

**T.C.
ISTANBUL OKAN
UNIVERSITY
GRADUATE SCHOOL**

**THESIS FOR THE DEGREE OF MASTER OF
ARCHITECTURE**

Muiz Wale MEMUD

**ENHANCING USER EXPERIENCE: EFFECTIVE DESIGN
STRATEGIES FOR COWORKING SPACES IN LAGOS
STATE, NIGERIA**

THESIS ADVISOR

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ISTANBUL, May 2023

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DEDICATION

I dedicate this project to Almighty Allah, who granted me the strength and guidance to pursue my academic goals. I also dedicate this project to my loving spouse, family, and friends, whose constant encouragement and unwavering belief in me have been the driving force behind this accomplishment. I express my deep appreciation and heartfelt gratitude to all of them.



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KISA ÖZET

KULLANICI DENEYİMİNİ İYİLEŞTİRMEK: NİJERYA, LAGOS EYALETİNDEKİ ÇALIŞMA ALANLARI İÇİN ETKİLİ TASARIM STRATEJİLERİ

Ortak çalışma, küresel olarak çalışmanın tercih edilen yolu haline geldi ve bu nedenle ortak çalışma alanlarının gelişiminin arttığı görülüyor. Nijerya'da, son on yılda ülke genelinde ortak çalışma alanlarının gelişiminde kaydedilen katlanarak bir büyüme var. Bu büyüyen gelişimin ışığında araştırma, bu alanların başarısının büyük ölçüde kullanıcılarının olumlu deneyimlerine bağlı olduğuna işaret etmeyi amaçlıyor. Mekanın deneyimi, mimari tasarımının ergonomi açısından kalitesi ile belirlenir. Lagos eyaletindeki ortak çalışma alanları kavramı ve kullanıcılarının algısı üzerine sınırlı araştırma göz önüne alındığında, bu araştırma, kullanıcıların Lagos Eyaletindeki ortak çalışma alanlarındaki deneyimlerinin etkili tasarım yoluyla iyileştirilmesini sağlamaya yönelik bir kılavuz oluşturmayı amaçlamaktadır.

Ortak çalışma alanlarının kavramı, tarihçesi ve tipolojileri, kullanıcı deneyimlerinin algılanması, bu alanların kullanımındaki temel itici güçler ve başlıca tasarım hususları hakkında kapsamlı bir literatür taramasının ardından, bu araştırma ana hatları çizilen hedeflere ulaşmak için bir anket geliştirdi. Toplanan ve analiz edilen veriler, ortak çalışma alanlarının mevcut kullanıcıları ve bu alanların gelecekteki tasarımlarının yörüngesini belirleyecek faktörler hakkında değerli bilgiler sağladı. Sonuçlar, ortak çalışma alanlarına itici güçlerin, kullanıcı deneyiminde daha fazla iyileştirme elde etmek için gelecekteki tasarımlarda desteklenmesi gereken tasarım hususlarının öngörücüleri olduğu sonucuna varmıştır. Çalışmanın sonuçları, Nijerya'nın Lagos Eyaletindeki ortak çalışma alanlarının tasarımına bilgi verecek ve kullanıcı deneyimini geliştirmeye yönelik öneriler sunacaktır.

Anahtar Kelime: İş arkadaşı, Çalışma alanları, Kullanıcı deneyimi

ABSTRACT

ENHANCING USER EXPERIENCE: EFFECTIVE DESIGN STRATEGIES FOR COWORKING SPACES IN LAGOS STATE, NIGERIA

Coworking has increasingly become the preferred way to work globally and as thus the development of coworking spaces is seen to be on a rise. In Nigeria, there is a recorded exponential growth in the development of coworking spaces across the country in the last decade. In light of this growing development, research aims to point out that the success of these spaces is heavily reliant on the positive experience of its users. The experience of space is determined by the quality of its architectural design in terms of ergonomics. Given the limited research on the concept of coworking spaces and perception of its users in Lagos state, this research sets out to establish a guide on ensuring users' experience in coworking spaces in Lagos State are improved through effective design.

Following an extensive literature review of the concept, history and typologies of coworking spaces, the perception of user experiences, the key drivers to the use of these spaces and its major design considerations, this research developed a questionnaire to achieve its outlined objectives. The data collected and analyzed provided valuable insights on the current users of coworking spaces and the factors which would determine the trajectory of future designs of these spaces. The results concluded that the drivers to coworking spaces are predictors of the design considerations which should be upheld in future designs to achieve greater improvement on users' experience. The results of the study would thus inform the design of coworking spaces in Lagos State, Nigeria and provide recommendations for improving the user experience.

Keyword: Coworker, Coworking spaces, User experience

ABBREVIATIONS

CWS – Coworking Spaces

UX - User Experience

RII – Relative Importance Index

M -Mean

SD -Standard Deviation



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CHAPTER 1 – INTRODUCTION

1.1 RESEARCH BACKGROUND

Coworking spaces (CWS) are the physical locations that facilitate the coworking phenomena. Coworking is a term used to describe a group of working people who share a workspace but can work alone or in collaboration at will. CWS are considered as a reaction to the transition in the present working style, which is more reliant on technology, individualism, mobility, and cooperation. Although there have long been places that resemble CWS, but modern CWS are recorded to have started in 2005 and continued to evolve in its design and management till date (Waters-Lynch et al., 2016). Over the last decade, research shows an exponential increase in the number of CWS that exist in cities globally (Kojo & Nenonen, 2014; Abu Gosh, 2019; Ayodele et al., 2021; Rådman et al., 2022; Knoll, 2022). This has also been the case in the continent of Africa, Nigeria especially (Akanle and Omotayo, 2019) where the number of coworking spaces grew by 90% between 2010 and 2019 (Odunsi et al., 2019). In Lagos State, the largest city in Nigeria, the development of CWS has been on a constant rise reflecting the growing demand for this concept (Ezugwu, 2021). CWS have become an important part of working cities factored for positive and progressive impact.

The success of these spaces depends greatly on the experience it produces for the coworkers, according to numerous reviews. Users of coworking spaces, commonly referred to as "coworkers," are a smart group with a variety of work dynamics motivated by their urge to create value in collaboration. Similar to ergonomics, user experience (UX) has recently attracted more attention, especially in the field of architectural design, since places that are invested in users' perceptions have replaced those that only achieve functionality. The user's experience at CWS is known to be strongly impacted by the spatial design. The user's perception of the environment as a result of their engagement with it is crucial to the ergonomics study since it affects their comfort, health, productivity, and social interactions. Consequently, it is imperative to investigate coworkers' experiences in light of the increasing number of CWS developments. Unfortunately, reviews of literature point out that there is a general lack of insight on users' experiences in these spaces (Appel-Meulenbroek et al. 2018).

Summarily, as the development of CWS continues to increase, this research delves into deriving an understanding of its concept and history. In the wake of this growth and given the perceived importance of users' perception of these developments, this study addresses the

intersection of design and user experience in term of CWS. This could be achieved by uncovering the needs peculiar to the current users so as to provide spaces that cater to their expectations thereby improving their overall experience, creating room for improvement in design and sustainability practices and also satisfying users' needs. It is important that the design of coworking spaces is professionally handled and intently built to achieve its success.

1.2 STATEMENT OF PROBLEM

A global survey by Northcourt, (2020) reported that approximately 10,080 (72%) of the sampled 14,000 co-working spaces had a decrease in the number of users. In Lagos state, Uzoho (2020) reported an estimated N300 million losses in revenue in the first quarter of 2020 due to a drop in demand for co-working spaces. Although some of these setbacks were attributed to the pandemic's spread and its constraints, they actually result from users' discontent with how these venues are used. Coworking spaces are expected to grow in quantity over the next few years and be seen as a wise investment, however some users have expressed dissatisfaction after finding it challenging to attain their purpose in using these spaces, making this improbable.

Various studies point to this disappointment and lack of satisfaction as a result of poor user experience (Kojo & Nenonen, 2014; Mammadrzayeva, 2019; Appel-Meulenbroek et al., 2020). Users' dissatisfaction is prevalent in coworking spaces because of the design and management's increased attention to stakeholders' desire for financial gain, or it could be a result of the lack of research on the phenomenon of coworking spaces and users' needs that could have influenced stakeholders' and design professionals' decisions. In light of this, a successful coworking space should place a high focus on user satisfaction because happy users produce successful business models, devoted space users, and sustained development that ensures shareholder profits.

As CWS continue to saturate the work climate, attracting series of investors, the key factor, user experience needs to be fulfilled. Given the plethora of benefits that effective design has on the experience of space, it is important to harness its benefits for the success of CWS to avoiding spiraling developments which are likely to fail.

1.3 SIGNIFICANCE OF RESEARCH

As at 2008, global statistics of existing coworking spaces was amounting to 160. The development of these spaces has continued to see an exponential growth resulting to an approximately 19,000 spaces worldwide with over 3.1million coworkers in 2019 (Huddle,

2022; Stevanovic, 2022). Furthermore, this number is projected to rise to about 41,975 coworking spaces by the end of 2024 (Statista Research Department, 2022). In spite of the exponentially growth of in number of coworking spaces globally (Kojo & Nenonen, 2014; Ayodele et al., 2021; Rådman et al., 2022), Cheah & Ho, (2019) confirms that there has been little research on the subject matter.

Kraus et al., (2022) mapped out the state of research on coworking spaces and found that although the number of studies done have tremendously increased since 2017, most of them remain country specific, concentrating mainly on western countries. This is similar to the findings of Berbegal-Mirabent, (2021) whose result showed that the top ten countries with research on coworking spaces were in Europe and America. In trying to adopt these researches for Africa, Appel-Meulenbroek et al., (2020) and Kraus et al., (2022) explained that work cultures are varied between countries and research on CWS are generally not applicable from one country to the other. They also added that research on coworking spaces is more efficient when conducted for a target user group or a local situation (Appel-Meulenbroek et al., 2020).

In another vein, Kraus et al., (2022) found that most research on coworking spaces were focused on management-related topics and urged that subsequent researches should explore social sciences or architecture as the success of coworking spaces are deeply rooted in human social behaviour and their activities in work spaces. This was supported by Kojo & Nenonen, (2016) and Fasano et al., (2018) who added that user' behaviour, users' needs, space and typologies needs to be studied to understand the creation of coworking spaces. Soegoto & Hafandi, (2018) concluded that given the diversity of needs of coworking spaces, it is important they are guided by proper research.

The low number of research on coworking spaces, the inability for their findings to be applied across countries and the recommendation for more architecture-based and user centered research begs the need for further research. As thus, this research covers Lagos state Nigeria as a target audience, investigating users' motivation to coworking spaces and the ways in which users' experience can be elevated through design. This research would be highly beneficial to the governing bodies, organizations, design professionals as well as stakeholders who invest in coworking spaces, serving as a guide to improve users' satisfaction and uphold sustainability of this practice. It would guide decision making in correcting existing coworking spaces and the development of future spaces in Lagos state Nigeria.

1.4 RESEARCH OBJECTIVES

The aim of this research is to establish guided design considerations to improve the experience of coworkers in coworking spaces in Lagos State Nigeria.

To achieve the stated aim, the following objectives are to be carried out:

Objective 1: To understand and establish the reasons why workers chose to coworking spaces in Lagos State, Nigeria.

Objective 2: To develop an insight on coworkers' experience of existing coworking spaces in Lagos State, Nigeria.

Objective 3: To identify design considerations that would efficiently improve coworkers experience in coworking spaces in Lagos State, Nigeria.

Objective 4: To make recommendations for future development of coworking spaces which would improve coworkers experience in coworking spaces in Lagos State, Nigeria.

1.5 RESEARCH HYPOTHESIS

Hypothesis: The reasons for coworking and the measure of user experience of existing coworking spaces are key in developing design considerations for future coworking spaces in Lagos State, Nigeria.

Null Hypothesis: There is no significant relationship between the reason for coworking and the measure of user experience of existing coworking spaces, and the development of design considerations for future coworking spaces in Lagos State, Nigeria.

1.6 RESEARCH SCOPE

Mirza et al., (2013) and Akanle et al., (2020) emphasized on the importance of developing a scope at the inception of a research and the elements which it could be based on. Following this, this research develops a niche based on geographical location thereby ensuring it is researchable, credible and valid. This research focuses on the co-workers and coworking spaces in Lagos state, Nigeria. Lagos State is the economic hub of Nigeria, has the highest continual economic growth in the country and the 7th largest economic city in Africa (Kazeem,

2016; Osho and Adishi, 2019). It is home to various cooperate headquarters, cooperate businesses, entrepreneurs, freelancers, start-ups and creatives (Pilling, 2018). As thus, it an important study area for the research in question as it houses relatable demographic. It is also a valid start point for development of future researches in Nigeria and Africa as a whole.



CHAPTER 2 - LITERATURE REVIEW

2.1 DEFINING COWORKING AND COWORKING SPACES

The word “Coworking,” as conceived by Bernard DeKoven refers to the idea of working independently in a shared environment and is differentiated from the word “Co-working” which meant to work together on a piece of work/project (Gandini, 2022). Although these words are not distinctively used in various research as postulated by Gandini, (2022), this research sticks to the idea behind “coworking”. Uda, (2013) succinctly broke down coworking into two parts “working individual” called coworker and “workplace” referred to as the coworking space.

Coworking entails persons of different forms of employment converging in a space to perform given tasks while willingly cooperating communally in terms of knowledge and resources sharing (Uda, 2013). This modern work situation focuses on ensuring liberty and deliberate community building in work patterns amongst workers of different fields with like-minds (Muth and Rauscher,2022). Most notably, coworking is void of hierarchy and social barriers as it centres more on developing a community of workings whilst upholding their autonomy (Johns and Gratton, 2013; Ayodele et al., 2021). Coworking spaces (CWS), as derived from the concept of coworking are spaces specifically planned for coworking activities (Gandini, 2015; Waters-Lynch et al., 2016).

