'Engaging' the Workplace Ecosystem Post-COVID-19: An Interplay of Environmental Factors and Employee Engagement in Hybrid Work Practices

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October 2023

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Acknowledgements

Abstract

The overall research aim of the PhD project is to better understand the relationship between the physical workplace environment and employee engagement in light of a post-COVID-19 workplace ecosystem. Subsequently, the research objectives are: i) to investigate options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management, ii) to explore the interplay of employee behaviours and environmental factors for employee engagement in hybrid work practices, iii) to better understand the impact of a workplace ecosystem on employee engagement in hybrid work practices, and iv) to explore options for the development of an 'engaging' workplace post-pandemic. The PhD project applies a mixed-method approach: quantitative surveys, interview study and qualitative thematic analysis, and content analysis. The key findings of this PhD project are: i) traditional employee engagement metrics and industry approaches to monitoring workplace design and management do not fully reflect the recent shift to hybrid work patterns in the context of the post-pandemic workplace ecosystem (i.e., home, office, third places, and urban realm), ii) a workplace ecosystem has a positive effect on employee engagement components (i.e., vigour, dedication, and absorption) via the interplay of environmental and behavioural factors, iii) flexibility - associated with both employee behaviours and the physical workplace – is one of the main drivers of employee engagement in a workplace ecosystem, and iv) the evaluation of a workplace ecosystem needs better alignment between organisational and workplace industry metrics in the wider city context to ensure a successful transition to an 'engaging' workplace ecosystem post-pandemic. The PhD project found that the compilation of both a home and the office can strengthen and sustain employee engagement post-pandemic. The PhD project contributes to existing knowledge and practice by i) demonstrating the role of the physical workplace environment (indoor/outdoor) as an antecedent of vigour, dedication, and absorption (i.e., the UWES scale), ii) providing new insights on the role of a workplace ecosystem in employee engagement in knowledge-intensive organisations, iii) informing the global workplace industry regarding the future evaluation of an 'engaging' workplace ecosystem, and iv) delivering empirically-based research evidence on employee engagement in knowledge organisations working in a hybrid mode.

Overall word count: 79497

Declaration of Original Authorship

'I confirm that this is my work and the use of all material from other sources has been properly and fully acknowledged.'

MARTYNA JOANNA SURMA

'Minimally, where we work should be part of a healthy ecosystem in which we as individuals, teams, and organizations cannot just survive or be productive but flourish'

Franklin Becker (2005, p.5)

CHAPTER 1: Introduction

Employee engagement is a psychological construct that has been of interest to both researchers and businesses for a few decades now. The topic emerged at the end of the 20th century as a novel concept in business (Schaufeli and Salanova, 2007). It was further developed by human resources departments and consultants to support organisations' mental capital—'cognitive and emotional fortitude and strength of the employees'—towards higher economic outcomes (Schaufeli and Salanova, 2014b, p.295). However, according to recent studies, only 20% of the workforce globally is actively engaged (Gallup, 2021). Thus, the wide interest of researchers continues to be relevant to global studies reporting a low engagement level among both European and American employees (Attridge, 2009), despite the phenomenon of employee engagement already having been recognised by global organisations as one of the key determinants of their success. Also, there is reported evidence for the effectiveness of employee engagement in raising performance and productivity across the UK economy (Rayton et al., 2012).

In light of the above, knowledge-intensive work is an essential context for exploring the driver of productivity and economic growth (OECD, 1996). Knowledge-intensive services already constituted 61.20% of all service exports in 2012 (European Commission, 2014). Knowledge-intensive work is therefore crucial in achieving a key aspect of the 'UK Industrial Strategy' - being the world's most innovative economy (HM Government, 2017). Knowledge-intensive organisations (KIOs) are organisations whose main activity is based on the employment of knowledge (Alvesson, 2004), for example, IT firms, finance organisations, and management consultancies. Therefore, creating healthy workplaces with engaged and productive employees within KIOs is paramount in achieving this aim.

Alongside the above interests, for more than a decade, the physical (office) workplace has been perceived as a 'business tool' designed for a financial return far greater than the initial investment (USGSA, 2006). This statement is widely supported by a growing body of research on the impact of physical workplace environments on organisational outcomes (e.g., productivity), accompanied by the global real estate industry and building certification interests (e.g., IWBI; Cushman & Wakefield; and Leesman) in monitoring workplace design and management. Nevertheless, we do not know how the physical workplace environment impacts employee engagement which is also a key to employee performance.

Additionally, the COVID-19 pandemic has dramatically accelerated new trends in the way knowledge work is performed (e.g., hybrid work patterns, flexible working, etc.) (Ipsen et al.,

2021) that were quickly and widely adopted by global businesses worldwide (Gillen et al., 2021, Deloitte, 2021, Teevan et al., 2021) impacting office markets and corporate real estate (Cooke et al., 2022). A global shift from '5-day in the office' to fully remote work-from-home (WFH) has unexpectedly encouraged many organisations and the real estate sector to think differently about what constitutes a workplace environment (e.g., home, office, third places, etc.) and how this workplace ecosystem impacts organisational outcomes (Boland et al., 2020). The generally positive WFH employee experience (Barrero et al., 2021) has been accompanied by statements made by the most prominent global agencies projecting a permanent transition to a 'total workplace ecosystem' (Cushman & Wakefield, 2020b) with 'adaptive workplaces' (Deloitte, 2021) underpinned by a high-quality urban realm to fully embrace 'workplacemaking' as a whole (IPUT & ARUP, 2020).

It can be observed that most employees nowadays who work in the knowledge economy sectors split their working environments between different physical workplaces. Given that employee engagement is mostly defined as "a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption" (Schaufeli et al., 2002, p.74), how are these parameters impacted by employee experience of the physical workplace(s) that have changed since the pandemic?

This PhD project is strongly positioned in a very specific time context of the COVID-19 pandemic (also known as the coronavirus pandemic) when hybrid work patterns became the 'new normal' for the majority of global knowledge-intensive organisations (Romei, 2022). The World Health Organisation (WHO) announced the pandemic on 11 March 2020 and ended its declaration of COVID-19 being a global health emergency on 5 May 2023 (WHO, 2023). For this PhD project, all primary data was collected remotely during the COVID-19 pandemic, and all participating organisations worked in a hybrid way. Although all participants worked from home at the very beginning of the pandemic, this PhD research focused on a time when they all worked in a hybrid way. Therefore, the PhD project fully reflected participants' hybrid work experience gained during this period of time, providing valuable material to study the relationship between employee engagement and the physical workplace environment in the new context of work.

In this PhD, all studies (1-4) had particular timeframes related to the COVID-10 pandemic. For example, Study 1 was primarily focused on the content analysis of the secondary data (i.e., workplace certification schemes and employee engagement metrics) developed pre-pandemic. However, Study 1 also included changes in the workplace metrics as the initial industry response to the pandemic. Study 1 was published on 16 October 2021 (Surma et al., 2021) after 1.5 years

since the start of the pandemic and included all industry updates relevant to that period. Studies 2 and 3 were based on primary data gathered from knowledge-intensive organisations from February to March 2022. All participants were asked to reflect on the last six months of their experience (i.e., from August 2021) when they all conducted hybrid work. Study 4 used primary data and focused on future (i.e., post-pandemic) workplace scenarios based on experts' experience from pre-pandemic and during the pandemic.

In this PhD research, the term 'post-COVID-19 workplace ecosystem' was adopted to highlight the relevance of the COVID-19-related work experience (i.e., hybrid work) for the evolution of the workplace definition (i.e., an ecosystem of places) with direct implications for academic research (e.g., organisational behaviour and environmental psychology), and the real estate and planning sector (e.g., workplace certification scheme development). Although 'remote', 'out of office' work or 'work-from-home' was also conducted pre-pandemic, this PhD project focused on hybrid work that constitutes a workplace ecosystem compiled of different physical locations (e.g., home, office, and third places) where knowledge work occurs during a working week (e.g., two days at home and three days in the office). Hence, the adopted in this PhD work term a 'post-COVID-19 workplace ecosystem' reflected the shift to a more distributed workplace as a direct consequence of the COVID-19 pandemic. The phrase 'workplace ecosystem' itself referred to one of the very first industry reports released at the beginning of the pandemic projecting future changes in the real estate and planning sector (Cushman & Wakefield, 2020b).

The new industry-projected workplace ecosystem scenarios developed by leading global providers of consulting (e.g., Deloitte), commercial real estate (e.g., Cushman & Wakefield; CBRE; and IPUT), and design, planning and engineering (e.g., ARUP) involve a variety of workplaces (both physical and virtual) (Gillen et al., 2021). The increased popularity of flexible work arrangements and related hybrid work practices among knowledge-based organisations (Cambon, 2021) encourages a rethinking of the construct of employee engagement in the context of a distributed workplace environment (i.e., home, office, and third places) and its potential impact on employee engagement. Therefore, there is a greater need to consider different employee engagement metrics and industry approaches to monitoring workplace design and management that may help businesses and their employees adapt to the 'New Normal' (i.e., blended virtual and physical work environments underpinned by digital technology across the office, home, and/or 'third place' work environments) (Deloitte, 2021). Additionally, it remains unclear to what extent industry approaches to workplace design and management are aligned with employee engagement metrics (Chapter 4). For example, green building certifications (e.g., LEED and BREEAM) focus on minimising the negative effects of the

built environment on external environmental conditions (e.g., air quality); health and well-being certifications (e.g., WELL) support employees' mental and physical well-being. Yet, there is little known concerning how internal and external workplace environmental conditions impact employee engagement.

Despite growing academic interest in remote work due to the pandemic (Angelucci et al., 2020, Gallacher and Hossain, 2020, Pass and Ridgway, 2022), still, a more distributed workplace scenario poses new challenges in a way of understanding how the physical space (e.g., design, use of space, etc.) of different types (e.g., home, office, and third place) in the wider urban realm may influence employee engagement. Also, we do not know the role of (office) place attachment and travel experience for employee engagement in this new context of work. Thus, to fully embrace the whole environmental complexity of hybrid work practices, this study measures the effect of several factors that may have an impact on it considering a wider post-COVID-19 workplace ecosystem. Hence, this research looks at the interplay of environmental satisfaction and replenished energy during work breaks for employee engagement (Chapter 5).

Acknowledging that a hybrid workplace became a 'new normality' and a 'default workplace' for the majority of global organisations nowadays (including knowledge-intensive organisations), it also has an unpreceded impact on organisations and their employees (Future Forum Pulse, 2022). It can be observed that after the initial debate 'home versus office', there is growing evidence of 'hybrid' as the best option for all (Williamson and Colley, 2022, Naor et al., 2021, Teevan et al., 2021), including the youngest workforce (Pataki-Bittó, 2021). Therefore, the role of the office post-pandemic needs to be re-examined to better accommodate a hybrid workforce (Vinopal, 2022, Orel, 2022, Gillen et al., 2021). Considering the key role that the real estate industry sector plays in providing global standards on how to create and evaluate the office workplace environment (e.g., IWBI; Leesman; Skanska; Arup; CBRE; Cushman & Wakefield; and WiredScore), it can be argued that a new set of guidelines is needed to allow knowledge organisations to operate successfully in an 'engaging' workplace ecosystem.

Therefore, on a practical level, this study will advance our understanding of a workplace ecosystem and its impact on employee engagement. This is important due to accelerated by the COVID-19 pandemic an organisational interest in hybrid work patterns (Ro, 2020) underpinned by a discussion on the future workplace (Nixey, 2020). Additionally, the present work responds to calls for research on the workplace environment that meets subjective alignment for optimal employee support (Appel-Meulenbroek and Danivska, 2021). As such, it is important to

investigate whether environmental variables and related employee behaviours associated with hybrid work play a role.

Concluding, the new workplace ecosystem scenario has important implications for several domains, for example:

- built environment sector (e.g., planning of the new workplace network, and urban realm quality);
- transport infrastructure (e.g., active transportation - cycling and walking);
- IT sector (e.g., digital infrastructure, Wi-Fi connectivity, and 5G network availability); and
- organisational practice (e.g., management of a distributed workforce and employee engagement).

There were several meaningful reasons to justify undertaking this PhD research. One of the most important was the recent shift to hybrid work practices that massively accelerated as a result of the COVID-19 pandemic (Tredinnick and Laybats, 2021). This new and unexpected situation has resulted in a global interest among knowledge-intensive organisations in how to ensure successful business operations without compromising organisational outcomes (e.g., productivity, performance, and employee engagement) (Gratton, 2021). Given that employee engagement statistics had been relatively low for a long time before the pandemic (Mann and Harter, 2016), the lack of visual control over employees as a result of work-from-home (WFH) created new organisational challenges.

Also, the newly adopted work habits have widely impacted the real estate and planning sector. For example, some questions were raised regarding the necessity of buying or leasing office real estate premises by global corporations, substantially contributing to decreased occupancy rates in major business hubs (e.g., London and New York) due to the growing popularity of WFH (Barrero et al., 2021). Large shifts in lease revenues were observed in office occupancy, lease renewal rates, lease durations, and market rents as firms took up remote work in the wake of the COVID-19 pandemic (Gupta et al., 2022, Hensher et al., 2023). Additionally, this situation affected the residential real estate market as knowledge employees prompted a massive 'exodus' to suburban areas due to lower living costs, better home qualities, and the possibility of WFH. Furthermore, the growing popularity and successful adoption by global corporations of hybrid work patterns have started discussions around the home workplace and the impact of environmental factors on organisational outcomes during remote work. The discussion around

employee health and well-being in the workplace – for a long time limited to the corporate office environment – appeared in the context of a home workplace (Carmona et al., 2020). Alongside these rapidly evolving circumstances, the necessity of conceiving the knowledge-intensive workplace to a more distributed network of workplaces (i.e., home, office, and third places) has become paramount (Di Marino et al., 2022, Reuschke and Ekinsmyth, 2021, Zenkteler et al., 2022) and a global debate around post-COVID-19 cities has emerged (Fiorentino et al., 2022, Banai, 2020, Batty, 2020, Andrews et al., 2021, Florida et al., 2021, Royal Town Planning Institute, 2021, Sharifi and Khavarian-Garmsir, 2020).

In light of the above, this PhD project focuses on investigating the impact of the physical workplace ecosystem environments on employee engagement post-COVID-19 pandemic. Given that the studies on this relationship had been limited even before starting this work, the PhD thesis aims to address this research gap.

The PhD project focuses on the link between the new workplace ecosystem scenario in a wider built environment (i.e., home, office, third places, and urban realm) and employee engagement, examining possible implications for knowledge-based organisations, the real estate industry and city planning - with Greater London Area and it's surrounding as a case study. Therefore, the overall research aim is to better understand the relationship between the physical workplace environment and employee engagement in light of a post-COVID-19 workplace ecosystem. Subsequently, the specific research aims are i) to investigate options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management, ii) to explore the interplay of employee behaviours and environmental factors for employee engagement in hybrid work practices, and iii) to better understand the impact of a workplace ecosystem on employee engagement in hybrid work practices, and iv) to explore options for the development of an 'engaging' workplace ecosystem post-pandemic. The PhD project applies a mixed-method approach: quantitative surveys, interview study and qualitative thematic analysis, and content analysis. The PhD research consists of four studies. Study 1 investigates how/if academic metrics (i.e., employee engagement metrics) and industry metrics (i.e., workplace evaluations) consider a wider post-pandemic workplace ecosystem in their evaluation methodologies. Study 2 explores the interplay between employee behaviours (i.e., work breaks), environmental satisfaction in workplace ecosystem, and employee engagement components (i.e., vigour, dedication, and absorption). Study 3 examines the impact of a workplace ecosystem on employee engagement in hybrid work practices. Study 4 investigates options for a successful transition to an 'engaging' workplace ecosystem post-pandemic. The PhD project has found that: i) traditional employee engagement metrics and industry

approaches to monitoring workplace design and management do not fully reflect the recent shift to hybrid work patterns in the context of the post-pandemic workplace ecosystem (i.e., home, office, third places, and urban realm), ii) a workplace ecosystem has a positive effect on employee engagement components (i.e., vigour, dedication, and absorption) via the interplay of environmental and behavioural factors, iii) flexibility - associated with both employee behaviours and the physical workplace – is one of the main drivers of employee engagement in a workplace ecosystem, and iv) the evaluation of a workplace ecosystem needs better alignment between organisational and workplace industry metrics in the wider city context to ensure a successful transition to an 'engaging' workplace ecosystem post-pandemic. The PhD project contributes to existing knowledge and practice by i) demonstrating the role of the physical workplace environment (indoor/outdoor) as an antecedent of vigour, dedication, and absorption (i.e., the UWES scale), ii) providing new insights on the workplace ecosystem in the context of knowledge work, iii) highlighting the relevance of workplace / employee engagement metrics for the post-pandemic workplace ecosystem, iv) delivering empirically-based research evidence on employee engagement in knowledge organisations working in a hybrid mode. PhD research concludes that the physical workplace environment understood as an ecosystem of places positively contributes to employee engagement in knowledge-based organisations.

This PhD research proposes the phrase 'workplace ecosystem' as one of the key concepts for the whole PhD study. The term was adopted from one of the first industry reports projecting permanent changes in the real estate and planning sector as a result of the COVID-19 pandemic (Cushman & Wakefield, 2020b). In this context, the physical workplace environment is understood more broadly - as a distributed network of different workplaces, including home, office, and third spaces, which are embedded within a wider urban realm. Such different networked workplaces, linked up by the hybrid work practices of one or more individuals, constitute a workplace ecosystem.

Given the focus of this PhD research on employee engagement, as an interplay of environmental and behavioural aspects, there are indisputable linkages with the definition of 'ecosystem' elaborated by Encyclopaedia Britannica (2023) as 'the complex of living organisms, their physical environment, and all their relationships in a particular unit of space'. Although the mentioned understanding of an 'ecosystem' is particularly rooted in the natural sciences, there are substantial connotations with the post-pandemic approach for the 'workplace ecosystem' as well. For instance, Langston and Al-khawaja (2018) - consider 'workplaces' as "eco-systems that are important to business goals and ultimate success" (p.277), and point out that "the health of an 'eco-system' is fundamental to corporate success and continuous

improvement" (abstract). Therefore, it can be argued that the 'workplace ecosystem' is a much more complex structure than a single workplace (e.g., office building), and the quality of the whole 'ecosystem' and related relationships has the potential to inform employee engagement in different ways.

Therefore, this thesis defines the 'workplace ecosystem' post-COVID-19 as a 'network of physical place and virtual space where work occurs, including offices, homes, third places and the surrounding urban realm'. The proposed definition was elaborated based on an analysis of industry reports released at the beginning of the pandemic (Cushman & Wakefield, 2020b, CBRE, 2021b, Deloitte, 2021, IPUT & ARUP, 2020) (section 2.2.). It aims to emphasise a broad spectrum of places (i.e., 'ecosystem') where knowledge work is conducted, providing the scope of investigation for this PhD research. The term 'ecosystem' is used in this PhD project to emphasise both a larger scale and a related higher level of complexity for the post-pandemic workplace compared to the traditional office environment. Hence, it can be argued that organisational outcomes (e.g., employee engagement) in such an 'ecosystem' become dependent on a larger number of physical and social factors.

Additionally, the concept of 'workplacemaking' was adopted (section 2.2.1.) as one of the industry responses to a post-pandemic workplace (IPUT & ARUP, 2020). It highlights the relevance of a wider urban quality and its underpinning role in the described above 'ecosystem'. Therefore, the 'workplacemaking' concept emphasises the relevance of an outdoor environment (e.g., semi-public and public) as a facilitator of remote work in the highly digitalised world.

The PhD thesis is structured according to seven chapters. Chapter 2 'Literature Review' is an extensive review of the key background literature and how this leads to the PhD project, Chapter 3 presents the methodology, Chapters 4-7 consist of four PhD papers, and Chapter 8 'Discussion and Conclusions' summarises and critically discusses the main findings of the research, considering the theoretical and practical implications of the work and how it advances the field and set out suggestions for future work.

CHAPTER 2: Literature Review

This literature review aims to review the key background literature on the relationship between the physical workplace environment and employee engagement, and how this leads to a PhD project. The scope of this review is the real estate and organisational behaviour literature, particularly on the concepts of the physical workplace environment and employee engagement. The focus is restricted to knowledge workers and their work patterns and employee engagement levels rather than team or organisational level patterns and levels. Based on the outlined rationales of the research programme the review of the literature seeks to demonstrate a current understanding of the following questions: 1) What are the options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management?; 2) To what extent are we able to point to consistent sets of relationships between employee behaviours, environmental satisfaction and employee engagement considering the varying environmental factors of hybrid work?; 3) How to understand the interplay of employee behaviours, the physical workplace and employee engagement in hybrid work practices?; and 4) What are the options for the development of an 'engaging' workplace ecosystem post-pandemic?

For each of the questions outlined above, I begin with a brief overview of what is known about these aspects in the literature and conclude with a discussion of the gaps in current understanding. Propositions are then formed on how to advance research on the relationship between the physical workplace environment and employee engagement of knowledge-based organisations in light of a post-COVID-19 workplace ecosystem. Following that, the aims and objectives of the present research programme are outlined at the end of this chapter (section 2.7.).

Due to the considerable relevance of this study for the real estate practice (e.g., evaluation/management/design of the physical workplace environment), this chapter reviews both academic and industry sources. Section 2.1. provides the reader with a general introduction to the literature review by presenting the overall real estate industry context for this study. Next, the literature review starts by discussing *the new workplace ecosystem* definition which reflects the latest industry research in the field (e.g., IPUT/ARUP; Cushman & Wakefield; CBRE; and Deloitte) (section 2.2.). The aim is to better understand a different meaning of the physical workplace environment post-COVID-19, also in the context of the remote work accelerated by the pandemic. Next, the author reviews research linking the built

environment with organisational outcomes to find out how this can be expanded to the new workplace ecosystem scenario (section 2.3.). The other key construct of this literature review – 'employee engagement' – is introduced according to both academic and industry sources (section 2.4.). The next section (2.5.) examines the relationship between the physical workplace environment and employee engagement in light of the relevant studies from different academic disciplines (e.g., occupational health, (interior) architecture, real estate and facilities management, and organisational behaviour). The last section (2.6.) provides the main conclusions.

2.1. The Real Estate Industry Context for the Literature Review

The COVID-19 pandemic has substantially changed the way we think about the future of real estate markets (Balemi et al., 2021, Carson et al., 2021) and how to plan our cities in this new context (Batty, 2020, Batty, 2022, Florida et al., 2021). There is a major shift in the prevalence of remote and hybrid work arrangements affecting residential and commercial real estate values and the future of cities with consequences for productivity, innovation, local public finance, and the climate (Van Nieuwerburgh, 2023). For example, in terms of commercial real estate, investors expect rents to rise in suburban areas relative to urban areas shortly (Rolheiser et al., 2022). The commercial rent gradient falls by roughly 15% in transit cities, and the premium for proximity to transit stops also falls (Rosenthal et al., 2022). In 2023, the real estate industry reports that take-up in Central London's offices totalled 2.1m sq. ft., standing below the long-term average by 33% in the first quarter of the year (CBRE, 2023). Even pre-pandemic, over the two years from 2018 to 2020, the residential property increased in value by 10% whilst the value of the commercial property stock has fallen by 9% (Mansley, 2022). In effect, landlords invest in flexible work spaces due to increased demand from corporate tenants for shorter leases and greater agility (JLL, 2022). The real estate industry reports that 56% of corporates consider operationalizing hybrid work models to support agility and flexibility a top priority between 2023 and 2025 (JLL, 2023a).

In light of the above pandemic-related consequences, the global agencies project that the office real estate sector – due to the expected increase in office vacancy – may need to be adapted to other (i.e., non-office) functions (CBRE, 2022, Boland et al., 2020) which may potentially meet housing demand in future (Cunningham and Orlando, 2022, Ward and Schwam, 2022). The newest research documents large shifts in lease revenues, office occupancy, lease renewal rates, lease durations, and market rents affecting both current and expected future cash flows

for office buildings (Gupta et al., 2022). While some changes in the current use of offices may be temporary or more dynamic, other adjustments may be permanent (e.g., working from home and portfolio rationalisations) and trigger structural changes across cities (Fiorentino et al., 2022). For example, nowadays companies invest in the "new office," bringing in more conference rooms and technology to blend in-person and remote workers (JLL, 2023b).

The following PhD research uses the general term 'traditional office' referring to the commercial office buildings' environment that is predominantly located in core city centres (e.g., Central Business Districts – CBD). Subsequently, the notion of the 'traditional office' is linked in this PhD project with many studies (e.g., environmental psychology, organisational behaviour, real estate, and urban planning) that have been conducted on workplaces for knowledge-intensive organisations (e.g., management, consulting, finance, and IT) since the shift to the knowledge economy. The key findings from this period help to better understand the relationship between the physical workplace environment (i.e., 'traditional office') and organisational outcomes (e.g., productivity, performance, and satisfaction) with a specific focus on knowledge employees.

Although the majority of the cross-disciplinary studies demonstrate a constant evolution of the 'traditional office' (e.g., cubicles, open-plan office, activity-based office design, and flexible office) in a way to improve organisational outcomes, the key findings are solely relevant to the office building design. Given that the majority of global organisations conducted full-time office work pre-pandemic, the office building was predominantly understood as a dominant place where knowledge work occurs. Therefore, the commercial office building environment was commonly used as a definition of the physical workplace environment for knowledge-intensive organisations.

The transformation of office design can be summarised according to a historical period: 1) Taylorism (1900) - workers are spaced evenly in an open room whilst the managers observed from private offices; 2) Streamlined Office (the 1930s) - more interaction between employees, note the space of workstation given for each worker; 3) Bürolandschaft (1950s) - furniture loosely scattered in an environment and partitions or privacy screens were used to create distinct areas and a level of privacy; and 4) Cubicle Farms (1980s) – small offices designed in a form of 'cubicles' to increase productivity but compromising health and well-being standards (Gan, 2019).

In the academic literature, different office concepts have been widely explored during the last few decades (Gjerland et al., 2019). However, the most often investigated by researchers is the 'open office' concept as a commonly adopted type of office for knowledge-intensive

organisations – the next step after 'cubicles'. There are many pros and cons of this specific type of workplace design. The benefits include, for instance, saving costs on real estate, increase communication, and improve teamwork. At the same time, there is a reported lack of productivity, problems with noise, temperature and fatigue, an increase in sickness and a decrease in overall employee health and well-being (European Parliament, 2020). However, employees in small open-plan offices, in comparison to large, have better possibilities to conduct cognitively demanding tasks (Seddigh et al., 2015).

The most applied type of an open plan office is an activity-based flexible office associated with workspace switching. However, some studies reported that increased workspace switching was associated with higher productivity, while an increase in self-reported time spent searching for a workspace was associated with lower productivity and well-being (Haapakangas et al., 2018). Some studies found that as work environments became more shared (i.e., with hot-desking being at the end of the continuum), not only were there increases in demands, but co-worker friendships were not improved and perceptions of supervisory support decreased (Morrison and Macky, 2017).

Considering the above, this PhD project extends the discourse around the 'traditional office' environment by looking at the physical workplace environment more broadly, following the current organisational trends towards permanent adoption of hybrid work practice – working between the office and home workplaces - accelerated by the COVID-19 pandemic. Therefore, this PhD research investigates the physical workplace environment as an 'ecosystem' – a distributed network of workplaces (i.e., home, office, and third places) within a wider urban context. Subsequently, this PhD work explores 'hybrid' work practices, where employees switch between different physical locations (e.g., home and office) during their working week. Hence, the following PhD thesis argues that the physical workplace environment can no longer be limited to the commercial office building environment. Instead, it must be understood as a "hub-and-spoke model", with the office becoming a hub of collaboration, while the home and other third places became spokes (JLL, 2023b).

The built environment contributes almost half of the global greenhouse emissions, so there is constant pressure on the property and real estate sector to develop more sustainably-oriented investments (Wilkinson et al., 2018). Given that the owner of real estate assets may be either an investor or an owner-occupier, both should be equally aware of the wider sustainability issues of social and environmental responsibility concerning real estate and of the emerging role of sustainability as a driver for real estate decision-making (Smith et al., 2006). For instance,

some studies report that eco-certified buildings have both a rental and sale price premium (Fuerst and McAllister, 2011).

Corporate social responsibility (CSR) is a "rapidly expanding high-profile phenomenon that influences organisations to consider the impact that their working practices have on the environment and society" (Barthorpe, 2010, p.5). Therefore, paying higher rental costs for green-certified buildings makes intuitive sense if tenants perceive benefits in human talent retention, increased productivity, and/or corporate social responsibility (CSR) advantages (Robinson and Simons, 2018). Although location remains the dominant consideration in decision-making for occupiers, sustainability is key to CSR and 'value-added' in certain sectors (Livingstone and Ferm, 2017).

In light of the above discussion on sustainable real estate, Langston and Al-khawaja (2018) elaborated on the term 'workplace ecology' understood as a "balance of factors that contribute to the health of an 'eco-system' that is fundamental to corporate success and continuous improvement" (abstract). Subsequently, the authors considered the 'workplaces' as "eco-systems that are important to business goals and ultimate success" (p.277), and the 'workplace ecology when organisation, space and technology are in harmony to support human endeavour" (p.277). Given this PhD research interest in the 'workplace ecosystem', it can be argued that hybrid work practices can contribute to CSR compliance due to reduced CO_2 emissions (and related carbon footprint) resulting from working from home and improving employee health and well-being due to the greater flexibility offered. Therefore, in light of hybrid work practices, the model proposed by Langston and Al-khawaja (2018) should not be limited to the office real estate sector but extended to the wider workplace ecosystem.

