strongly agree (5)

End of Block: Section3 - Coworking Experience