Rief et al., (2016) analyzed CWS in terms of users, size, motivation, location, services provided and ambience and concluded that they can be adequately defined as a workspace that attracts a versatile group of autonomous workers who aim to create value coming in a common space and location free from hierarchical constraints and more focused on social networking and corroboration. Holienka & Race, (2015) and Ayodele et al., (2021) support the point on versatility stating that workers in CWS are of various sectors of the economy comprising of entrepreneurs, start-ups, freelancers, self-employed or employees of some organization ranging in on various sectors of work in the economy. CWS provides a spatial blend of the two distinct work modes namely the standard/traditional work life of the office and the independent work life of an entrepreneur/self-employed persons (Gandini, 2015). They also are seen as a merge of the formal and informal aspect of life as majority of its design provides spaces with the traditional work desk and chair but also includes areas for dining and relaxation or play aimed to boost interaction while also working (Muth and Rauscher, 2022). These spaces are new advancements in the evolution of traditional office arrangements, spatial type, and layout. They result from a deliberate, forward-thinking thought process that incorporates sustainability

principles and significant economic considerations to create a flexible work environment that caters to a diverse clientele (Moreno, 2021).

Waters-Lynch et al., (2016) and Uda, (2013) compared CWS to concepts such as cooperate open office, small home office, incubatory facilities and serviced office spaces which are usually likened to it. They concluded that CWS have a higher degree of flexibility and proximity to its users, encourages a more diverse combination of workers, more deliberate in its intent for social interactions and have a friendly office/homelike (work/play) aesthetics to its spaces. Huang et al., (2019) added that flexibility in space design and lease terms also distinguishes CWS from the conventional office space.

2.2 HISTORICAL CONTEXT OF COWORKING SPACES

Numerous numbers of profession around the world have become familiar to the term coworking in recent times. This can be seen from the exponential growth of CWS over the years and its projected increase in the future (Mason, 2021; Knoll, 2022). To understand this phenomena's growth and future, it is important we look at its history.

2.2.1 Early traces of Concept Leading to Coworking

Uda, (2013) stated that as early as the 20th century, people had started to co-work and that this could be traced, likened to examples of artist or writers gathering to work together establishments located in Paris, Tokyo and New York. Kojo and Nenonen, (2014) opined that the materialization of CWS dates back to the early 1960s concept of telecentres which metamorphized into serviced centres in the 1980s and then finally, the CWS of the early 2000s. They explained that in the early 1970s, the need to provide strategic locations and neighborhoods with access to basic telecommunication technology such as computers and internet access gave rise to the development of telecentres. This concept subsequently grew bigger to be seen as serviced offices in the 1980s, housing office spaces for a wide range of work force of organizations and multinational companies. Contrary to the history line by Kojo and Nenonen, (2014), the authors Foertsch and Cagnol, (2013); Adeniyi, (2020) and Mason, (2021) reviewed that the oldest semblance to CWS was the 1995 C-base of Berlin founded by seventeen computer engineers aimed at promoting collaboration between technology lovers. Deducting from these authors, it could be said that the first semblance of CWS was driven by the growth of technology and the need to share.

2.2.2 Emergence of Coworking and Coworking spaces

At the end of the C-base era in Berlin, the term coworking did not exist but it can be considered as the pre-stage of this concept as it encapsulated its key features such as like-minded creative people with homogenous interest, the zeal for community and the availability of a common space (Rief et al., 2016). The word “coworking” was introduced in 1999 by Bernard DeKoven depicting the mode of work which involved collaboration coordinated by technology and void of hierarchy (Gandini, 2022). This ideology was the foundation of coworking spaces (Mason, 2021). This concept led to the birth of spaces such as 116 West Houston (1999) and 42 West 24 in New York City (2002), which offered a space to co-work and also offered collaboration, social network, pleasant work environment, short leases, amenities and flexible work spaces (Adeniyi, 2020).

Tracing the history of modern-day coworking, Waters-Lynch et al., (2016) stated that it was pioneered by tech geek Brad Neuberg in San-Francisco, USA, (2005) who aimed to create a space that solves the imbalance between working alone from home and working 9-5 at an office/organization. Gandini, (2022) in a similar trajectory explained that this space was driven by its possession of infrastructure for interaction and ability to connect technologies, spaces and people. Although the space created by Brad Neuberg was short lived, it sparked the creation of other similar spaces (Grinberg, 2019). An example was the creation of the hub in 2005 in London by a few entrepreneurs aimed at sparking productivity in a social setting as against the seclusion of home-working (Waters-Lynch et al., 2016).

As thus, it could be agreed that coworking has existed from earlier times based on the basic human need to work in collaboration instead of isolation and this need has led to the development of series of spaces with more intentional design which are now referred to as coworking spaces. The *Figure 2.1* below gives a summary of CWS developmental timeline of CWS from the C-base era of 1995 to the current century.

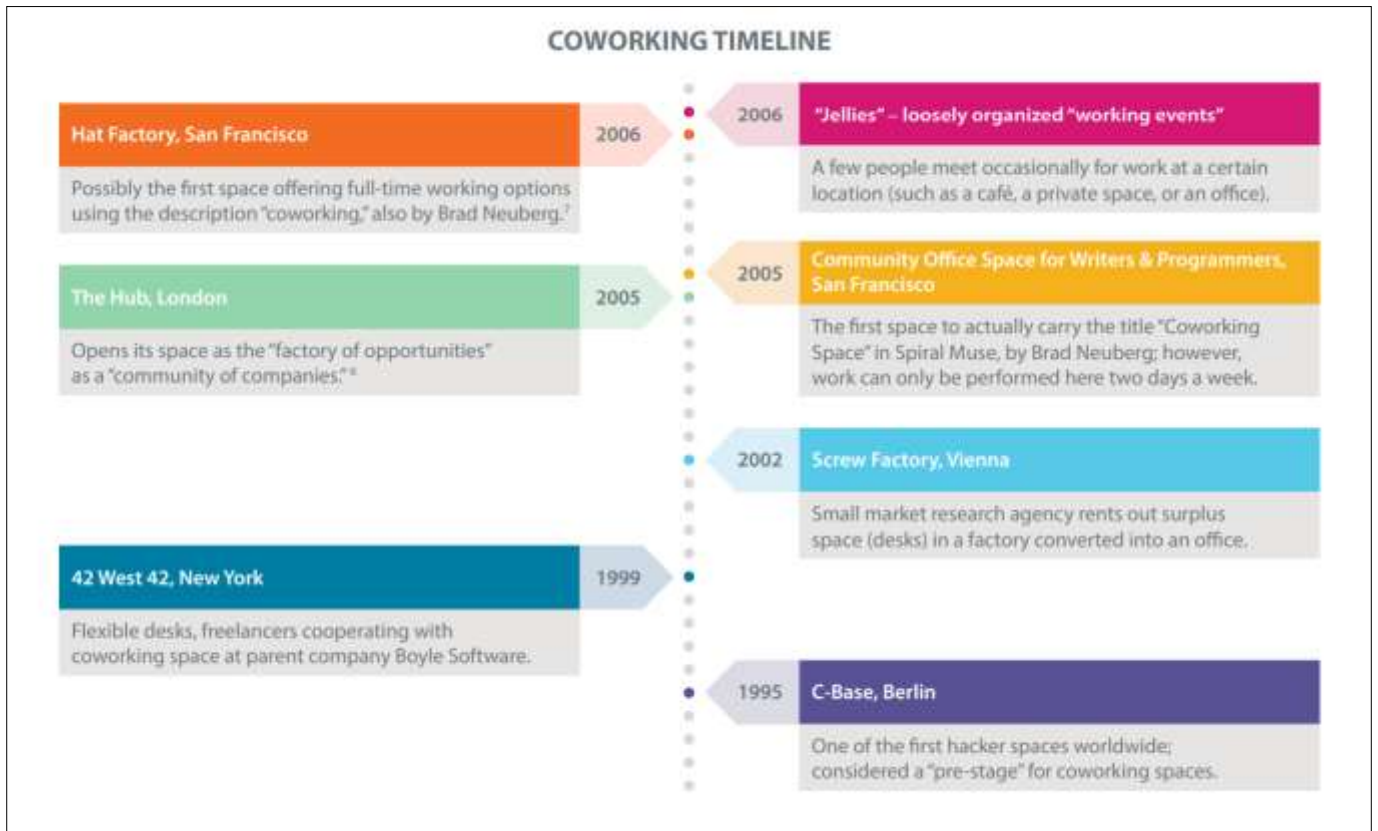


Figure 2.1: Historical timeline of the emergence of coworking spaces

Source: Rief et al., (2016)

2.2.3 The Nigerian Context of Coworking Spaces

Nwanne and Awodipe, (2017) likened the start and drive of coworking in Nigeria within the context of Uda, (2013) with the example of mechanic workshops, hamlets and villages in which spaces/places are created for people to work together, depend on each other for knowledge and share resources. According to Kamalu, (2021), in comparison to previous literature, the creation and growth of CWS in the Nigerian real estate market is a relatively new as the first CWS, the Co-creation Hub, was established in 2011. Prior to that time, little was known about this unconventional working arrangement, and investors were hesitant to invest in a model for which they were unsure of its acceptance and profitability (Adeniyi, 2020). Recent research shows that coworking in Nigeria has experienced an exponential growth between 2014 and 2017 (Aransiola, 2017) from just three (3) in Lagos and Abuja in 2011 to over seventy (70) spread out in eleven (11) states in 2018 (Adeniyi, 2020). This growth is attributed to the growth

of small and medium-sized enterprises (SMEs) and other creative start-ups in the country. The data shows that it is fast becoming a recognized and required addition to the country's real-estate climate and as thus should be regarded as an important research focus.

2.3 TYPOLOGIES AND SPATIAL REQUIREMENTS OF COWORKING SPACES

In a general description, Abu Gosh, (2019) stated that the design character of CWS is based on stimulating creativity, innovation and interactions. Appel-Meulenbroek et al., (2020) added that it designs intent caters for a diverse group of users, creating a space that promotes work-life balance and distancing it from the rigidity traditional office spaces. As the number of CWS increased over the years, various typologies of these spaces have emerged (Elif et al., 2019). Johns & Gratton, (2013) distinguished them based on ownership and expected users as organizational (owned by companies for their staff) and independent (owned by private entities for public use) operating CWS. Holienka & Race, (2015) classified them based on their sizes (Medium/large and Small) and their activities (Corporate, University and Pop-up) while Kojo & Nenonen, (2016) had a completely different view and classified the CWS based on two axes: the business model which entailed profit or non-profit and the level of user access which covered public, semi-private and private spaces. Deducting from these studies, typologies covering expected users are constantly put in place and a clear understanding of these typologies are paramount to a successful user experience.

Irrespective of the different typologies which exist, the spatial composition and design characteristics of CWS from the user's point of view fall under the four major work modes of focus, collaborate, socialize and learn which (Ondia et al., 2018; Elif et al., 2019). The focus mode requires full-on concentration, collaboration involves engagement with people who share similar objectives, socialization aims to eliminate isolation and offer a sense of belonging while learn involves activities of seeking and absorbing knowledge (Ondia et al., 2018). This is similar to the conclusion by Cheah & Ho, (2019) which explained that the generic design of co-working spaces is an office space with an informal but creative outlook which is usually of open plan workspaces for ease of collaboration, private spaces for meetings and focus and then casual spaces giving it the homely informal feel.

The four work modes of CWS cover the needs of a coworkers and informs the spaces required for a proper functioning CWS which are office spaces, meeting rooms, social spaces such as lounge and games room, facility spaces such as kitchen, toilets, printer/copy area, reception desk (Ondia et al., 2018; Hoay, 2022). This is clearly depicted by Firdaus and Fuad, (2021) means-to-end hierarchal breakdown of the work modes based on the questions Why, What and How as depicted in *Figure 2.2* below. Elif et al., (2019) added that they offer spaces for networking events, training programs, social events, and even summer camp. These spatial requirements depict an intricate space which shows a playful and social approach to work combined with the professionalism of the cooperate world.

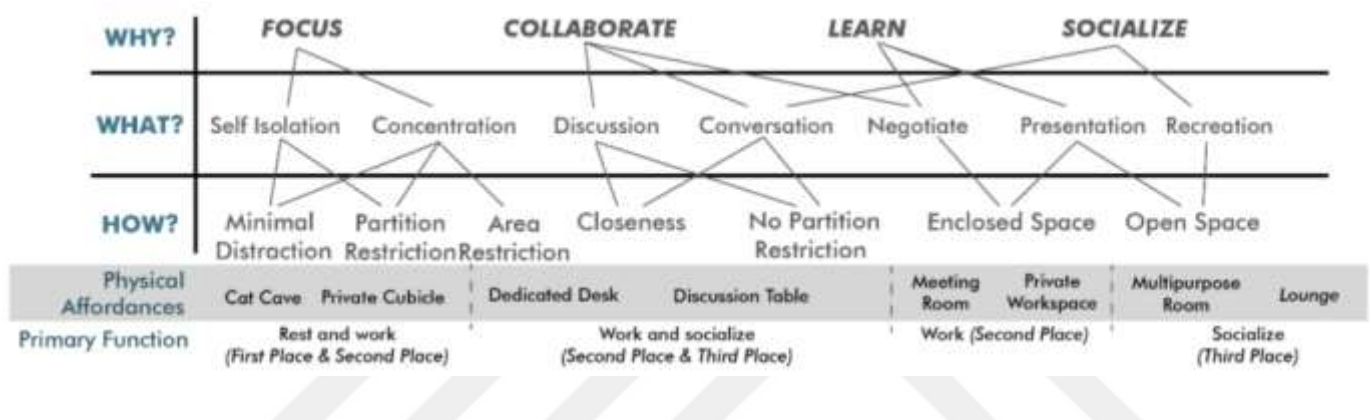


Figure 2.2: Hierarchical analysis of a coworking space using the four work modes

Source: Firdaus and Fuad, (2021)

Lazo (2018) stated that the spatial arrangement of CWS has to take notes of proper zoning, space adjacencies, space requirements and furniture anthropometrics to fit diverse users as well as space planning for privacy and general comfort. Lazo (2018) zoned these spaces as public, semi-public and private in a linear or perimeter arrangement transition from the entry point or per floor in multilevel buildings and achieved adjacencies based on users' activities, functional relationship between different spaces and seamlessness in circulation.