The research conducted by Dixon et al. (2009) suggested that occupiers in certified buildings (e.g., BREEAM) from business sectors with strong environmental and corporate responsibility policies, placed more emphasis on sustainability than other groups in the final choice of office, but location and availability remained paramount. Considering the growing popularity of hybrid work, it can be discussed now if knowledge-intensive organisations should subsidise living expenses related to occupying sustainable residential markets by their workers. Additionally, it remains a question for future studies, if offices more widely distributed across the city (e.g., satellite offices in suburban areas) to ensure greater connectivity with residential areas, are of higher interest to knowledge-intensive organisations. The latest research confirmed that, in terms of commercial real estate, investors expect rents to rise in suburban areas relative to urban areas shortly (Rolheiser et al., 2022). However, more research is needed to investigate

the perception of tenants in sustainable residential buildings as current studies are largely limited to the office sector (Jailani et al., 2015) located in central business districts (Levy and Peterson, 2013).

Since this PhD research is focused on the 'workplace ecosystem' dedicated to knowledge-intensive organisations, it can be argued that both the office and home workplaces would play a substantial role in contributing to both sustainable property markets and social and environmental responsibility (i.e., Environmental, Social, and Corporate Governance – ESG). Hence, looking specifically at hybrid work, there are clear linkages between cities' and organisational approaches to sustainability that can be merged for mutual benefits. For example, expanding the real estate certification portfolio to the wider urban environment can contribute to both sustainable urban development and improving organisational performance. Still, more research is needed to fully understand how sustainable real estate markets in a wider urban/suburban context can contribute to knowledge employee outcomes (e.g., employee engagement, performance, and productivity).

The complementary building certification schemes aim to provide better office working environments for their users, with a positive impact on both the external environment and human health conditions (IWBI, 2021b, BRE, 2017). However, while these metrics do create a solid background for upgraded employee work performance, they have been designed to specifically assess the traditional corporate office environments that have been the dominant form of the physical workplace. Nevertheless, due to higher construction/fit-out costs for developers/business enterprises who want to meet the certifications' criteria, the highest WELL, BREEAM, and LEED standards are offered predominantly among the prime office real estate sector and global corporations. Therefore, there is a real risk of mid-market commercial office space (i.e., a purpose-built office space that caters to 'hot-desking' arrangements for employees from a range of different commercial organisations) or alternative workspaces being left out of the certification process, despite the high standard of some of these properties.

Although these metrics are dedicated solely to the office workplace environment which has long been a dominant form of the place where work occurs, the increased shift towards remote work may lead to new considerations around the non-traditional workplaces, including the home environment and its quality. For example, a recent academic study taken of homework within the UK context demonstrates that most (but not all) work was carried out comfortably from home during the COVID-19 lockdown (Carmona et al., 2020). Only 7 % of respondents reported problems, for example, a physical lack of space, difficulties in separating home and work life,

poor home technology (notably Wi-Fi), and poor physical conditions (e.g., lighting, environmental conditions, inappropriate furniture, lack of storage, etc.). In terms of internal/external design, the fundamental requirements for home comfort included good environmental conditions, fresh air, daylight in the home, good noise insulation, access to better (larger) private open space, more living space in the home, and dedicated home office space. Regarding the wider city scale, the key factors for home comfort included green (e.g., parks), mixed-use, less trafficked (to enable walking and cycling) and connected (i.e., the 5 or the 10-minute city) neighbourhoods.

In contrast to the academic research taken solely within the UK context, the XSF@home Total Workplace analysis elaborated by Cushman & Wakefield (2020c) in the global context illustrates some greater concerns related to remote work during COVID-19. For example, 57 % of respondents (EMEA countries) reported a lack of sense of well-being, 48 % a lack of learning, and 55 % struggled with connecting to the company culture of everyday employee engagement. Another industrial research - conducted by Leesman (2020b) - demonstrates some differences in employee experience due to the variety of home working settings and work activities. Therefore, the study suggests a greater need for a comparative analysis of both home/office workplaces to maximise the employee experience in the future work landscape. This finding may also suggest that the new workplace ecosystem needs to be adapted/modified by organisations individually due to the variety of physical workplaces and the diverse roles that employees perform in that context.

However, both types of studies (i.e., academic/industry) highlight a greater need for flexible workplace ecosystem in the future, balancing the office and remote work. All of this requires a structural shift undergone by the commercial real estate industry practice, accompanied by a rethinking of urban planning and design considerations to support the new workplace ecosystem at the city level (e.g., upgrading residential environmental conditions in light of the above trends in home-to-work/remote work patterns). As already projected by Cushman & Wakefield (2020b), 50 % of the workforce will likely be working across a 'Total Workplace Ecosystem' balancing office, home and third places (e.g., café and library).

The recent surveys emphasise the willingness of employees to continue remote work after COVID-19 lockdowns are relaxed. These newly emerging global trends in remote work, supported by advances in ICT support, create a solid background for new debates on the future

of work and the 'workplace' in a hyper-mobile society. These reports by prominent urban real estate and planning consultancies (e.g., IPUT / ARUP; Cushman & Wakefield; CBRE; and Deloitte) have begun to make significant inroads into a future of work that is distributed across different work environments in the home, the office and other 'hot-desking' or temporary office arrangements closer to home. The first report is by Cushman & Wakefield (2020b) who argue for a new workplace ecosystem (the 'Total Workplace Ecosystem') - spread between offices, homes and third places. The second report by IPUT and ARUP (2020) emphasises the importance of 'workplacemaking', with a strong focus on the quality of the urban realm consolidating workplace environments across the places where we work at home or in the office, and the places where we live and work. The third report by CBRE (2021b) presents the 'hybrid workforce network' model emphasising the fluidity in workstyles (accelerated by the pandemic), which may potentially impact the future of work and the associated corporate real estate strategies. The fourth report by Deloitte (Deloitte, 2021, p.3) proposes a model of 'adaptive workplaces' as a more fluid concept between onsite and telework, "for a workforce that is able to work from anywhere but is empowered to work from where they're most productive". All industry reports encourage us to think differently about the 'workplace' and its physical dimensions, and its role in ensuring employee engagement, productivity and well-being.

Furthermore, despite remote work having been practised long before COVID-19 (Olson, 1983), this current shift, which has been accelerated by the pandemic, may lead to more lasting effects on the organization of work (Brynjolfsson et al., 2020) and management practices (Larson et al., 2020) more broadly. It can be observed that since 2020 most of the academic research on work has been focused on remote work (Angelucci et al., 2020, Gallacher and Hossain, 2020). In light of this attention (necessity?) to the conditions of remote work, there is an equally emerging private sector interest in the tools/metrics that can effectively contribute to the monitoring of employee engagement remotely. Given the fact, that many global organisations run their businesses virtually nowadays, and this trend is going to be permanently adapted for future work patterns, there is a greater need to reconsider employee engagement in that context (Deloitte, 2022). The newest research confirms that working from home during the COVID-19 pandemic is effective (Hickman and Robison, 2020) and improves employee productivity and well-being (Russo et al., 2020) which was reported by pre-COVID-19 studies as well (Bloom, 2014, Hunter, 2019). However, long-term home confinement during the ongoing COVID-19 can have negative mental and physical health consequences, which in turn can reduce productivity among those working remotely (Dongarwar et al., 2020). Therefore, there is a greater demand

for tools that help to evaluate/monitor individual factors (e.g., employee engagement) in different workplace (e.g., home and office) environments. Recent extensive research from Microsoft into the pandemic's impact on work practices – a report 'The new future of work' (Teevan et al., 2021) – highlighted some of the most pressing challenges of this new context, including collaboration and meetings, personal productivity and well-being, devices and physical ecosystems, and societal implications. Therefore, it can be assumed, that all of these issues may also impact employee engagement in the projected hybrid model of working. Hence, the roles of managers and leaders are evolving to adapt to the challenges of remote work, and company leaders are seeking tools to enable flexibility and productivity in a world where remote work is a norm.

Another tool/set of metrics that measure remote working, but with a more employee-oriented focus, has been the recently proposed framework by a London-based company (with global scope) – Leesman. The employee experience is measured based on, for example, physical features and work activities. However, it can be observed, that the Leesman metrics for home working do also contain some limitations. For example, the survey structure relies on previously developed tools/metrics dedicated solely to the traditional office environment. For example, all of the assessed physical workplace features (e.g. desk or table; chair) are related specifically to internal workplace design. Given the fact, that the company aims to provide solution/metrics dedicated to the new workplace landscapes (in response to COVID-19) addressing blended workplace features, the survey structure doesn't respond to the wider workplace environment (as pointed out by e.g., Cushman & Wakefield and ARUP). These examples illustrate that the variety of metrics, available on the market, does not necessarily fully address the challenges for the new remote workplace environments after COVID-19. Therefore, there is a great demand nowadays to think about the broader workplace environment 'out of the box'. These newly emerging challenges for the global real estate market require different metrics and innovative workplace solutions, to better address employee engagement, and to shift the global economy up after the crisis has been released.

Moreover, it remains unclear how these complementary workplace standards offered by the above certification schemes may potentially contribute to employee engagement. For example, green building certifications (e.g., LEED and BREEAM) focus on minimising the negative effects of the built environment on external environmental conditions (e.g., air quality), and health and well-being standards (e.g., WELL) contribute to employee mental and physical conditions.

Although there is a lot of scientific evidence (e.g., urban health, environmental psychology, etc.) on the positive impact of a healthy environment (internal/external) on human health and well-being (Altomonte et al., 2020, Loder, 2020), it is not known exactly how both internal and external workplace conditions impact on employee engagement. For example, many scholars have studied the quality of the internal physical office environment (e.g., office design, physical qualities of the building, etc.) and how this impacts general employee job performance (e.g., clean/fresh air improves cognitive thinking, biophilic design/contact with nature reduces work stress, etc.) (Wyon, 2004a, Kwallek et al., 2007b, Clements-Croome, 2004, Vischer, 2007, Kegel, 2017, Chan et al., 2007, Chadburn et al., 2017b, Feige et al., 2013b). Findings from this stream of research are being applied in the real estate industry worldwide (specifically in the green building sector), concerned with developing a healthy working environment to reduce sick leave and improve the overall performance of workers, leading to increased productivity (Brinkley et al., 2010b). The improved environmental factors can potentially contribute to, for example, the analytical thinking and systems thinking – skills associated with employee engagement (Lappalainen et al., 2019). Additionally, a healthy workplace environment offers greater opportunities to improve cognitive, emotional, prosocial, and physical energy, which positively impacts employee engagement as well (Klotz, 2020). However, as employee engagement is a construct based on the individual experience at the workplace, further research is needed to explore the above linkages to fully constitute the relevance of environmental quality for employee engagement per se.

Altogether, the above trends and developments in the area of monitoring and evaluating the role of workplaces (e.g., office, home, and other arrangements) on employee engagement suggests the need for a better understanding of:

- the 'workplace' definition for a post-COVID-19 world;
- the organisational psychology construct of employee engagement;
- the relationship between the built environment and organisational outcomes; and
- the impact of the physical environment on employee engagement.

Although all of the above considerations consolidate around the main focus of this literature review, the main objective is to explore the potential relationship between the built environment and employee engagement in the context of the new workplace ecosystem in a post-COVID-19 world. Since the topic of employee engagement has not been sufficiently addressed by the real estate and planning discipline yet, the literature review will discuss both academic and industry sources. The goal is to better understand how employee engagement

can potentially be impacted by the built environment in the future workplace scenario in a post-COVID-19 world.

The next section (2.2.) will open up the discussion, proposing the first key definition – *the new workplace ecosystem* - to better understand the wider context of this PhD research and its relevance for the post-COVID-19 scenario.

2.2. The New Workplace Ecosystem Definition

As a result of the COVID-19 pandemic, it can be observed a great shift toward more mobile-oriented forms of work supported by the newest technological advances. The acceleration of 'work (from) anywhere' was reported in 2020 by global real estate agencies worldwide and remote work is expected to be continued in the future. These new considerations contribute to a different understanding of the workplace and therefore there is a great demand for its new definition. The metrics which were traditionally used by the real estate sector (e.g., WELL; BREEAM; LEED; etc.) to monitor and evaluate employee engagement, and performance or productivity are focused on the traditional office workplace environment. The acceleration of the new workplace culture within the broader urban environment can help to redefine the 'workplace' and its metrics along different dimensions. Now, there is a greater need for a new typology of space relevant for the future workplace, against a long tendency to link workplace design with employee performance within the traditional office (Brill, 1984, Sundstrom, 1986).

This section (2.2.) introduces four transformative models (2.2.1.-2.2.4.) that present new insights into how the reimagined workplace can be defined and understood in the post-COVID world to ensure, for example, employee engagement in a distributed and flexible workplace. The remote work trend accelerated by the pandemic emphasizes the importance of a more mobile workstyle and the variety of the 'total workplace ecosystem' (i.e., home, office, and third places), associated with the 'hybrid workforce network' needs to be shaped by individual preferences (the 'adaptive workplaces'). Also, the digitalisation of work conducted within such workplace networks and related employee mobility demands a greater reflection on the quality of the urban realm expressed by the 'workplacemaking' concept. Hence, these four approaches propose a new definition of the workplace, which is positioned within the wider urban context (the 'ecosystem') understood as more complex than the traditional office environment, and physically extended beyond high-density urban cores. Therefore, a broader definition is needed – 'one that is not constrained by four walls but that can exist almost anywhere' (CBRE, 2020).

2.2.1. Workplacemaking: Public Realm as a Part of The Workplace Environment

The new approach for the workplace ecosystem has already been proposed by IPUT/ARUP. The global research report 'Making Place: The Recalibration of Work, Life, and Place' (2020) introduces 'workplacemaking', understood as a concept between traditional workplace design and public realm placemaking (Figure 1). According to this approach, digitalisation has led to blurred physical boundaries resulting in greater consideration of the quality of public and semi-public urban realms spread 'between the office and the home'. The novel issue in the proposed 'workplacemaking' concept is the lack of greater attention to neither internal office design, nor home office design ('in the office/home'), and focus on e.g., ground floors, the edges of buildings ('by the office/home'), and open space ('around the office/home'). In this context, the meaning of 'working from the office/home' is understood more broadly than the traditional office/home design. Hence, there is a shift from the building to the neighbourhood/city scale (including the third destinations open to the public, e.g., coffee shops, and libraries). The proposed 'extension/fluidity' of the physical workplace is a direct result of greater employee mobility due to the possibility of remote work which can happen anywhere. Moreover, the quality of the urban realm (the 'workplacemaking') may become a key determinant of workplace quality, either within the office or the home environment. For example, high-quality sustainable urban design may catalyse the social interactions which contribute to ideas' flow, as well as ensure human restorative processes by access to green space. The importance of urban quality for business districts has been previously noticed by, for example, the World Green Building Council in the report 'Health, Wellbeing and Productivity in Offices: The Next Chapter for Green Building' (2014). However, this approach has not been studied yet in the wider city- context of work, especially the one conducted from home. Hence, the new workplace ecosystem may require tighter collaboration between city makers/authorities/planners, developers and employers to ensure greater city resilience in terms of the social, economic and environmental aspects. The proposed holistic approach of 'workplacemaking' demands a design practice which can help to integrate the physical workplaces with the urban tissue, going beyond the mono functionality of the traditional central business districts' pattern. From the business perspective, the quality of the urban realm may become a key asset contributing to both the real estate economic value (e.g., increased property price determined by its prime location) and the organisational outcomes (e.g., enhanced human synergies/interactions, employee engagement, health and well-being, etc.). To fully evaluate such a workplace, there may be a greater need to link the current physical workplace metrics' design (i.e., focused on sustainable construction and fit-out) with the wider city environment (e.g., access to green space, efficient and sustainable

transportation, third places with the good Wi-Fi connection, etc.). Some of these facilities have been previously addressed by the real estate industry (e.g., IWBI and BRE), although limited to the district scale (e.g., office building's neighbourhood). The full 'workplacemaking' evaluation would then need to be framed much more broadly, and span across different domains which may have an impact on it (e.g., organisational practice, workplace setting, etc.). Also, further transdisciplinary/interdisciplinary research is needed to encompass the variety of relationships (e.g., employee-workplace, employee-employer, etc.) which may inform such an ecosystem. For example, if we assume that the workplace can be physically located out of the traditional office, the organisational metrics (e.g., employee engagement) need to be redefined in this context as well.
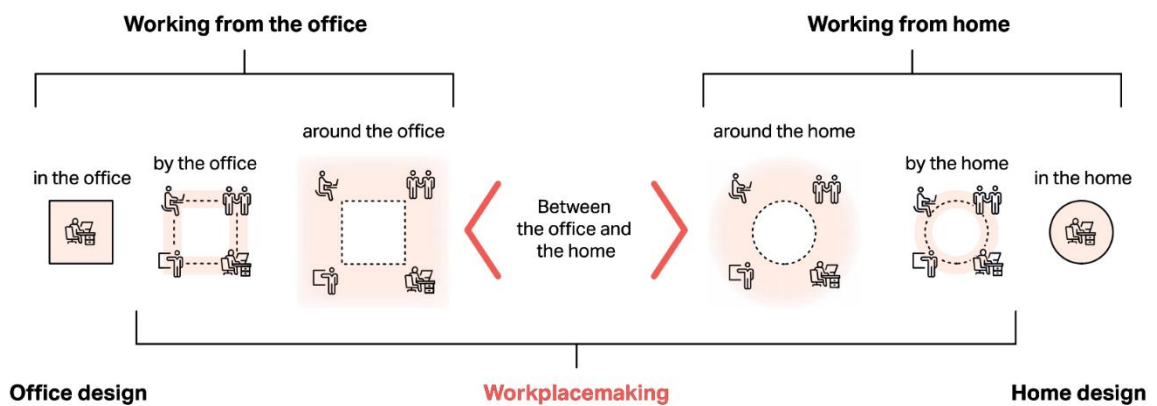
Figure 1. The 'workplacemaking' concept. Source: IPUT & ARUP (2020).

2.2.2. Total Workplace Ecosystem: Home, Office, and Third Places

The second report 'The Future of Workplace: How will COVID-19 and data shape the new workplace ecosystem?' by Cushman & Wakefield (2020b) presents the concept of a 'total workplace ecosystem'. Again, the workplace is not defined as a single building or destination, but rather as a network of virtual and physical places, spread between digitally connected homes, offices and third places (e.g., cafés and libraries). The projected ecosystem aims to provide flexible and on-demand places to support convenience, functionality and well-being. According to this approach, the workplace can be chosen by an individual employee based on current needs, preferences, workload, job character etc. Figure 2 presents the concept as a city-wide network of spaces, including 1) home, 2) local community hubs, 3) on-demand event space, 4) third places, and 5-6) core office urban hubs. It can be observed, that the proposed model ensures greater employee flexibility in terms of more sustainable daily travel plans, ranging from

limited travel (e.g., work from home), short commutes (e.g., local community hubs) and long commutes (e.g., core office urban hub). This has the potential to decrease the time spent on unnecessary travel and minimise the use of a car, which may result in improved air quality in the wider urban environment. Additionally, the 'total workplace ecosystem' will enable a variety of workplaces according to different work tasks carried out: individually (e.g., home), in small groups e.g., (local community hubs and third places), and during large meetings (e.g., core office urban hub). Therefore, the more distributed workforce demands greater attention to the general quality of such a network of spaces, and perhaps a complex new metrics' development addressing the 'workplace' in a more holistic, but individually-oriented way.
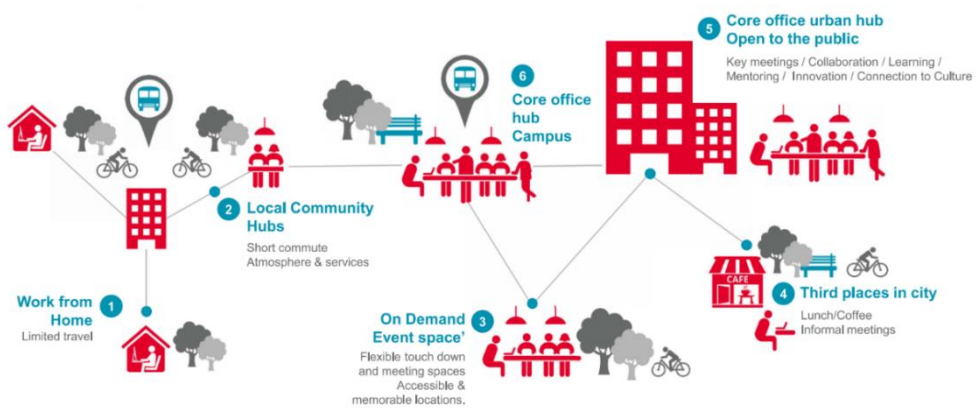
Figure 2. The 'total workplace ecosystem' model. Source: Cushman & Wakefield (2020a).

2.2.3. Hybrid Workforce Network

The third example is the report 'Real Estate Strategy Asset: 8 Core Truths Guiding the Future of Work' released by CBRE (2021b). The authors propose the 'hybrid workforce network' model (Figure 3). The concept emphasises the fluidity in work styles (accelerated by the pandemic), which may potentially impact the future of work and the associated corporate real estate strategies. According to this model, the future workplace will reflect the distributed workforce needs, and therefore will be spread among a network of headquarters in the urban-core locations and a network of other locations (i.e., satellite office network, home, project office, meeting on-demand, and flexible space and gym/café). The high-density urban-core locations will be used part-time to facilitate social interactions, and a network of other locations (e.g., satellite offices) will be used to conduct the work closer to home. The 'hybrid workforce network' model aims to decrease both commute time and feelings of isolation associated with remote work, allowing a fluid virtual workplace. Additionally, the proposed CBRE 'hybrid workforce network' model is focused on the company-provided locations out of the urban core.

This can potentially enhance the general quality of the urban realm, underpinned by the previously mentioned 'workplacemaking' debate by IPUT/ARUP. Additionally, the future workplace requires a substantial change in the way how we define and measure workplace performance in general (CBRE, 2021a, p.11). According to the authors, workplace performance will be solely reflected by people-centric measures aligned with workplace design. For example, tangible measures (e.g., occupancy cost per employee, sq. ft. per employee, sq. ft. per desk, desk-sharing ratio, % of open vs. enclosed space, reduction in overall footprint, and cost savings) will be replaced by non-tangible measures (e.g., workplace experience Net Promoter Score and other employee engagement metrics, % of employees who agree they can easily collaborate when in the office, % of employees who feel a sense of belonging when in the office, % of space within 25' of natural light, % of employees who feel the workplace reflects the company's brand and culture, % of meeting technology-enabled spaces, and the degree to which the workplace supports health and well-being). Hence, it can be concluded, that there is a greater need now to elaborate metrics/tools dedicated to different types of workplaces (i.e., going beyond the traditional office workplace design), to comprehensively address the needs of a hybrid workforce network in the future.
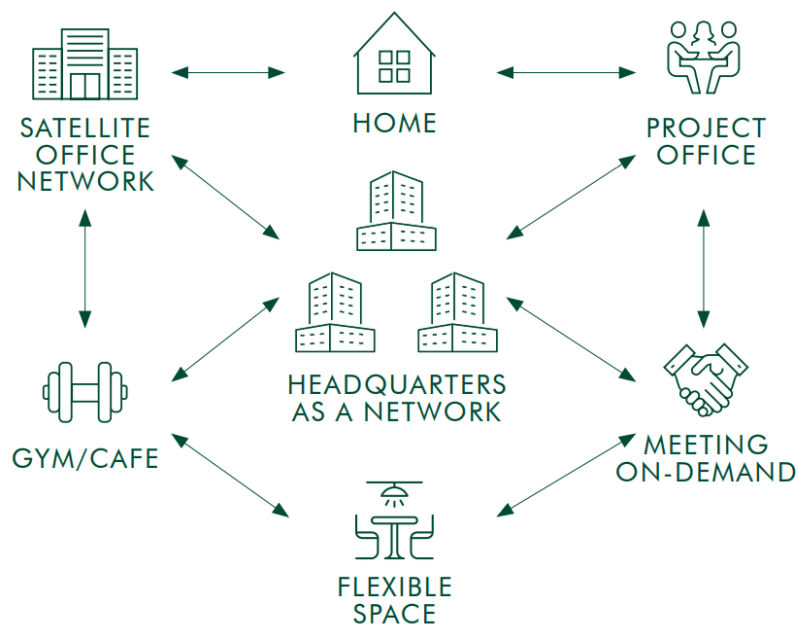
Figure 3. The 'hybrid workforce network' model. Source: CBRE (2021b).

2.2.4. Adaptive Workplaces

The last insight on the future workplace has been provoked by Deloitte in the report 'Designing adaptive workplaces: How the public sector can capitalize on lessons learned from COVID-19'

(2021, p.3). The authors proposed a model of 'adaptive workplaces' (Figure 4) as a more fluid concept between onsite and telework, "for a workforce that is able to work from anywhere but is *empowered* to work from where they're most productive". In practice, organisational leaders are aimed to engage employees to shape their optimal work environments according to individual preferences.
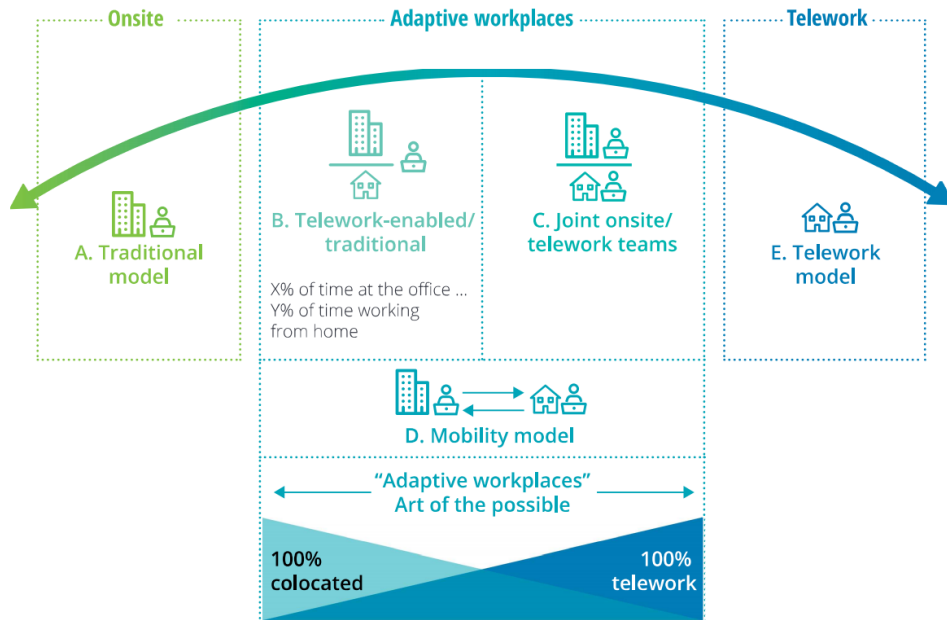
Figure 4. The 'adaptive workplaces' model. Source: Deloitte (2021).

The 'adaptive workplaces' model is designed according to four core dimensions: places + spaces, productivity and performance, workforce experience, and well-being and connection (Figure 5). Therefore, there is a great emphasis on employee needs which leads to organisational outcomes. For example, the 'places + spaces' factor depended on employee engagement levels in terms of different workplace settings, which further has some important implications for 'productivity + performance'. Hence, the workplace experience should embrace different workplace dimensions holistically – work, organisation, workforce, technology, well-being, and a variety of places.

Figure 5. The 'adaptive workplaces' model – core aspects. Source: Deloitte (2021).

The 'adaptive workplaces' concept proposed by Deloitte is directly linked by them with employee engagement, understood as the important contributor to sustained productivity, along with the other economic factors: efficiency (i.e., is work being done in a way that optimises resources) and effectiveness (i.e., is work being done in a way that optimises resources) (Figure 6). The authors suggest, that 'adaptive workplaces' will help employees to optimise their work environment to their own needs, which makes them feel more engaged in their work. Therefore, the workforce-centred approach emphasises the importance of employee engagement levels in terms of different workplace environments. Hence, there is a relationship between the employee and the physical workplace environment which may differ across a new workplace ecosystem scenario. Additionally, 'empowering workforce and sustaining their well-being' may suggest the importance of managerial practices consolidated with the environmental workplace quality. The employee engagement construct will be discussed further in the literature review (section 2.4.), following the analysis of cross-sections with the built environment (section 2.3.).
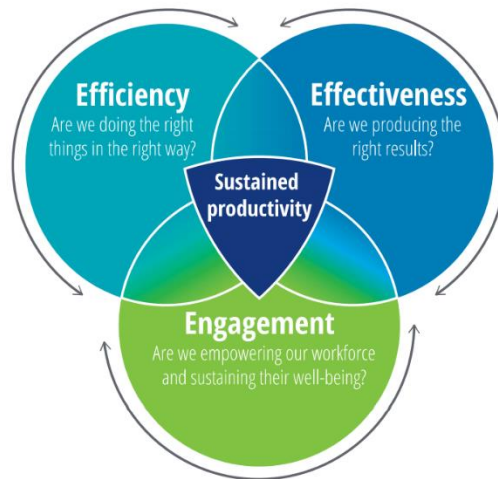
Figure 6. Engagement as a key construct of productivity. Source: Deloitte (2021).

For this PhD research, *the new workplace ecosystem* is defined as a *network of physical and virtual places where work occurs, including offices, homes, third places and the surrounding urban realm.* The proposed definition aims to emphasise greater employee flexibility due to the remote character of work accelerated by the pandemic, as well as the importance of urban realm quality which matters for enhanced human mobility within the new workplace ecosystem. As COVID-19 has already flipped the traditional workplace orthodoxies in terms of both space and employee engagement, all of these issues need to be reconsidered now (Deloitte, 2021), including future metrics development.