2.4 USER EXPERIENCE IN EFFECTIVE SPACE DESIGN

Mak, (2013) explained that an excellent design goes beyond the basic functionality and aesthetics to address the concerns from the users' perceptions in other to pan better spaces. He concluded that the best spatial planning stem from the users' experience. The term "User experience" (UX) as introduced by Norman et al., (1995) refers to the seamless interaction between human beings and any designed system. Scholars refer to UX as a combination of factors that involve the user, the designed system and the context or environment within which the interaction takes place (Berni and Borgianni 2021). Hassenzahl and Tractinsky, (2006) explained that UX can be covered in three dimensions as the internal state of the user such expectations needs, motivation, moods etc, the attributes of the designed system such as its usability, complexity, functionality and the context which entails the environment/framework/settings in which the user interacts with the designed system. Berni and Borgianni (2021) stated that UX can be categorized distinctively into three parts namely ergonomic, cognitive, and emotional experiences.

Reddy et al., (2012), Attaianese, E., and Duca, G. (2012), Mokdad and Abdel-Moniem, (2017) and Eilouti, (2021) explained that ergonomics is a broad scientific term which encapsulates cognitive and emotional experiences. Its definition is also quite similar to that of UX as it is described as the investigation of the relationship between human beings and the elements of a system, aimed at optimizing human and system effectiveness. In design, Lee (2022) explained that the human experience of a space goes beyond what is visible to entail how it is affects the user throughout the user's body senses and physical movement during their interaction with the space. Reddy et al. (2012), Rodriguez-Aguñaga et al. (2020), Eilouti (2021) and Lee (2022) deducted that the ergonomics of a built space and the user is bordered on the factors of comfort, health and safety, security, sense of belonging, satisfaction, functionality, flexibility, aesthetics, cultural connection, adaptability, social relationship, personal goals, multi-use and performance of buildings.

The planning and design of the space can alter the experience for the user to a large extent. Tamasi, (2016) delineated that in the design of physical spaces, it is important that in the early stages of developing the floor's plans, furniture layout, mood boards and 3d mockups, key considerations be placed on the users' activities at different times and their preferred sequence to achieve the best user experience. Further to this, it is also important to consider basic design elements which augment these considerations such as Colours, textures, ambience

design and space relation to users should be considered. Optix Team, (2021) concluded that to achieve the best user experience in a space, the key step should be identifying the factors which propel users to choose and continuously use these spaces and then work on analyzing this data for implementation. Schwab, (2019) added that this is best understood by acquiring data from the space users.

2.5 KEY DRIVERS TO ADOPTING COWORKING SPACES BY USERS

Huang et al., (2019) opined that the core driving forces to the use of CWS was the fact that the working culture has drastically changed and the new economy is keen on operating efficiently. This meant that work modes were now based on creativity, technology, knowledge and resources sharing. Following the increasing number of coworking spaces in different economies, it is important to understand the motive that drives users into using or choosing a particular coworking space (Rådman et al., 2022). Various studies from different locations as summarized in *Table 2.1* explored the reasons why people opt for coworking as best practice.

Kojo and Nenonen, (2014) analyzed users' perspective of these spaces and found the key reason that drives coworking is the growth of technology. This was quite different from the findings by Holienka and Race, (2015) who reported that users are drawn to coworking spaces for their perceived ambience first, and secondly for their ability to give users a sense of community and positive interactions with like minds. In another vein, Seo et al., (2017) stated that the two key drivers are the need to facilitate relationship and the economic benefits of sharing a space. This study was supported by Cruz et al., (2021) and Huang et al., (2019) adding that that the urge for professional and social interaction are pivotal to coworking. Clifton et al., (2019) states interaction, expansion to social business, cost savings and being in a creative environment as first four reasons people chose to co-work. Appel-Meulenbroek et al., (2020) cuts across three countries in co-analysis and found the key motivators to be perceived ambience and efficiency in resources/time management. According to Hoay, (2022), the most important drivers were flexibility and sense of community these spaces offer.

Table 2.1: Conclusion on Key Drivers to the Use of Coworking Spaces

Source: Authors review (2023)

S/N	Author	Conclusion on Key Drivers to the Use of Coworking Spaces	
1.	Kojo & Nenonen, (2014) Extensive review and analysis of academic papers that researched CWS	<ol style="list-style-type: none"> 1. The new ways of working which involves working in a mobile way and connecting people with technology 2. The attractiveness of its ambience and variety in space 3. Diverse group of users fostering work and social collaborations 	<ol style="list-style-type: none"> 4. Ability to offer work–life balance 5. Economic efficiency in rent and resources 6. Alternative for a sustainable lifestyle
2.	Appel-Meulenbroek et al., (2020) Research on workers in cities and CWS in Netherlands, Germany and the Czech Republic in a period of three years (2016–2019).	<ol style="list-style-type: none"> 1. The vibrant and creative atmosphere 2. Interactions and networking opportunities 3. Professional, attractive and supportive work environment 	<ol style="list-style-type: none"> 4. Separating work and private life 5. Affordable accommodation 6. Flexibility in rental terms 7. Being part of a community
3.	Clifton et al., (2019) Questionnaire survey of coworkers across two CWS in South East Wales, UK.	<ol style="list-style-type: none"> 1. Good office infrastructure 2. A socially enjoyable space 3. Interaction with others 4. It is a community 5. Good value for money 	<ol style="list-style-type: none"> 6. A close distance to my home 7. Knowledge sharing 8. Flexible work time 9. Random discoveries and opportunities 10. Possibility to work in groups
4.	Howell, (2022) Researched based on the online platform Coworker.com and a large CWS in the eastern United States.	<ol style="list-style-type: none"> 1. Efficiency by saving entrepreneurs time and money 2. Flexibility by allowing new ventures to grow or shrink on an as-needed basis 3. Legitimacy by providing a professional setting where entrepreneurs can take clients, investors, or hires 4. Value of belonging to a community 	
5.	Holienka & Race, (2015) Research on active members of CWS in Slovakia in April 2015	<ol style="list-style-type: none"> 1. Social/enjoyable atmosphere 2. Interaction with others 3. Community 4. Knowledge sharing 5. Good value for money 	<ol style="list-style-type: none"> 6. Close distance to home 7. Good transport connections 8. Flexible work time 9. Office infrastructure 10. Easy to change work place
6.	Rådman et al., (2022) Research on members of 3 CWS in Gothen-burg, Sweden, for six months (January–June 2020)	<ol style="list-style-type: none"> 1. Social needs to be part of a community and enjoy the benefits of a community 2. To have a standard space for business and show business competence 3. For business networking 4. Knowledge exchange between peers and like minds 5. Increased productivity by focusing on work without technical distractions 6. Physical well being 	
7.	Seo et al., (2017) Research on Users and host of Korean CWS	<ol style="list-style-type: none"> 1. Relationship facilitation 2. Networking event and party 3. Community and communication 4. Service diversity and price plan 5. Promotion and public relations 	<ol style="list-style-type: none"> 6. Alliance and partnership 7. Space and interior 8. Facility and device solution 9. Mentoring and education

In a bid to classify these reasons, Rådman et al., (2022) grouped the various drivers of coworking into social needs, Business networking, Knowledge exchange, Productivity and Physical wellbeing. Generally, all studies in review pose similar motivation to cowork and deducting from the various literature, this study summarizes the key reasons that drives workers to coworking spaces in the sub-headings below;

2.5.1 Productive Interactions

‘Co’, used as a prefix in words as related to coworking stands for together, jointly (Stinson, 2022) and this forms the core basis that drives coworking. Interaction is the communication between two or more people (Hornbæk and Oulasvirta, 2017) and productive interaction in the context of this review would be viewed as interactions that yield desired results. Reviews from literature point to the need for collaboration on works/projects, knowledge sharing, community building, creating novel ideas, professional or social networking etc. as one of the key drivers of co-working (Kojo & Nenonen, 2014; Seo et al., 2017; Clifton et al., 2019; Appel-Meulenbroek et al., (2020) Ayodele, Kajimo-Shakantu, et al., 2021). This is supported by the review of Howell, (2022) which explained that the value of these interactions within coworkers include connections for jobs or investments, easy access to help for work problems, energy/motivation derived from others, social supports and personal relationships.

Muth et al., (2022) explained that although current work dynamics allows for choices and flexibility pointing to the fact that workers do not need to go to the office to get work done, there is still a strong need not to feel isolated and be part of a thriving work community. Given that human beings admittedly enjoy being part of a social community thus drives the need for CWS as it provides a much-needed community for interaction (Garrett et al., 2017). Another productive point of interaction in CWS is that due to the diversity of workers, it creates a relaxed environment void of unhealthy competitions and work politics and heightens the feeling of importance and uniqueness (Garrett et al., 2017).

These authors found coworkers are drawn to CWS as it brings together creative minds of diverse work industries thereby fostering interactions and all its benefits. Subsequently, this leads to elevations in quality of work, higher users’ productivity as well as individual and communal developments.

2.5.2 Flexibility in Work Modes

Woodley, (2018) explained that one core advantage of using CWS is the flexibility it affords its users. This is deep rooted in the design of the spaces and its management rules (Holienska & Race, 2015; Garrett et al., 2017; Woodley, 2018; Cheah & Ho, 2019) which gives users the opportunity to work autonomously or in collaborative groups. The flexibility of space in CWS are achieved with varieties in the layout and design elements of work spaces, seating arrangement, sceneries, common areas and service areas (Waber et al., 2014; Woodley, 2018; Clifton et al., 2019; Cheah & Ho, 2019). This allows different users to choose how, where and when they want to carry out any activity in the space (Thanem et al., 2011). This ease of work brings great satisfaction.

One of the early reasons for the rise of CWS was the need for freelancers and remote workers to separate home activities from work activities (Oldenburg, 1989). The design of CWS perfectly creates this balance as it infuses the spaces need for work activities and relaxation together, creating a highly sought-after space (Ayodele, Kajimo-Shakantu, et al., 2021). In another vein, unlike the traditional office spaces or other third work snspaces, most CWS offer flexibility in lease contracts, short rental options, ease of access and flexible access times. This is especially encouraging for startups and business owners whose staff strength, activities and scope of work are constantly evolving and their needs, uncertain (Houghton et al., 2018; Bouncken et al., 2018; Elif et al., 2019; Cheah & Ho, 2019; Ayodele, Kajimo-Shakantu, et al., 2021). This also eases the rigidity of the 9-5 work systems and the lack of comfort of work from home. It allows users to carve their mode of work in a way that best suits them, giving their life purpose and meaning (Garrett et al., 2017).

2.5.3 Economic efficiency

Sharing economy which entails apportioning assets/resources is a growing phenomenon evident within various economic sectors, aimed at achieving economic growth and sustainability (Abu Gosh, 2019). This is a highly celebrated concept in CWS (Zhou, 2023) as economically, the main driving force to coworking is the need for people to share available resources in other to reduce cost (Cheah & Ho, 2019; Huang et al., 2019). Ayodele, Kajimo-Shakantu, et al., (2021) points to the global financial crisis of 2008 as a key propeller in the rise of CWS. Theander, (2018) added that traditional offices are too rigid for the unstable situation that the economy has tendered in recent years.

Sharing of office spaces reduces the overall expenses acquired in running an office organization or home office alone as it allows for shared cost in rent, facility management, office equipment, utility bills as well as risk sharing (Capdevila, 2013; Kojo and Nenonen, 2017; Moreno, 2021; Ayodele, Kajimo-Shakantu, et al., 2021). Although it could be argued that the more users a CWS has, the more resources needed to run it, (Capdevila, 2013) and Zhou, (2023) confirm that the cost reduction in sharing is considerably reduce directly or indirectly. As thus, it is highly economically efficient for entrepreneurs, start-ups and even large corporations to opt for CWS as it reduces the cost burden of running an office thereby increasing comfort, convenience and productivity of its users.

2.5.4 The growth of technology

In the late 20th century, Toffler (1980) predicted that the advent of personal computers would reduce the need for office spaces. More recent, Houghton et al., (2018) explained that the exponential growth of information and digital technology in the last two decades has created a wiggle room from the traditional work routines to a system that prioritizes results. This is similar to the conclusion by Cruz et al., (2021) who stated that the evolution of technology and digital nomadism has increased work flexibility thereby prompting coworking.

To elaborate, the invention and development of various smart devices and software allows for work activities to be carried out effectively at any location (Hoay, 2022). In addition, the growth and availability of internet communication technologies (ICT) over the years has made communication between workers easier, also, making work more mobile and less tied to a location (Clifton, 2014). These have led to the development of work modes such as such as teleworking, hot desking, smart working as well as coworking which have been recorded to serve as perfect substitute for traditional office spaces (Fasano et al., 2018). Studies confirm that workers see these modes to be advantageous as they allow for flexibility of working hours, encourage creativity and are result orientated (Spinuzzi, 2012; Houghton et al., 2018).

In addition, CWS are able to provide the much needed technological and electronic tools such as large office equipment's and connection services which maybe too expensive to get for a home office, a self-employed entrepreneur or a startup (Ayodele, Kajimo-Shakantu, et al., 2021; Muth et al., 2022). To work productively, workers opt for coworking spaces as it provides the much-needed technology required for their efficiency (Fasano et al., 2018).

2.5.5 Worker demographics

Zhou, (2023) stated that the development of CWS is rooted in the changes in workforce demographics, the way people are hired and how they work. Various studies point out that although the users of CWS have varying age ranges, the most prominent age group attracted by this arrangement are between 18–33 (Green, 2014; KPMG, 2015; Kartika et al., 2019; Clifton et al., 2022). The workers of this age range have been found to have attitudes and preferences that do not align to the traditional office practice. They typically live in a context strongly characterized by high technologic development, globalization, mobility, job sharing and a widespread work flexibility (Howell et al., 2019). The present-day work structure has become non-standard in the sense that working days are now characterized by an overlapping of work and life activities and a low need for permanent workplace (Fasano et al., 2018). Given the shift in needs, workers tend towards using CWS and employers of labour offer them as incentives to staff (Howell et al., 2019).