The next section (2.3.) will look at several models (i.e., academic/industry) of the relationship between the built environment and organisational outcomes, to better position the employee engagement research in the context of the new workplace ecosystem scenario.

Summary

Section 2.2. illustrates four conceptualisations of the new workplace ecosystem scenario elaborated by the global industry sector.

The main findings from this new approach can be summarised as follows:

- greater distribution of physical workplaces within urban space (the 'total workplace ecosystem');
- greater flexibility of the workforce due to remote work (the 'hybrid workforce network');
- blurred physical boundaries of the workplace (e.g., virtual workplaces);

- importance of urban realm quality (the 'workplacemaking');

- greater mobility across different workplaces;

- shorter commute time within urban space (e.g., work from home and local community hubs);

- the type of workplace linked to specific work tasks (e.g., third places – informal meetings);

- greater emphasis on employee workplace decision-making (the 'adaptive workplaces');

- employee engagement may differ across a variety of workplaces; and

- employee engagement may potentially be reinforced by the opportunity of individual choice.

Given the above considerations, for this PhD research, *the new workplace ecosystem* is defined as a *network of physical and virtual places where work occurs, including offices, homes, third places, and the surrounding urban realm.*

2.3. The Impact of a Built Environment on Organisational Outcomes

For the last two decades, there is observed a growing interest of the real estate industry (e.g., commercial office developers and green building certification bodies), organisations (e.g., human resource managers), and academics (e.g., organisational psychology and built environment) in developing the right set of tools to be used to effectively measure different individual factors (e.g., employee engagement, employee health and well-being, job satisfaction, work performance, and organisational commitment) contributing to the financial performance of companies. For example, green building design is mostly applied to the metrics developed by the real estate sector. Achievement of a green building certification (e.g., WELL and BREEAM) by the real estate investment industry can potentially help to upgrade the sustainability portfolio of the prime office property, as well as attract organisations ensuring long-term leasing. Also, some research demonstrates the positive financial effect of eco-labelling on rental rates and selling prices (Eichholtz et al., 2010), as well as on the occupancy rates of offices (Fuerst and McAllister, 2009). However, employee engagement metrics used by the human resource departments are not directly aligned with those developed for the physical workplace. Therefore, the interaction between the physical workplace and the organisational factors may not be either adequately understood or estimated. Hence, there is a greater need to better understand this connection, as this will contribute to improved metrics development. Moreover, this relationship can become even more complex in light of the new workplace ecosystem with the dominance of remote work.

First, this section (2.3.) explores some linkages between indoor environmental conditions of the workplace and organisational outcomes (section 2.3.1.). Secondly, it presents how organisational outcomes can be driven by both indoor *and* outdoor/external factors of the built environment (section 2.3.2.).

2.3.1. The Impact of Indoor Environmental Conditions on Organisational Outcomes

The relationship between the built environment and the organisational outcomes has been examined by, for example, Newsham et al. (2014) as an interplay between the internal physical office quality, the organisational outcomes and the individual employee control over the physical workplace. In their proposed model, 'work engagement' derives from 'pleasure' as the previous result of 'individual control', 'light distribution' and/or 'physical conditions'. Therefore, it can be assumed that work engagement in such a model is the effect of an individually-based appraisal of the physical workplace. Hence, this model reflects the previous research in the field of built environment focusing on the importance of environmental conditions for improved organisational outcomes. However, this model has some limitations. For example, it can be discussed why other environmental factors (i.e., CO_2 and temperature) in this concept don't affect work engagement similarly to light distribution. Also, it can be debated why work engagement is being left out of 'environmental satisfaction'. Additionally, the only link to work engagement is via 'pleasure'. From the next section (2.4.) we will know that work engagement has also cognitive and physical aspects. Moreover, Newsham et al. (2014) stress the significance of 'individual control' over the physical workplace which is determined by different employees' needs, so it may be hardly achieved in a shared workplace environment (e.g., office), but it may be more relevant for the home workplace environment and 'adaptive workplaces' discussed earlier in the context of the new workplace ecosystem scenario (section 2.2.4.). Also, it can be debated if work engagement leads to 'complex cognitive appraisals' and 'motivation'. Given the fact that analytical thinking and systems thinking are among the factors associated with employee engagement (Lappalainen et al., 2019), this relationship may potentially be reversed. Additionally, it can be debated if motivation is the result of work engagement or if it's the other way around. To sum up, the model emphasises some correlations between the built environment and organisational outcomes, but in terms of employee engagement (section 2.4.) in the new workplace ecosystem, further research is needed.

Further exploration of the relationship between the built environment and organisational outcomes was conducted by Newsham et al. (2018). The research on a large financial

organisation found that the green-certified buildings demonstrated higher scores than conventional buildings on the survey outcomes related to employee engagement, job satisfaction, value to clients and stakeholders, evaluation of management, facility complaints, and corporate engagement. Also, the authors identified a tendency for the manager-assessed job performance to be higher in green-certified buildings. The key observation was that the metrics routinely recorded by the organisations should be more linked to the building characteristics, which may open up a new possibility for research in this area. As pointed out by the authors, such research demands two sorts of datasets to be merged, namely the employee data (i.e., managed by human resources) and the building data (i.e., owned by the facilities managers or the corporate real estate departments). Hence, the research stressed the importance of a multi-metric approach for the evaluation of the impact of the built environment on organisational outcomes. However, given the greater complexity of the new workplace ecosystem and the wider distribution of workplaces (e.g., home, office, and third places) in future (section 2.2.), the data required to fully evaluate employee engagement (section 2.4.) in terms of the physical workplace may need to be more extensive.

The importance of different metrics' correlation for workplace evaluation has been emphasised by the World Green Building Council (WGBC) in the report 'Health, Wellbeing and Productivity in Offices: The Next Chapter for Green Building' (2014). The proposed WGBC metrics framework highlights the three key elements of workplace evaluation: financial (organisational), perceptual, and physical – the combination of objective/subjective data. The financial (organisational) include objective indicators: absenteeism, staff turnover, retention, revenue breakdown, medical costs, medical complaints, and physical complaints. The perceptual is related to non-objective factors (e.g., self-reported attitudes). And the physical reflects on the indoor physical environment (e.g., direct measures of illuminance, pollutants, temperature, evaluation of views outside, and quality of amenities) with some external dimension (e.g., availability of public transport, and active design facilities for walking, and cycling). The approach proposed by WGBC underlines the necessity of combining different types of metrics to fully evaluate the physical workplace environment and its impact on organisational outcomes. Therefore, there are three key relationships to be considered in this context: physical-perceptual (i.e., physical conditions and worker attitudes), physical-financial (i.e., physical conditions and financial outcomes), and perceptual-financial (i.e., worker attitudes-financial outcomes). The model will therefore need to be filled with the aligned built environment and the organisational datasets. In light of the previous research on the relationship between the physical workplace and organisational outcomes (Newsham et al.,

2018, Newsham et al., 2014), the model proposed by WGBR was expanded by the authors to the outdoor environmental qualities. However, this approach has some limitations in terms of the new workplace ecosystem (section 2.2.), as the physical metrics are solely focused on the traditional workplace environment and its closest surrounding. Hence, the proposed metrics framework may need to be further developed to comprehensively address organisational factors (e.g., employee engagement) (section 2.4.).

2.3.2. The Impact of Indoor and Outdoor Environment on Organisational Outcomes

The relationship between environmental conditions and organisational inputs has been recently elaborated by the International WELL Building Institute (the IWBI) (2021a) as the 'building health conceptual model' – one of the core findings from the report 'Global research agenda: Health, well-being and the built environment'. The proposed concept emphasises a shift from a prevailing risk reduction model to a more holistic approach embracing both risk reduction and health promotion. According to the model, both 'environmental conditions' (i.e., internal and external) and 'organisational inputs' (i.e., organisational and work factors) have an impact on the 'individual/ collective health and performance outcomes' (i.e., cognitive/psychological, behavioural, and physiological), and vice versa. Moreover, there are 'mediators' and 'moderators' which influence this relationship on the individual/collective level, as well as 'economic inputs' impacting organisations and 'design, policy, planning decisions', further influencing 'environmental conditions'. In the proposed highly complex and comprehensive model, 'engagement' is positioned as one of the cognitive/psychological outcomes of 'individual and collective health and performance'. Therefore, according to such a model, both environmental conditions and organisational inputs may have a potential impact on employee engagement, and vice versa. Hence, the model developed by the IWBI suggests that the relationship between the built environment and organisational outcomes is more complex than it was previously suggested by Thompson et al. (2014), and the data required to effectively address it is more extensive, going beyond organisational datasets (WGBC, 2014). Compared to the previous research in the field (World Green Building Council, 2014, Newsham et al., 2014, Newsham et al., 2018), the model developed by the IWBI illustrates the wider context which remains underestimated and needs further interdisciplinary exploration. For example, the additional study may investigate how mediators and moderators interact with environmental conditions.

Concluding, the proposed IWBI model encourages a more holistic understanding of the larger contextual circumstances (e.g., mediators and moderators) which may better inform the

relationship between the built environment and organisational outcomes. However, additional research is needed to explain the relationship between tangible environmental qualities (e.g., physical parameters/qualities) and intangible organisational issues (e.g., employee behaviours and managerial practices), and the impact of both on employee engagement (section 2.4.). For example, little is known about how employee behaviours resulting from healthy workplace design may determine employee engagement, as well as what the managerial role is in that context. Although the proposed model was designed with a focus on the traditional office workplace environment, it has the potential to be successfully expanded to the new workplace ecosystem scenario as well (section 2.2.).

The next section (2.4.) will look at the second key concept for this PhD research – employee engagement – and how is defined in both academic and 'grey' literature, to investigate its relevance for the built environment sector, also in the context of a new workplace environment.

Summary

Section 2.3. illustrates the relationship between the built environment and organisational outcomes, looking at several models of its interpretation. The aim is to better understand where/how employee engagement is positioned in that context, what the implications may be for the new workplace ecosystem scenario (section 2.2.) and the definition of employee engagement (section 2.4.). The findings from this section (2.3.) can be summarized as the following:

- there is a relationship between the built environment and employee engagement;
- employee individual control over the physical workplace can contribute to employee engagement;
- individual control over the workplace can be aligned with the 'adaptive workplaces' (section 2.2.4.);
- the research on workplace environment is still limited to the office environment;
- there is a greater need for multi-metrics development for workplace evaluation;
- the workplace model needs to be expanded to the wider city scale;
- the role of mediators/moderators (e.g., the IWBI model) needs further exploration; and
- the role of urban planning (e.g., the IWBI model) can be linked with 'workplacemaking' (section 2.2.1.).

2.4. Employee Engagement Definition

The topic of employee engagement emerged at the turn of the 20th and 21st century as a novel concept in business and was further developed by the human resources departments and consultants to support the organization's mental capital – "cognitive and emotional fortitude and strength of the employees" leading towards the higher economic outcome (Schaufeli and Salanova, 2014b, p.295). This wide interest of researchers is in line with the global studies reporting a very low employee engagement level among European and American employees (Attridge, 2009).

There are two main conceptualisations of employee engagement in organisational behaviour research: 'employee engagement' (Kahn, 1990) and 'work engagement' (Schaufeli et al., 2002). While much research does not adequately differentiate the two concepts, some academics suggest that they should be treated as distinct concepts due to their distinct origins and the content they measure (Kosaka and Sato, 2020). For example, 'work engagement' is generally understood as the relationship between an employee and work, while 'employee engagement' is perceived in the wider context of the relationship between an employee and work *and* the workplace. It can be observed that the preference for using the term (and understanding) of 'employee engagement' is more visible in industry research, for example by Gallup (2022b).

Additionally, employee engagement as a concept in literature is very often referred to as both the healthy workplace (Day and Randell, 2014b) and employee health and well-being (Lovelace, 2009, Isaac and Ratzan, 2016). Therefore, it can be assumed, that the relationship between the workplace and employee health may be one of the key determinants of employee engagement. This potential correlation reflects the interest of the real estate sector in linking sustainable/healthy building design with organisational outcomes which were explored earlier in this literature review (section 2.3.).

Moreover, employee engagement is defined as a type of work-related well-being (Russell, 1980, May et al., 2004). The academic interest in this topic was initiated by the field of positive psychology, referring to human strength and optimal functioning (Schaufeli and Salanova, 2014a, 2014b). Both 'grey' and academic literature have linked employee engagement with organisational outcomes and financial success (Baumruk, 2004, Harter et al., 2002, Richman, 2006), as well as an organisational competitive advantage (Macey et al., 2009). However, it is "a relatively new and multifaceted construct that has been conceptualized in a variety of ways in the research literature" (Hurrell, 2014, p.328). Therefore, there is a need for further

explorations in this area, also in the context of the new workplace ecosystem spread between a variety of places (section 2.2.).

This section (2.4.) introduces the construct of employee engagement understood as a business value for organisations (2.4.1.), as well as its relationship with employee health and well-being (2.4.2.).

2.4.1. Employee Engagement as a Business Value for Organizations

The academic definitions differ from those elaborated by organizations in the practitioner literature (Schullery, 2013). Nevertheless, one of the most cited academic definitions of employee engagement was proposed by Kahn (1990) as "the harnessing of organization members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances" (Kahn, 1990, p.694). Kahn (1990) in his seminal paper on 'personal engagement' with work was the first to argue that employees choose whether to invest themselves fully and authentically in their role based on their experiences within the working environment. And as noticed by Crawford et al. (2013) employee engagement has become one of the most significant concepts in the management field in recent years which constitutes further efforts for its better understanding. However, as pointed out by Macey and Schneider (2008) there are currently many definitions, conceptualisations, measures and theories of employee engagement. For example, Bailey et al. (2017) identified several distinct conceptualizations of employee engagement referring to their antecedents: psychological states, job design, leadership, organisational and team factors, and organisational interventions. However, as pointed out by authors, this concept is not fully developed in terms of its definition, measures, drivers etc. because employee engagement per se is a multi-faceted construct. Moreover, as noticed by some authors (Jenkins and Delbridge, 2013, Keenoy, 2013), employee engagement should be perceived within a wider context (e.g., organisational and political).

Employee engagement was also defined as "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption" (Schaufeli et al., 2002, p.74), one step up from commitment (Robinson et al., 2004b), passion for work (Truss et al., 2006, Brim, 2002a), "positive work-related psychological state characterized by a genuine willingness to contribute to organizational success" (Albrecht, 2010b, p.5), relationship with employee work, role and organization, "a state of mental energy", "associated with involvement, commitment, passion, focused effort and energy" (Schaufeli and Salanova, 2014a, p.295-299).

On the one hand, a substantial lack of employee engagement leads to lower productivity in organizations (Johnson, 2004). On the other hand, engaged employees feel more energy toward their work and the whole organization (Schaufeli and Salanova, 2007). There is a reported connection between employee engagement and business results (Harter et al., 2002) and higher earnings per share (Ott, 2007). Moreover, engaged employees are perceived as having a more positive attitude towards their companies, being emotionally connected to them and more productive (Saks, 2006b, Shuck and Wollard, 2010). Employee engagement has many positive outcomes, for example, higher job performance, lower turnover, higher levels of organisational commitment, extra-role behaviour, self-reported health and affect (Harter et al., 2002, Maslach et al., 2001a, Rich et al., 2010, Schaufeli and Bakker, 2004b, Sonnentag, 2003b). Employee engagement leads to less stress, higher satisfaction in personal life and bigger productivity, better health and positive affect among employees (Crabtree, 2005), involvement, commitment, passion, enthusiasm, focused effort and energy and 'to go the extra mile' (Schaufeli and Salanova, 2014a), emotional and intellectual commitment to the organization (Baumruk, 2004, Richman, 2006, Shaw, 2005). Engaged workers perform better and experience better productivity due to: positive emotions (e.g., happiness, joy, and enthusiasm), good health, ability to mobilize resources and transfer their engagement to others (Bakker, 2008).

For this PhD research, the focus will be on two scientific mainstreams focused on employee engagement. The first one evolved in the organisational psychology field and reflects the psychosocial factors that affect job performance. According to this stream, the organization itself is a driver of employee engagement (Irvine, 2009, Bakker and Demerouti, 2008, Anitha, 2014a). The factors determining employee engagement in this context are, for example, work environment (i.e., understood as a social rather than a physical environment), leadership, team and co-worker training and career development, compensation, organisational policies and workplace wellbeing. Bakker et al. (2013) discussed seven possible interventions aimed at fostering employee engagement in an organisational setting: through optimizing the work environment (i.e., new ways of working, optimizing job demands and resources, and inclusive work-life support) and individual interventions (i.e., job crafting interventions aimed at increasing employees' psychological capital - efficacy, hope, optimism and resilience, happiness interventions, and strengths-based interventions). All the interventions are focused on employee well-being as a driving force of employee engagement. Employee engagement in this field is measured by, for example, the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2006).

2.4.2. Employee Engagement Versus Employee Health And Well-Being

The second scientific mainstream reflects the green building design's considerations and the impact of internal environmental factors (e.g., temperature, air, lighting, etc.) on employee health and well-being, and how this influences organisational outcomes (section 2.3.). Many scholars have studied the quality of the internal physical office environment (e.g., office design, physical qualities of the building, etc.) and how this impacts organisational outcomes (Wyon, 2004a, Kwallek et al., 2007b, Clements-Croome, 2004, Vischer, 2007, Kegel, 2017, Chan et al., 2007, Chadburn et al., 2017b, Feige et al., 2013b). Findings from this stream of research are being applied in the real estate industry worldwide (i.e., specifically in the green building sector), concerned with developing a healthy working environment to reduce sick leave and improve the overall performance of workers. Additionally, employee health and well-being in this context is perceived as a contributor to the knowledge economy, leading to increased productivity (Brinkley et al., 2010b).

The most cited model linking employee engagement with employee well-being is The Job Demands-Resources Model (JD-R Model) (Demerouti et al., 2001) which summarises most of the antecedents and factors of employee engagement (from an organisational behaviour perspective). The model states that high job demands (e.g., work pressure and emotional demands) lead to strain (i.e., burnout) which further hurts well-being determining negative outcomes (i.e., health problems). But reduced job demands have a positive effect on increased job resources (e.g., career opportunities, supervisor coaching, role-clarity, and autonomy) which leads to well-being (e.g., employee engagement) determining positive outcomes (e.g., performance). Hence, the model explains that both the health impairment process and the motivational process are parallel and dependent on each other. The specific relationship between the physical workplace environment and employee engagement will be thoroughly investigated in section 2.5.

Although it is generally reported that investment into employee health and well-being automatically results in increased employee engagement and commitment (Cooper and Bevan, 2014), employee engagement is an individual-level construct and is "related to individuals' attitudes, intentions, and behaviours" (Kular et al., 2008, p.7). Shuck (2019) argued, that definition of employee engagement is limited due to strong pressure on performance-related outcomes and focus on productivity without considering "a deeper understanding of the individual experience, context, and processes of engagement" (p.288). This statement was in line with Hurrell (2014) perspective, who found, that employee engagement may be more

related to the individual rather than the work-related factors and "what working conditions affect engagement and the processes involved are only beginning to be understood" (p.328). This may lead to the conclusion that the universal metrics for employee engagement need to embrace both the physical workplace qualities and related employee behaviours/managerial practices to fully capture all the relevant issues informing employee engagement. The study by McCunn and Gifford (2012) on green offices and employee engagement did not find a positive relationship between them, which may also explain that such metrics could be elaborated more broadly and look at the different factors influencing them. Jenkins and Delbridge (2013) in their study on 'soft' and 'hard' approaches to employee engagement found that positioning employees at the centre of the organisation (called the 'soft' approach) is more beneficial for business growth than perceiving them only through the economic lens of productivity (called the 'hard' approach). The authors pointed out the importance of complex external context which should be considered by organisational during management practices. The need for more research on the broader contextual organisation factors was also emphasised by Bakker et al. (2011). Following the assumption made by Jenkins and Delbridge (2013) that employee response is better in organisations managed in a human-focused manner, it can be hypothesised that employee well-being deriving from a healthy workplace environment may be conducive to employee engagement per se. Given the fact, that the authors emphasised the importance of humanity in management processes for employee engagement, the wider environmental context – 'workplace ecosystem' - may potentially provide a supportive 'employee engagement-oriented' context. As already proposed by Robertson and Cooper (2010) in their concept of 'full engagement', employee engagement is more likely to be sustainable when employee well-being is also high. Therefore, employee well-being can potentially contribute to both organisational and personal benefits. Hence, employee well-being becomes an integrated part of the construct, along with 'commitment-based' employee engagement. However, further research is needed to explore the link between the physical workplace, employee health and well-being and employee engagement, also in the wider context (section 2.5.2.).

In the field of organisational psychology, there are numerous metrics focused on employee engagement that have some relevance to employee health and well-being. For example, the Utrecht Work Engagement Scale (UWES) uses 'vigour' as one out of three proposed subscales to measure employee engagement. As 'vigour' per se can be defined as either strength, energy or enthusiasm[1], it can be logically linked with employee mental and physical health conditions, which constitutes the efforts around healthy workplace design (both sociologically and

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[1] Definition VIGOUR, Cambridge English Dictionary (12 February 2021)

physically). Moreover, the UWES methodology is commonly used in various studies on the association between employee engagement and health outcomes (Veromaa et al., 2017) (section 2.6. will further explore the relationship between the physical workplace environment and employee engagement). Potentially, a 'healthy' workplace design can contribute to 'full engagement' (Robertson and Cooper, 2010) - a broader conception of employee engagement – extended beyond 'a commitment-base view' to a more 'human-oriented' construct – ensuring sustainable benefits for both organisations and individuals. Additionally, linking employee engagement with human health at the workplace can 'empower the workforce and sustain their well-being', as highlighted in Deloitte's model (2021) in the context of 'adaptive workplaces' in a post-COVID-19 scenario (section 2.2.4.). However, this approach demands further investigation of the relationship between the physical (healthy?) workplace environment and employee engagement (section 2.5.2.).

To sum up, this section demonstrates, that the construct of employee engagement has been strongly conceptualised on the individual level in the organisational realm (e.g., psychological states, job design, leadership, organisational and team factors, and organisational interventions) (Bailey et al., 2017). Although the qualities of the workplace environment and their potential impact on general employee performance have been widely studied in the built environment field, these investigations were limited to the traditional office environment (Wyon, 2004a, Kwallek et al., 2007b, Clements-Croome, 2004, Vischer, 2007, Kegel, 2017, Chan et al., 2007, Chadburn et al., 2017b, Feige et al., 2013b). Given the previous discussion on the new workplace ecosystem scenario (section 2.2.), the employee engagement concept may need to be re-examined/re-conceptualised now in that context. For example, Kahn (1990) argued that 'personal engagement' with work is determined by experiences within the working environment. But how do employee experiences informing employee engagement differ across a variety of places?

The more distributed workspaces and the acceleration of remote work patterns in a post-COVID-19 world are expected to have a greater impact on employee flexibility associated with employee engagement (Deloitte, 2021), which may differ across a variety of workplaces. Additionally, employees will get the privilege of choosing the preferred workplace within such an ecosystem based on, for example, individual-level employee engagement. Hence, there will be a greater role of employee decision-making in shaping the 'adaptive workplaces'. As very little is known about how different workplace settings in the 'total workplace ecosystem' (i.e., home, third places, local community hubs, etc.) impact employee engagement, further research

is needed to address the whole spectrum of the new workplace ecosystem to thoroughly examine this issue.

Although there is no scientific evidence that a 'healthy' workplace design per se (e.g., WELL-certified office space) directly contributes to employee engagement, some studies report that both physical and mental health factors have a positive relationship with employee engagement (Veromaa et al., 2017, Eguchi et al., 2015). Given the fact that employee engagement is driven by a variety of factors (e.g., social relationships at the workplace), enhanced employee mental and physical health conditions (as a result of a 'healthy' office design) can potentially mitigate the negative impact of other factors determining employee engagement at the workplace. For example, employee engagement as a concept in literature is very often referred to as both a healthy workplace (Day and Randell, 2014b) and employee health and well-being (Lovelace, 2009, Isaac and Ratzan, 2016). Hence, a 'healthy' workplace can be understood holistically as a 'healthy' social *and* physical environment. Nevertheless, there is a greater need now to investigate the role of employee behaviours (e.g., health-oriented - Jindo et al. (2020)) and organisational practices of 'empowering workforce and sustaining their well-being' in a variety of 'adaptive workplaces' (Deloitte, 2021) and their contribution to employee engagement. The managerial aspect can be even more challenging considering the projected dominance of remote work patterns in the future.

The next section (2.5.) will look at the relationship between the physical workplace environment and employee engagement and how this can be informed by research findings from different academic backgrounds.

Summary

Section 2.4. presents an overview of the employee engagement construct and how it is understood by both academics and practitioners. First, the research demonstrates that employee engagement is highly correlated with employee productivity which explains its importance for businesses working across different methods of improvement on the organisational level. Secondly, the focus of the built environment sector on a healthy workplace design may complement organisational efforts towards improved employee engagement, due to its relationship with employee health and well-being. Given a variety of conceptual (subjective) elements which all together built upon this, further research is needed to explore the actual role of a physical workplace environment for employee engagement.

Additionally, due to increased global awareness of a new workplace ecosystem scenario (section 2.2.), the construct of employee engagement may need to be re-adapted to this new framework proposed by the worldwide industry sector, considering, for example:

- impact of greater employee flexibility on employee engagement;
- different levels of employee engagement across a variety of workplaces;
- the role of a healthy workplace environment for employee engagement in the wider context;
- the role of employee decision-making in the shaping of the 'adaptive workplaces'; and
- impact of remote work on organisational practices related to employee engagement.

2.5. The Physical Work Environment and Employee Engagement

From the scientific perspective, there is still not clear how the physical workplace environment impacts employee engagement as the studies on this relationship are very limited (Kegel, 2017, Appel-Meulenbroek et al., 2018, Smith, 2011). Moreover, it can be observed, that there is no common agreement among researchers on the definition of the workplace. For example, 'work environment' in the context of employee engagement studies (e.g., organisational psychology, human resources, and management) is usually understood as a social (Kumar and Sia, 2012, Osborne and Hammoud, 2017, Rana et al., 2014) rather than the physical environment. Additionally, most of the academic research (e.g., environmental psychology, organisational psychology, and built environment) focuses on the office workplace environment as a dominant place where work occurs (Kämpf-Dern and Will-Zocholl, 2020, Devlin, 2018, Veitch, 2012, Valentin and Gamez, 2010, Cooper et al., 2014) which may not fully address a new workplace ecosystem scenario projected by the global agencies for a post-COVID-19 world (IPUT & ARUP, 2020, Deloitte, 2021, Cushman & Wakefield, 2020b, CBRE, 2021b). As already observed, a hybrid work scenario may have a long-term effect on both the real estate market (e.g., office demand and residential quality) (Liu and Su, 2020) and future city planning (e.g., transport infrastructure) resulting in the 'doughnut effect' – prioritising suburban regions over the core city locations by remote workers (Ramani and Bloom, 2021). This trend is especially visible in dense urban agglomerations (e.g., London and New York City) where there is the greatest demand for work which can be conducted remotely as well (e.g., financial sector and IT sector), which is called the 'City Paradox' (Althoff et al., 2020) and is more relevant for higher-income economies (Dingel and Neiman, 2020).

Since there is no agreement on the currently fluctuating definition of 'workplace' towards a wider city framework, there is even more complexity around metrics development addressing employee engagement in the context of the physical workplace. Since Schaufeli et al. (2002) defined employee engagement as "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication and absorption" (p. 74), a large body of research proposes a commitment-based approach focused on organisational purposes (Baldoni, 2013) by the use of relevant employee engagement metrics to drive business performance (Sorenson, 2013). Additionally, it can be observed that this type of metric (e.g., organisational psychology) favours the quality of the social (working) environment, e.g., supervisory communication, job design, resource support, working conditions, corporate culture, and leadership style (Attridge, 2009, Rana et al., 2014). However, in light of the projected shift towards hybrid work patterns with the dominance of remote work, virtual relationships may dramatically change the way we think of the established construct of employee engagement, its metrics, and the role of the physical workplace. A process of redesigning the post-pandemic workplace will also require managers to advance their skills in both physical and virtual settings (Kane et al., 2021, Love, 2021, Kniffin et al., 2021, Newman and Ford, 2021). This short literature review aims to identify the relevant research streams on the link between employee engagement and the physical workplace, and further explore them in the context of a new workplace ecosystem scenario.

The next sections will investigate the cross-disciplinary perspective on the impact of the physical parameters on employee engagement (section 2.5.1.), and what the relationship is between a healthy workplace design and employee engagement (2.5.2.).

2.5.1. The Impact of the Physical Parameters on Employee Engagement

As was already mentioned, the research findings linking the physical workplace and employee engagement are scarce and distributed among a broad range of academic disciplines (e.g., occupational health, (interior) architecture, real estate and facilities management, and human resources). Additionally, these limited findings very often emerge as a 'by-product' of studies taken for other organisational/ employee outcomes and environmental factors. For example, the study conducted by Feige et al. (2013b) on the impact of sustainable office buildings on occupants' comfort and productivity found, that that the building itself has a clear impact on the comfort level of the building user. The positive impact of certain features, such as operable windows and the absence of air conditioning, was identified. While productivity was not directly correlated to comfort levels, employee engagement was. Therefore, it can be concluded, that

the physical workplace environment may impact employee engagement through occupant's comfort level. Given the fact, that comfort per se cannot be solely defined by the physical parameters (e.g., the optimum temperature for improved employee engagement), it is important to consider individual preferences in shaping such 'comfort'. Hence, employee engagement may be informed by both the physical workplace qualities and employees' individual preferences. In light of the new workplace ecosystem scenario, the home environment can potentially offer greater opportunities for achieving an individual level of comfort, but this needs further research.