Another key demographic issue that has led to the use of CWS is the rise of start-ups, contract jobs, freelancers and entrepreneurs. Waters-Lynch et al., (2016) reviewed that job growth is notably high in the creative industry (artist and technology professional), with independent workers tied to bigger organizations, contract staff and the self-employed. Howell et al., (2019) reviewed that technological growth in recent years has created a variety of new jobs such as Information technology (IT), blogging, social media management, content creation etc. This is supported by Zhou, (2023) who stated that there has been a decline in what we referred to as “standard jobs” and a lot of companies now outsource jobs, encourage flexible working or keep staff on contracts also known as ‘gigs’.

The change in type of work and the requirements for such jobs has necessitated the use of coworking spaces. Waters-Lynch et al., (2016) explained that these new job types drive the need for coworking as CWS provides users with the most suitable space for such dynamism. This is supported by the findings of Holienka and Race, (2015); KPMG, (2015) and Clifton et al., (2022) which revealed that the top users of coworking spaces were IT related workers, marketers, video editors and followed closely by graphic designers, journalist, artist and architects.

2.5.6 Balancing Professionalism and Relaxation

Given the new types of jobs and the flexibility that allows workers and business owners to work from any location, many people adopted the ‘work-from-home’ method (Robelski et al., 2019). This has fast become a preferred choice as the home provides a plethora of comfort in its use as an office. In spite of the advantages that working from home offers, research has shown that workers have developed an inherent need to separate work life from home life as they seek to reduce self-isolation, avoid home/family distractions, enhance social life and find opportunities for career developments (Orel, 2019). Also, Elif et al., (2019) pointed out the need for businesses to be linked to a cooperate address and not the personal address of the owners for safety and professional reasons. Lenka et al., (2022) observed that this work-life balance is achieved with the provision of suitable services, business hours, location, and equipment.

CWS are reviewed to successfully create spaces that provides this balance between home and work by giving a serious work environment yet socially relaxed and homely one (Koramaz and Ozturk, 2019). Merkel, (2015) elaborated that the use of CWS creates a definitive boundary between the home activities and work activities yet maintaining flexibility and privacy. Robelski et al., (2019) compared the home and CWS as professional workspaces and found that the CWS is advantageous over the home office in various aspects especially as regards to creating a professional environment that champions concentration, productivity, and self-organization.

2.5.7 Operational Efficiency

The study by Haucke and Östmarck, (2017) found that over 60% of coworkers adopt this method of working because of the plethora of services that are offered at great comfort. Lazo, (2018) explained that CWS, given the expected diversity of its users provide a wide range of professional and building services which might not be present in traditional offices, home offices or other third place of work. They range from items such as printers, lockers, surf/bike racks to conference rooms, event spaces, daycare/petcare, innovation/collaboration spaces, shower spaces etc. These services are attractive to most coworkers as they are integral to their needs and mostly overlooked. The availability of serviced office infrastructures in CWS is thus noted as an important driver to its use (Houghton et al., 2018).

Although Weijs-Perrée et al., (2018) confirms that facilities/services such as a reception and hospitality, events, and diversity in supply spaces are a driving force to the use of CWS, they are of least importance to the coworkers. This was different from the findings of Ayodele

et al., (2021) which stated that facilities and services are of key importance to coworkers and users are keen on having a properly managed environment that boast of cleanliness, availability of good internet connection, uninterrupted power supply, serenity of the neighborhood, spaces for privacy as well as collaboration and ease of signing up. The difference in result between both studies might be as a result of the different locations which the studies were carried out or the fact that different type of facilities/services were analyzed.

2.6 SPATIAL DESIGN FACTORS AND THEIR EFFECTS ON USERS' EXPERIENCE

Given the five core values that define a coworking space; Collaboration, Openness, Community, Accessibility and Sustainability as generated by Kwiatkowski and Buczynski (2011), the spatial design of CWS has a tremendous effect on users' attainment of these values (Cheah & Ho, 2019). Its design poses quiet a dilemma as it struggles to find a balance between a professional space which is highly motivational, efficient and productive and a space that champions social interaction and extracurricular lifestyle (Koramaz and Ozturk, 2019). This was supported by Gandini, (2015) and Waters-Lynch et al., (2016) who explained that CWS designs are to house a paradox of activities.

Fayard and Weeks (2007); Appel-Meulenbroek (2010) and (Mille, 2016) found that to improve users experience of CWS in terms of spatial design, the most important factors to address are its visual/aural accessibility, proximity/privacy, location of building, layout and functionality of internal spaces, availability of building facilities, poor environmental ambience and availability of meeting areas. Appel-Meulenbroek et al., (2020) discussed that the design attributes of CWS are three (3) namely its location and ease of access, its interior space layout and its relaxing/comfortable functionality and ambience. Lukman et al., (2018) opined that large spaces, flexible spaces, good lighting and ventilation, minimal distraction and a controlled population density are the key features that make a successful CWS. Koramaz and Ozturk, (2019) suggested that emphasis be laid on creating spaces whose technicality lies in achieving motivation, productivity and the creation of social interactions and social networks.

Following these reviews, this study elaborates on the key spatial design elements that affect users experience in CWS as thus;

2.6.1 Prime Location

Appel-Meulenbroek et al., (2020) reviewed that the most important element which determines the success of a CWS from the user's perspective is the ease of accessibility of its location. Coworkers would choose only CWS that are easily accessible by automobiles either private or public transport (Sankari, 2019). Hölzel et al., (2022) noted that coworking aims to eliminate the need to work from particular office location but closer to home and comfort. In a bid to reduce long commute time which is associated with unhappiness, stress, loss of productive time and ecological damage from air pollution of automobiles, users prefer CWS closest to home over those in the central business and industrial areas (Hölzel et al., 2022). As thus, it was concluded that establishment of CWS should be focused close to living vicinity rather than targeting business cities. Similarly, Kene-Okafor, (2020) reviewed that CWS should be located at closer proximity to employees who are potential users of these space as this would reduce travel time to city/commercial centres and decentralize living close to these areas which are known to have high real estate cost.

Another major point as noted by Lazo (2018) is that the chosen location should prioritize proximity to nearby amenities. Huang et al., (2019) found that CWS are seen to be developed in commercial areas or areas with higher numbers of businesses, large scale enterprises, industries, and tech companies as they are believed to be areas where freelancers and startups frequent. Koramaz and Ozturk, (2019) concluded that coworking spaces are mostly located in the central business area or close to it, in recently developed commercial areas, and in the historical city centre as they are seen as the economic hub of such areas. In another vein, Zhou, (2023) suggested that the distribution of CWS in big cities such as New York are not random but clustered around mixed-use area so that they could take more advantages of the easy access to the surrounding facilities and urban resources.

Summarily, it can be deduced that the two major considerations for locating a CWS are ease of access and closeness to other business and amenities. In addition, the serenity of the environment to harbor such an establishment should also be a major consideration (Lazo, 2018).

2.6.2 Space Composition, Complexity and functionality

Previous discussions point to interactions to foster community and collaboration as a key reason for CWS. In design, this is largely propelled by openness of design in spaces planning which aids wide visibility, encouraging knowledge sharing both physically and visually (Cheah and Ho, 2019). Ironically, as important as these interactions are, the human mental, social and need for privacy is also paramount (Çağlar, 2018). Interactions with their many benefits can sometimes be unwelcomed, overwhelming or dangerous (Rådman et al., 2022). Various studies point to the issues of noise, lack of privacy of information, fear of intellectual theft, multiple distractions and difficulty in concentration as problems associated with the open plan office space design (Emberson et al. 2010; Kim and De Dear, 2013; Abu Gosh, (2019) and Yang et al., 2019). These issues tend to create tension in a collective group thereby discouraging collaborations, community and networking. As thus, the attainment of effective user experience in terms of space planning and functionality is largely dependent on finding a balance between interactions and privacy (Rådman et al., 2022).

Lukman et al., (2018) concluded that CWS are successful if they are dominated by shared working spaces. Abu Gosh, (2019) argued that the design has to be intricately done to maintain openness yet achieve privacy that does not kill the connectivity and seamlessness of space and the need to collaborate. Similarly, Appel-Meulenbroek et al., (2020) reviewed that an open layout, half-open layout and closed spaces should all be harmoniously included in a CWS to cater for variety of preferences and achieve the much need balance.

In response to this, various studies have carried out research proposing design elements such as dividing screens between work stations, high back seating areas, high panel work cubicles, semi-private meeting rooms etc. which helps keeps the open plan concept yet achieve privacy as well as giving options of a closed spaces (Holienska and Race, 2015; Çağlar, 2018). User experience is enhanced when ample spaces is provided for various activities taking into consideration different user anthropometrics, effective circulation and correct ergonomics (Lukman et al., 2018; Soegoto and Hafandi, 2018). Their design should offer fun and flexible spatial arrangement which promotes independence and freedom of working solo (Hoay, 2022). Ayodele et al., (2021) added that facilities such as adequacy of space, easy to clean furniture, toilets, serenity and quietness, furniture's and fittings etc are key to users' satisfaction. They advised that the design of CWS should be shaped to the peculiar needs of the proposed users in the locality rather than adopting generic designs

2.6.3 Multiple types of spaces

In CWS, a variety of spaces which are not focused on formal works and meeting but social/home like activities such as informal meetings, relaxation, exercise and eating are very important (Çağlar, 2018; Cheah and Ho, 2019) as they encourage a more organic and relaxed atmosphere for collaboration as well as enable coworkers' comfort in such environments (Appel-Meulenbroek et al., 2020). These support spaces are highly important for multifunctional activities and social interactions as it offers an approachable environment for users (Lukman et al., 2018). Çağlar, (2018) added that these spaces are important for informal interactions, to decrease work pressure, increase creativity, productivity, mental and physical comfort. Although some coworkers argue that they are not effective, majority believe them to be highly necessary (Çağlar, 2018).

Given that many users of CWS come to form new bonds, it is difficult to cut into social settings and initiate interactions with absolutely new people. Fayard and Weeks (2007) and Jubitana, (2017) found that locating these social spaces centrally in the design of coworking spaces fostered organic interactions thereby eliminating the tension that comes from trying to form new ties by promoting unplanned interactions and run-ins. Koramaz and Ozturk, (2019) listed the lounges, kitchen, recreation areas, resting places as well as designated activity halls as spaces which undertake the task of social interaction through both spontaneous encounters and organized events.

2.6.4 Ambience and Functional Aesthetics

Sanny et al., (2019) carried out a study which concluded that the ambience and interior attributes of a CWS are the most important factors to users in choosing a facility. Similarly, Kopec, (2012) and Mammadzayeva, (2019) noted that the physical appearance of the CWS is key in attracting users. Cheah and Ho, (2019) explained that design of CWS can be heightened by paying attention to interior design, especially furniture and lighting. Waters-Lynch et al., (2016) reviewed that spaciousness, branding spaces with inspirational quotes, projecting discussions on wall, digital discussion platforms projected onto walls and unique arts improve space ambience.

Given that most of the day is spent at work, research on designing work spaces has found it important to incorporate the soft, warm, and cozy ambience associated to the home into the work space in other to keep space users comfortable and relaxed while the carryout various businesses (Çağlar, 2018). This could be achieved by the perfect choices in colour, material

texture, lighting, furniture choices and (Çağlar, 2018). Mammadrzayeva, (2019) added that colours, artwork, plants and other type of personal decorations should be encouraged as they evoke different feelings in users. Also, providing niches and bland spaces allows users to be able to personalize their spaces in arts and colours they relate to thus helping them connect to the space, create a sense of belonging, improve social and physiological feeling of the environment.

Sanny et al., (2019) stated that the interior ambience of CWS is of three attributes namely modern, industrial or homely all delivering different values to different user preference. While Sanny et al., (2019) concluded that the most preferred atmosphere is modern, Appel-Meulenbroek et al., (2020) found in their study across three countries that coworkers would also mostly opt for a homely atmosphere. Sankari, (2019) concluded that the three attributes are quite important as design should be done to suit the preference of its locality based on their needs, culture or types of activities.

Effective lighting, noise control and air quality are the three elements of interior ambience that affect concentration, productivity, motivation, satisfaction, sense of belonging and social interaction of the space users (Soegoto and Hafandi, 2018; Mammadrzayeva, (2019). This impact can be positive elevating their professional life and wellbeing or negative causing stress, anxiety, depression and dissatisfaction (Mammadrzayeva, 2019). The source, colour, direction and intensity of light has to be carefully designed for each space and different activity types to ensure users comfort, evoke different moods, perform various activities and be aesthetically pleasing. Noise in a space and from the exterior should be acoustically controlled as too much noise is distracting and stressful but not totally eliminated as dead quiet spaces can still create a feeling of isolation. Air should be very well circulated and space should have right vents and fenestrations. Bad air quality is detrimental to the health of users as it can cause great discomfort as well as lead to “sick building” syndrome. (Kopec, 2012; Soegoto and Hafandi, 2018; Mammadrzayeva, 2019).

2.6.5 Flexibility of Space

Flexibility of space in this context refers to the ability of coworkers to change their work stations or position easily to fit their work mode or current activity (Cheah and Ho, 2019). This is an important attribute in CWS which is strongly linked to the users and mode of operation. Unlike traditional office spaces and other third places of work who have fixed work stations and machine positions, the CWS is more flexible in its operation (Suarez, 2014). Çağlar, (2018)

discussed this function as mobility and explains that design has to cater for flexible work stations/spaces and eliminate working position that constrain coworkers. As thus, it was suggested that CWS be designed in a manner of layout that enables ease of changes such as adding or removing simple partition and the use of varied or convertible types of seating.

The spatial layout of the CWS is constantly developing and as such, requires adaptability (Suarez, 2014). Cheah and Ho, (2019) points out that a lot of CWS use furniture items and space divides that allow for easy rearrangement of work areas in accordance to the plethora of professionals and business that carry out activities in the space. Offering variation in seating t allows users the flexibility to choose or rearrange spaces to fit their activities (Abu Gosh, 2019). As Workplaces continue to evolve influenced by needs, culture and technology, it is important to keep their flexibility in other to constantly ensure productivity or creativity of its users (Elif et al., 2019).