The effect of other physical parameters on employee engagement was studied by Hansen et al. (2021). The authors found that dynamic electrical lighting, complementing and responding to the natural dynamics and qualities of daylight has perceived effects on employee engagement. This study's results combined with the previous research conducted by Feige et al. (2013b) suggest the relevance of indoor physical factors for greater comfort of office workers resulting in self-reported employee engagement. Additionally, both studies emphasise the possible linkages between indoor environmental conditions conducive to health and well-being (e.g., circadian lightning, mechanical ventilation, etc.) and employee engagement. However, further research is needed to explore how the physical indoor/outdoor environment may potentially contribute to employee engagement in meeting both employee needs (e.g., individual control) and general health and well-being standards for the physical workplace. The qualitative in-depth interviews revealed the importance of individual preferences which are conducive to employee engagement and which may be hard to apply in a shared physical environment (e.g., open plan office). Moreover, there is a greater need to reflect on a variety of methods used to measure employee engagement by academics from different disciplines. For example, the study conducted by Hansen et al. (2021) relied on the self-developed questionnaire (i.e., frequency of good work performance, feeling motivated, producing innovative ideas/novelty, feeling concentrated at work, having a good workflow, and willingness to take risks in work tasks) which differs from commonly used by researchers the UWES scale (Schaufeli and Bakker, 2003).

Another study conducted by Carter et al. (2020) found that a high-quality, satisfying workspace and workplace environments contribute to employee engagement. According to the authors, through employers' investments in the workplace and workspace, an exchange relationship is likely to form resulting in enhanced employee engagement. Hence, employee engagement is the effect of 'immediate workspace satisfaction' (i.e., the ergonomics, floor and furniture configurations, and ambient features such as lighting, acoustics and temperature at the desk/office space where a person works) and 'environmental workplace quality' (i.e., the

location, outdoor and green space, and aesthetics associated with one's place of work) - both understood as sources of organisational investment. The authors simultaneously draw on environmental psychology and social exchange theory, and 'environmental workplace quality' is understood as an additional input in the employee-employer exchange relationship. The authors suggest that employees' perceptions of their workspace and surroundings can affect their attitudes and behaviours. However, itis not known yet how individual employee behaviours within such a workplace may inform employee engagement through in-depth employee-workplace relationships. Hence, there may be a greater need of going beyond methods based on evaluating 'employee perception' (i.e., passive employee behaviour) to assessing 'employee experience' (i.e., active employee behaviour) which may potentially provide new insight into employee engagement. Although the scope of the physical workplace was expanded by the authors to an external quality, their research may have some additional limitations in terms of a wider new workplace ecosystem scenario (i.e., home, office, and third places).

The importance of the correlation between employee behaviours and office design for greater employee engagement was highlighted by, for example, Appel-Meulenbroek et al. (2020). The authors demonstrated the significance of workspace use for employee engagement in the example of activity-based offices with a variety of flexible workspaces. The study found that both interaction and desk-switching were positively related to employee engagement. Hence, it can be concluded that the physical workplace environment may need an agency of 'mediators/moderators' (e.g., employee behaviours and managerial practices) for greater employee engagement, but this needs to be further tested. In light of the new workplace ecosystem scenario, flexible workspaces may be considered as a variety of workplaces on the city scale (e.g., home, office, and third places) rather than a mix of workspaces in the office building. Therefore, greater availability of different workplaces/workspaces can help employees to choose their preferred workplace and contribute to employee engagement (e.g., 'adaptive workplaces' by Deloitte (2021).

Some research highlights the importance of remote work patterns for greater employee engagement. For example, the study conducted by Duque et al. (2020) examined the relationship between physical environment factors, New Ways of Working - NWW (e.g., telework, flexible work, and mobile work), and employee engagement. The findings indicated a positive significant relationship between the physical environment factors, NWW and employee engagement. Although the concept of NWW had evolved before the COVID-19 pandemic hit the world, these findings can be relevant for a post-COVID-19 scenario as well, with the projected

dominance of remote work patterns in the context of a new workplace ecosystem. The research by Duque et al. (2020) is supported by earlier studies on the positive relationship between remote work patterns and employee engagement (Gerards et al., 2018).

Nevertheless, it can be observed, that the above stream of research refers to 'workplace autonomy' as one of the main factors driving employee engagement. 'Workplace autonomy' in the context of the physical environment can be understood, for example, as a control over the space in which work is done (Newsham et al., 2014) to ensure greater comfort (Feige et al., 2013a, Hansen et al., 2021), or remote work patterns (Duque et al., 2020, Gerards et al., 2018). The research demonstrates that performing job tasks at home increases perceptions of autonomy by, for example, increased control over breaks, layout, decoration, lighting, ventilation, and other ambient elements (Standen, 2000, Elsbach, 2003). Given a much larger diversity of workplaces in a post-COVID-19 scenario underpinned by digital technology, the greater flexibility offered can potentially enhance employee engagement. It can be noticed, that 'flexible workplace' in studies conducted pre-pandemic was mostly referred to as either flexible work arrangements/patterns (Gittleman et al., 1998, Rodgers, 1992, Bauer, 2003, Kalleberg, 2001) or interior design (Van Koetsveld and Kamperman, 2011, Orel et al., 2021, Van Der Voordt, 2004) focused on the individual adaptations. However, a post-COVID-19 reality may dramatically change the way (scale!) we think of a 'flexible workplace' - as a variety of sites in different geographical locations[2]. Therefore, it can be assumed that a 'flexible workplace (ecosystem)' in a post-pandemic world may potentially increase employee engagement due to the greater possibilities of its optimisation according to individual needs. However, still very little is known about how employee engagement may fluctuate across different workplaces and what kind of physical factors determine better employee engagement.

2.5.2. Healthy Workplace Design and Employee Engagement

Another identified stream of research on employee engagement is linked with employee health and well-being conditions (Seymour and Dupré, 2008, Eguchi et al., 2015, Nishi et al., 2016, Veromaa et al., 2017, Seppälä et al., 2012, Otsuka et al., 2020) which can potentially be adapted to the healthy workplace design ensuring, for example, opportunities for workplace exercise (Jindo et al., 2020, Munir et al., 2015, Otsuka et al., 2020), recovery (Sonnentag et al., 2012, ten Brummelhuis and Bakker, 2012, Kühnel et al., 2017, Bosch et al., 2018), psychological detachment and relaxation (ten Brummelhuis and Bakker, 2012). Although there is no scientific evidence that the 'healthy' workplace design per se directly contributes to employee

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[2] Embracing a flexible workplace - The Official Microsoft Blog (12 May 2021)

engagement, some studies report that both physical and mental health factors have a positive relationship with employee engagement (Seppälä et al., 2012, Veromaa et al., 2017, Eguchi et al., 2015). However, some researchers (e.g., organisational psychology) refer to health and well-being as a direct result of employee engagement rather than as a contributor (Bakker and Demerouti, 2017). In this context, health and well-being is the effect of employee physical/mental health activities taken during off-job activities (i.e., detachment from work during work breaks is conducive to employee engagement). Nevertheless, in light of the previously discussed impact of the physical parameters imitating the natural environment (e.g., mechanical ventilation, circadian lightning, etc.) aligned with individual preferences for greater employee engagement (Feige et al., 2013b, Hansen et al., 2021), it may be important to examine the possible role of the 'healthy'/comfortable workplace environment for employee engagement as well as it may be a two-way causal relationship. It can be noticed, that some of the physical parameters (e.g., air-cleaning devices to control indoor allergens improving indoor air quality) impact directly all employees, but the others (e.g., biophilic design) may need additional agency (e.g., the individual employee behaviours and managerial practices) to fully contribute to employee health and well-being. For example, contact with the natural environment improves cognitive refreshment which may further contribute to reduced burnout (negatively related to employee engagement) through human brain activation (Kim et al., 2010), improved mood and concentration (Van den Berg et al., 2003), and relieving strain outcomes (Thompson and Bruk-Lee, 2019). However, all of these need further exploration as the relationship between health and well-being has not been explicit yet. Given that employee engagement per se is related to individual preferences (Feige et al., 2013b) and the construct is person-oriented, it may be suitable to verify the occupational health research findings (Veromaa et al., 2017, Eguchi et al., 2015) within a variety of workplace setting (e.g., home, office, and third places) with diversified opportunities for health outcomes, and their actual impact on employee engagement.

In light of the above discussion on the possible relationship between the 'healthy' workplace environment and employee engagement, some studies highlight the importance of 'healthy' employee activities. For example, the research conducted by Jindo et al. (2020) found a connection between workplace exercise and employee engagement. According to the authors, the practice of workplace exercise is positively and independently related to vigour (i.e., one out of three subscales of employee engagement on the Utrecht Work Engagement Scale). The association was observed regardless of the frequency of once or twice, or three or more times

a week. The findings indicated that workplace exercise at least once or twice a week could have practical implications for the enhancement of vigour of employee engagement, especially among white-collar workers. Hence, it can be pointed out, that the 'healthy' workplace environment needs to be correlated with intended employee activities to have a greater impact on employee engagement. Otherwise, the outcomes of the 'healthy' design approach may not be equal for all employees based in such an environment. Additionally, it can be observed, that workplace exercise may not be strictly dependent on the availability of a 'healthy' workplace environment (e.g., gym/fitness and green space). However, such facilities encourage employees to perform an exercise at the workplace, contributing to sustainable employee engagement. Therefore, greater integration of health-related practices with the 'healthy' workplace environment can potentially help to better understand (promote?) employee engagement more holistically, in contrast to the traditional 'commitment-based' approach focused on financial outcomes for the organisation (Baumruk, 2004, Harter et al., 2002, Richman, 2006). For example, some research demonstrates that dietary fish intake, regular exercise, sufficient sleep, and abstinence from tobacco might be lifestyle factors that can serve as resources for employee engagement (Nishi et al., 2016) and that interventions such as introducing sit-stand workstations to reduce sitting times may be beneficial for employee engagement as well (Munir et al., 2015). Given the relative importance of a healthy lifestyle for employee engagement (Nishi et al., 2016), it may be necessary to consider 'healthy' habits within both home and office environments, as an integral part of 'healthy' workplaces in the new workplace ecosystem scenario.

Another study examining both employee behaviours and the role of recovery in employee engagement was conducted by Kühnel et al. (2017). The authors found that taking self-initiated short breaks from work (i.e., on-the-job recovery periods) in the afternoon boosted daily employee engagement. As employee engagement fluctuates daily, a daily diary study was conducted with 107 employees who provided data twice a day (before lunch and at the end of the working day) over 5 workdays (453 days in total). Multilevel regression analyses showed that short breaks were beneficial for employees' daily employee engagement by restoring energetic and self-regulatory resources. Hence, employees can actively manage their resources (e.g., state of being recovered) during the workday to sustain employee engagement. This study is in line with the job demands-resources model (Bakker et al., 2014) developed in the field of organisational psychology to explain employee engagement. However, it remains not clear what kind of activities pursued during breaks (e.g., healthy-oriented or not) have a more restorative effect on employee engagement and what the role of the physical workplace environment is in

this context. For example, a refreshing work break in a green space has more restorative outcomes for health and well-being, with positive consequences for better employee engagement. However, further research is needed to explore the role of both employee activities and the type of physical environment (e.g., indoor/outdoor) where the restoration occurs. Given the previous research in the fields of environmental psychology and occupational health on employee engagement, it may be relevant to consider health-related activities resulting from the use of the physical workplace daily to sustain employee engagement. Hence, there is a greater need to advance understanding of how recovery is embedded in a physical context by examining employee activities in different workplace environments during breaks.

The relationship between the physical workplace and employee engagement remains unexplored/underestimated due to, for example, the relative complexity of the construct per se. Nevertheless, some authors explore the possible linkages between these two variables by looking at another construct (negatively related to employee engagement) – burnout. For example, the study conducted by Augustin (2020) provided some design recommendations for the physical workplace environment aiming to reduce the probability of burnout. According to this approach, Augustin (2020) identified the following design parameters to be considered in workplace design: supporting the task at hand; creating opportunities for cognitive refreshment; encouraging comfortable levels of environmental control; facilitating the development of bonds between employees, and managing nonverbal messages sent via design actively. This approach (and related physical requirements) are currently adopted by organisations (e.g., Google). It can be observed, that some of these design recommendations are aligned with the previous employee engagement studies regarding comfort (Feige et al., 2013b) and health (Veromaa et al., 2017). However, still very little is known about the possible roles of (individual) employee behaviours and (collective) managerial practices for greater employee engagement in such an environment. More extensive research on this can potentially help to better understand the concept of employee engagement per se, but this may require going beyond its established definitions (e.g., organisational psychology).

A recent study by Roskams and Haynes (2021) proposes a framework that proposes to capture the dynamic nature of the employee-workplace relationship by the application of the Job Demands-Resources (JD-R) theory (Bakker et al., 2014, Demerouti et al., 2001, Bakker and Demerouti, 2017) to the office workplace environment. The analysis conducted by the authors suggests that the workplace environment can be viewed as a composite of environmental demands (i.e., which instigate a health impairment process) and environmental resources (i.e., which trigger an employee engagement process). The findings report that employees

proactively try to improve the suitability of their workspace through environmental crafting, motivated by minimising demands and maximising resources. This is a novel perspective since JD-R theory (one of the most popular and influential models of employee engagement in organisational psychology literature) has not been applied to the physical workplace yet, as it is primarily focused on the personal, social or organisational factors. Although the findings underline the relevance of the physical environment for employee engagement, this work may have some limitations regarding the insufficient understanding of the complexity of the entire employee–workplace ecosystem in a post-COVID-19 world. However, the study provides new insight into the employee-workplace relationship and its dynamism which seems to be a missing component of the variables informing employee engagement.

Concluding, the link between the physical workplace and employee engagement remains unclear to date. However, some studies - although limited - report the importance of factors that may have an impact on employee engagement, for example, through 'workplace autonomy' understood as either comfortable levels of physical parameters according to individual preferences (Feige et al., 2013b, Augustin, 2020, Newsham et al., 2014, Veitch et al., 2013) and flexible work arrangements (Duque et al., 2020, Gerards et al., 2018), or employee health and well-being conditions (Veromaa et al., 2017, Eguchi et al., 2015, Nishi et al., 2016, Jindo et al., 2020, Munir et al., 2015, Augustin, 2020, Roskams and Haynes, 2021, Otsuka et al., 2020, Seppälä et al., 2012). Hence, it can be noticed, that employee engagement in the future workplace ecosystem scenario may be largely informed by employee choice regarding the 'preferred' physical workplace according to individual needs. First, hybrid/flexible work arrangements may offer greater opportunities for choosing the preferred workplace (e.g., home, third places, etc.), contributing to comfort according to individual preferences. The previous research has already highlighted the relevance of autonomy (Gagné and Bhave, 2011, Littman-Ovadia et al., 2013, Pattnaik and Sahoo, 2021, Burke and Cooper, 2016, Phillips, 2016) and flexibility (Anderson and Kelliher, 2009, Richman et al., 2008) for employee engagement, but without considering the context of physical environment. Secondly, 'healthy' workplaces aligned with pro-healthy behaviours may provide additional sources of employee engagement. The relative importance of recovery experience during work breaks for better employee engagement has been pointed out by earlier studies in the field of organisational psychology (Sonnentag et al., 2012, ten Brummelhuis and Bakker, 2012, Kühnel et al., 2017) although with no focus on the physical space where restoration occurs (e.g., indoor/outdoor, home/office, etc.). It is recommended that organizations should provide their employees with sufficient break

control and offer environments that facilitate relaxation during work breaks which is conducive to employee engagement (Bosch et al., 2018).

However, it is still unknown how the physical environment is related to employee engagement (e.g., as a physical space for daily work and/or as a physical space for a short-term recovery break allowing absorption with work and/or detachment from work). Additionally, employee engagement may vary according to different workplaces (e.g., home, office, and third places), employee behaviours within such workplaces (e.g., healthy-oriented, individual adaptations), and managerial practices. For example, different workspaces may provide/or not greater opportunities for individual arrangements/control and support of employee health and well-being (e.g., access to green space to ensure cognitive refreshment, and workplace exercise). Therefore, is not known if workplace environmental satisfaction can be directly translated to employee engagement metrics, since employee perception measured by such tools may have/or not have relevance for employee engagement per se. Given the fact, that employee engagement fluctuates during the day-time, the physical quality of the workplace can potentially contribute to energising employees during off-job activities (e.g., work breaks) rather than ensuring longitudinal effectiveness during work hours. Hence, further research is needed to explore employee behaviours conducive to better employee engagement (e.g., recovery experience) within various types of physical workplace environments (e.g., home, office, and third places) and managerial practices, which all may holistically inform employee engagement in the context of the new workplace ecosystem. Concluding, positioning the 'workplace' within a wider built environment context (e.g., home, office, and third places) may help to better understand the actual role of the physical workplace environment for employee engagement per se, as well as the agency of moderators/mediators (e.g., employee behaviours and managerial practices).

Summary

Section 2.5. demonstrates that the relationship between the physical workplace environment and employee engagement can be informed by several factors:

- comfortable levels of individual preferences;
- flexible work arrangements;
- health-oriented employee behaviours (e.g., workplace exercise, diet, and access to green space); and
- health-oriented management practices (e.g., allowing the employee to take a break).

Although there is no scientific evidence of a direct impact of the physical workplace environment on employee engagement, the above factors aligned with intended employee behaviours (e.g., health-oriented and flexible arrangements) and managerial practices may help to better understand this relationship, as well as contribute to the established definitions of employee engagement (section 2.4.).

Moreover, in light of a new workplace ecosystem scenario (i.e., home, office, and third places – see section 2.2.), employee engagement may depend on different workplaces and their physical qualities. However, greater opportunities for choosing the preferred workplace (e.g., flexible work arrangements) according to employee needs (e.g., comfortable levels of individual preferences) may contribute to employee engagement. Additionally, healthy-oriented employee behaviours aligned with 'healthy' workplace design and managerial practices may potentially impact employee engagement as well (e.g., use of green space for cognitive refreshment, workplace exercise, etc.). Also, there is a greater need now to consider the home environment and its qualities as an integral part of the 'healthy'/flexible workplace environment for a hybrid workforce in a post-COVID-19 world.

Concluding, positioning the 'workplace' within a wider built environment context (i.e., home, office, and third places) may help to better understand the actual role of the physical workplace environment for employee engagement per se (section 2.5.), as well as the agency of moderators/mediators (e.g., employee behaviours and managerial practices).

2.6. Conclusions

The idea for this PhD research emerged as a direct result of the global disruption caused by the pandemic which dramatically changed the way we work with significant implications for the real estate and planning sector and organisations (section 2.1.). The necessity (and acceptance by many) of remote work has accelerated a global debate on the possibilities of adopting home office and remote work patterns for the future. The discussion has been widely supported by a growing number of industry reports projecting a 'total workplace ecosystem' (Cushman & Wakefield, 2020b) underpinned by a high-quality 'workplacemaking' (IPUT & ARUP, 2020) to ensure 'adaptive workplaces' (Deloitte, 2021) for a 'hybrid workforce network' (CBRE, 2021b) (section 2.2.).

In light of the above, this literature review examined and discussed a wide range of academic/industry sources focused on both the physical workplace environment and employee engagement. The main identified research gaps are:

- employee engagement has been explored in the psychological and social work environment and not in the physical work environment;

- the research findings linking employee engagement and the physical workplace environment (e.g., environmental satisfaction in the workplace) are limited and focused on the office environment, and do not consider a wider built environment (i.e., a variety of workplaces, including home, office, and third places);

- employee behavioural aspects (e.g., work breaks) are not taken into consideration in the research on employee engagement in a workplace ecosystem; and

- there is no research on how a workplace ecosystem impacts employee engagement in knowledge organisations.

Although the research on the link between the built environment and employee engagement is very limited (section 2.5.), a new workplace ecosystem scenario can potentially help to better understand it and provoke a new trajectory of thinking 'out of the box'. Given the fact that the concept of employee engagement was primarily designed for the traditional workplace environment, greater distribution of workplaces and related employee flexibility may shed new light on the established construct of employee engagement (section 2.4.). This is a challenging task considering the greater complexity of this environment compared to the traditional workplace. Additionally, all of this requires substantial changes in the way we think of 'employee engagement' and 'the workplace'. This PhD research aims to catalyse this transition.

Considering the identified research gaps in this literature review, Figure 7 presents the research aim, objectives, questions, and corresponding studies which will be addressed in four PhD papers (Chapters 4-7).

Figure 7. Research aim, objectives, questions, and corresponding studies.

Overall aim of the PhD project:
to examine the relationship between the physical workplace environment and employee engagement in light of a post-COVID-19 workplace ecosystem

Research objective 1:
to investigate options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management

Research question 1:
How do academic employee engagement metrics correspond with industry approaches to monitoring workplace design and management?

Research question 2:
What are the options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management?

Study 1 (Chapter 4):
qualitative study (content analysis)

Research objective 2:
to explore the interplay of employee behaviours and environmental factors for employee engagement in hybrid work practices

Research question 3:
To what extent are we able to point to consistent sets of relationships between employee behaviours, environmental satisfaction and employee engagement considering the varying environmental factors of hybrid work?

Study 2 (Chapter 5):
quantitative study (regression analysis)

Research objective 3:
to better understand the impact of a workplace ecosystem on employee engagement in hybrid work practices

Research question 4:
How to understand the interplay of employee behaviours, the physical workplace and employee engagement in hybrid work practices?

Research question 5:
To what extent does the workplace ecosystem contribute to employee engagement in hybrid work practices?

Study 3 (Chapter 6):
qualitative study (interviews/thematic analysis)

Research objective 4:
to explore options for a successful transition to an 'engaging' workplace ecosystem post-pandemic

Research question 6:
Is there an alignment between an 'engaging' workplace ecosystem and future workplace strategies?

Research question 7:
What are the options for the development of an 'engaging' workplace post-pandemic?

Study 4 (Chapter 7):
qualitative study (interviews/thematic analysis)

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The PhD project consists of four studies summarized below:

- Study 1 (Chapter 4):

Study 1 aims to better understand employee engagement in a post-COVID-19 workplace ecosystem. By identifying a knowledge gap in the relationship between employee engagement and the physical workplace environment through an interdisciplinary literature review, Study 1 subsequently tests this gap by comparing employee engagement metrics proposed by leading academics in the field of organisational psychology with a sample of commonly used real estate industry approaches to monitoring workplace design/management. Study 1 focuses specifically on industry-projected post-COVID-19 workplace ecosystem scenarios, and the results suggest that traditional employee engagement metrics and industry approaches to monitoring workplace design and management do not fully reflect the recent shift to hybrid work patterns. Study 1 sheds light on the implications that this can have on our existing knowledge of "sustainable" property markets in a wider city context. Study 1 sets out an agenda that demonstrates the need for a multi-disciplinary approach to research the interplay of environmental factors and employee engagement, and it questions the notion of employee engagement.

- Study 2 (Chapter 5):

Study 2 seeks to examine the effects of a workplace ecosystem on employee engagement based on survey questionnaires (*n*=169) collected from two industry-related organisations from Central London (UK). Study 2 measures employee engagement components (i.e., vigour, dedication, and absorption by the UWES) against environmental satisfaction, replenished energy during work breaks, using statistical regressions. Study 2 shows the positive effect of environmental satisfaction in the workplace ecosystem on employee engagement components and replenished energy during work breaks. Study 2 highlights the relevance of environmental factors for employee engagement components. Study 2 has practical implications for organisations considering hybrid work patterns.

- Study 3 (Chapter 6):

Study 3 investigates the role of a workplace ecosystem in employee engagement based on 10 semi-structured in-depth interviews with representatives of two knowledge-intensive organisations working in a hybrid mode in Greater London Area and its surrounding (UK). Study 3 found that a workplace ecosystem can influence employee engagement in a more effective way than the traditional office environment. In the analysis, flexibility - associated with both employee behaviours and the physical workplace - was identified as the main driver of

employee engagement in hybrid work patterns. Such findings theoretically challenge the ongoing debates regarding work-from-home versus fully office-based work. Practically, this study underscores the need for wider adoption of hybrid policies by knowledge-based organisations.

- Study 4 (Chapter 7):

Triggered by the acceleration of hybrid work practices during the COVID-19 pandemic, Study 4 sheds light on future development and utilisation of the workplace environment for knowledge-based organisations and investigates how/if the global real estate (workplace) sector aims to catalyse this transition. The specific focus is put on the development of an 'engaging' workplace post-pandemic. A qualitative study was conducted to explore future workplace scenarios via in-depth interviews with eleven experts representing the global real estate (workplace) sector. All interviewed experts came from the real estate (workplace) sector and focused on different aspects of the workplace environment (e.g., management, design, and evaluation). The findings highlight that the evaluation of a workplace ecosystem needs better alignment between organisational and the workplace industry metrics in the wider city context to ensure a successful transition to an 'engaging' workplace ecosystem post-pandemic. Study 4 emphasises the necessity of wider adoption of workplace certificates/metrics in the city context to fully embrace the post-pandemic workplace ecosystem. This is a topical and timely study that presents future workplace scenarios projected by global workplace leaders. The findings obtained through in-depth interviews provide recommendations for organisations considering a permanent shift to hybrid work practices, corporate real estate leaders, and city planners. Additionally, the findings of Study 4 provide a practical lens to look at future changes in the evaluation of an 'engaging' workplace ecosystem in a wider city context.

CHAPTER 3: Methodology

This methodology chapter starts with a concentrated reflection on all methods used to inform in more detail as to why each was adopted, presenting a clear justification of why particular approaches were used and when. The following chapter is organised into 3 sections. The first comprehensively reflects connections and coherence of select methods, enabling the different studies to complement each other (3.1.). Additionally, this chapter provides more detail on the study area itself - the justification for using Greater London Area and its surrounding as the focus of the work (3.2.). The last section (3.3.) presents all methods used in the studies (1-4) constituting this thesis. All data used in this studies were collected by the guidelines of the Henley Business School Research Ethics Committee at the University of Reading.

3.1. Overview

This PhD research used mixed methods design overall in four complementary studies (1-4).

Study 1 aimed to better understand the relationship between employee engagement and a post-COVID-19 workplace ecosystem. Subsequently, Study 1 – given its exploratory character – provided an overall introduction to the whole PhD research considering the relevant academic/industry context. Study 1 adopted a qualitative mixed-methods approach that has been structured on a combination of critical reviews of the literature ('grey'/academic) and the content analysis of (1) workplace design and management monitoring tools, and (2) employee engagement metrics. Hence, the qualitative approach – content analysis of the secondary data – was adopted to provide a more nuanced understanding of the possible interactions across a more distributed workplace ecosystem (i.e., home, office, and third places). The focus on both the academic and industry sources, both in terms of metrics and the literature was intended to link different areas of research where possible unexplored relationships were identified considering a post-pandemic reality (e.g., hybrid work patterns). Therefore, Study 1 investigated both the academic and the industry sources (e.g., employee engagement / workplace metrics) to fully address the research gaps that emerged in the literature review (See Chapter 2). It used secondary data to explore current approaches used by academics and industry for measuring both the physical workplace quality and employee engagement.

Study 2 was a quantitative study, extending the previous one through a collaboration with knowledge-intensive organisations (i.e., the real estate sector) based in Central London. Given most of the research on employee engagement (e.g., organisational behaviour and

environmental psychology) is focused on traditional office environments, this interdisciplinary study examined if environmental satisfaction (i.e., comfort) in a workplace ecosystem (i.e., the home and the office) is associated with employee engagement (i.e., vigour, dedication, and absorption) and replenished energy during work breaks in a sample of 169 knowledge employees working in a hybrid mode in Greater London Area and its surrounding (the justification for using this area as the focus for work will be explained in section 3.2.). Therefore, Study 2 addressed the research gap between organisational behaviour studies (i.e., employee engagement and work breaks) and environmental psychology in the real estate context (i.e., environmental satisfaction). However, Study 2, in contrast to the previous studies in these fields, extended the physical workplace environment to the workplace ecosystem where knowledge work is conducted in both the home and the office environment during a working week. It explored the relationship between the physical workplace environment, employee engagement components (i.e., vigour, dedication, and absorption), and replenished work breaks in each of the two workplace environments (i.e., the home and the office). The third places (e.g., café and library) were excluded from the analysis due to the relatively low number of participating employees who worked in such spaces.

Study 3 aimed to explore to what extent the workplace ecosystem impacts employee engagement in hybrid work practices, using interviews. It applied a qualitative approach as it was found suitable for getting additional insights from the previous quantitative investigation of Study 2. The interviews provided a more nuanced understanding of employee engagement in office/home workplaces.

Study 4 directly referred to Study 1, as it continued the discussion which emerged in the introductory study. Given that Studies 2 and 3 were conducted with knowledge-intensive organisations to gather empirical insights on employee engagement in a workplace ecosystem, Study 4 provided a critical reflection on the alignment between the global workplace strategies and an 'engaging' workplace ecosystem.

3.2. Study Area

Although Studies 1 and 4 were conducted in a global context and without a specified study area, Studies 2 and 3 were specifically designed for the Greater London Area and its surrounding. This study area was chosen due to its importance for global knowledge-intensive businesses, as well as its prominent role in the global office real estate market. The study are is a 'home' for the

majority of global knowledge-intensive organisations who adopted hybrid work practices as the result of the COVID-19 pandemic. Additionally, the study area has a well-developed transportation network allowing knowledge employees to conduct hybrid work in multiply locations during a working week (e.g., two days at home and three days in the office). Moreover, the study area provided the right context for exploring it as a 'workplace ecosystem', including well-developed core business hubs (e.g., different types of office workplaces in Central London) with associated amenities (e.g., restaurants, shops, parks, and banks), and a variety of residential developments (e.g., terraced houses, semi-detached houses, detached houses, and apartments). Therefore, the study area itself allowed studying environmental satisfaction in the workplace ecosystem as a whole, considering infrastructural diversification (e.g., access to places conducive to replenishing work breaks). Hence, the chosen study area provided a liveable and enriched environment to investigate employee engagement in the context of the network of diversified physical workplaces. After the initial consultation conducted with the global real estate consultants, it was decided that the Greater London Area and its surrounding would work best as a single case study as it cannot be compared with any other cities in the UK context.

The physical office workplace environment in this study included three office buildings located in Central London (two out of three office buildings were located in the City of London). One out of three buildings was fully refurbished, sustainable Grade A, and set to achieve relevant quality certifications (e.g., BREEAM and WELL). All of the office buildings were designed as open-plan offices and were used by employees in such a way pre-pandemic and during the COVID-19 pandemic.

3.3. Methods

The format of the PhD thesis provided a collection of four research articles, included as chapters (4-7). A mixed-method approach was applied to fully embrace the novelty and complexity of the proposed research, alongside answering the research questions addressed in four studies. This section (3.3.) presents the justification of relevant complementary approaches (3.3.1.-3.3.4.).

3.3.1. Study 1 (Chapter 4)

Study 1 investigated two types of metrics that are intended to measure employee engagement and evaluate physical workplace quality. Given the considerable lack of research on the relationship between these two variables, the proposed approach aimed to better understand what kind of qualities/variables/characteristics constitute both an 'engaged employee' and a

'quality physical workplace environment'. Therefore, Study 1 explored two distinct academic and industry research areas of organisational behaviour and environmental psychology / real estate, to find possible linkages between them in the study of workplace ecosystems and their associated implications for sustainable property markets.

First, a critical in-depth review of key global industry reports (i.e., Cushman & Wakefield, CBRE, Deloitte, and IPUT/ARUP), exploring the organisational implications of the switch to a new workplace ecosystem scenario, was undertaken to understand how the physical workplace environment has been defined in a post-COVID-19 world. Next, a content analysis was conducted for a sample of workplace design and management monitoring tools. The content analysis sought to understand the importance of workplace factors that may impact employee engagement in a more distributed workplace ecosystem. The study investigated two types of workplace tools: focusing on office building certifications (i.e., WELL and BREEAM) and associated IT infrastructure (i.e., WiredScore), and post-occupancy workplace evaluation of 'employee experience' (i.e., Leesman) and well-being (i.e., Thrive Global) at the workplace. They have been primarily chosen due to their global popularity among organisations within and outside the real estate sector. Additionally, their practice reflects the latest academic and industry research and provides a broad overview of different key aspects of the contemporary workplace, including sustainability assessment methods and green building rating schemes for office building construction, retrofits and fit-outs (i.e., BREEAM), digital connectivity and smart technology certification systems (i.e., WiredScore), tools for advancing employee health and well-being in buildings (e.g., IWBI), behaviour change technology platforms (e.g., Thrive Global), and tools for measuring workplace 'employee experience' (e.g.., Leesman). Hence, Study 1 evaluated a range of factors that may potentially contribute to better organisational outcomes (e.g., employee engagement). This information was primarily gathered through official company websites (e.g., industry reports). Next, Study 1 reflected on all these workplace tools to identify factors conducive to a successful workplace environment that may or may not be relevant in a post-COVID-19 scenario. It should be noted that certification standards like WELL (i.e., organisational AND building focused) or BREEAM (i.e., building focused) use metrics to measure the success/outcomes of the actions undertaken for the sake of the certification. However, WELL is not metrics *per se*; it has features which are evidenced-based that indicate the outcomes will support health/performance (exceptions are some performance-testing standards for indoor environmental quality) and asks projects to use metrics to evaluate these human outcomes (ideally with a third-party survey provider for human outcomes, performance-testing agents for environmental outcomes).

Second, a literature review of key academic papers in the field of organisational psychology was undertaken to better understand the practice of evaluating employee engagement by organisations worldwide (Schaufeli and Bakker, 2003, Shirom, 2003, May et al., 2004, Harter et al., 2002, Robinson et al., 2004a, Saks, 2006a). A content analysis of employee engagement questionnaires was conducted to determine the extent or range of workplace factors presented. The analysed employee engagement metrics have been classified as 'academic' because they were primarily developed by organisational psychology researchers. However, it must be noted that some of these metrics have been successfully commercialised (e.g., Gallup). Lastly, a matrix of employee engagement metrics and workplace design and management monitoring tools was developed. This was followed by an investigation of the similarities and differences between them, the extent to which they refer to a more distributed workplace ecosystem, and their potential utility in evaluating a variety of workplaces.

3.3.2. Study 2 (Chapter 5)

3.3.2a. Sample and Procedures

The study participants were recruited from two large knowledge-intensive global organizations from the real estate sector based in Central London (UK) by approaching them via email and using personal contacts. As an incentive for participation, we provided an information leaflet with information about the project. Additionally, each participating organisation received a summary of the findings. The study included a survey carried out through the Qualtrics platform, and it had to be completed over two consecutive workweeks (a reminder was sent after the 1st week of running the survey). The survey was implemented online with a link sent to participants by organisational email via respective HR departments. A total of 169 persons completed the survey (33.5% response rate). Participants were 61% male, 38% female, and 1% others (or preferred not to say). Participants had an average of 10.37 years of work experience in their organisations. Participants were full-time (95%) and part-time (5%) employed. The sample was heterogeneous consisting of various organisational levels, such as individual contributors, people leaders / area leaders, leaders of managers, business leaders, partners, and consultants. Consent was obtained from all participants. All participants participated voluntarily and did not receive any reward. The study was approved by the relevant ethics committee. The study was conducted remotely from February to March 2022. All participating employees worked in a hybrid mode (i.e., conducted their work in both the home and the office during a working week) during our data collection process. All employees' responses were relevant for the period of six

months before the start of the data collection process (i.e., August 2021 – March 2022). Therefore, all responses reflected employee experience with hybrid work during the pandemic.

This study adopted a quantitative approach as this method allowed us to evaluate the relationship between organisational outcomes and the physical workplace environment. In our research, we applied multiple regression to investigate the impact of the chosen predictors on all employee engagement components (i.e., vigour, dedication, and absorption) separately and by using the validated employee engagement scale (i.e., UWES). The proposed approach helped us to better understand any possible nuances and variations in employee engagement components in a workplace ecosystem. Additionally, we asked employees to complete the UWES twice (i.e., during work at home and in the office) as we aimed to holistically reflect on a workplace ecosystem which in our case consisted of both the home and the office environments during a working week. To our knowledge, the UWES has not been adopted twice in one single study yet.

The physical office workplace environment in this study included three office buildings based in Central London (two out of three buildings were in the City of London) - all located in a dense urban environment of similar external quality with equal access to outdoor urban amenities (e.g., shops, restaurants, and cafés) and a well-developed transportation network.. One of three buildings was fully refurbished, sustainable Grade A, and set to achieve relevant quality certifications (e.g., BREEAM and WELL). Two other buildings were not certified by any global certification schemes' providers. All the office buildings were designed as open-plan offices and were used by employees in such a way pre-pandemic and during the COVID-19 pandemic. Additionally, the physical workplace ecosystem associated with these three offices consisted of a variety of home workplaces (i.e., apartments, terraced houses, semi-detached houses, and detached houses). The study was conducted remotely from February to March 2022. All participating employees worked in a hybrid mode (i.e., conducted their work in both the home and the office during a working week) during our data collection process. All employees' responses were relevant for the period of six months before the start of the data collection process (i.e., August 2021 – March 2022). Therefore, all responses reflected employee experience with hybrid work during the pandemic.

3.3.2b. Measures

In this study, two variables (i.e., 'environmental satisfaction' and 'replenished energy' were measured with one item. The latest research demonstrated that single-item measures showed good psychometric properties, supporting their use (Matthews et al., 2022, Allen et al., 2022).

Employee engagement in the workplace ecosystem was measured twice with the 9-item Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2006), i.e., vigour, dedication, and absorption. All items were rated on a 7-point Likert scale, 1 = never to 7 = always. A sample item is "At my work, I feel bursting with energy." Cronbach's alpha is ≥ 0.70 (α = 0.87 home and α = 0.85 office), which means that the reliability of the measures was confirmed.

Environmental (workplace) satisfaction in the workplace ecosystem was measured twice with the self-developed 1-item 'I am satisfied with my working set up' rated on a 7-point Likert scale, 1 = strongly disagree to 7 = strongly agree.

Replenished energy during a work break in the workplace ecosystem was measured twice with the self-developed 1-item 'My workplace environment helps me to replenish my energy when I take a work break' rated on a 7-point Likert scale, 1 = strongly disagree to 7 = strongly agree.

3.3.2c. Data Processing and Analysis

In this study, quantitative analyses were applied by using the SPSS and Amos 27. To examine the relationships between employee engagement, environmental (workplace) satisfaction, and replenished energy during work breaks in the workplace ecosystem, two sets of analyses were computed. First, bivariate correlations between the variables were computed. Second, the data was analysed to determine the unique relationships between employee engagement, environmental (workplace) satisfaction and replenished energy during work breaks in the workplace ecosystem. Consequently, multiple regressions that might predict employee engagement were computed, using environmental (workplace) satisfaction and replenished energy during work breaks simultaneously entered as predictors. Also, linear regressions that might predict replenished energy during work breaks were computed, using environmental (workplace) satisfaction as a predictor. This method was found relevant for the data analysis due to the relatively small sample size used in the study. Hence, a structural equation modelling technique was excluded. Additionally, in the analysis, some demographics as control variables were included, namely gender, length of time in the organisation, role in the organisation, and

contract type (i.e., part-time vs. full-time). All participants equally shared their working week between the home and the office environment.

Due to exploratory character and the number of participants (*n*=169), Study 2 adopted multiple regressions to examine the impact of the chosen variables on employee engagement components separately. Although the quantitative approach has been widely adopted by researchers, examining the relationship between organisational outcomes and the physical workplace environment in previous studies, the use of the Utrecht Work Engagement Scale (UWES) has been generally limited to the office workplace environment research. Therefore, Study 2 applied the UWES to two physical environments (i.e., the home and the office) simultaneously. This approach helped to investigate both the physical workplace environment and employee engagement in the context of a workplace ecosystem.

3.3.3. Study 3 (Chapter 6)

3.3.3a. Data and Sample

Interview participants consisted of 10 representatives of two knowledge-intensive organisations from the real estate sector who previously took part in Study 2. Participants worked in a hybrid way in three office buildings in Central London (two out of three offices were in the City of London) and a variety of home environments in the Greater London Area and beyond. The office buildings were represented by 3 premises in total, all located in a dense urban environment of similar external quality with equal access to outdoor urban amenities (e.g., shops, restaurants, and cafés) and a well-developed transportation network. One out of three buildings was fully re-furbished and adapted to global certification schemes (i.e., BREEAM and WELL). Two other buildings were not certified by any global certification scheme providers. Study 3 was based on interviews with managerial and higher-level representatives (e.g., managers, directors, and HR department and legal departments) for capturing organisational perspectives that might have been overlooked in the general survey of all employees in Study 2.

The two organisations from Central London were chosen due to the exploratory character of this study. Given that the participants worked in a hybrid way, this number of organisations was found relevant for investigating the workplace ecosystem in a wider urban context (i.e., including centrally located offices and a variety of home environments in a Greater London Area and beyond). The three office buildings were also chosen because they contained global

corporations working in the field of real estate, providing the study with a comparable set of working practices by knowledge employees who share similar working experiences.

Considering that the participating organisations adopted provisions and guidance on hybrid work practices as a direct result of the COVID-19 pandemic, this research provided the first insight into their work conducted in such a way. Before the pandemic, the organisations were fully office-based excluding occasional site visits. Subsequently, neither fully remote work nor hybrid work was experienced on the organisational scale by the participants pre-pandemic. The participating organisations first experienced employees' engagement in hybrid work during the pandemic in 2021 (following recommendations of the UK government regarding office work). Employees were free to decide which days they wished to work from home and which days they preferred to work from the office alongside their line managers' approval.

3.3.3b. Procedure

In Study 3, ten in-depth semi-structured online 40-min interviews were conducted (MS Teams). Study participants were recruited from two knowledge-intensive organizations working in a hybrid mode (i.e., home/office) from the real estate sector in London (UK) via email and using personal contacts. As an incentive for participation, an information leaflet with information about the project was provided. Consent was obtained from all participants. All participants participated voluntarily and did not receive any reward. The study was conducted remotely during the 4 months of February - May 2022.

The semi-structured interview approach was found to be an appropriate method to answer the research questions. The number of interviews (10) was found relevant for this research due to the in-depth nature of the analysis. The highest-level organisational representatives with diversified responsibilities (e.g., management, leadership, legal, and HR) were invited and who were able to talk in the name of their companies. Although a relatively small sample size, the author was able to thoroughly investigate their opinions via a semi-structured interview technique within 40 min time allocated, as one hour was considered a reasonable maximum length for semi-structured interviews to minimize fatigue for both interviewer and respondent (Adams, 2015). It allowed collecting responses rigorously, at the same time leaving enough 'space' for the interviewees to help them express their thoughts. The semi-structured interviews provided a greater opportunity for discovery, but with space to follow topical trajectories as the conversations unfolded (Magaldi and Berler, 2020) as they were suited to answering a 'why' question (Fylan, 2005). Semi-structured interviews were found suitable for studies involving

small numbers of people (e.g., mini-studies and case studies) (Drever, 1995) and sufficiently structured to address specific topics where new topics can emerge in the study focus whilst helping to explore the full complexity of the research (Galletta, 2013).

In this exploratory study, a qualitative approach (i.e., thematic analysis) was applied. The data was transcribed, anonymised, and then analysed via thematic analysis. Several themes were identified that emerged in the process of coding/data analysis to better understand how a workplace ecosystem impacts employee engagement. Findings were centred on themes that emerged from the interviews inductively. Through interviews, organisational views on a workplace ecosystem were explored. Hence, the study was mainly concerned with improving our understanding of and obtaining deeper insights into experiences to enable the identification of aspects that may have been overlooked in the previous quantitative Study 2 conducted with all employees. Also, the qualitative approach adopted by Study 3 offered a chance to understand key determinants, by collecting original and in-depth insights into a workplace ecosystem. A blend of non-probability convenience and snowball sampling was used for interviews to identify the respondents based on a combination of requests for participation from the professional contacts and/or recommendations from these professional contacts. The number of interviews was determined by the point at which there were no new insights gathered from subsequent interviews (Seidman, 2006). The small number was also justified given the in-depth interview process.

3.3.4. Study 4 (Chapter 7)

3.3.4a. Data and Sample

Study 4 was based on 11 in-depth semi-structured online 40-min interviews (MS Teams) with global industry experts/consultants for workplace design/evaluation/management recruited externally (i.e., vice president of research, executive managing director and global lead, head of EMEA, senior environmental advisor, senior product manager, chief insights & research officer, workplace strategist, head building-environment, senior associate market solutions in Europe, integrated cities & planning leader in Europe, and country director in the UK & Ireland). Aside from individual professional backgrounds, the organisational focus on the office workplace was another criterion for interviewee selection.

3.3.4b. Procedure

A qualitative approach was similarly adopted in Study 4. To explore an 'engaging' workplace ecosystem post-pandemic, in-depth interviews were considered to be the most efficient way to obtain information from global workplace practitioners. In-depth interviews are particularly suited to developing knowledge about poorly understood areas, often having an exploratory-discovery orientation (Legard et al., 2003). Estimating an adequate sample size to achieve saturation is a long-standing problem in interview-based qualitative research. A blend of non-probability convenience and snowball sampling (Onwuegbuzie and Collins, 2007) was used for interviews to identify the respondents based on a combination of requests for participation from professional contacts and/or recommendations from these professional contacts.

As an incentive for participation, an information leaflet with information about the project was provided. Consent was obtained from all participants. All participants participated voluntarily and did not receive any reward. The study was conducted remotely during the 4 months of February - May 2022. Respondents were provided with an information sheet on the research project in advance and completed a consent form. The interviews were transcribed, anonymised, and then analysed. Initially, the data was coded to identify common themes and then re-coded to rationalise the list of themes and identify connections. Findings are centred on themes which have emerged from the interviews. Experts' views on an 'engaging' post-COVID-19 workplace ecosystem and future workplace strategies were explored. The main focus was to obtain deeper insights into how future workplace strategies were aligned with hybrid work post-pandemic, to enable the identification of factors shaping hybrid work practices, which may have been overlooked in questionnaire-based surveys with employees.

The next chapters (4-7) present four studies conducted for this PhD research in the form of articles to be submitted for publication in academic journals.

CHAPTER 4: Assessing Employee Engagement in a Post-COVID-19 Workplace Ecosystem

Abstract: This article has aimed to better understand employee engagement in a post-COVID-19 workplace ecosystem. We identified a knowledge gap in the relationship between employee engagement and the physical workplace environment through an interdisciplinary literature review. We subsequently tested this gap by comparing employee engagement metrics proposed by leading academics in the field of organisational psychology with a sample of commonly used real estate industry approaches to monitoring workplace design/management. We focused specifically on industry-projected post-COVID-19 workplace ecosystem scenarios, and the results suggest that traditional employee engagement metrics and industry approaches to monitoring workplace design and management do not fully reflect the recent shift to hybrid work patterns. We shed light on the implications that this can have on our existing knowledge of "sustainable" property markets in a wider city context.

Keywords: post-COVID-19 workplace ecosystem; employee engagement; physical workplace environment; employee engagement metrics; sustainable property markets; workplace tools; hybrid work patterns; home office; health and well-being

1. Introduction

The topic of employee engagement emerged at the turn of the 20th and 21st centuries as a novel concept in business (Schaufeli and Salanova, 2007). It was further developed by human resources departments and consultants to support organisations' mental capital—'cognitive and emotional fortitude and strength of the employees'—towards higher economic outcomes (Schaufeli and Salanova, 2014b) (p. 295). This wide interest of researchers continues to be relevant to global studies reporting a low engagement level among European and American employees (Attridge, 2009), despite the phenomenon of employee engagement already having been recognised by global organisations as one of the key determinants of their success. In the past twenty years, the concept of employee engagement rapidly evolved, resulting in numerous definitions and associated metrics.

In line with the above interest, for more than a decade, the physical workplace has been perceived as a 'business tool' designed for a financial return far greater than the initial investment (USGSA, 2006). This statement is widely supported by a growing body of research on the impact of physical workplace environments on organisational outcomes, accompanied by the global real estate industry and building certification interests (e.g., IWBI; Cushman & Wakefield; and Leesman) in monitoring workplace design and management. Given that the importance of physical workplace environments increases when some or all work is performed virtually (Deloitte, 2020), this pre-pandemic observation seems to be even more relevant now; new industry-projected workplace ecosystem scenarios developed by leading global providers of consulting (e.g., Deloitte), commercial real estate (e.g., Cushman & Wakefield; CBRE; and IPUT), and design, planning and engineering (e.g., ARUP) involve a variety of workplaces (both physical and virtual) (Gillen et al., 2021). However, from a scientific perspective, this can be challenged as it is still not clear how the physical workplace environment impacts employee engagement; the studies on this relationship are limited (Kegel, 2017, Appel-Meulenbroek et al., 2018, Smith, 2011) despite a large existing body of research focused on other organisational outcomes (e.g., productivity, performance, job satisfaction, etc.). Hence, there is now a greater need to consider different employee engagement metrics and industry approaches to monitoring workplace design and management that may help businesses and their employees adapt to the 'New Normal' (i.e., blended virtual and physical work environments underpinned by digital technology across the office, home, and/or 'third place' work environments) (Deloitte, 2021).

Considering there is no common agreement among researchers on the definition of 'workplace', the projected workplace ecosystem makes these considerations even more complex and challenging. All of these issues pose a greater need for re-examining employee engagement in the context of a post-COVID-19 workplace ecosystem. For example, a 'work environment' in employee engagement studies (e.g., organisational psychology, human resources, and management) is usually defined as a social environment (Kumar and Sia, 2012, Osborne and Hammoud, 2017, Rana et al., 2014) rather than a *physical* one. On the one hand, this understanding is in line with a large number of research studies in the field which emphasise the importance of social relationships at work (e.g., with a supervisor, colleague, customer, etc.) for better engagement. On the other hand, the predominant preference for a 'social' approach by some disciplines may underestimate the possible value of the physical workplace environment for employee engagement, limiting its actual role as a potential variable. Hence, the interaction between physical and social may be a key factor in future research.

Most research on the workplace focuses on the office workplace environment as a dominant place of work (Kämpf-Dern and Will-Zocholl, 2020, Devlin, 2018, Veitch, 2012, Valentin and Gamez, 2010, Cooper et al., 2014), which may not fully address total workplace ecosystem considerations (IPUT & ARUP, 2020, Deloitte, 2021, Cushman & Wakefield, 2020b, CBRE, 2021b). Similarly, most employee engagement metrics tend to favour the quality of the social (working) environment, job design, resource support, working conditions, corporate culture, and leadership style (Attridge, 2009, Rana et al., 2014). However, considering the projected shift toward hybrid work patterns with the dominance of remote work, virtual relationships may dramatically change the way we conceive of employee engagement, its metrics, and the role of the physical workplace environment. Furthermore, employee engagement metrics do not consider indoor environment studies (e.g., the impact of indoor air quality on performance). Therefore, a process of redesigning the post-pandemic workplace and associated employee engagement metrics, industry approaches to monitoring workplace design, and management will require a more holistic approach, which is accompanied by managers advancing their skills in both physical and virtual settings (Kane et al., 2021, Love, 2021, Kniffin et al., 2021, Newman and Ford, 2021).

Further complicating our typically held knowledge regarding employee engagement and the place of work is recent research that confirms how working from home during the COVID-19 pandemic was (for some) effective (Hickman and Robison, 2020) and improved employee productivity and well-being (Russo et al., 2021). The same has been reported in pre-COVID-19 studies (Bloom, 2014, Hunter, 2019). However, long-term home confinement during the COVID-19 pandemic can have negative mental and physical health consequences, which in turn can reduce productivity among those working remotely (Dongarwar et al., 2020). Therefore, there is a greater demand for metrics that help to evaluate and monitor individual factors (e.g., employee engagement) in different workplace environments. Extensive research by Microsoft into the pandemic's impact on work practices—'The new future of work' (Teevan et al., 2021)—has highlighted some of the most pressing challenges of this new context, including collaboration and meetings, personal productivity and well-being, and the role of technology and its societal implications. Therefore, we can assume that all these issues may similarly impact employee engagement for those projected to soon be working across a mix of workplaces—or a workplace ecosystem. As such, the roles of managers and business leaders are evolving or are having to adapt to the challenges of remote work; they are seeking employee engagement metrics that enable them to monitor flexibility and productivity in a world where remote work is increasingly the norm.

However, it remains unclear to what extent industry approaches to workplace design and management are aligned with employee engagement metrics. For example, green building certifications (e.g., LEED and BREEAM) focus on minimising the negative effects of the built environment on external environmental conditions (e.g., air quality); health and well-being certifications (e.g., WELL) support employees' mental and physical well-being. Potentially, a 'healthy' workplace design can contribute to 'full engagement' (Robertson and Cooper, 2010)—a broader conception of engagement beyond 'a commitment-based view' to a more 'human-oriented' holistic sense of thriving and well-being. Even though third-party survey providers (linked to the real estate industry, e.g., Leesman) have found a correlation between high-performing workplaces and organisational outcomes (e.g., improved employee engagement), the academic research on this relationship remains sparse.

Also, there is extensive scientific literature (e.g., on urban health and environmental psychology) on the positive impact of physical environments on human health and well-being (Altomonte et al., 2020, Loder, 2020). Yet, there is little known concerning how internal and external workplace environmental conditions impact engagement. For example, many scholars (e.g., environmental psychology field) have studied how the quality of internal office environments (e.g., office design, physical qualities of the building, etc.) impact general employee job performance (e.g., clean and fresh air improves cognitive thinking, biophilic design and contact with nature reduce work stress, etc.) (Wyon, 2004b, Clements-Croome, 2004, Kwallek et al., 2007a, Vischer, 2007, Chan et al., 2007, Feige et al., 2013c, Kegel, 2017, Chadburn et al., 2017a). Findings from this workstream have been applied to real estate industry research (specifically in the 'green building' sector), concerned with developing healthy work environments that reduce sick leave and improve the overall performance of workers, as well as helping to increase productivity (Brinkley et al., 2010a). These improved indoor environmental factors can contribute positively to employee engagement (Klotz, 2020). Hence, there is scope for greater collaboration between built environment professions (IWBI, 2021a).

As already observed, hybrid work practices would affect both real estate markets (e.g., office demand, residential quality, etc.) (Liu and Su, 2020) and future city planning (e.g., transportation infrastructure), which may result in remote workers' preference for suburban regions over core city locations (Ramani and Bloom, 2021). This trend is especially visible in dense urban agglomerations for higher-income economies (Dingel and Neiman, 2020) (e.g., London and New York City), where there is the greatest demand for remote work. Hence, these issues may not only impact single properties in both residential and commercial markets but

also urban planning more generally (e.g., development of healthy communities, access to sustainable infrastructure, etc.).

The implementation of a post-COVID-19 workplace ecosystem and the new role of properties in such a context can potentially contribute to more sustainable cities. For example, the substantial decrease in long daily commute times can have a significant positive effect on CO_2 reduction, helping cities to adapt to ongoing climate change challenges. If the effects of digitalisation on the way people work persist, the physical boundaries of the future workplace will continue to blur, and the distribution of work would be spread between a variety of locations, requiring new policies for both organisations and cities. From a real estate perspective, this creates opportunities to rethink the workplace more holistically as a network of places (e.g., home, office, and third places) underpinned by relevant quality standards (e.g., certification schemes on a district/city level as opposed to single properties).

Altogether, the above trends and developments in the area of monitoring workplace design and management and its crossover with employee engagement suggest the need for a better understanding of (i) the 'workplace' definition for a post-COVID-19 world; (ii) the impact of the physical environment on employee engagement; (iii) employee engagement metrics, and the focus and scope of industry approaches to quality workplace design/management; and (iv) the possible alignment with new industry-projected workplace ecosystem scenarios.

In this paper, we seek to better understand employee engagement in the context of a post-COVID-19 workplace ecosystem. We do so by analysing possible alignments/differences between employee engagement metrics and industry approaches to monitoring workplace design and management post-COVID-19 to answer the following two research questions: How do academic employee engagement metrics correspond with industry approaches to monitoring workplace design and management? What are the options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management considering post-COVID-19 workplace ecosystem scenarios?

Additionally, two key definitions have been adopted for this paper. First, the physical workplace environment is understood in a broader context as *a post-COVID-19 workplace ecosystem—a network of physical and virtual places where work occurs, including offices, homes, third places, and the surrounding urban realm.* This elaborated definition aims to emphasise greater employee flexibility due to the remote character of work accelerated by the pandemic, as well as the importance of urban realm quality, which matters for enhanced human mobility within the new workplace ecosystem. Industry-projected scenarios of a post-COVID-19

workplace ecosystem are reflected in recent reports illustrating the growing shift toward hybrid work patterns as the norm (Cushman & Wakefield, 2020b, IPUT & ARUP, 2020, Deloitte, 2021, CBRE, 2021b). Secondly, *employee engagement* is defined by Schaufeli et al. (2002) as "a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption"(p. 74). This definition is directly aligned with the Utrecht Work Engagement Scale (UWES), which is a globally recognised tool for the measurement of employee engagement in organisations, not to mention widely adopted by academics (e.g., organisational psychologists). There are other definitions of employee engagement as well, but the one chosen has been widely adopted in academic/industry research. As COVID-19 continues to call into question traditional workplace orthodoxies in terms of definitions of 'workplace' and 'employee engagement', the above issues need to be urgently reconsidered (Deloitte, 2021), including the development of future engagement metrics/industry approaches.

The following paper is structured as follows: Section 2 presents a theoretical background before an outline of adopted methods in Section 3 and an overview and discussion of our results in Sections 4 and 5. The paper closes with some concluding remarks in its final section.

2. Theoretical Background

2.1. The Workplace and Its Effect on Employee Engagement

The general aim of complementary building certification schemes available on the global market is to provide better office working environments for their users, with a positive impact on both the external environment (e.g., air quality outdoor) and indoor environmental conditions (e.g., lighting, temperature, noise, etc.), as well as health and well-being (IWBI, 2021b, IWBI, 2021a, BRE, 2017). Also, while evidence to date has shown that these certifications can help to achieve upgraded employee work performance (which is linked to engagement), they have been designed specifically for traditional corporate office environments that have been the dominant form of physical workplaces (Leesman, 2020a). For example, data from third-party survey providers has shown that such high-performing workplaces, which prioritise experience and well-being, are linked to employee health, engagement and satisfaction; but this data is limited (Leesman). Additionally, while many survey providers do have work-from-home modules, they are primarily designed for more traditional offices that may not fully correspond with the characteristics of home workplace environments (Leesman, 2021).

Due to higher construction and fit-out costs for developers and business enterprises who want to meet the certifications' criteria, the highest WELL, BREEAM, and LEED standards are offered predominantly among the prime office real estate sector and global corporations. Therefore, there is a real risk of mid-market commercial office space (a purpose-built office

space caters to 'hot-desking' arrangements for employees from a range of different commercial organisations) or alternative workspaces that have been left out of the certification process despite the high standard of some of these properties. Additionally, the current COVID-19-related shift towards a greater need for more distributed workplaces is calling into question the expectation that the traditional office will be the biggest influencing factor in employee health and well-being and performance. The latest research has demonstrated the varied success of remote work during the COVID-19 pandemic. That also means that it may be worth examining the metrics that have traditionally been used to measure performance and employee engagement in light of these changes.