2.7 Summary of Literature Review

The definition of CWS pointed out that they are distinctive from the traditional offices and other third places of works in that it houses both formal work environment and lifestyle environment for diverse group of workers who use the space voluntarily at their own flexibility, void of echelons. The study traced the history of this trend to the early 20th century of like-minded people coming together to work down to the present-day arrangement which has its roots tied to San-Francisco, USA. Currently, this concept has spread globally and is regarded as a growing one in Nigeria.

Delineation from the review showed that user experience is key to the success of CWS as users are one of the two most important stakeholders in these developments. The definition of the UX and the scientific function referred to as ergonomics which studies human interaction with a designed system are quite similar. As thus the measure of UX is bordered on factors of ergonomics such as health, comfort, safety, functionality, aesthetic etc. In understanding the spatial distribution of CWS, the typologies show that although they are referred to in different groups based own ownership, users, size, activities etc., their design all incorporate similar spaces and all groupings consider users activities. The coworkers' activities carried out in CWS are essentially covered in the four work modes of focus, collaborate, socialize and learn.

The review revealed various drivers to the use of coworking spaces and critical comparison of these pointed out that these drivers could be grouped as productive interactions, flexible work modes, economic efficiency, the rise of technology, the change in workers

demographics, professionalism of environment and availability of services/amenities. Further to this, the research creates an understanding of design factors which could aid better UX and concluded that they are a function of prime location, Space Composition, Complexity and functionality, Multiple types of spaces, Ambience and Functional Aesthetics and Flexibility of Space.



CHAPTER 3 - MATERIALS AND METHODS

3.1 RESEARCH METHODS

The research philosophy is a guiding block which is important in shaping how we formulate and solve research problem (Saunders, 2009). This thesis adopts the pragmatism philosophy as it aims only to achieve the research goal by any means necessary and possesses no obstructions in lines of thought as other philosophies (Dudovskiy, 2022). In this research, this would be helpful in focusing on the reality and practicality of things, building data from a professional's view point. Building on the pragmatic philosophy of approaching research from what works best, the research approach used is the inductive approach as it focuses on gathering specific information in a specific context based on the research objectives (Creswell, 2014). This helps to build rich data in the development of effective conclusions and recommendations.

This research adopts the mixed research method as it combines both qualitative and quantitative methods by the collection, analysis and interpretation of data in numerical and non-numerical manner (Akoh, 2018). The combination of methods in the mixed method affords the research the much-needed flexibility to acquire data and deeper understanding of the research objectives as well as strengthen the credibility and validity of the research (Saunders, 2009). The survey research strategy was adopted as it is most suitable for data collection about a particular event/relationship of people based on their thoughts, beliefs or actions which could not be experienced by the researcher (Alshdiefat, 2017). The research objective requires information from the users of coworking spaces and as thus, the questionnaire survey method was used to acquire primary data.

The time horizon followed in this research is the cross-sectional as data was collected from the respondents at a single point in time. This was most suitable as data needed was based on users past experience (Creswell, 2014).

3.2 RESEARCH PARTICIPANTS AND PROCEDURE

This research uses the non-probability sampling method called selective sampling selects of respondents based off the researcher's judgement in other to justify generalization of findings (Sharma, 2017). This study used a total of 55 respondents. The bias of selective sampling was eliminated by ensuring all respondents were current or longtime users of CWS thereby ensuring experienced responses. The respondents were all above the age of 15 which is

the age limit for non-hazardous employment in Nigeria (Lambo & Agomuo, 2022). This research adopted the use of self-administration of questionnaire via online distribution of links developed with the aid of google forms and administered in real time. With this, ease of dissemination, use and feedback was achieved (Halim et al., 2018). The safety of this data was ensured by allowing access to only respondents and questionnaire developer.

3.3 DATA COLLECTION

Secondary data collection was done in the literature review mapped in accordance to the research objectives giving an in-depth understanding of the objectives and the gaps of previous literature. They were sourced from online search engines covering academic journals, academic books, professional journals and statistical data from government websites as recommended by Kabir, (2016) and Sheppard, (2020) using the research keywords. The understanding drawn from this literature serves as the basis of development of the primary data collection (questionnaire development), analysis and recommendations.

3.3.1 Questionnaire Design

The questionnaires survey consisted of a well-organized list of questions which were both close ended and open ended. It was designed based on deductions from extensive literature review as advised by Saunders et al., (2019) and covers all aspects of the research objectives section by section thereby ensuring its relevance. It starts with an introductory page for the respondents and an option to decide if they want to participate. After the consent of the respondent, the following section ensued;

Section A: Professional demographic of the respondent – This covers the relevant demographics of respondents as it relates to the research.

Section B: Drivers to the use of coworking spaces in Lagos state Nigeria – This had 12 questions to the respondents on their agreement on the drivers to the use of CWS in Lagos state based on a 5-point Likert scale of agreement. It also asked an open-ended question to record their personal reasons in case they are omitted by previous literature.

Section C: Users perception of Ergonomic factors of Coworking Space based on their Experience – This section investigated the users experience in current CWS in Lagos State based on a 5-point Likert scale of dissatisfaction.

Section D: Design Considerations to ensure improved users experience in coworking spaces in Lagos state - This had 15 projected design considerations to the respondents to rate their level of importance based on a 5-point Likert scale of importance.

Section E: Miscellaneous and Optional – This is an open ended section, which urges respondents to make inputs to the data collection based on their intuition. It also gives respondents the option of requesting for this research when published.

The detailed questionnaire is attached in *Appendix A*.

3.3.2 Questionnaire Validity/Reliability and Limitation

The validity and reliability of this questionnaires was achieved through a pilot study. The pilot study was a trial run of the questionnaire prior to its dissemination to ensure its success, protocols are followed, enough time is given and that the questions posed are ethical and easy to understand by the targeted audience (Synder, 2019). A draft of the questionnaire was reviewed by two users of coworking spaces and their comments effected before they were administered. The questionnaire is deemed valid as it was created from an extensive literature review and distributed to a considerable number of people, and its results would be compared to previous studies to confirm its adaptability as advised by Alshdiefat, (2017).

Despite the notable limitation of online surveys such as poor response rate, respondents who do not fit the sampling selection and difficulty of respondents to ask for clarity (Nayak and Narayan, 2019), this research overcame these by distributing the questionnaire only in CWS and motivating respondents by pointing out the importance of the research for them.

3.4 DATA ANALYSIS

The resultant data was analyzed using the Microsoft excel as it detailed yet simple tool commonly used in analyzing data from questionnaires on Likert scale (David et al., 2020). The data collected from the google forms was converted into Microsoft Excel spreadsheet and the same software was further used to sort and analyze the data using IBM SPSS Version 29. Demographic variables were presented in tables using descriptive statistics such as mean and standard deviation to describe the characteristics of the participants.

The Shapiro-Wilk test for normality was used to test the dataset if they were normally distributed, where P-value >0.05 was considered statistically significant and the data was considered normal.

Design considerations to ensure improved users experience in coworking spaces was the dependent variable, while the drivers for the demand for coworking spaces and users' perception of ergonomic factors of coworking spaces based on their experience were the independent variables. Correlation analysis was carried out to determine the relationship between the variables.

Multiple regression analysis was then carried out to determine if implementing the tested design considerations can significantly improve coworkers' experience in coworking spaces in Lagos State, Nigeria. Subsequently, inferential entities derived from the analyses were interpreted and summarized, and conclusions were made. P value < 0.05 was considered statistically significant.

The sections deemed important to the study were further analyzed using the Relative Importance Index (RII). RII was selected in this study to rank the factors considered according to their relative importance to one another in order to determine the key factors and also determine if the factors were relevant. The formula used was;

$$\text{RII} = \text{Likert weight summation } (\sum W) / (\text{Highest weight (A)} * \text{Number of respondents (N)})$$

where W is the weighting as assigned by each respondent on a scale of 1-5, A is the highest weight (5) and N is the total number of the sample (55).

Jeng et al. (2018) reviewed that five important levels are transformed from RII values: high (H) ($0.8 \leq \text{RI} \leq 1$), high-medium (H-M) ($0.6 \leq \text{RI} \leq 0.8$), medium (M) ($0.4 \leq \text{RI} \leq 0.6$), medium-low (M-L) ($0.2 \leq \text{RI} \leq 0.4$) and low (L) ($0 \leq \text{RI} \leq 0.2$). This is the basis of which the importance of each factor would be determined.

3.5 MATERIALS

This study utilized questionnaires in understanding the need for coworking spaces and how design can improve users experience in Lagos state, Nigeria. The questionnaire comprises four different sections. The following are the sections in the questionnaire;

Section A: Professional demographic of the respondent – The first section collected demographic information of the participants, which includes age, level of educational, current profession and the length of time they have been working in a coworking space.

Section B: Drivers to the use of coworking spaces in Lagos state Nigeria – This section comprises twelve questions that were used to determine why coworking spaces are in demand. The questions were administered using a 5-point Likert scale where; strongly disagree=1,

disagree=2, neutral=3, agree=4 and strongly agree=5. This was scored by summing all the responses, and the highest possible score is 60. The questions were structured such that the higher the score the higher, the participant agreed with the factors in this section.

Section C: Users perception of Ergonomic factors of Coworking Space based on their Experience – This section comprises ten questions regarding users’ perception of ergonomic factors of coworking space based on their experience. The questions were administered using a 5-point Likert scale where; very dissatisfied=1, dissatisfied=2, neutral=3, satisfied=4 and very satisfied=5. This was scored by summing up all the responses, and the highest possible score is 50. The questions were structured such that the higher the score, the higher the participant agreed with the factors in this section.

Section D: Design Considerations to ensure improved users experience in coworking spaces in Lagos state - This section comprises fifteen questions that focus on the design considerations for improved user experience. The questions were administered using a 5-point Likert scale where; unimportant=1, slightly important=2, moderately important=3, important=4 and very important=5. This was scored by summing all the responses, and the highest possible score is 75. The questions were structured such that the higher the score, the higher the participant agreed with the factors in this section.

3.6 ETHICAL CONSIDERATIONS

Following the ethical rules that guide the conduction of research, the following ethical considerations were adhered to;

1. This research achieved privacy and confidentiality by ensuring all respondents were able to respond anonymously. Respondents were also assured that all data acquired would be solely for research purposes and informed of their right to withdraw at any time.
2. The questionnaire developed contained a brief which sought informed consent of participants, encouraged trust, accountability and mutual respect between the researcher and respondents.
3. The development of the questionnaire was based solely on the guide from extensive literature review and void of the researcher’s bias.
4. The research was done solely for academic and developmental interest and was not affected by any incentive benefits.

CHAPTER 4 – DATA PRESENTATION AND ANALYSIS

The retrieved data is analyzed and presented for further discussion and conclusion. The following subheadings follow the structure of the administered questionnaire.

4.1 DEMOGRAPHIC DISTRIBUTION OF RESPONDENTS

This section analyses the demographic distribution of all fifty-five (55) respondents into its frequency and percentage as depicted in *Table 4.1* below and discusses the results.

Age Range - The age range of respondents were classified into four groups based on the generations within the working age with the least age capped at 14 as the youngest working age and the highest age capped at 68 as the retirement age for the country. A group for others was included to cover any respondent who falls outside these age categories. The resultant data showed that majority of the respondents (69.2%) were millennials as they fell between the 27-42 age range. This was followed with quite a difference by the Generation Z between the age range 14-26 with 27.3%. The older generations had just 1.8% each and there was no respondent that fit into others.

Level of Education – 90.9% of the respondents have a university degree with 47.3% having a Bachelors' degree only and 43.6% having a post-graduate degree. The remaining 9.1% are also educated with Diplomas and University degrees in view. No respondents fit the trade test or others identification.

Current Profession and Hierarchical Level – The professional distribution of the respondents is depicted in *Figure 4.1*. From the result, Majority of the respondent are into Information technology and Building construction with 17% followed by service-based professions with 11%. Other recorded professions fall below 10%.

Majority of the respondents (38.2%) are at senior levels of the career followed loosely by those in junior role with a percentage of 29.1% and entry level staff with a 14.6%. Also, Business owners/partners, interns, contract and Mid-level staff had a featured percentage.

Length of Use – The length of use was classified using a closed group of 5years gap and the results showed that over 56.4% of the respondents have worked in coworking spaces for 5years and below. This was followed by respondents who have used coworking spaces for 6-10 years with a percentage of 32.7%.

Table 4.1: Descriptive statistics of key demographics in the research

Source: Author's Research (2023)

FACTOR	VARIABLES	FREQUENCY (N = 55)	PERCENTAGE (%)
Age (in years)	15 – 26	15	27.3
	27 – 42	38	69.1
	43 – 58	1	1.8
	59 – 68	1	1.8
	Others	0	0
Level of Education	OND/HND	4	7.3
	Undergraduate	1	1.8
	Bachelor's degree	26	47.3
	Postgraduate	24	43.6
Professional Hierarchy	Senior Level	21	38.2
	Junior Level	16	29.1
	Entry Level	8	14.6
	Partner/Owner	6	10.9
	Intern	2	3.6
	Contract	1	1.8
	Mid-Level	1	1.8
Length of Use of CWS	Less than 5yrs	31	56.4%
	6yrs - 10yrs	18	32.7%
	11yrs - 15yrs	4	7.3%
	16yrs - 20yrs	1	1.8%
	Over 21yrs	1	1.8%

Current Profession of Respondents

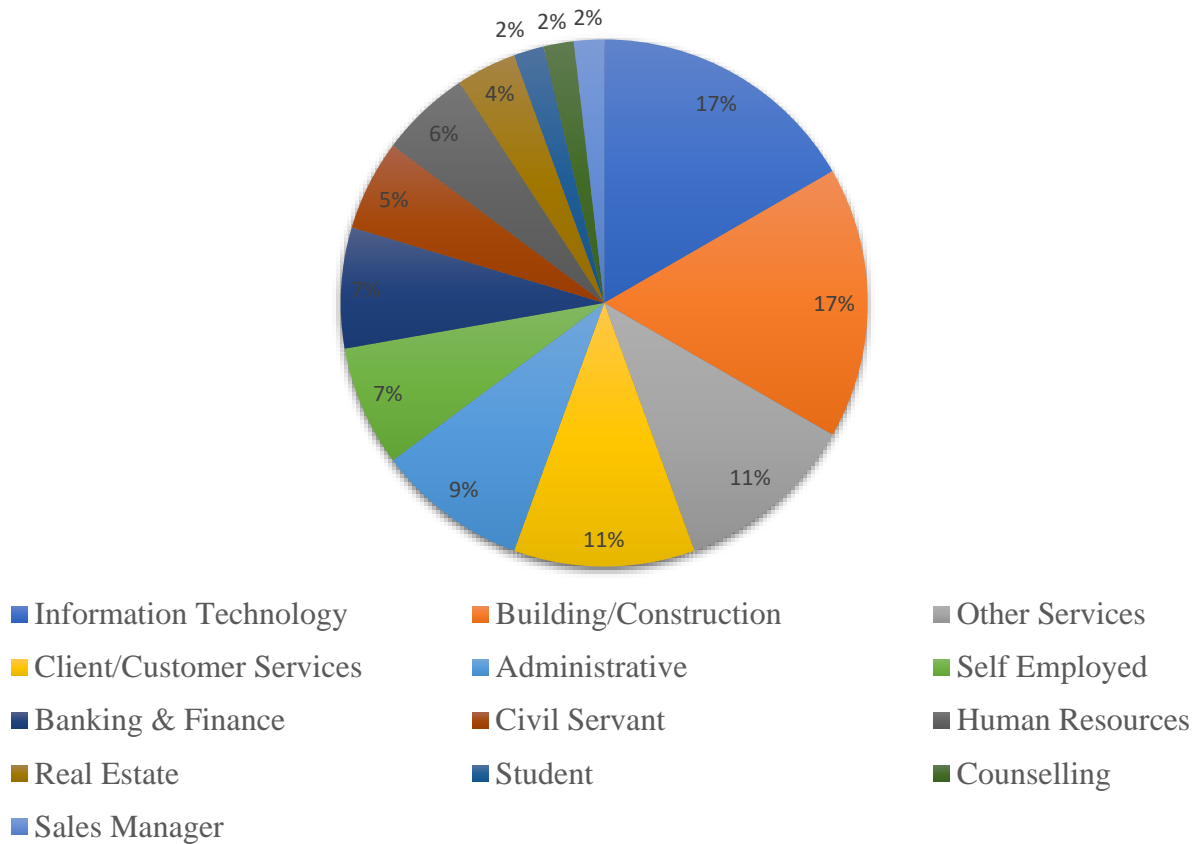


Figure 4.1: Pie chart showing demographic distribution of respondents' profession

Source: Author's Research (2023)

4.2 DESCRIPTIVE STATISTICS OF SECTION B, C, D

These statistical tools show a concise summary of the questionnaire using the Mean (M) and Standard Deviation (SD). The mean and standard deviation for each section is thus;

- Section B: Drivers for the demand for coworking spaces - (M= 48.5, SD= 5.80),
- Section C: Users' perception of ergonomic factors of coworking spaces based on their experience -(M=23.04, SD= 3.72)
- Section D: Design considerations to ensure improved users experience in coworking spaces -(M=63.67, SD= 8.98)

The result shows that the data points are spread over a range of values from the mean as seen in *Table 4.2* below. The highest values for the drivers for the demand for coworking spaces,

users' perception of ergonomic factors of coworking spaces based on their experience, Design considerations to ensure improved users experience in coworking spaces are 60, 35 and 75 respectively while the minimum values are 31, 16, and 27 respectively.

Table 4.2: Descriptive statistics of sections B, C, D dataset

Source: Author's Research (2023)

Variables	N	Mean	Standard Deviation	Standard Error	Lower 95% CI of mean	Upper 95% CI of mean	Minimum	Maximum
Section B	55	48.45	5.80	0.78	46.89	50.02	31	60
Section C	55	23.04	3.72	0.50	22.03	24.04	16	35
Section D	55	63.67	8.98	1.21	61.25	66.10	27	75

4.3 NORMALITY TEST

To determine if the distribution of questionnaire responses were normal, given that the respondents was less than 100, the Shapiro-Wilk test was used. If the p-value derived is less than the chosen significance level (0.05), it indicates that the data is not normally distributed.

Table 4.3: Shapiro-Wilk's test for Normality for sections B, C, D

Variables	P value
Section B	0.069
Section C	0.021
Section D	<0.001

The result as shown in *Table 4.3* inferred that only Section B was normally distributed, having a p-value > 0.05 and as thus was considered statistically significant. These results inform the next step in correlation analysis.

4.4 CORRELATION ANALYSIS

The correlation analysis was adopted to investigate the relationship between the research variables. The Section D, being the bedrock of the research hypothesis is taken as the dependent variable while sections B and C are the independent variables. As thus, the test was carried out Section D against Section B and C. Given that the data is not normally distributed as proved in *4.3* above, the non-parametric test Spearman’s correlation (r) test was adopted to explore the relationship between the variables.

The result of the correlation analysis shows that there was a moderately positive correlation between Drivers for the demand for coworking spaces (Section B) and Design considerations to ensure improved users experience in coworking spaces (Section D), with $r(41) = 0.416$, $p = <0.001$ as depicted in *Table 4.4*. The result is summarized by a scatter plot as shown in *Figure 4.2*.

Table 4.4: *Correlations between the Design considerations to ensure improved users experience in coworking spaces and the independent variables*

Section D vs	Spearman r	p value	Number of variables(N)
Section B	0.416	<0.001	55
Section C	-.005	1	55

P value <0.05 was considered statistically significant

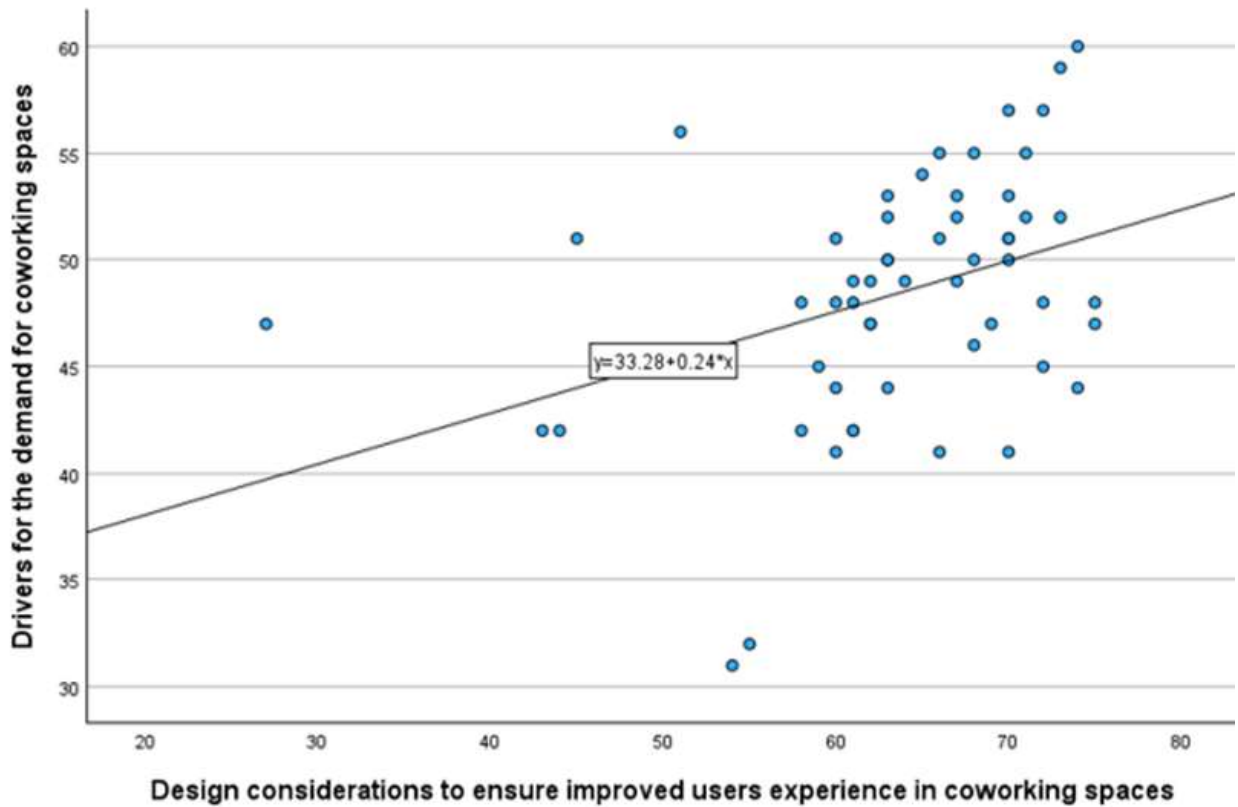


Figure 4.2: Scatter plot showing correlation between Section B and Section D

4.5 MULTIPLE REGRESSION ANALYSIS

To determine if the Drivers for the demand for coworking spaces and Users' perception of ergonomic factors of coworking spaces based on their experience design considerations are predictors for Improved users experience in coworking spaces, the correlation result showed a relationship between Drivers for the demand for coworking spaces (Section B) and Design considerations to ensure improved users experience in coworking spaces (Section D). Multiple regression was then carried out with the Drivers for the demand for coworking spaces (section B) and Users' perception of ergonomic factors of coworking spaces based on their experience (section C) as the independent variable, and the Factors for improved users experience in coworking spaces was the dependent variable.

The result of the multiple regression analysis shows that there was a statistically significant amount of variance in the factors for improved users experience in coworking spaces, such that

$F(1, 53) = 8.36, p = 0.006, R^2 = 0.354, R^2_{\text{adjusted}} = 0.292$ (Table 4.5). The R^2 value indicates that about 35.4% of the variability of the dependent variable (the factors for improved users experience in coworking spaces) can be explained by the independent variables (drivers for the demand for coworking spaces).

Table 4.5: ANOVA output and Regression model Summary

Model	Degree of freedom	F	P value	R Square	Adjusted R Square
Regression	1	8.36	0.006	0.354	0.292
Residual	53				

P value < 0.05 was considered statistically significant

To further understand the regression model, the outcome of the predictor was assessed. The drivers for the demand for coworking spaces variable was a significant predictor of the factors for improved users experience in coworking spaces, $\beta = 0.369, t(53) = 2.892, p = 0.006$; an increase in constraining factors by a unit score means a 0.572 unit increase in improved users experience in coworking spaces 95% CI [0.175, 0.969] (Table 4.6).

On the contrary, the users' perception of ergonomic factors of coworking spaces based on their experience was an insignificant predictor of the factors for improved users experience in coworking spaces, and it was not included in the model built.

Table 4.6: Regression Coefficients

Variables	Coefficients	Standard Error	t	P value	95% Confidence Interval	
					Lower Bound	Upper Bound
Constant	35.96	9.649	3.727	<0.001	16.609	55.316
Section B	0.572	0.198	2.892	0.006	0.175	0.969

P value < 0.05 was considered statistically significant

Regression equation was extracted from *Table 4.6*

$$Y = 35.96 + (0.572 * \text{drivers for the demand for coworking spaces}) + e$$

Where Y = factors for improved users experience in coworking spaces

constant = 35.96

e = error

4.6 Assumptions

Summarizing the research hypothesis as postulated in *1.4.3* based on the questionnaire, the assumption in this study is that;

Hypothesis: Section B (Drivers to the use of coworking spaces in Lagos state Nigeria) and Section C (Users perception of Ergonomic factors of Coworking Space based on their Experience) are predictors of Section D (Design Considerations to ensure improved users experience in coworking spaces in Lagos state).

Null Hypothesis: Section B (Drivers to the use of coworking spaces in Lagos state Nigeria) and Section C (Users perception of Ergonomic factors of Coworking Space based on their Experience) are not predictors of Section D (Design Considerations to ensure improved users experience in coworking spaces in Lagos state).

Null hypothesis H0: $\beta_1 = \beta_2 = 0$

Where β are the predictor variables

Alternate hypothesis H1: at least one of the predictor variables is not equal to 0

$\beta \neq 0$

The result of the regression model in the study showed that the overall significance, p-value was 0.006 (*Table 4.5*), since $p < 0.05$ is considered statistically significant, this implies that the null hypothesis H0 will be rejected as it states that section B and section C factors will not predict factors for improved users experience in coworking spaces. This indicates that at least one of the independent variables is a predictor of factors for improved users experience in coworking spaces.

Therefore, the assumptions for the predictor variables are as follows;

For Section B factors H0: $\beta_1 = 0$ H1: $\beta_1 \neq 0$

Where β_1 is Section B (drivers for the demand for coworking spaces variable that predict the factors for improved users experience in coworking spaces).

The model developed excluded section C, therefore it is not a predictor for the factors for improved users experience in coworking spaces.

4.7 RELATIVE IMPORTANCE INDEX OF SECTION B AND D

Given that the Section B is a proven predictor variable to the dependent variable, Section D, this section goes further to determine the most important predictors and dependent variables given that multiple variables were involved.

4.7.1 Predictor Variable - Section B

The findings from this section of the questionnaires were analyzed into frequency, percentage and RII to determine the level of importance of each factor in predicting improved users' experience of CWS. The result to this is presented in *Table 4.7* and *Figure 4.3* below.

All factors had their RII above 0.7 showing that all factors tested are highly important drivers to the use of CWS. From the analysis, the most important drive to use coworking spaces is factor B1 "The need to interact, network and collaborate with likeminded people". This is followed very closely with B9 and B8 which covers the Availability of office services and utility services. The two least important factors consider according to respondents are B5 and B11 which covered flexibility in lease and lease payment and the change in workers demographics.