For example, a recent academic study of homework within the UK demonstrates that most work was carried out comfortably from home during the COVID-19 lockdown (Carmona et al., 2020). In contrast to the academic research taken solely within the UK context, the XSF@home Total Workplace analysis elaborated by Cushman & Wakefield (2020c) in the global context illustrates some greater concerns related to remote work during COVID-19. For example, 57% of respondents (EMEA countries) reported a lack of sense of well-being, 48% a lack of learning, and 55% struggled with connecting to the company culture of everyday staff engagement. Other industrial research conducted by Leesman (2020b) demonstrates some differences in employee experience due to the variety of home working settings and work activities. This suggests a greater need for comparative analyses of both home/office workplaces to maximise employee experience in the future.

Both above studies highlight a greater need for flexible workplace ecosystems in the future, balancing office and remote work. As already projected by Cushman & Wakefield (2020b), 50% of the workforce will likely be working across a 'Total Workplace Ecosystem', balancing office, home, and third places (e.g., café, library). Furthermore, despite remote work having been practised long before COVID-19 (Olson, 1983), this current shift, which has been accelerated by the pandemic, may lead to more lasting effects on the organisation of work (Brynjolfsson et al., 2020) and management practices (Larson et al., 2020) more broadly. It can be observed that since 2020 most academic research on work has been focused on remote work due to COVID-19 (Angelucci et al., 2020, Gallacher and Hossain, 2020). Considering this attention to the conditions of remote work, there is an equally emerging private sector interest in metrics that can effectively contribute to the monitoring of employee engagement remotely. However, employee engagement metrics traditionally do not consider the role of the built environment because they are primarily focused on evaluating social relationships in the workplace.

As outlined above, the link between the physical workplace and employee engagement remains understudied. However, some studies—although limited—report the importance of factors that may link employee engagement with the physical workplace environment, such as individual preferences (Feige et al., 2013c, Augustin, 2020, Newsham et al., 2014, Veitch et al., 2013), flexible work arrangements (Duque et al., 2020, Gerards et al., 2018), or employee health and well-being conditions (Veromaa et al., 2017, Eguchi et al., 2015, Nishi et al., 2016, Jindo et al., 2020, Munir et al., 2015, Augustin, 2020, Roskams and Haynes, 2021, Otsuka et al., 2020, Seppälä et al., 2012). For example, different workspaces may provide greater opportunities for individual arrangements and the control and support of employee engagement (e.g., access to green space to ensure cognitive refreshment and workplace exercise).

Figure 1 identifies the relevant research streams on the link between employee engagement and the physical workplace environment, to be further explored in the context of a post-COVID-19 workplace ecosystem scenario. Notably, most of the research on the physical workplace environment is investigated by the field of environmental psychology. Hence, more interdisciplinary research with other disciplines (e.g., occupational health, human resources/management, and organisational psychology) can potentially shed new light on this relationship and make it more holistic and explanatory. For example, there is a greater need for new studies on both indoor *and* outdoor environments, and the extent to which employee engagement varies between these different environments for different workplaces (e.g., the role of healthy communities, access to green space, availability of sustainable infrastructure, quality of residential sector, satellite offices' location, etc.).
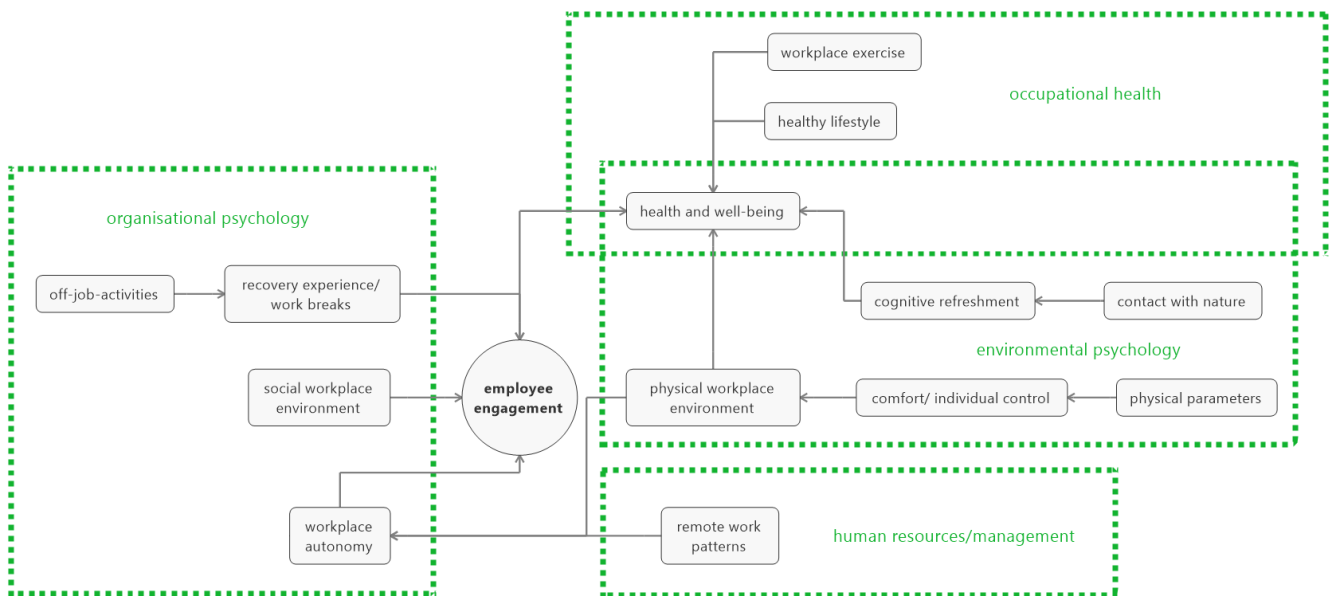
Figure 1. The academic approach for employee engagement.

Hence, further research is needed to explore employee behaviours conducive to better engagement (e.g., recovery experience) considering various types of physical workplace environments and managerial practices. For example, Figure 1 demonstrates that the role of work stress recovery is not addressed in typical environmental psychology work. Additionally, health and well-being must be a transdisciplinary consideration considering the extent to which it may be informed through recovery. Hence, positioning a definition of the 'workplace' within the context of a new post-COVID-19 workplace ecosystem may help to better explain the actual role of these factors.

2.2. Defining the Post-COVID-19 'Workplace'

As a result of the COVID-19 pandemic, there has been a shift towards more mobile-oriented forms of work supported by the newest technological advances. The acceleration of 'work (from) anywhere' was reported in 2020 by global real estate agencies worldwide and remote work is expected to continue in the future. These new considerations contribute to a different understanding of the 'workplace' and, therefore, growing demand for new definitions. The certification schemes for setting standards that have been traditionally used by the real estate sector (e.g., WELL; BREEAM; and LEED) are focused on the traditional office workplace environment. The acceleration of new workplace cultures within the wider urban environment, post-COVID-19, can help to redefine the 'workplace' and shift the metrics used to measure employee engagement alongside different workplace considerations. Consequently, there is a need for a new typology of space that is relevant to industry visions of future workplace scenarios, against the long tendency to link workplace design with employee performance within the traditional office (Brill, 1984, Sundstrom, 1986).

For example, a new approach for the workplace ecosystem already has been proposed by IPUT/ARUP. The global research report 'Making Place: The Recalibration of Work, Life, and Place' (2020) introduces 'workplacemaking', understood as a concept between traditional workplace design and public realm placemaking. According to this approach, digitalisation has blurred physical boundaries that have resulted in greater consideration of the quality of public and semi-public urban realm 'between the office and the home'. In this context, the meaning of 'working from the office and the home' is understood more broadly than the traditional considerations of office and home design. That is, there has been a shift of industry focus from the building to the neighbourhood/city-scale where it concerns 'workplacemaking', including third places open to the public (e.g., the coffee shop and the library).

A second report, 'The Future of Workplace: How will COVID-19 and data shape the new workplace ecosystem?' by Cushman & Wakefield (2020b), presents the concept of a 'total

workplace ecosystem'. Again, the 'workplace' is not defined as a single building or destination, but rather as a network of virtual and physical places, spread between digitally connected homes, offices, and third places (e.g., the café or library). The projected ecosystem aims to provide flexible and on-demand places to support convenience, functionality, and well-being. According to this approach, the workplace can be chosen by an individual employee based on current needs, preferences, workload, job character, etc. The concept is illustrated as a city-wide network of spaces, including (1) the home, (2) local community hubs, (3) on-demand event spaces, (4) third places, and (5) core office urban hubs.

A third example is the report 'Real Estate Strategy Asset: 8 Core Truths Guiding the Future of Work' released by CBRE (2021b). The authors propose the 'hybrid workforce network' model. The concept emphasises the fluidity in work styles (accelerated by the pandemic), which may potentially impact the future of work and associated corporate real estate strategies. According to this model, the future workplace will reflect the distributed workforce needs and therefore will be spread among a network of headquarters in urban-core locations and a network of other locations (satellite office networks, homes, project offices, meeting on-demand, flexible spaces, and gyms/cafés). The high-density urban-core locations will be used part-time to facilitate social interactions, and a network of other locations (e.g., satellite offices) will be used to conduct the work closer to home. The 'hybrid workforce network' model aims to decrease both commute times and feelings of isolation associated with remote work, allowing a fluid virtual workplace. Additionally, the proposed CBRE 'hybrid workforce network' model is focused on company-provided locations out of the urban core. This can potentially enhance the general quality of the urban realm, underpinned by the previously mentioned 'workplacemaking' debate by IPUT/ARUP.

The last insight on the future of the workplace has been provoked by Deloitte in the report 'Designing adaptive workplaces: How the public sector can capitalise on lessons learned from COVID-19' (2021). The authors proposed a model of 'adaptive workplaces' as a more fluid concept between onsite and telework, 'for a workforce that is able to work from anywhere but is *empowered* to work from where they're most productive' (p. 3). In practice, organisational leaders aim to engage employees in shaping their optimal work environments according to individual preferences. The 'adaptive workplaces' model is designed according to four core dimensions: places + spaces, productivity + performance, workforce experience, and well-being and connection. There is an emphasis on employee needs that lead to organisational outcomes. For example, the 'places + spaces' factor is dependent on individual employee engagement levels relative to different workplace settings, which has implications for 'productivity +

performance'. Hence, the workplace experience should embrace different workplace dimensions holistically—work, organisation, workforce, technology, and well-being across a variety of places.

Furthermore, recent surveys emphasise the willingness of employees to continue remote work after COVID-19 lockdowns are relaxed. These newly emerging global trends in remote work, supported by advances in ICT support, create a solid background for new debates on the future of work and the 'workplace' in a hypermobile society. These reports by prominent urban real estate and planning consultancies (e.g., IPUT/ARUP, Cushman & Wakefield, CBRE, and Deloitte) have begun to make significant inroads into a future of work that is distributed across different work environments in the home and the office and other 'hot-desking' or temporary office arrangements closer to home. All industry reports encourage us to think differently about the 'workplace', its physical dimensions, and its role in ensuring employee engagement, productivity, and well-being.

2.3. The New Workplace Ecosystem: Implications for Monitoring Employee Engagement Post-COVID-19

Academic definitions of employee engagement differ from those elaborated by industry organisations across the 'grey' literature (Schullery, 2013), resulting in numerous approaches to measuring engagement effectively. Nevertheless, one of the most cited academic definitions of employee engagement was proposed by Kahn (1990) as 'the harnessing of organisation members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances' (Kahn, 1990, p.694). Employee engagement also has been defined as 'a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication, and absorption' (Schaufeli et al., 2002, p.74), one step up from commitment (Robinson et al., 2004a), a passion for work (Truss et al., 2007, Brim, 2002b), or a 'positive work-related psychological state characterised by a genuine willingness to contribute to organisational success' (Albrecht, 2010a, p.5); a relationship with employee work, role and organisation, or 'a state of mental energy' that is 'associated with involvement, commitment, passion, focused effort and energy' (Schaufeli and Salanova, 2014b, p.295-299).

In the field of organisational psychology, there are numerous metrics focused on employee engagement that have some relevance to employee health and well-being. For example, the Utrecht Work Engagement Scale (UWES) uses 'vigour' as one out of three proposed subscales to measure engagement. As 'vigour' can be defined as either strength, energy or enthusiasm (CambridgeDictionary, 2021), it can be logically linked with employee mental and physical health conditions, which constitutes the efforts around healthy workplace design (both

sociologically and physically). Moreover, the UWES methodology is commonly used in various studies on the association between employee engagement and health outcomes (Veromaa et al., 2017). Additionally, linking employee engagement with human health at the workplace can 'empower the workforce and sustain their well-being', as highlighted in Deloitte's model (2021) in the context of 'adaptive workplaces' in a post-COVID-19 scenario. However, this approach demands further investigation of the relationship between the physical workplace environment and employee engagement and a closer look at the metrics subsequently developed by both academics and industry, particularly for workplaces that aim to promote health and well-being.

The more distributed workspaces and the acceleration of remote work patterns in a post-COVID-19 world are expected to have a greater impact on employee flexibility associated with employee engagement (Deloitte, 2021), which may differ across a variety of workplaces. Additionally, employees will have the privilege of choosing their preferred workplace within such an ecosystem based on, for example, individual-level engagement. Hence, there will be a greater role of employee decision-making in the shaping of 'adaptive workplaces'. As little is known about how different workplace settings in the 'total workplace ecosystem' impact employee engagement, further research is needed to address the whole spectrum of workplaces to thoroughly examine this issue.

Although there is no scientific evidence that a 'healthy' workplace design (e.g., WELL-certified office space) directly contributes to employee engagement, some studies report that both physical and mental health factors have a positive relationship with engagement (Veromaa et al., 2017, Eguchi et al., 2015) (it has to be noted that WELL includes policy, design and maintenance features, but this paper focuses on the design side). However, there are many overlapping factors influencing engagement; so, it is hard to pinpoint which factors influence engagement, as well as how to measure it (IWBI, 2021a). Is it the access to natural light or the ability to rest that influences the outcome? Or is it management? Or is it both? The evidence is still emerging and needs clarity on which factors influence what and the extent of their interaction.

Given the fact that employee engagement is driven by a variety of factors (e.g., social relationships at the workplace), enhanced employee mental and physical health conditions can potentially mitigate the negative impact of other factors determining engagement at the workplace. For example, employee engagement as a concept in literature is often referred to as both a healthy workplace (Day and Randell, 2014a) and employee health and well-being (Lovelace, 2009, Isaac and Ratzan, 2016). Hence, a 'healthy' workplace can be understood holistically as a 'healthy' social *and* physical environment. Nevertheless, there is now a greater

need to investigate the role of employee behaviours (e.g., health-oriented ones, see Jindo et al. (2020)), and the organisational practices of 'empowering workforce [employees] and sustaining their well-being' in a variety of 'adaptive workplaces' (Deloitte, 2021)—not to mention their contribution to engagement. The managerial aspect of these roles can be even more challenging considering the projected dominance of remote work patterns in the future.

To sum up, this section demonstrates that the construct of engagement has been strongly conceptualised on the organisational level (e.g., psychological states, job design, leadership, organisational and team factors, and organisational interventions) (Bailey et al., 2017). Although the qualities of the physical workplace environment and their potential impact on general employee performance have been widely studied in the built environment field, these investigations have been limited to the traditional office environment (Wyon, 2004b, Kwallek et al., 2007a, Chadburn et al., 2017a, Feige et al., 2013c, Clements-Croome, 2004, Vischer, 2007, Chan et al., 2007, Kegel, 2017). Given the above discussion of a new post-COVID-19 workplace ecosystem scenario, traditional office environment-based assumptions of employee engagement need to be reconsidered. For example, Kahn (1990) argued that 'personal engagement' with work is determined by experiences within the working environment. But how do employee experiences informing engagement differ across a variety of workplaces?

3. Methods

Our research adopted a qualitative mixed-methods approach that has been structured on a combination of critical reviews of the literature ('grey'/academic) and the content analysis of (1) workplace design and management monitoring tools, and (2) employee engagement metrics (Figure 2).
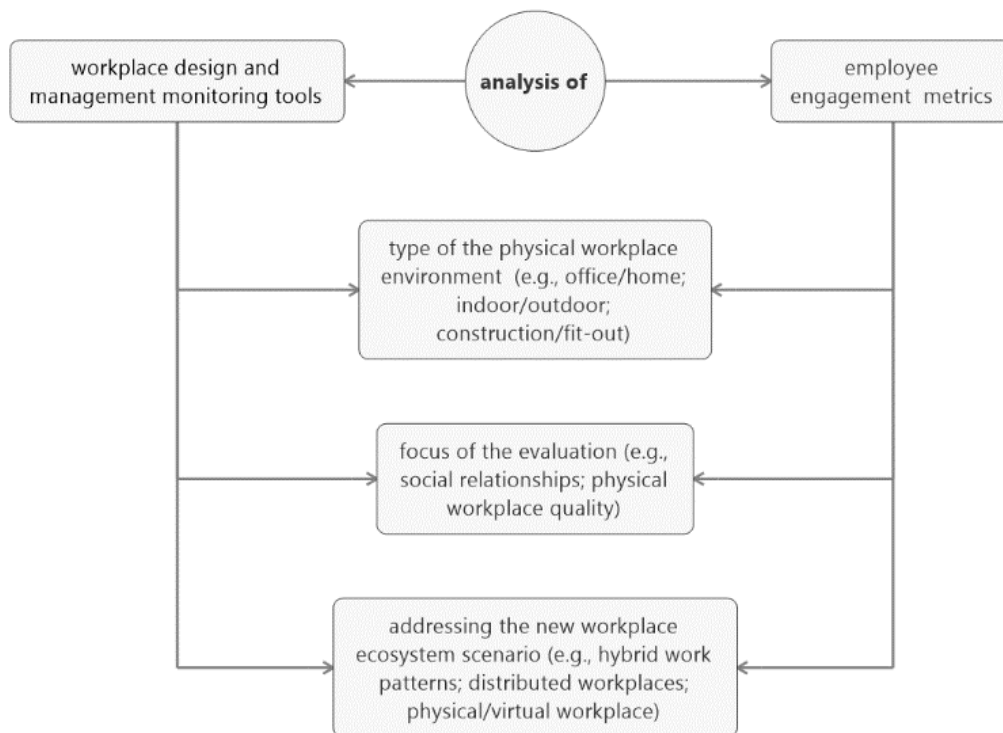
Figure 2. Analytical framework.

First, a critical in-depth review of key global industry reports (i.e., Cushman & Wakefield, CBRE, Deloitte, and IPUT/ARUP), exploring the organisational implications of the switch to a new workplace ecosystem scenario, was undertaken to understand how the physical workplace environment has been defined in a post-COVID-19 world. Next, a content analysis was conducted for a sample of workplace design and management monitoring tools. The content analysis sought to understand the importance of workplace factors that may impact employee engagement in a more distributed workplace ecosystem. The study investigated two types of workplace tools: focusing on office building certifications (i.e., WELL and BREEAM) and associated IT infrastructure (i.e., WiredScore), and post-occupancy workplace evaluation of 'employee experience' (i.e., Leesman) and well-being (i.e., Thrive Global) at the workplace. They have been primarily chosen due to their global popularity among organisations within and outside the real estate sector. Additionally, their practice reflects the latest academic and industry research and provides a broad overview of different key aspects of the contemporary workplace, including sustainability assessment methods and green building rating schemes for office building construction, retrofits and fit-outs (i.e., BREEAM), digital connectivity and smart technology certification systems (i.e., WiredScore), tools for advancing employee health and well-being in buildings (i.e., IWBI), behaviour change technology platforms (i.e., Thrive Global), and tools for measuring 'employee experience' at workplace (i.e., Leesman). Hence, we

evaluated a range of factors that may potentially contribute to better organisational outcomes (e.g., employee engagement). This information was primarily gathered through official company websites (e.g., industry reports). Next, we reflected on all these workplace tools to identify factors conducive to a successful workplace environment that may or may not be relevant in a post-COVID-19 scenario. It should be noted that certification standards like WELL (organisational AND building focused) or BREEAM (building focused) use metrics to measure the success/outcomes of the actions undertaken for the sake of the certification. However, WELL is not metrics *per se*; it has features which are evidenced-based that indicate the outcomes will support health/performance (exceptions are some performance-testing standards for indoor environmental quality) and asks projects to use metrics to evaluate these human outcomes (ideally with a third party survey provider for human outcomes, performance-testing agents for environmental outcomes).

Second, a literature review of key academic papers in the field of organisational psychology was undertaken to better understand the practice of evaluating employee engagement by organisations worldwide (Schaufeli and Bakker, 2003, Shirom, 2003, May et al., 2004, Harter et al., 2002, Robinson et al., 2004a, Saks, 2006a). A content analysis of employee engagement questionnaires was conducted to determine the extent or range of workplace factors presented. The analysed employee engagement metrics have been classified by us as 'academic' because they were primarily developed by organisational psychology researchers. However, it must be noted that some of these metrics have been successfully commercialised (e.g., Gallup). Lastly, a matrix of employee engagement metrics and workplace design and management monitoring tools was developed. This was followed by an investigation of the similarities and differences between them, the extent to which they refer to a more distributed workplace ecosystem, and their potential utility in evaluating a variety of workplaces.

4. Results

4.1. The New Workplace Ecosystem: Typology of Space

Figure 3 presents an elaborated typology of space for the new workplace ecosystem in the context of global industry concepts and industry metrics available on the market. Considering global projections of 'work [from] anywhere' (i.e., IPUT/ARUP, Cushman and Wakefield, CBRE, and Deloitte), it can be observed that understandings of workplace environments vary across the industry. For example, recent 'post-COVID-19 workplace ecosystem' definitions, emphasise the importance of the wider urban environment and a mix of spaces (i.e., urban realm, third places, and home), which is not fully addressed by workplace design and management monitoring tools evaluated in this paper. Still, there is a strong focus on the traditional office

building as the dominant physical space where work occurs. Although the internal office environment remains a core focus of all workplace tools, some of them (e.g., WELL and BREEAM) recognise outdoor environmental quality albeit limited to nearby office surroundings (the crossovers between LEED and BREEAM environmental certifications and the WELL Community Standard were not included in this study). Also, some industry leaders (e.g., Leesman)—in the pandemic context—have recently gained interest in the home environment and its evaluation. And while Thrive Global does not aim to evaluate workplace design and management, its tool could potentially be adapted to monitoring employee health and well-being in the office, third places, and at home.
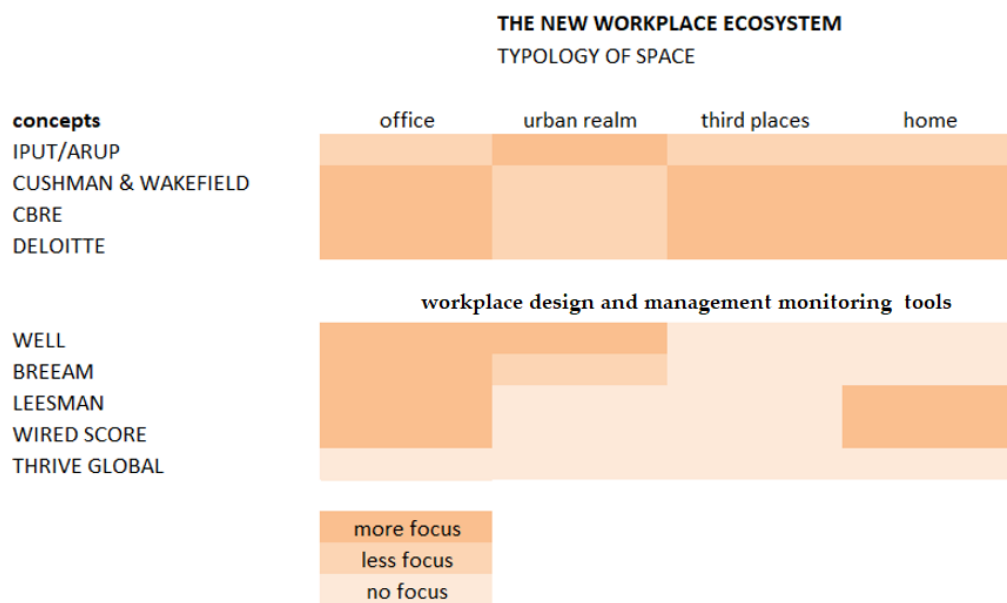
Figure 3. A typology of space considered by the industry for the new workplace ecosystem.

Still, the factors assessing physical home environments may need further investigation as they are often limited to standard office workplace designs (e.g., availability of desks, chair, etc.). Additionally, the recent shift to remote work highlights the importance of virtual workplace quality and related digital infrastructure (i.e., WiredScore) for both office and home environments. That is, this trend can potentially enhance and support remote work tendencies within the wider urban realm (e.g., third places), requiring the adaptation of new digital tools like those offered by Thrive Global to measure organisational factors (e.g., employee engagement metrics) for different places of work.

4.2. Workplace Tools

Our content analysis of workplace design and management monitoring tools has demonstrated that the most developed and comprehensive standards for the traditional office workplace are currently represented in the WELL certification by IWBI. While some of its factors of assessment (e.g., water, materials) overlap with BREEAM standards by BRE, there is a slightly different focus to these two certification schemes. For example, the BREEAM assessment emphasises the positive relationship of physical workplaces to their external environments (i.e., green buildings), whereas WELL gives priority to employees' health and well-being.

Generally, such workplace tools are aligned with sustainability requirements for green buildings, which is favoured by organisations like the World Green Building Council. However, sustainability requirements have started to add health-focused distinctions. This can be observed on several levels: physical workplace quality (i.e., air, water, materials, light, thermal comfort, and sound), healthy behaviours among employees (i.e., nourishment, movement, and mind), and organisational health policy (i.e., community or social interaction). In WELL, the risk reduction model for the sick building syndrome has been expanded to also include health and well-being promotion approaches (IWBI, 2021a). Hence, the approach proposed by both WELL and BREEAM emphasises the greater need for a more holistic workplace design (e.g., considering indoor and outdoor environment quality *and* employee health and well-being). Considering recent industry projections of a post-COVID-19 shift to work in an extended workplace ecosystem, there is consequently a growing need to holistically embrace both internal and external urban qualities across this new typology of interconnected workplaces.

As argued by real estate advisors, prevailing workplace trends will be driven by a variety of factors such as existing housing quality and space, cultural differences, laws, and regulations. Nevertheless, the workplace flexibility associated with working from home has been highlighted as key to promoting a healthy work environment, which may also positively impact employee engagement (AON, 2020).

In conclusion, the influencing factors underpinning health and well-being (e.g., WELL) and sustainability (e.g., BREEAM) in the workplace may need further exploration within the wider city context of a post-COVID-19 workplace ecosystem. For example, the relationship 'employee–to–workplace' outlined in real estate industry trends requires additional investigation (e.g., indoor environmental quality) as it may constitute a missing component of employee engagement metrics. Moreover, there is now a greater need to develop 'home–to–outdoor environment' metrics (e.g., Leesman), as well as a need to identify the associated factors determining employee engagement in such contexts. For example, the research conducted by

Carmona et al. (2020) already highlights the importance of both internal and external environmental conditions for the home workplace environment. However, in the case of the Leesman Index, the environmental assessment is focused on indoor evaluation (Leesman, 2021). Although it is detailed and wide in scope, there is a greater need for consideration of the interplay of external environmental parameters at the city scale (e.g., access to green space, mixed-use development, less-trafficked streets to enable walking and cycling, and connected neighbourhoods).

4.3. Employee Engagement Metrics

Our content analysis of employee engagement metrics demonstrates a strong focus on evaluating employee attitudes, feelings and behaviour toward work performed. Some of these metrics look at employee relationships with co-workers/customers (Shirom, 2003), their line manager (Harter et al., 2002), and the organisation (Robinson et al., 2004a, Saks, 2006a). Therefore, priority is often given to the evaluation of social relationships that impact employee engagement in the workplace. The next section will present the identified differences and alignments between the abovementioned workplace tools and employee engagement metrics.