4.7.2 Dependent Variable - Section D

The findings from this section of the questionnaires were analyzed into frequency, percentage and RII to show the most important design considerations to be considered in improving users' experience of CWS. The result to this is presented in *Table 4.8* and *Figure 4.4* below.

The 15 factors fell within the high significance bracket and as thus, all factors are considered important. Comparing the factors in consideration, the factor D15 'Design should ensure thermal comfort (space temperature not too hot or cold)' was the most important for the users to attain.

This was followed very closely with D1 'Easily accessible by public transport system'. The two least factors as considered by the respondents were D9 'Availability of different sceneries' and D11 'A homely Interior design ambience which is warm and cozy'.



Table 4.7: Ranking of factors that drive the use of CWS in Lagos State, Nigeria

Source: Author's Research (2023)

Factor code	Drivers (Reasons) why co-working spaces are in demand	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)	RII	RANK
		Response in Frequency and (Percentage %)						
B1	The need to interact, network and collaborate with likeminded people.	32 (58.2)	20 (36.4)	2 (3.6)	0 (0.0)	1 (1.8)	0.898182	1
B2	To escape the isolation of working from home	15 (27.3)	21 (38.2)	14 (25.4)	2 (3.6)	3 (5.4)	0.756364	10
B3	The need to separate home activities from work activities	24 (43.6)	21 (38.2)	7 (12.7)	3 (5.4)	0 (0.0)	0.84	5
B4	Availability of flexible working hours	15 (27.3)	27 (49.1)	6 (10.9)	5 (9.1)	2 (3.6)	0.774545	8
B5	Availability of flexible lease and lease payment	11 (20.0)	21 (38.2)	17 (30.9)	5 (9.1)	1 (1.8)	0.730909	11
B6	The ease to change work location or space at will	13 (23.6)	25 (45.5)	13 (23.6)	2 (3.6)	2 (3.6)	0.763636	9
B7	The economic efficiency of renting office spaces and sharing facilities/resources/bills	13 (23.6)	31 (56.4)	5 (9.1)	5 (9.1)	1 (1.8)	0.781818	7
B8	Availability of uninterrupted basic services such as electricity and water	27 (49.1)	23 (41.8)	2 (3.6)	2 (3.6)	1 (1.8)	0.865455	3
B9	Availability of office services such as office equipment and internet connection	31 (56.4)	19 (34.6)	4 (7.3)	1 (1.8)	0 (0.0)	0.890909	2
B10	Advancement in technology such as personal computers, work-sharing and virtual meetings which eliminates the need for employers' offices	24 (43.6)	23 (41.8)	5 (9.1)	3 (5.5)	0 (0.0)	0.847273	4
B11	The new age and professional demographics of workers cannot align their lifestyle to that of the traditional offices.	10 (18.2)	23 (41.8)	14 (25.5)	7 (12.7)	1 (1.8)	0.723636	12
B12	Coworking spaces are presumed to have a relaxed ambience that attracts users	17 (30.9)	30 (54.6)	5 (9.1)	2 (3.6)	1 (1.8)	0.818182	6

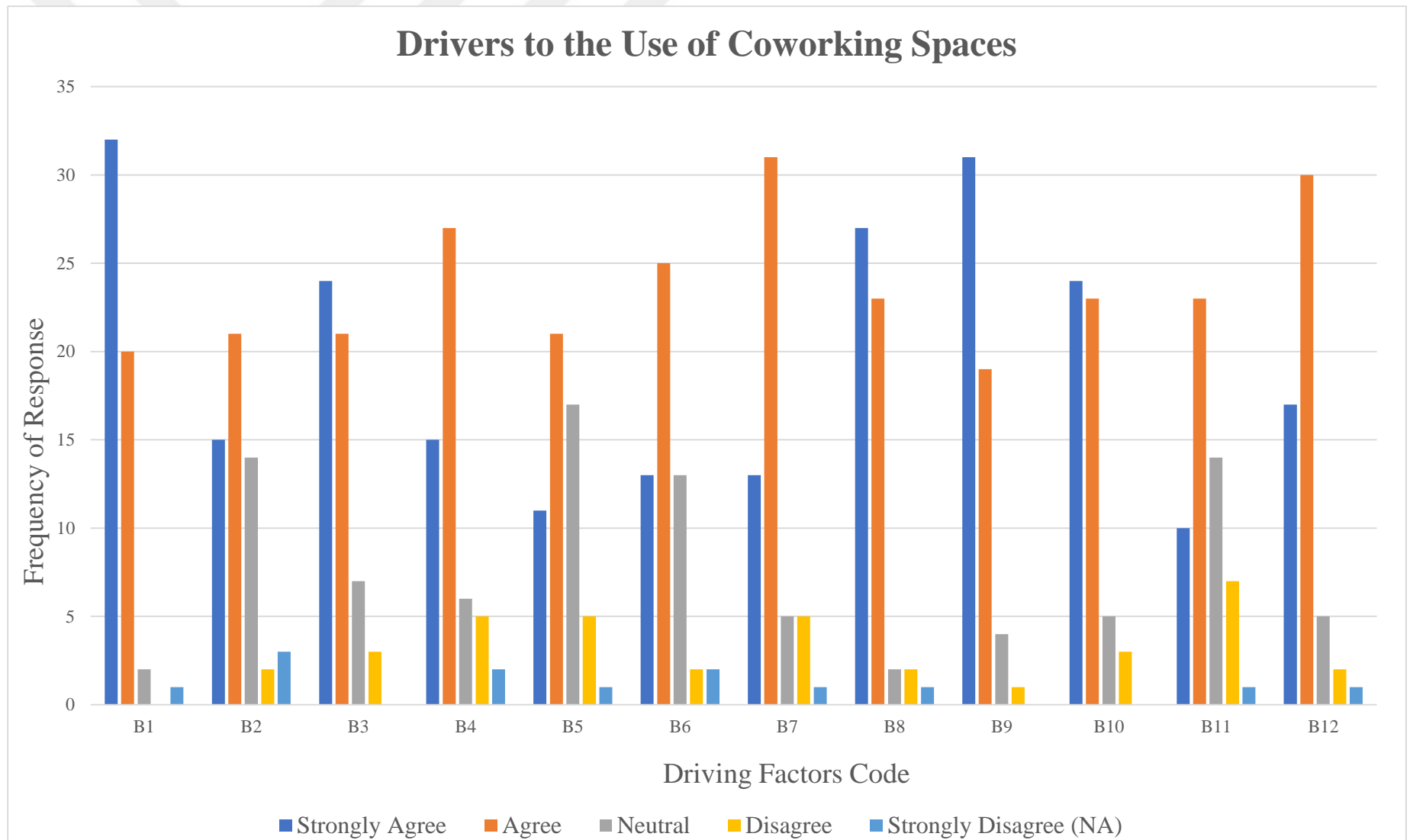


Figure 4.3: Relationship between respondent level of agreement to the factors that drive the use of CWS in Lagos State, Nigeria

Source: Author's Research (2023)

Table 4.8: Ranking of Importance of design consideration factors for improved users experience of CWS in Lagos State, Nigeria

Source: Author's Research (2023)

Factor Code	Design Considerations for Improved User Experience	Very Important (5)	Important (4)	Moderately Important (3)	Slightly Important (2)	Unimportant (1)	RII	RANK
		Response in Frequency and (Percentage %)						
D1	Easily accessible by public transport system	42 (76.4)	9 (16.4)	2 (3.6)	2 (3.6)	0 (0.0)	0.930909	2
D2	Located close to residential areas (closer to employees)	29 (52.7)	14 (25.4)	8 (14.6)	2 (3.6)	2 (3.6)	0.84	7
D3	Located in commercial, industrial or city centres (closer to other business organizations)	21 (38.2)	23 (41.8)	6 (10.9)	5 (9.1)	0 (0.0)	0.818182	12
D4	Spaces should be more of open plan for better interactions	23 (41.8)	20 (36.4)	7 (12.7)	5 (9.1)	0 (0.0)	0.821818	11
D5	Availability of closed spaces for privacy and acoustic comfort	26 (47.3)	21 (38.2)	7 (12.7)	1 (1.82)	0 (0.0)	0.861818	5
D6	A mixture of open plan and private, closed or demarcated offices	23 (41.8)	24 (41.8)	7 (12.7)	1 (1.8)	0 (0.0)	0.850909	6
D7	Availability of various seating arrangements and furniture	28 (50.9)	24 (43.6)	2 (3.6)	1 (1.8)	0 (0.0)	0.887273	3
D8	Ease of changing space layout according to space activity.	23 (41.8)	21 (38.2)	7 (12.7)	3 (5.4)	1 (1.8)	0.825455	9
D9	Availability of different sceneries	23 (41.8)	19 (34.6)	8 (14.5)	4 (7.3)	1 (1.8)	0.814545	14
D10	Availability and functionality of social/relaxation spaces	30 (54.6)	19 (34.6)	3 (5.4)	2 (3.6)	1 (1.8)	0.872727	4
D11	A homely Interior design ambience which is warm and cozy	20 (36.4)	21 (38.2)	8 (14.6)	5 (9.1)	1 (1.8)	0.796364	15
D12	An official interior design theme but a shift from the traditional office ambience	22 (40.0)	21 (38.2)	9 (16.4)	1 (1.8)	2 (3.6)	0.818182	12
D13	Natural lights, artificial Lights and colours to enhance interior ambience and space function	29 (52.7)	17 (30.9)	4 (7.3)	1 (1.8)	4 (7.3)	0.84	7
D14	The use of branded inspiration walls, Art, potted plants etc. to create an inviting and inspiring interior ambience	28 (50.9)	16 (29.1)	3 (5.4)	5 (9.1)	3 (5.4)	0.825455	9
D15	Design should ensure thermal comfort (space temperature not too hot or cold)	43 (78.2)	9 (16.4)	1 (1.8)	1 (1.8)	1 (1.8)	0.934545	1

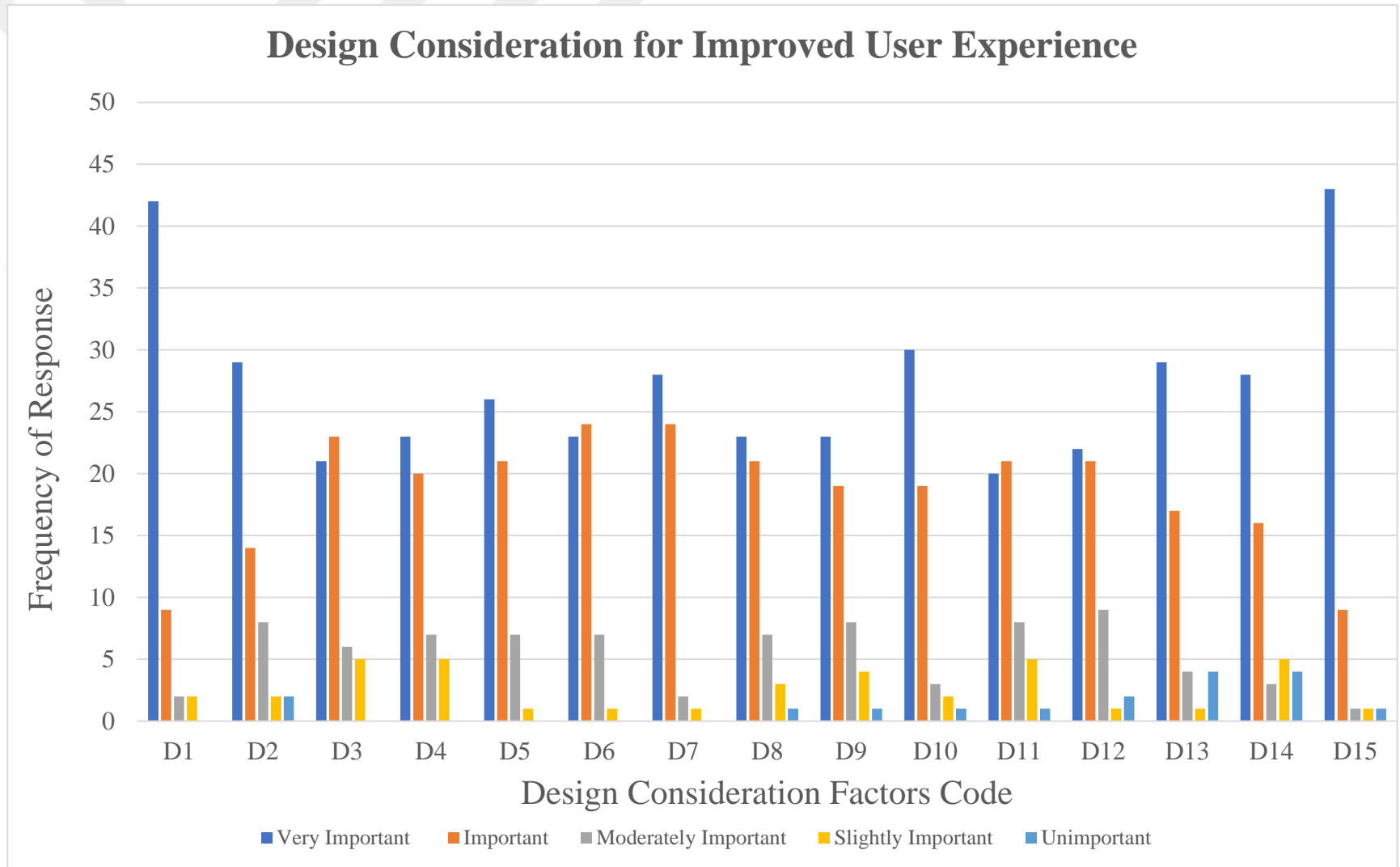


Figure 4.4: Relationship between respondent rating of importance of design factors for improved user experience in CWS in Lagos State, Nigeria

Source: Author's Research (2023)

4.8 CONTRIBUTION TO QUESTIONNAIRE BY RESPONDENTS

Open ended questions in sections E of the questionnaire, in a bid to increase respondent engagement with the research encouraged them to contribute to the research based on their understanding of the research topic. Only 3 out of 55 responded and their response were thus;

1. Respondent 1 – ‘Office space should be as comfortable as much as possible, keen attention to lighting, thermal comfort and probably a homely feel to ease the mind for maximum productivity’
2. Respondent 2 – ‘This is very sophisticated and should be able to drive insight through the feedback’
3. Respondent 3 – ‘Then offices should have creche to accommodate working mums’

CHAPTER 5 - DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 DISCUSSION AND CONCLUSION

Deducting from the presented data on demographics of respondents, it could be seen that majority of coworkers fall within the millennial generation and the generation X. This is in line with findings from various literature as noted in 2.5.5 above which explained that these generations make up the coworking workforce. Furthermore, they are the bulk of the worlds current workforce whose key mantra is striving for a healthy work-life balance (Hoffower, 2021; Stannett, 2022). Given that CWS promotes this lifestyle, it is thus postulated that its growth is eminent in years to come.