4.4. Matrix of Metrics/Tools: Differences/Alignments

The comparative analysis of both academic employee engagement metrics and workplace design and management monitoring tools is a necessary step if we are to better understand the different levels of relationships measured and evaluated by them. Figure 4 illustrates a matrix of metrics/tools. Our analysis suggests organisational psychology approaches to employee engagement are predominantly focused on the relationship between employees and work (5). However, it is not clear how the physical workplace contributes to engagement. That is, there is a broad spectrum of social relationships (2–4) in the workplace, which informs employee engagement (relationship with co-workers, customers, and supervisors), not to mention wider considerations such as organisational culture (1). For example, we find that employee engagement metrics and workplace tools emphasise different factors in their assessment of employee–to–work relationships (Figure 4).
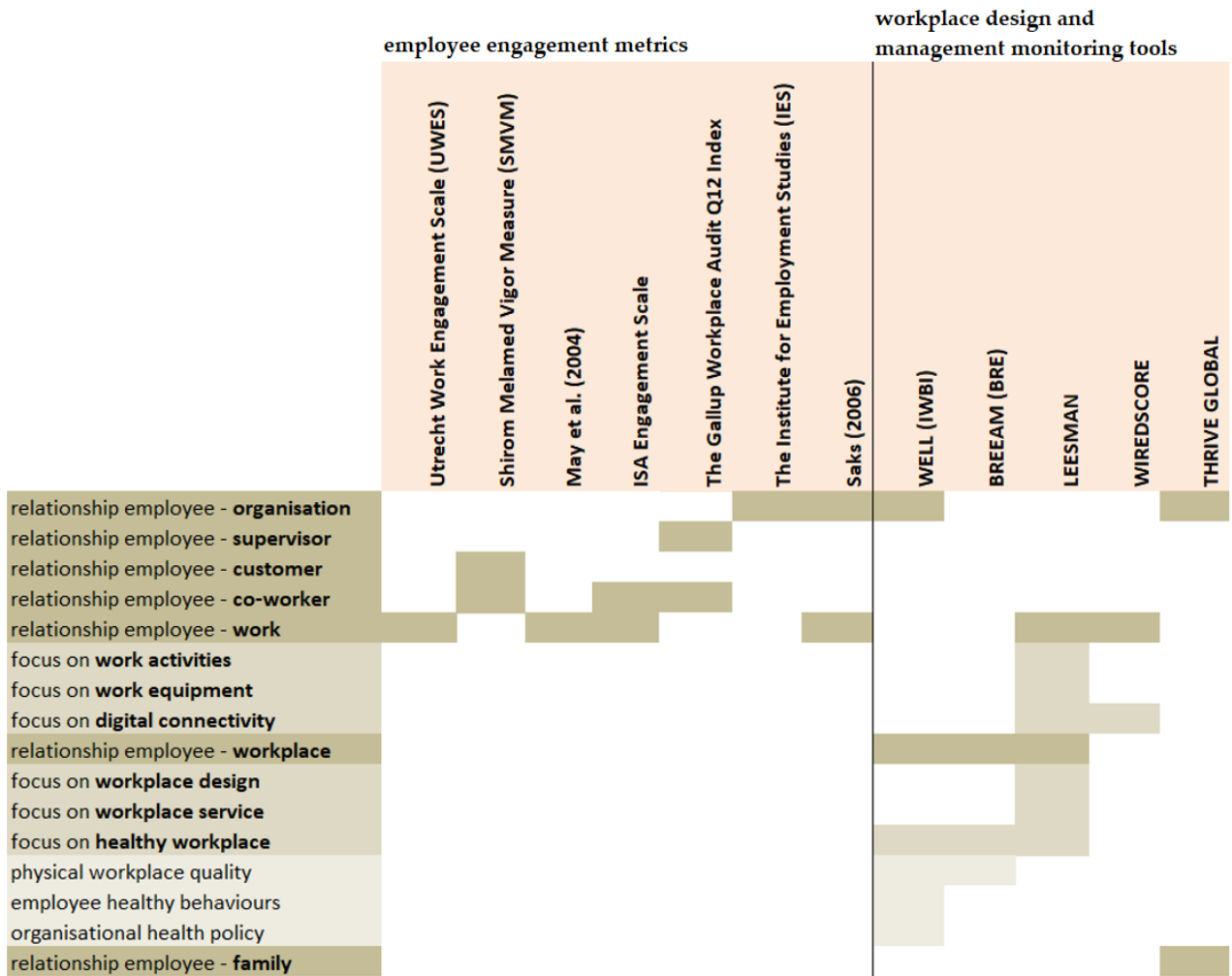
Figure 4. Different-level employee relationships evaluated in employee engagement metrics and workplace tools.

As such, the alignment between employee engagement metrics and workplace tools is weak. This primarily reflects the substantial lack of academic research on this relationship. However, Figure 4 demonstrates that workplace tools are advanced and expand from the physical (e.g., work equipment, digital connectivity, and workplace design) to the more human-oriented dimensions of workplace evaluations (e.g., employee health and well-being, family relationships, and organisational policy). It can be observed that employee engagement metrics developed in the field of organisational psychology are strongly dominated by human relationship assessments, leaving the physical characteristics of workplace environments left out of consideration.

Nevertheless, the growing popularity of prime office certification schemes (e.g., WELL, BREEAM) and 'employee experience' tools (e.g., Leesman) suggest there is an appetite for a more integrated assessment of physical workplace environments (indoor and outdoor), as well as organisational engagement (Kegel, 2017). These more holistic approaches to assessment

would need to encompass both physical and social factors. The challenge is understanding how 'employee experience' across the physical workplace ecosystem can be translated into engagement metrics.

4.5. Matrix of Metrics/Tools: The New Workplace Ecosystem Scenario

Based on our analysis, industry considerations of a variety of workplaces within a workplace ecosystem scenario must consider an expanded set of metrics/tools. Figure 5 illustrates how existing employee engagement metrics and workplace design and management monitoring tools are aligned with a post-COVID-19 workplace ecosystem scenario. It can be observed that employee engagement metrics were designed for a traditional office environment while workplace tools already have expanded to post-COVID-19 home office evaluations. Still, the third places sector remains left out of certification schemes. Despite industry evaluations of the neighbourhood level, a wider scale of assessment that factors in 'flexible workplace' arrangements is still needed. For example, this may require the expansion of existing metrics to encompass satellite offices at the city scale, including access to infrastructure that is underpinned by a high-quality urban realm (i.e., 'workplacemaking') (IPUT & ARUP, 2020).

ENGAGEMENT METRICS - ORGANISATIONAL PSYCHOLOGY | **INDUSTRY METRICS - WORKPLACE INDICATORS**

Columns (left to right):
- Utrecht Work Engagement Scale (UWES)
- Shirom Melamed Vigor Measure (SMVM)
- May et al. (2004)
- ISA Engagement Scale
- The Gallup Workplace Audit Q12 Index
- The Institute for Employment Studies (IES)
- Saks (2006)
- WELL (IWBI)
- BREEAM (BRE)
- LEESMAN
- WIREDSCORE
- THRIVE GLOBAL

NEW WORKPLACE ECOSYSTEM

1. office level
1.1. traditional office
1.2. home office
1.3. third places
2. building level
2.1. core office
2.2. satellite office
2.3. home
2.4. third places
3. neighbourhood level
3.1. business district - core office
3.2. business districs - satellite office
3.3. residential
4. city level
4.1. access to infrastructure
4.2. quality of 'workplacemaking'

Figure 5. Matrix of metrics considering the new workplace ecosystem scenario.

However, all of this requires substantial changes in the way we define 'employee engagement' and 'workplace'. First, employee engagement metrics would need to factor in a variety of workplaces (including virtual workplaces) and the substantial changes to levels of social interaction and related managerial practices associated with this consideration. Given the projected shift toward hybrid work patterns, the definition of employee engagement may need to be reconceptualised to adequately capture a new dynamism of work in different work settings. Secondly, the physical workplace transition may require new tools or the modification of existing ones to evaluate a whole spectrum of workplaces (e.g., home, core office, and satellite office) within a wider urban setting.

5. Discussion

Given the growing interests of both the global real estate industry (e.g., IWBI, BRE, Cushman and Wakefield, Leesman, etc.) and business consultants in workplace design,

evaluation, and management for improved organisational outcomes (e.g., productivity, performance, etc.), our study has explored the extent to which employee engagement metrics correspond with workplace design and management monitoring tools. It has sought to better understand the potential gaps and alignments between the two. The discussion below draws on the insights of both academic and industry research, aiming to provide new perspectives on employee engagement metrics and workplace tools in a post-COVID-19 world.

The above review of organisational psychology approaches to employee engagement has highlighted the importance of social factors for better engagement in the workplace. Though, the physical workplace is not seen as a variable environment but rather treated as a constant. This is consistent with academic studies in fields such as environmental psychology, which are limited regarding the actual role of the physical environment in employee engagement (Kegel, 2017). On the one hand, this contrasts with the large body of research emphasising the importance of the physical environment in determining organisational outcomes (e.g., productivity, performance, etc.). On the other hand, this is aligned with the disconnect between employee engagement metrics and workplace design and management monitoring tools.

We have pointed out the strong focus of employee engagement metrics and workplace tools on the traditional (office) workplace environment as the dominant place of work. However, the current organisational shift (caused by the COVID-19 pandemic) toward more hybrid-oriented ways of working has forced a reconsideration of the workplace. This shift is most currently reflected in industry evaluations of the home office environment. Yet, our analysis of workplace tools confirms there are substantial limitations with their ability to comprehensively address industry-projected post-COVID-19 workplace ecosystem scenarios.

Also, we have found that workplace tools are predominantly focused on indoor characteristics without equivalent attention to outdoor urban environmental factors. This contrasts, for example, with recent research that emphasises the importance of both indoor and outdoor environmental factors for home offices (Carmona et al., 2020). Despite the advanced level of certification schemes, including issues such as employee health and well-being (e.g., WELL), green building design (e.g., BREEAM), and digital connectivity (e.g., WiredScore), industry certification schemes still lack a city-wide scale of assessment.

Given that future post-COVID-19 workplace scenarios must be understood in a much wider built environment context, this demands greater concern around supporting city infrastructure. This may require continuing with efforts aimed at mitigating urban sprawl and rising prices in the suburbs (Ramani and Bloom, 2021). Hence, to ensure sustainable property markets, it seems relevant to consider a greater distribution of mixed business and residential districts or nodes

across a city-region, underpinned by active transportation infrastructure (e.g., pedestrian routes, bicycle paths, etc.).

However, more research is needed to determine the extent to which different types of physical spaces impact employee engagement and what these flexible work arrangements mean for the sustainability of property markets. Moreover, considering how social relationships have dramatically changed during the COVID-19 pandemic (e.g., virtual workplace), there is a need to closely examine human–space interactions. Hence, addressing these physical and social factors will be essential considering a wider adoption of remote work patterns in the future workplace and its future impact on property markets.

6. Conclusions

In this paper, we have explored the possible impact of the built environment on employee engagement in a post-COVID-19 world in which changes to the way we work have been triggered or reinforced. That is, the necessity of remote work has accelerated a global debate on the possibilities of adopting home, office, and remote work patterns for the future. The discussion has been widely supported by a growing number of industry reports projecting visions of a 'total workplace ecosystem' (Cushman & Wakefield, 2020b) underpinned by high-quality 'workplacemaking' (IPUT & ARUP, 2020) practices that ensure 'adaptive workplaces' (Deloitte, 2021) for a 'hybrid workforce network' (CBRE, 2021b). Hence, we have adopted a 'post-COVID-19 workplace ecosystem' definition to capture this emergent understanding of a physical workplace that embraces both virtual and physical realities across a variety of workplaces.

However, we conclude that existing academic research on the link between the built environment and employee engagement is limited. Yet, considering how early approaches to employee engagement were primarily based on traditional workplace environments, future considerations of different workplace types and their distribution at the city scale, alongside the growing flexibilisation and digitalisation of work, may shed new light on our understanding of employee engagement.

Our analysis of existing employee engagement metrics and workplace design and management monitoring tools demonstrates some divergence between them. On the one hand, traditional academic employee engagement metrics do not recognise the potential impact of indoor environmental quality as they are solely focused on the analysis of social relationships at work. But these have been dramatically changed by the acceleration of remote/hybrid work patterns due to the COVID-19 pandemic, as mentioned before. On the other hand, a growing amount of industry research on 'employee experience' in the physical workplace environment

encourages organisations to use indoor environmental quality as a proxy for organisational benefits (e.g., better employee engagement). Hence, industry approaches to workplace tools may potentially inform the academic understanding of employee engagement and its metrics, but further research is needed to fully clarify the linkages between the two. For example, high-performing buildings are showing promise of better health and employee engagement and performance outcomes, but the exact relationship between the physical versus the social factors is still unclear. Additionally, in light of the total workplace ecosystem post-COVID-19, it may be relevant to consider the 'bigger picture' and to expand existing employee engagement metrics and workplace tools to the city scale (e.g., wide access to Wi-Fi in third places, development of healthy communities, access to green space for cognitive refreshment, satellite offices located nearby residential districts, and sustainable transportation). The above adaptations to the future workplace will certainly contribute to more sustainable property markets.

Lastly, we have been able to illustrate that existing approaches to both employee engagement metrics and workplace tools are still far from considering this emerging workplace ecosystem despite some recent adaptations (e.g., the home environment assessment). We recognise this is a challenging task. Our research demonstrates that this is a complex subject with many variables. Future considerations of workplace ecosystems will inevitably require substantial changes in the way we think about the relationship of 'employee engagement' to the 'workplace'. This paper has aimed to catalyse this transition.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data was created or analysed in this study. Data sharing does not apply to this article.

Conflicts of Interest: The authors declare no conflict of interest.

CHAPTER 5: The 'Engaging' Workplace Ecosystem: An Interplay of Environmental Factors and Health-Related Behaviours for Employee Engagement in Hybrid Work Practices

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ABSTRACT

According to recent studies, only 21% of the workforce globally is actively engaged (Gallup, 2022a), feeding concerns over the need for increased staff health, well-being and productivity. Given most of the research on employee engagement (e.g., organisational behaviour and environmental psychology) is focused on traditional office environments, this interdisciplinary study examined if environmental satisfaction (i.e., comfort) in a workplace ecosystem is associated with employee engagement (i.e., vigour, dedication, and absorption) and replenished energy during work breaks in a sample of 169 knowledge employees working in a hybrid mode in real estate sector in Greater London Area and its surrounding. Results of correlation and regression analyses show that environmental (workplace) satisfaction has a positive effect on all facets of employee engagement in the workplace ecosystem, additionally contributing to replenished energy during work breaks. Also, our results demonstrate that work breaks taken in the home workplace are more conducive to employee engagement. These findings help to deepen the understanding of environmental quality in a larger urban context (i.e., business districts and residential areas) for employee engagement in the workplace ecosystem. Our research suggests that the positive effect of work breaks on employee engagement can be enforced by the environmental quality of the workplace ecosystem.

KEYWORDS

COVID-19; employee engagement; environmental satisfaction; environmental quality; hybrid work practices; knowledge-intensive work; physical workplace environment; replenished energy; work breaks; workplace behavioural health; workplace ecosystem

1. Introduction

Knowledge-intensive work is an essential context for exploring the drivers of productivity and economic growth (OECD, 1996). Knowledge-intensive services already constituted 61.20% of all service exports in 2012 (European Commission, 2014), making knowledge-intensive work essential in the drive to achieve key aspects of the 'UK Industrial Strategy' (HM Government, 2017). Knowledge-intensive organisations (KIOs) are organisations whose main activity is based on the employment of knowledge (Alvesson, 2004), for example, IT firms, finance organisations, and management consultancies. Therefore, creating healthy workplaces with engaged and productive employees within KIOs is paramount in achieving this aim. However, according to recent studies, only 21% of the workforce globally is actively engaged (Gallup, 2022a).

The COVID-19 pandemic has dramatically accelerated the way knowledge work is performed (e.g., hybrid work patterns and flexible working), which were quickly and widely adopted by global businesses worldwide (Gillen et al., 2021, Deloitte, 2021, Teevan et al., 2021). It can be observed that most employees today, who work in the knowledge economy sectors, split their working environments between different physical workplaces. Hence, the above workplace environment is understood in a much broader context as "a post-COVID-19 workplace ecosystem—a network of physical and virtual places where work occurs, including office, home, third places, and surrounding urban realm" (Surma et al., 2021, p.4). Given that employee engagement is defined as "a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption" (Schaufeli et al., 2002, p.74), there is not clear how these parameters are impacted by employee experience of a workplace ecosystem in hybrid work practices, understood as interconnected places where knowledge work is conducted permanently (e.g., two days per week at home and three days per week in the office). Therefore, we argue that this type of workplace environment has its unique impact on employee engagement, different to traditional patterns of full-time work conducted in a single workplace environment (i.e., either home or office). Hence, it requires more attention in light of the growing popularity of hybrid work patterns among knowledge-intensive organisations.

Although telework - now often referred to as 'work-from-home' (WFH) - can be challenging (Al-Habaibeh et al., 2021), some studies demonstrate that it also can be effective (Hickman and Robison, 2020), comfortable (Carmona et al., 2020), satisfactory (Yang et al., 2021), and can lead to improved productivity and well-being (Russo et al., 2021), with a positive effect on employee engagement (Appel-Meulenbroek et al., 2020). In contrast, other studies have found that telework is negatively related to employee engagement (Sardeshmukh et al., 2012). However,

this research was not taken in the context of a hybrid work practices adopted by most of the global knowledge organisations nowadays (Future Forum Pulse, 2022). Despite growing academic interest in remote work due to the pandemic (Angelucci et al., 2020, Gallacher and Hossain, 2020, Pass and Ridgway, 2022), a more distributed workplace scenario referred to workplace ecosystem poses new challenges to our understanding of how the physical space of different types in the wider urban realm may influence employee engagement. Therefore, we would argue that more in-depth explorations around a variety of interconnected workplaces in the wider urban realm can help us to better understand how employee engagement is influenced and experienced in light of a post-COVID-19 workplace ecosystem (Surma et al., 2021).

Given that existing academic knowledge lacks sufficient understanding of the phenomenon of employee engagement in the context of a workplace ecosystem, we aim to address this by examining the particular interplay between environmental factors and health-related behaviours (i.e., work breaks). For example, we know that there is a positive effect of replenishing work breaks for employee engagement (Bosch et al., 2018, Sonnentag, 2003a), but we do not know if employee experience of environmental quality plays a role in that context. Thus, this study measures the effect of environmental satisfaction (i.e., comfort) on both replenished energy during a work break and employee engagement components (i.e., vigour, dedication, and absorption). Additionally, in contrast to another study (Feige et al., 2013c) we measure the effect of environmental satisfaction in a workplace ecosystem on all facets of employee engagement. Therefore, this study will advance our understanding of a workplace ecosystem and its impact on employee engagement through the interplay of environmental factors and health-related behaviours. This study is timely due to the organisational interest in hybrid work patterns, which has been accelerated by the COVID-19 pandemic (Ro, 2020) and underpinned by discussions on the future of the workplace (Nixey, 2020). Furthermore, it contributes to the emerging evidence of the impact of physical workplaces on organisational outcomes (Kegel, 2017), and calls for further research on the subjective alignment between workplace environments and optimal employee support (Appel-Meulenbroek and Danivska, 2021). As such, it is important to investigate the extent to which environmental factors and health-related behaviours impact employee engagement in a workplace ecosystem. We do so by first reviewing relevant literature on the relationship between the physical workplace environment and employee engagement, then discussing health-related behaviours conducive to employee engagement. We then combine these lines of research to inform our study design.

The research results are subsequently summarized, before discussing their relevance relative to existing research and suggesting directions for further research.

1.1. Environmental (workplace) satisfaction and organisational outcomes

The research on the physical workplace environment and its potential impact on a variety of organisational outcomes (e.g., productivity and performance) (Wyon, 2004b, Clements-Croome, 2004, Kwallek et al., 2007a, Vischer, 2007, Chan et al., 2007, Chadburn et al., 2017a) has emerged in scientific literature as a result of cross-sectional studies. Such studies are represented by several disciplines, for example, organisational psychology, business management, real estate, and environmental psychology. On the one hand, it can be observed that organisational psychology research on employee engagement is rooted in the explorations of the social environment at work (Bakker et al., 2014, Rana et al., 2014, Kumar and Sia, 2012, Osborne and Hammoud, 2017). On the other hand, there are many studies (e.g., environmental psychology) (Kegel, 2017) finding positive outcomes between physical space quality and organisational outcomes (e.g., productivity and performance) which may shed new light on the concept of employee engagement.

For example, some studies have found that indoor air quality affects cognitive skills (Allen et al., 2016, Satish et al., 2012, Zhang et al., 2015) and overall health outcomes (Seppänen and Fisk, 2006). Other studies have emphasised the role of temperature (Rupp et al., 2015) and lighting (Boyce et al., 2006, Jamrozik et al., 2019) for employee energetic resources, job satisfaction (Leather et al., 1998), and cognitive performance (Zhu et al., 2019). And some authors have elucidated the role of plants in the self-reported perception of performance (Larsen et al., 1998). Therefore, the key research finding is that the (office) indoor environmental quality (IEQ) has relevance for organisational outcomes with direct effects on employees (e.g., health and well-being). Although recently growing, the research on the positive effect of environmental conditions of home offices on organisational outcomes is still in its infancy (Yang et al., 2021).

In light of the above, we argue that the specific relationship between the physical workplace environment and employee engagement remains under-researched and insufficiently understood (Kegel, 2017). Nevertheless, a limited number of studies examined the environmental impact on employee engagement, but with a strong focus on the traditional office environment (Feige et al., 2013c, McCunn and Gifford, 2012, Appel-Meulenbroek et al., 2020, Roskams and Haynes, 2021, Carter et al., 2020). However, the mentioned studies had contradictory results, used different measures to evaluate employee engagement, and referred to the different conceptualisations of employee engagement.

1.2. Health-related behaviours and employee engagement

Academic research suggests some linkages between health-related behaviours and employee engagement. For example, evidence demonstrates that employees who take work breaks are more engaged at work (Bosch et al., 2018, Kühnel et al., 2017, Sonnentag et al., 2012). However, it is not clear if environmental satisfaction plays a role in that context. The situation has become even more complex due to a variety of environments in a post-COVID-19 workplace ecosystem (Leesman, 2020b). Additionally, the behavioural aspects linked to these distributed environments have yet to be explored. Several studies have focused on healthy employee lifestyles (e.g., workplace exercise and sit-stand workstations) that inform better employee engagement (Jindo et al., 2020, Munir et al., 2015, Nishi et al., 2016, Seymour and Dupré, 2008, ten Brummelhuis and Bakker, 2012). Others have found that employee engagement itself has an impact on employee health outcomes (Eguchi et al., 2015, Seppälä et al., 2012, Veromaa et al., 2017). Therefore, we argue that the physical workplace environment supporting health-related behaviours may contribute to 'full engagement' - a more 'human-oriented' holistic sense of thriving and well-being in the workplace (Robertson and Cooper, 2010) and 'human flourishing' (Roskams et al., 2021, Clements-Croome, 2021).

Several studies (e.g., environmental psychology and urban health) have found a relationship between the built and natural environment and human health and well-being (Loder, 2020, Altomonte et al., 2020, IWBI, 2021a, Hartig et al., 2014, Ostner, 2021), which also has been observed among knowledge workers taking work breaks in green spaces (Colley et al., 2017) or having a view of natural elements (Leather et al., 1998). However, this research has provided some contradictory results. For example, some studies show that using an electronic device in green settings substantially counteracts the attention enhancement benefits of green spaces (Jiang et al., 2019). There is also evidence that even the different types and quality of the natural environment has implications for restorative experiences (Wyles et al., 2019). Additionally, recent research also highlights the potential impact of exogenous factors (e.g., external environment) on employee engagement which may help to understand and explain this phenomenon better (IWBI, 2021a). Overall, the interactive effects of the physical workplace environments and health-related employee behaviours on employee engagement have remained largely unexplored in the context of hybrid work arrangements (Turits, 2022). Thus, we assume that consideration of self-reported environmental satisfaction in a behavioural investigation casts employee engagement research into a new context. However, we do not know if different physical workplace conditions of a workplace ecosystem are supportive for health-related behaviours, and subsequently to employee engagement.

1.3. The interplay of environmental and health-related factors for employee engagement

Despite several decades of research on how to create and sustain employee engagement in the areas of organisational psychology and organisational behaviour, significant but limited portions of the variance in employee engagement can be predicted through antecedents such as leadership behaviour and workplace well-being (Anitha, 2014b). In terms of creating healthy workplaces, disciplines related to the built environment (e.g., architecture and workplace design) have created robust evidence on how to design and support work environments that facilitate employee well-being and productivity (Kegel, 2017). Some studies demonstrated linkages between the physical workplace and employee engagement via individual preferences (Feige et al., 2013c, Augustin, 2020, Newsham et al., 2014, Veitch et al., 2013), flexible work arrangements (Duque et al., 2020, Gerards et al., 2018), or employee health and well-being conditions (Augustin, 2020). One could therefore argue that a significant part of employee engagement is also driven by aspects of the work environment such as office design and work environment quality (e.g., air quality, thermo-comfort, and lighting), which not only create a sense of well-being but indeed might energise cognition, emotion, and behaviour towards common goal attainment and the ability to be engaged (Schaufeli and Bakker, 2003) and productive. These are likely to result from an interplay between different physical work environments and individual levels of satisfaction with the extent to which these workplace arrangements encourage engagement and productive work experiences.

Based on the above literature review, we put forth the following hypothesis:

The interplay of environmental (workplace) satisfaction and health-related behaviour (i.e., work breaks) is positively linked to employee engagement in the workplace ecosystem.

2. Methods

2.1. Sample and procedures

The study participants were recruited from two large knowledge-intensive global organizations from the real estate sector based in Central London (UK) by approaching them via email and using personal contacts. As an incentive for participation, we provided an information leaflet with information about the project. Additionally, each participating organisation received a summary of the findings. The study included a survey carried out through the Qualtrics platform,

and it had to be completed over two consecutive workweeks (a reminder was sent after the 1st week of running the survey). The survey was implemented online with a link sent to participants by organisational email via respective HR departments. A total of 169 persons completed the survey (33.5% response rate). Participants were 61% male, 38% female, and 1% others (or preferred not to say). Participants had an average of 10.37 years of work experience in their organisations. Participants were full-time (95%) and part-time (5%) employed. The sample was heterogeneous consisting of various organisational levels, such as individual contributors, people leaders / area leaders, leaders of managers, business leaders, partners, and consultants. Consent was obtained from all participants. All participants participated voluntarily and did not receive any reward. The study was approved by the relevant ethics committee. The study was conducted remotely from February to March 2022. All participating employees worked in a hybrid mode (i.e., conducted their work in both the home and the office during a working week) during our data collection process. All employees' responses were relevant for the period of six months before the start of the data collection process (i.e., August 2021 – March 2022). Therefore, all responses reflected employee experience with hybrid work during the pandemic.

This study adopted a quantitative approach as this method allowed us to evaluate the relationship between organisational outcomes and the physical workplace environment. In our research, we applied multiple regression to investigate the impact of the chosen predictors on all employee engagement components (i.e., vigour, dedication, and absorption) separately and by using the validated employee engagement scale (i.e., UWES). The proposed approach helped us to better understand any possible nuances and variations in employee engagement components in a workplace ecosystem. Additionally, we asked employees to complete the UWES twice (i.e., during work at home and in the office) as we aimed to holistically reflect on a workplace ecosystem which in our case consisted of both the home and the office environments during a working week. To our knowledge, the UWES has not been adopted twice in one single study yet.

The physical office workplace environment in this study included three office buildings based in Central London (two out of three buildings were in the City of London) - all located in a dense urban environment of similar external quality with equal access to outdoor urban amenities (e.g., shops, restaurants, and cafés) and a well-developed transportation network.. One of three buildings was fully refurbished, sustainable Grade A, and set to achieve relevant quality certifications (e.g., BREEAM and WELL). Two other buildings were not certified by any global

certification schemes' providers. All the office buildings were designed as open-plan offices and were used by employees in such a way pre-pandemic and during the COVID-19 pandemic. Additionally, the physical workplace ecosystem associated with these three offices consisted of a variety of home workplaces (i.e., apartments, terraced houses, semi-detached houses, and detached houses). The study was conducted remotely from February to March 2022. All participating employees worked in a hybrid mode (i.e., conducted their work in both the home and the office during a working week) during our data collection process. All employees' responses were relevant for the period of six months before the start of the data collection process (i.e., August 2021 – March 2022). Therefore, all responses reflected employee experience with hybrid work during the pandemic.

Studies 2 was specifically designed for the Greater London Area and its surrounding. This study area was chosen due to its importance for global knowledge-intensive businesses, as well as its prominent role in the global office real estate market. The study are is a 'home' for the majority of global knowledge-intensive organisations who adopted hybrid work practices as the result of the COVID-19 pandemic. Additionally, the study area has a well-developed transportation network allowing knowledge employees to conduct hybrid work in multiply locations during a working week (e.g., two days at home and three days in the office). Moreover, the study area provided the right context for exploring it as a 'workplace ecosystem', including well-developed core business hubs (e.g., different types of office workplaces in Central London) with associated amenities (e.g., restaurants, shops, parks, and banks), and a variety of residential developments (e.g., terraced houses, semi-detached houses, detached houses, and apartments). Therefore, the study area itself allowed studying environmental satisfaction in the workplace ecosystem as a whole, considering infrastructural diversification (e.g., access to places conducive to replenishing work breaks). Hence, the chosen study area provided a liveable and enriched environment to investigate employee engagement in the context of the network of diversified physical workplaces. After the initial consultation conducted with the global real estate consultants, it was decided that the Greater London Area and its surrounding would work best as a single case study as it cannot be compared with any other cities in the UK context.

2.2. Measures

In this study, two variables (i.e., 'environmental satisfaction' and 'replenished energy' were measured with one item. The latest research demonstrated that single-item measures showed good psychometric properties, supporting their use (Matthews et al., 2022, Allen et al., 2022).

Employee engagement in the workplace ecosystem was measured twice with the 9-item Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2006), i.e., vigour, dedication, and absorption. All items were rated on a 7-point Likert scale, 1 = never to 7 = always. A sample item is "At my work, I feel bursting with energy." Cronbach's alpha is ≥ 0.70 ($\alpha = 0.87$ home and $\alpha = 0.85$ office), which means that the reliability of the measures was confirmed.

Environmental (workplace) satisfaction in the workplace ecosystem was measured twice with the self-developed 1-item 'I am satisfied with my working set up' rated on a 7-point Likert scale, 1 = strongly disagree to 7 = strongly agree.

Replenished energy during a work break in the workplace ecosystem was measured twice with the self-developed 1-item 'My workplace environment helps me to replenish my energy when I take a work break' rated on a 7-point Likert scale, 1 = strongly disagree to 7 = strongly agree.