The findings show that majority of the coworkers are highly educated with professional hierarchy mostly in the junior and senior levels. Other categories were sparsely represented. Although, literature review points out that CWS is void of hierarchical constraints and embraces flexible social interaction (Johns and Gratton, 2013), the distribution of coworkers amongst every category is quite uneven. The reason for this disparity is worthy of further research. Furthermore, the bulk of coworkers have been in on this mode of working for less than 5yrs and then another notable set, less than 10yrs. This agrees with the study of Aransiola, (2017) and Adeniyi, (2020) points that the growth of CWS in Nigeria is relatively new and has grown over 50% within the last 5yrs.

Finally, the resultant demographics agrees with previous studies that coworking spaces houses a variety of users as out of the 55 respondents, the study recorded 13 different professions, majority of them being information technology and construction industry professionals, trickling down to counsellors and sales managers. These findings are in line with that of Holienka and Race, (2015); KPMG, (2015) and Clifton et al., (2022) which revealed that the top users of coworking spaces included IT related workers and architects.

Given the analysis of the hypothesis and null hypothesis and the subsequent rejection of the null hypothesis, it is concluded that the user's perception of Ergonomic factors of Coworking Space based on their Experience is not an important determinant of design considerations to improve these spaces but the reasons why co-working spaces are in demand is. This contradicts the conclusion by Mak, (2013) who stated best space planning stems from information based on users' experience. The reason for this contradiction can be because the

space users do not view the current spaces in Lagos state as standard or in any way, satisfactory (Ayodele et al., 2021). The result of the study thus tends towards the conclusion by Optix Team, (2021) and Schwab, (2019) which explained that the best design considerations would be achieved by investigating what propels the use of the space and this is best done by acquiring and analyzing data directly from space users.

Keying in on the predicting factors to proper design of CWS, similar to various definitions of CWS and key drivers of coworking spaces discussed by previous studies globally, the result of this research points out that the most important drive to cowork in Lagos is the need to interact, network and collaborate with likeminded people. The importance of positive interaction has been emphasized in *2.5.1* as the key to growth, productivity and improved mental health. Following this, coworking is deemed to continually rise due to its ability to easily offer services and amenities such as office equipment, internet, water and uninterrupted power supply. This factor is not of high importance in comparison to other studies across the world as shown in *Table 2.1* but, is similarly to the findings of Ayodele et al. (2021) which stated that availability of these facilities is the most important attraction for users. Although all reasons considered were essential, the least relatable factors were the conditions of leasing and the modern-day work dynamics. In conclusion, it could be stated that coworking in Lagos is fueled by the need for interaction, office and utility services, advancement in technology, keep work-life balance, its economic efficiency, flexibility in lease, working hours and space, and the change in the workforce demographics.

The findings of this study pointed out that to improve user experience through design, the most important factor is the thermal comfort. Alwetaishi (2016) stated that thermal comfort is a major determinant of health and productivity in spaces. Thermal discomfort in spaces is a known issue in Nigeria temperature and humidity levels are always high and as thus, design needs to factor adequate cooling system naturally and artificially (Nwalusi et al., 2019). Given the population density of the state, the lack of properly designed spaces for natural ventilation and the constant lack of electricity, it is no wonder that users of coworking spaces are keen on this consideration.

The next most important design consideration is the ease of access to the CWS. This need might be fueled by the traffic situation of the state. According to the Economic Intelligence Unit Ministry of Economic Planning & Budget (2013), Lagos state is known for its constant traffic congestion especially during peak working hours were statistics shows that about 8 million people travel to work daily on the few expressways/motorable ways available. They further reported that this has negative effects on the sense of wellbeing. It is thus deemed

important that CWS should be easily accessible. In terms of their location, the findings of the study shows that coworkers in Lagos state would prefer work spaces closer to their home rather than in commercial areas and central business areas. This aligns with the thought process and conclusion of Hölzel et al., (2022) and Kene-Okafor, (2020) who stressed the need to reduce commute time to work.

Following this, the need for varied seating arrangement, functionality of spaces, availability of required spaces and privacy were deemed important to be considered. In considering the choices of open and closed plan layouts, the closed plan layout was highly preferred in comparison to the open plan layout. This could be because of the various limitations the open plan layout poses as explained in 2.6.2. Furthermore, it was noted that coworkers preferred the office design ambience with a shift from the traditional office space in comparison to a homely office look. This shows that coworkers in Lagos are not overly keen on the homelike office design.

In conclusion, the major design considerations which would likely elevate users experience of coworking spaces in Lagos are the focus on achieving thermal comfort, the ease of access of coworking spaces which are to be situated close to places of residence, and the focus on achieving an office-like designed space which prioritizes functionality, varied seating and privacy seating. Other considerations include creating a relaxed environment, variety in sceneries and a generally welcoming ambience.

5.2 RESEARCH CONTRIBUTION

Following the fact that improving users experience is key to the success of coworking spaces in Lagos state and the bid to solve the research problem and add significantly to the existing body of knowledge, this research makes the following contributions by:

1. Affirms that the drive to the use of CWS is of paramount importance to the design considerations
2. Shifts the focus of development of coworking spaces to consider user centered designs as key to the success of development in working cities.
3. Providing a wholistic view to the reasons why coworking would continue to grow in Lagos state.
4. Provides major highlights of design tactics and consideration which could serve as a basic for future design of research.
5. Serves as the basis for policy development by the government of Lagos state

5.3 RESEARCH RECOMMENDATIONS AND LIMITATIONS

Following the research review, findings, discussion and conclusion above, it is highly recommended that future development of CWS key into focusing on satisfying their users as the ripple effect of this is a guaranteed success for all stakeholders involved. In other to effectively design future CWS for improved used experience, the reasons for coworkers to opt for these spaces has to be highly considered at forefront of project development. Before the concept of a CWS is conceived, adequate research should be made on the proposed users to understand their needs and expectations. In other words, investors and building professionals should key into available research for decision making.

There are following limitations associated with this study.

1. The research is based on data from Lagos state Nigeria and as such, its findings, conclusion and recommendation cannot be generalized. Comparative studies are thus recommended for future research.
2. Due to the time limit of this research, the questionnaire sample size is not extensive in comparison with the number of coworkers active in Lagos state. Future research should consider larger sample sizes and also explore the use of structured interview to investigate the problem statement further for effective solutions.
3. Given that the research is heavily based on users' experience, future research should consider structured interviews and case studies for deeper insights.
4. The research taken gives a peripheral understanding of ergonomics and coworking spaces. This is an important part of user experience and as thus future research should elaborate on this phenomenon.
5. Translating research into design intervention is a challenging task and as thus, future research should try to join empirical and analytical tools in other to facilitate implementation of research findings.

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APPENDIX



January, 2023

Dear Sir/Ma,

Invitation for Participation in a Research Survey on: **ENHANCING USER EXPERIENCE: EFFECTIVE DESIGN STRATEGIES FOR COWORKING SPACES IN LAGOS STATE, NIGERIA**

I am currently studying MSc Architecture at the Istanbul Okan University, Istanbul, Turkiye, and conducting a study on above-named topic. The aim of research is to understand the need for coworking spaces and how design can improve users experience in Lagos state Nigeria.

Kindly assist in filling out the following questionnaire based on the above-named topic and your personal experience as a user of coworking spaces in Lagos Nigeria. The data collected would be analyzed to support research findings and make informed recommendations on the above-named topic.

Your response is highly effective in gathering information from users' perspective and would be greatly appreciated. The responses provided will be confidential, anonymous and solely for the purpose of this research. Rights are reserved to respondent to opt out at any stage of the survey as participation is completely voluntary.

This questionnaire is panned to be less than 10minutes. If you have any questions about this research, please feel free to contact me directly with the details below.

Name: **Muiz Wale Memud**

Email address:

Project Supervisor:

Email address:

❖ *Do you wish to continue?*

(By clicking YES, you are consenting to participate in this study, if otherwise, kindly click NO and submit).

- Yes

- No

Thank You.

SECTION A: Demographic Distribution of Respondents

Kindly indicate your demographic by ticking the appropriate box on the left:

1. Age range by generation of workforce:

<input type="checkbox"/>	14 – 26	<input type="checkbox"/>	27 – 42	<input type="checkbox"/>	43 – 58
<input type="checkbox"/>	59 – 68	<input type="checkbox"/>	69 – 77	<input type="checkbox"/>	78 – and above

2. Level of Education;

<input type="checkbox"/>	Secondary School Cert	<input type="checkbox"/>	HND/OND	<input type="checkbox"/>	University Graduate
<input type="checkbox"/>	Post-Graduate Degree	<input type="checkbox"/>	Trade Test Graduate	<input type="checkbox"/>	Others, please specify

3. State your current profession and tick a related hierarchy on professional level.

.....

<input type="checkbox"/>	Intern	<input type="checkbox"/>	Entry Level	<input type="checkbox"/>	Junior Level
<input type="checkbox"/>	Senior Level	<input type="checkbox"/>	Partner/Business owner/CEO	<input type="checkbox"/>	Others, please specify

4. How long have you been using CWS

<input type="checkbox"/>	Less than 5 yrs	<input type="checkbox"/>	5 yrs – 10 yrs	<input type="checkbox"/>	10 yrs – 15 yrs	<input type="checkbox"/>	15 yrs – 20 yrs	<input type="checkbox"/>	Over 21 yrs
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SECTION B: Drivers to the use of coworking spaces in Lagos state Nigeria.

1. Kindly rate your level of agreement to the following **drivers to the use of co-working spaces in Lagos State Nigeria** using a 5-point Likert scale. (1 = Strongly Disagree (also means Not Applicable - NA); 2 = Disagree; 3 = Neutral; 4 = Agree; and 5 = Strongly agree).

S/N	Drivers (Reasons) why co-working spaces are in demand	Strongly	Agree	Neutral	Disagree	Strongly Disagree
1.	The need to interact, network and collaborate with likeminded people.					
2.	To escape the isolation of working from home					
3.	The need to separate home activities from work activities					
4.	Availability of flexible working hours					
5.	Availability of flexible lease and lease payment					
6.	The ease to change work location or space at will					
7.	The economic efficiency of renting office spaces and sharing facilities/resources/bills					
8.	Availability of uninterrupted basic services such as electricity and water					
9.	Availability of office services such as office equipment and internet connection					
10.	Advancement in technology such as personal computers, work-sharing and virtual meetings which eliminates the need for employers' offices					
11.	The new age and professional demographics of workers cannot align their lifestyle to that of the traditional offices.					
12.	Coworking spaces are presumed to have a relaxed ambience that attracts users					

SECTION C: Users perception of Ergonomic factors of Coworking Space based on their Experience in Lagos State, Nigeria.

Kindly rate your level of dissatisfaction to the following drivers to the use of co-working spaces in Lagos State Nigeria using a 5-point Likert scale. (1 = Very Satisfied; 2 = Satisfied; 3 = Neutral; 4 = Dissatisfied; and 5 = Very Dissatisfied).

Factor Code	Users perception of Ergonomic factors of Coworking Space based on their Experience	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
C1	General comfortability					
C2	Mental, Physical and Social health					
C3	Safety and Security					
C4	Sense of belonging					
C5	Availability and Functionality of space					
C6	Social relationship with other users					
C7	Alignment with personal goals of users					
C8	Cultural connection to spatial design					
C9	Flexibility and Adaptability of environment (Allowance for immediate and future changes)					
C10	Aesthetics (Beauty of space and sceneries)					

SECTION D: *Design Considerations to ensure improved users experience in coworking spaces in Lagos state.*

Kindly rate your level of agreement to the importance level of the following **design considerations for coworking spaces in Lagos Sate** using a 5-point Likert scale. (1 = Unimportant; 2 = Slightly Important; 3 = Moderately Important; 4 = Important; and 5 = Very Important). Please, you may also check the option " N/A " (under the last column to the right) if the factor is not applicable in your opinion



S/N	Design Considerations for improved User Experience	Very Important	Important	Moderately Important	Slightly Important	Unimportant	N/A
1.	Easily accessible by public transport system						
2.	Located close to residential areas (closer to employees)						
3.	Located in commercial, industrial or city centres (closer to other business organizations)						
4.	Spaces should be more of open plan for better interactions						
5.	Availability of closed spaces for privacy and acoustic comfort						
6.	A mixture of open plan and private, closed or demarcated offices						
7.	Availability of various seating arrangements and furniture						
8.	Ease of changing space layout according to space activity.						
9.	Availability of different sceneries						
10.	Availability and functionality of social/relaxation spaces						
11.	A homely Interior design ambience which is warm and cozy						
12.	An official interior design theme but a shift from the traditional office ambience						
13.	Natural lights, artificial Lights and colours to enhance interior ambience and space function						
14.	The use of branded inspiration walls, Art, potted plants etc. to create an inviting and inspiring interior ambience						
15.	Design should ensure thermal comfort (space temperature not too hot or cold)						

SECTION E: *Miscellaneous and Optional*

- a. Do you have any other valuable contributions, suggestions, etc. you might like to add to this questionnaire?

- b. Do you wish to see a summary of the research findings for reverence?
If so, Kindly fill in your details below:

Name:

Email:

Organization.....

THE END

THANK YOU VERY MUCH FOR YOUR PARTICIPATION