2.3. Data processing and analysis

In this study, quantitative analyses were applied by using the SPSS and Amos 27. To examine the relationships between employee engagement, environmental (workplace) satisfaction, and replenished energy during work breaks in the workplace ecosystem, two sets of analyses were computed. First, bivariate correlations between the variables were computed. Second, the data was analysed to determine the unique relationships between employee engagement, environmental (workplace) satisfaction and replenished energy during work breaks in the workplace ecosystem. Consequently, multiple regressions that might predict employee engagement were computed, using environmental (workplace) satisfaction and replenished energy during work breaks simultaneously entered as predictors. Also, linear regressions that might predict replenished energy during work breaks were computed, using environmental (workplace) satisfaction as a predictor. This method was found relevant for the data analysis due to the relatively small sample size used in the study. Hence, a structural equation modelling technique was excluded. Additionally, in the analysis, some demographics as control variables were included, namely gender, length of time in the organisation, role in the organisation, and contract type (i.e., part-time vs. full-time). All participants equally shared their working week between the home and the office environment.

Due to exploratory character and the number of participants (*n*=169), Study 2 adopted multiple regressions to examine the impact of the chosen variables on employee engagement components separately. Although the quantitative approach has been widely adopted by researchers, examining the relationship between organisational outcomes and the physical

workplace environment in previous studies, the use of the Utrecht Work Engagement Scale (UWES) has been generally limited to the office workplace environment research. Therefore, Study 2 applied the UWES to two physical environments (i.e., the home and the office) simultaneously. This approach helped to investigate both the physical workplace environment and employee engagement in the context of a workplace ecosystem.

3. Results

3.1. Descriptive statistics and correlation analyses

As expected, environmental (workplace) satisfaction showed significant positive correlations with all three facets of employee engagement in the workplace ecosystem (see Table 1). Environmental (workplace) satisfaction in both the home and in the office was positively correlated with vigour (r = .32, p < 0.01; r = .45, p < 0.01, respectively), dedication (r = .23, p < 0.01; r = .35, p < 0.01, respectively), and absorption (r = .27, p < 0.01; r = .37, p < 0.01, respectively). The results also indicated significant positive correlations between replenished energy during a work break and employee engagement in the workplace ecosystem. Replenished energy during a work break in both the home and the office was positively correlated with vigour (r = .28, p < 0.01; r = .39, p < 0.01, respectively), dedication (r = .28, p < 0.01; r = .31, p < 0.01, respectively), and absorption (r = .21, p < 0.05; r = .33, p < 0.01, respectively). Additionally, our analyses showed significant positive correlations between environmental (workplace) satisfaction and replenished energy during a work break in the workplace ecosystem. Environmental (workplace) satisfaction in both the home and the office was positively correlated with replenished energy during a work break (r = .36, p < 0.01; r = .58, p < 0.01, respectively). The correlations between dependent/independent variables and control variables (i.e., gender, length of time in the organisation, role in the organisation, and contract type) were not statistically significant.

TABLE 1 Correlations and Descriptive Statistics

Variable	1	2	3	4	5	6	7	8	9	10
Employee engagement										
Home										
1. Vigour										
2. Dedication	.70**									
3. Absorption	.72**	.69**								
Office										
4. Vigour	.61**	.59**	.45**							
5. Dedication	.56**	.85**	.55**	.73**						
6. Absorption	.47**	.57**	.56**	.63**	.67**					
Environmental satisfaction										
7. Home	.32**	.23**	.27**	.02	.10	-.02				
8. Office	.22*	.21*	.22*	.45**	.35**	.37**	.08			
Replenished energy during a work break										
9. Home	.28**	.28**	.21*	-.42	.12	.00	.36**	.03		
10. Office	.17	.20*	.17	.39**	.31**	.33**	.02	.58**	-.01	
M	5.13	5.86	5.52	4.96	5.83	5.31	5.65	5.04	5.13	4.31
SD	1.37	0.92	1.04	1.46	0.94	1.16	1.33	1.48	1.45	1.34

Note. N = 169. For comparability, means and standard deviations are provided for sum scores.

*p < .05, **p < .01.

3.2. Regression analyses

Multiple linear regression was used to test if environmental (workplace) satisfaction and replenished energy during a work break significantly predicted employee engagement (i.e., vigour, dedication, and absorption) in the workplace ecosystem (see Table 2 for details).

The overall regression was statistically significant for vigour at home and in the office (R^2 = 0.13, $F(2, 130)$ = 10.02, p = < .001; R^2 = 0.22, $F(2, 119)$ = 17.17, p = < .000, respectively). It was found that environmental (workplace) satisfaction and replenished energy during a work break significantly predicted vigour at home (β = 0.26, p = < .01; β = 0.18, p = < .05, respectively). Also, it was found that environmental (workplace) satisfaction significantly predicted vigour in the office (β = 0.34, p = < .001).

The overall regression was statistically significant for dedication at home and in the office (R^2 = 0.10, $F(2, 130)$ = 7.05, p = < .01; R^2 = 0.14, $F(2, 119)$ = 9.64, p = < .000, respectively). It was found that replenished energy during a work break significantly predicted dedication at home (β = 0.23, p = < .05). Also, it was found that environmental (workplace) satisfaction significantly predicted dedication in the office (β = 0.26, p = < .01).

The overall regression was statistically significant for absorption at home and in the office (R^2 = 0.09, $F(2, 130)$ = 6.29, p = < .01; R^2 = 0.16, $F(2, 119)$ = 10.97, p = < .000, respectively). It was found that environmental (workplace) satisfaction significantly predicted absorption at home and in the office (β = 0.23, p = < .05; β = 0.27, p = < .05; respectively).

The above results demonstrated that environmental satisfaction in the physical workplace environment and replenished energy during a work break explained variance in all three facets of employee engagement, accounting for 9% to 13% of the variance in employee engagement in the home workplace, and 14% to 22% of the variance in employee engagement in the office workplace. Therefore, the results were mostly in line with our expectations that both environmental satisfaction in the physical workplace environment and replenished energy do have an impact on employee engagement components, with some variances between the home and the office workplace. The results showed that environmental satisfaction in the home workplace uniquely predicted two facets of employee engagement with positive coefficients: vigour and absorption. Environmental satisfaction in the office workplace uniquely predicted all three facets of employee engagement with positive coefficients: vigour, dedication, and absorption. Replenished energy during a work break in the home workplace uniquely predicted

two facets of employee engagement in the home workplace with positive coefficients: vigour and dedication.

The linear regression results also demonstrated that environmental satisfaction in the home workplace accounted for 13 % of replenished energy during a work break in the home workplace, and environmental satisfaction in the office workplace accounted for 34 % of replenished energy during a work break in the office workplace (see Table 2 for details). The overall regression was statistically significant for replenished energy during a work break at home and in the office (R^2 = 0.13, F(1, 131) = 19.64, p = < .001; R^2 = 0.34, F(1, 120) = 61.49, p = < .000, respectively). It was found that environmental (workplace) satisfaction significantly predicted replenished energy during a work break at home and in the office (β = 0.36, p = < .001; β = 0.58, p = <.001; respectively). Therefore, the results were in line with our expectations that environmental satisfaction in the physical workplace environment does have an impact on replenished energy during a work break.

TABLE 2 Summary of Multiple Regressions: Environmental Satisfaction and Replenished Energy during a Work Break Predicting Employee Engagement, and Linear Regression: Environmental Satisfaction Predicting Replenished Energy during a Work Break

	Employee engagement						Replenished energy during a work break	
	Home			Office				
	Vigour	Dedication	Absorption	Vigour	Dedication	Absorption	Home	Office
	β	β	β	β	β	β	β	β
Environmental satisfaction								
1. Home	.26**	.15	.23*				.36***	
2. Office				.34***	.26**	.27*		.58***
Replenished energy during a work break								
1. Home	.18*	.23*	.13					
2. Office				.19	.16	.17		
R^2	.134***	.098**	.088**	.224***	.139***	.156***	.130***	.339***
R^2 adjusted	.120***	.084**	.074**	.211***	.125***	.142***	.124***	.333***

Note. N = 169.

*p < .05, **p < .01, ***p < .001.

Discussion

The overall aim of the present research was to investigate the interplay between environmental factors and health-related behaviours for employee engagement in a workplace ecosystem, on the example of knowledge-intensive organisations. Subsequently, the study explored if environmental satisfaction (i.e., comfort) in the physical workplace environment and replenished energy during a work break were associated with employee engagement components (i.e., vigour, dedication, and absorption) in a workplace ecosystem.

Our results showed that employees with higher levels of environmental satisfaction in the physical workplace environment had higher levels of employee engagement in a workplace ecosystem, with some variances between the home and the office workplace. For example, employees with higher levels of environmental satisfaction in the home workplace had higher levels of vigour and absorption. And employees with higher levels of environmental satisfaction in the office workplace had higher levels of all components of employee engagement. Therefore, these results extended the previous studies (Feige et al., 2013c, Appel-Meulenbroek et al., 2020) by providing evidence that higher environmental satisfaction in both workplaces (i.e., the home and the office) has a positive impact on employee engagement components in a workplace ecosystem. Also, our results might question to some extent the previous research findings suggesting that green design in office buildings does not have a positive effect on employee engagement (McCunn and Gifford, 2012). Considering the large body of studies demonstrating the associations between environmental conditions and environmental satisfaction, and their positive impact on organisational outcomes (e.g., productivity and performance) (Wyon, 2004b, Clements-Croome, 2004, Kwallek et al., 2007a, Vischer, 2007, Chan et al., 2007, Chadburn et al., 2017a) - our results suggest that this relationship also exists for employee engagement per se.

In light of the above, our study indicated that environmental quality in a larger urban context (i.e., business districts and residential developments) had relevance for employee engagement in a workplace ecosystem. However, in our research, the significant effect of environmental satisfaction on dedication emerged only in the case of the office workplace. This result may suggest that the quality office environment is additionally perceived by employees as a visual 'investment' made by the employer for their staff, and therefore encourages greater employee commitment. Therefore, our study reflects the previous research that high-quality, satisfying workspace and workplace environments have a positive effect on employee engagement

(Carter et al., 2020). Hence, it can be assumed that environmental workplace quality creates a sense of a stronger connection to the organization and enhances one's dedication to the job. In this context, it can be argued that the quality office workplace positively contributes to employee engagement via its physical and psychological impact. Another explanation might be that employees who experience 'face-to-face' social interactions at work (e.g., supervision and collaboration) are more committed to their job tasks which further informs their dedication level. Nevertheless, our results suggest that dedication might be related to both the physical and psychological context of the workplace environment and therefore needs a more nuanced understanding and explanation.

Also, our results demonstrated that employees experiencing higher levels of replenished energy during a work break in the home workplace had higher levels of vigour and dedication.
These results are aligned with previous findings demonstrating that employees who take work breaks are more engaged at work (Bosch et al., 2018, Kühnel et al., 2017, Sonnentag et al., 2012). However, in our study, this relationship was only observed in the context of the home workplace. This result may suggest that the home workplace is a more conducive environment to quality work breaks (i.e., resulting in a lasting recovery effect allowing to be more vigorous at work) which further contributes to better employee engagement. For example, this result can be explained by the fact that the home workplace provides more opportunities for replenishing (i.e., health-related) work breaks (e.g., sports exercise and access to home food) according to individual needs and worktime schedule that might be more flexible at home compared with the corporate office. The last factor may also justify the positive effect of such a work break on the dedication level. Therefore, our study refers to previous research on the positive outcomes of a 'healthy lifestyle' for employee engagement (Jindo et al., 2020, Munir et al., 2015, Nishi et al., 2016, Seymour and Dupré, 2008, ten Brummelhuis and Bakker, 2012).

Moreover, our study showed that employees with higher levels of environmental satisfaction in the physical workplace environment had higher levels of replenished energy during a work break. This result was observed for both the home and the office workplace. Given the previous finding suggesting the home workplace to be a more conducive environment for replenishing work breaks, we can assume that another explanation is needed for the office workplace. For example, our results may suggest that the quality office workplace environment can better facilitate casual social interactions at work that usually happen during work breaks (e.g., via access to indoor/outdoor meeting places). In this context, our study extends the previous

studies on both the relevance of the social environment quality (Bakker et al., 2014, Rana et al., 2014, Kumar and Sia, 2012, Osborne and Hammoud, 2017) and replenishing work breaks for employee engagement (Bosch et al., 2018, Kühnel et al., 2017, Sonnentag et al., 2012).

In light of the above findings, our study extends the literature on employee engagement by providing the first significant results using indicators of environmental satisfaction in the physical workplace environment (i.e., home and office) and replenished energy during a work break (i.e., home and office) and by studying the associations with employee engagement components (i.e., vigour, dedication, and absorption) and replenished energy during a work break (i.e., home and office). Our findings extend evidence from studies on the positive associations between the physical workplace environment and organisational outcomes (Wyon, 2004b, Clements-Croome, 2004, Kwallek et al., 2007a, Vischer, 2007, Chan et al., 2007, Chadburn et al., 2017a) by looking explicitly at employee engagement. The present findings also replicate evidence that according to the job-demands resources model (Demerouti et al., 2001), environmental qualities of the workplace may act both positively (i.e., environmental resources) and negatively (i.e., environmental demands) on employee engagement (Roskams et al., 2021). Therefore, our findings are consistent with research on the physical workplace environment, showing that environmental satisfaction in the physical workplace environment is positively associated with higher levels of employee engagement (Feige et al., 2013c, Appel-Meulenbroek et al., 2020) with the relevance for a workplace ecosystem as well. Additionally, we found that environmental satisfaction in the physical workplace environment contributes to employee engagement components directly (i.e., having a positive effect on vigour, dedication, and absorption), and indirectly (i.e., having a positive effect on replenishing work breaks).

On the one hand, our findings differ from past research that suggests environmental quality (e.g., green design) does not have a positive effect on employee engagement (McCunn and Gifford, 2012). On the other hand, our findings are consistent with studies that consider the positive effect of health–related employee behaviours (e.g., work breaks) on employee engagement (Bosch et al., 2018, Kühnel et al., 2017, Sonnentag et al., 2012). Nevertheless, our study shows that the interplay of both health-related employee behaviours and environmental satisfaction informs employee engagement in the workplace ecosystem. Therefore, we can assume that the quality workplace ecosystem may help to achieve the 'full engagement' - a more 'human-oriented' holistic sense of thriving and well-being in the workplace (Robertson and Cooper, 2010) and 'human flourishing' (Roskams et al., 2021, Clements-Croome, 2021).

Limitations and future research

Several limitations to this study should be overcome in subsequent future research. First, the study is based on data related to a specified geographic location within a few months. Thus, there is a need for longitudinal analysis in future based on a larger number of employees to quantify the effects of a workplace ecosystem more broadly (i.e., home, office, and third place) over time on employee engagement. Along these lines, the effect of a variety of physical/geographical locations on subjectively measured employee engagement could be examined. The current results do not address the impact of third places (e.g., café and libraries) on employee engagement. Second, the analysis conducted in this study did not consider objectively measured environmental qualities (e.g., home/office type). While environmental satisfaction presumably is considered the final point of interest, considering objectively measured environmental qualities in addition to employee workplace perception can provide a fuller picture of environment-related externalities arising from different features of the built environment. In future research, more data on using third places could also be considered in addition to the comprehensive built environment data considered in this study. Additionally, our research did not focus on organisational context (e.g., culture) and the types of work breaks. Finally, caution must be taken in generalizing these findings to other areas since the Greater London Area is one of the largest and most populated urban agglomerations in the world and this may impact the self-reported level of environmental satisfaction and hybrid work preferences. These potential limitations suggest a need for examining the effects of a workplace ecosystem in different configurations by using similar data collected in other cities. It remains a question for the future as to what extent the workplace ecosystem will become a default workplace for global organisations in the post-pandemic reality. Nevertheless, more research (and time) is needed to determine whether environmental quality can contribute to more sustainable employee engagement in the long term.

Conclusion

Our study demonstrates that the interplay of health-related employee behaviours and a quality workplace environment positively contribute to employee engagement in a workplace ecosystem. To our knowledge, this is the first study that quantified the associations between employee engagement components (i.e., vigour, dedication, and absorption) and the workplace ecosystem (i.e., the home and the office) post-COVID-19 and conducted an in-depth analysis of the associations between environmental satisfaction, health-related behaviours (i.e., work

breaks) and employee engagement components. Harnessing a unique and comprehensive organisational dataset, the analysis presented in this study allows a more nuanced understanding of the differential associations of a wider workplace ecosystem with employee engagement post-pandemic. Our research is based on a quantitative framework that captures the potential dependencies among health-related employee behaviours in a wider workplace environment by assessing the direct and indirect effects of environmental satisfaction on employee engagement. This is a strength of the paper, as the results show that the post-pandemic physical workplace environment can no longer be limited to office workplace environments. To the authors' knowledge, this is the first study to evaluate the effect of behavioural and physical aspects of a workplace ecosystem on employee engagement post-pandemic based on primary data collected in one of the major global business hubs. Our research has practical implications for organisations seeking to improve workplace behavioural health strategies in the context of hybrid work patterns for increased employee engagement in a workplace ecosystem.

Ethical approval

This research was approved by the ethical committee at the Henley Business School, University of Reading.

Informed consent

Participants were fully informed about the nature of the study, and informed consent was obtained from all individual participants included in the study.

Disclosure statement

No potential conflict of interest was reported by the author(s).

CHAPTER 6: 'You're Not Going in Every Single Day Battling with that Tube': How to Understand the Impact of a Workplace Ecosystem on Employee Engagement in Hybrid Work Practices?

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ABSTRACT

Although the construct of employee engagement has been explored for three decades, it is still not clear what role the physical workplace environment plays in maintaining and enhancing employee engagement. This is surprising because environmental psychology research suggests there is a clear influence of physical factors on other cognitive and emotional work-related constructs such as performance. The situation has become even more challenging since the COVID-19 pandemic accelerated new trends constituted by the wide adoption of a hybrid work practices among knowledge-work organisations. We investigated the role of the workplace ecosystem in employee engagement. We conducted 10 semi-structured in-depth interviews with representatives of two knowledge-intensive organisations working in a hybrid mode in Greater London Area and its surrounding. We found that the workplace ecosystem can better facilitate employee engagement than the traditional office environment. In our analysis, flexibility - associated with both employee behaviours and the physical workplace - was identified as the main drivers of employee engagement in a workplace ecosystem. Such findings theoretically challenge the ongoing debates regarding work-from-home versus fully office-based work. Practically, this study underscores the need for wider adoption of hybrid policies by knowledge-based organisations.

Keywords: Employee Engagement, Hybrid Work Practices, Employee Behaviours, Environmental Factors, Workplace Ecosystem

INTRODUCTION

Imagine a day like this… You wake up in the morning. And then you start working on your laptop. You don't need to hurry to catch the last train to your workplace because you have an online meeting in one hour just in your room. Hence, you have enough time to walk your children to school, have a morning walk with your dog to the nearby park or do a little bit of jogging alongside the river. However, sometimes it's good to discuss things with your work buddies 'face-to-face', so at noon you go by bike to your nearby satellite office which has just been

opened in your area. On your way back home, you grab another coffee at the place nearby your company's hub, working a little bit over there to 'change the scenery', and they provide high-quality wireless. You can even work outside as you can plug your laptop in there, and enjoy the atmosphere of a more casual workplace. Today, you have even met with your boss, so you both had a chance to exchange ideas on the project. In the afternoon, you have another official meeting with her and other project partners in the City. You will get there in 30 min by tube which has a direct connection between a core city and your home district. Whilst you are in the City, you will have a business lunch in the nearby restaurant. Just don't forget to pick up your kids from school. There's a co-working space in the area, just in case you have some work to be done later today. At the end of the day, you still have time to fix any home duties or enjoy your free time in the way you like. Does a workplace ecosystem like the one described above make you feel more engaged with work?

Employee engagement is a relatively new phenomenon and it still lacks a unified understanding in terms of its definition and related measurement options (Saks and Gruman, 2014). However, according to recent studies, only 20% of the workforce globally is actively engaged (Gallup, 2021). But how do we know that we measure it appropriately, especially in the context of a post-COVID-19 workplace ecosystem (Surma et al., 2021)? Given that workplace-related research has long been focused on the office environment, it can be questioned now if the organisational dynamics remain the same after the COVID-19 pandemic (Mortensen and Haas, 2021, Hogan, 2022, Oygür et al., 2022). Although there are studies (e.g., organisational psychology and management) finding linkages between a supportive (social) environment (e.g., relationships with co-workers and supervisor) and engagement (Bakker and Demerouti, 2008, Nahrgang et al., 2011, Saks, 2006a), the specific research on a physical environment and its impact on engagement is still limited (Feige et al., 2013c) despite a significant number of studies (e.g., environmental psychology) highlighting the importance of a physical workplace environment for other organisational outcomes (e.g., productivity and performance).

Although research on telework (today mostly referred to as 'work from home' - WFH) is not new (Bailey and Kurland, 2002, Halford, 2005, Messenger and Gschwind, 2016, Sardeshmukh et al., 2012, McKee and Hedge, 2022), the studies on a workplace ecosystem are limited (Gauger et al., 2022). However, the fast-paced growth of information and communication technologies (ICT) supports the development of a virtual environment, allowing many knowledge-based organisations (e.g., IT, finance, insurance, etc.) now to successfully combine business management and operation across distributed workplaces (Souza, 2022). Nevertheless, we do

not know what is important for employee engagement in this current world of work as it has changed from fully office-based to a hybrid mode (Future Forum Pulse, 2022).

Industry research highlights a positive impact of hybrid work practices on organisational outcomes (e.g., productivity, performance, etc.), but academic research on a workplace ecosystem post-COVID-19 is still in its infancy (Mergener and Trübner, 2022). Although there is a connectivity between organisational flexibility (e.g., flexibility in human resource management) and employee engagement (Bal and De Lange, 2015), is a workplace ecosystem conducive to employee engagement as well? Considering that "employees will be more engaged in workplaces that provide them with physical, emotional, and psychological resources necessary for role performance" (Saks and Gruman, 2014, p.160), what are the resources offered by a workplace ecosystem?

Hence, is a workplace ecosystem more likely "to reduce job demands and the associated physiological and psychological costs, and [to be] functional in achieving work goals" (Schaufeli and Bakker, 2004a, p.296)? On the one hand, one could argue that a workplace in the home might be more conducive to engagement as we can do all the home and caring tasks while also working. For example, recent research demonstrates that daily relaxation and psychological detachment whilst at home have a positive effect on employee engagement (ten Brummelhuis and Bakker, 2012). The latest research highlights that even home attire increases engagement (Bailey et al., 2022). On the other hand, working from home may equally impact negatively engagement as we no longer have stable boundaries between work and home, as a result of work-home interferences (Derks et al., 2015, Dowling et al., 2022, Williamson and Colley, 2022). Given that working preferences differ among employees (Appel-Meulenbroek et al., 2022), is the hybrid the best option to sustain employee engagement?

This paper continues our previous study which highlighted the interplay between environmental factors, employee behaviours, and employee engagement components (i.e., vigour, dedication, and absorption – the UWES) (Study 2). The earlier research showed that both environmental satisfaction in the workplace ecosystem and employee interaction with the workplace environment (indoor/outdoor) impact employee engagement in a workplace ecosystem. We used the UWES – a validated scale to measure employee engagement (Schaufeli and Bakker, 2003) for two types of workplaces (i.e., home/office) separately. Our results demonstrated that employee engagement level was comparable in both types of workplaces (i.e., home and office) whilst working remotely.

Following the above research findings, the overall aim of this paper is to better understand the impact of a workplace ecosystem on employee engagement. Therefore, the research questions are: i) How to understand the interplay of employee behaviours, the physical workplace and employee engagement in hybrid work practices?; ii) To what extent does the workplace ecosystem contribute to employee engagement?

In our study, we take *employee engagement* to be "a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption"(Schaufeli et al., 2002, p. 74). This definition is aligned with the UWES which we used in the previous quantitative study to measure employee engagement.

The remainder of this paper sets out our adopted methods, followed by a presentation of research findings and discussion.

METHOD

This study was part of a larger PhD research project on the interplay between environmental factors and employee engagement in a post-COVID-19 workplace ecosystem. This qualitative study aimed to explore to what extent the workplace ecosystem impacts employee engagement, using interviews. We applied a qualitative approach as we found it suitable for getting additional insights which might have been overlooked in the previous study.

Data and Sample

Interview participants consisted of 10 representatives of two knowledge-intensive organisations from the real estate sector who previously took part in Study 2. Participants worked in a hybrid way in three office buildings in Central London (two out of three offices were in the City of London) and a variety of home environments in the Greater London Area and beyond. The office buildings were represented by 3 premises in total, all located in a dense urban environment of similar external quality with equal access to outdoor urban amenities (e.g., shops, restaurants, and cafés) and a well-developed transportation network. One out of three buildings was fully re-furbished and adapted to global certification schemes (i.e., BREEAM and WELL). Two other buildings were not certified by any global certification scheme providers. Study 3 was based on interviews with managerial and higher-level representatives (e.g., managers, directors, and HR department and legal departments) for capturing organisational perspectives that might have been overlooked in the general survey of all employees in Study 2.

The two organisations from Central London were chosen due to the exploratory character of this study. Given that the participants worked in a hybrid way, this number of organisations was

found relevant for investigating the workplace ecosystem in a wider urban context (i.e., including centrally located offices and a variety of home environments in a Greater London Area and beyond). The three office buildings were also chosen because they contained global corporations working in the field of real estate, providing the study with a comparable set of working practices by knowledge employees who share similar working experiences.

Considering that the participating organisations adopted provisions and guidance on hybrid work practices as a direct result of the COVID-19 pandemic, this research provided the first insight into their work conducted in such a way. Before the pandemic, the organisations were fully office-based excluding occasional site visits. Subsequently, neither fully remote work nor hybrid work was experienced on the organisational scale by the participants pre-pandemic. The participating organisations first experienced employees' engagement in hybrid work during the pandemic in 2021 (following recommendations of the UK government regarding office work). Employees were free to decide which days they wished to work from home and which days they preferred to work from the office alongside their line managers' approval.

Procedure

In Study 3, ten in-depth semi-structured online 40-min interviews were conducted (MS Teams). Study participants were recruited from two knowledge-intensive organizations working in a hybrid mode (i.e., home/office) from the real estate sector in London (UK) via email and using personal contacts. As an incentive for participation, an information leaflet with information about the project was provided. Consent was obtained from all participants. All participants participated voluntarily and did not receive any reward. The study was conducted remotely during the 4 months of February - May 2022.

The semi-structured interview approach was found to be an appropriate method to answer the research questions. The number of interviews (10) was found relevant for this research due to the in-depth nature of the analysis. The highest-level organisational representatives with diversified responsibilities (e.g., management, leadership, legal, and HR) were invited and who were able to talk in the name of their companies. Although a relatively small sample size, the author was able to thoroughly investigate their opinions via a semi-structured interview technique within 40 min time allocated, as one hour was considered a reasonable maximum length for semi-structured interviews to minimize fatigue for both interviewer and respondent (Adams, 2015). It allowed collecting responses rigorously, at the same time leaving enough 'space' for the interviewees to help them express their thoughts. The semi-structured interviews

provided a greater opportunity for discovery, but with space to follow topical trajectories as the conversations unfolded (Magaldi and Berler, 2020) as they were suited to answering a 'why' question (Fylan, 2005). Semi-structured interviews were found suitable for studies involving small numbers of people (e.g., mini-studies and case studies) (Drever, 1995) and sufficiently structured to address specific topics where new topics can emerge in the study focus whilst helping to explore the full complexity of the research (Galletta, 2013).

In this exploratory study, a qualitative approach (i.e., thematic analysis) was applied. The data was transcribed, anonymised, and then analysed via thematic analysis. Several themes were identified that emerged in the process of coding/data analysis to better understand how a workplace ecosystem impacts employee engagement. Findings were centred on themes that emerged from the interviews inductively. Through interviews, organisational views on a workplace ecosystem were explored. Hence, the study was mainly concerned with improving our understanding of and obtaining deeper insights into experiences to enable the identification of aspects that may have been overlooked in the previous quantitative Study 2 conducted with all employees. Also, the qualitative approach adopted by Study 3 offered a chance to understand key determinants, by collecting original and in-depth insights into a workplace ecosystem. A blend of non-probability convenience and snowball sampling was used for interviews to identify the respondents based on a combination of requests for participation from the professional contacts and/or recommendations from these professional contacts. The number of interviews was determined by the point at which there were no new insights gathered from subsequent interviews (Seidman, 2006). The small number was also justified given the in-depth interview process.

RESULTS

During the interviews, we asked our participants about their individual experiences of working in a hybrid mode (i.e., home and office) concerning employee engagement. However, we did not explain to our interviewees how we define the construct of employee engagement (i.e., the UWES scale) as we aimed to explore their understanding to help us answer the research questions.

The results of the thematic analysis were summarised below according to the following themes, namely 'Flexibility', 'Face-to-face Interactions', 'Office Workplace', 'Commuting', and 'Challenges':

1. Flexibility

We observed that most of our interviewees experienced better self-reported engagement post-COVID-19 due to greater flexibility offered via hybrid work. In this context, flexibility was understood concerning individual choices (e.g., private and professional) which subsequently determine a *preferred* workplace type. For example, one of our interviewees said: *"people can make their own choices broadly and without fear of criticism, they're able to decide whether they're working from home or they're going to the office…And as a result of that… doesn't feel that they have to be in a certain place at a certain time… that does give rise to more employee engagement"* (OR5). Another one said: *"People should feel empowered in terms of where they work and when they work… people are more engaged if they feel they have control over that rather than being told you need to work in the office five days a week and you need to work 9:00 to 5:00"* (OR9). Hence, one of our respondents confirmed: *"people are enjoying the hybrid working and we're being pretty… flexible. We're not saying you have to be in three days, two days. We're leaving it to line managers and individuals. But equally, we can't have our employees saying I'm only going to work from home"* (OR4). Therefore, a hybrid working policy was found to be one of the key issues considering employee engagement in a workplace ecosystem: *"approach to flexible working, how much choice and control and autonomy do they give people over where and how they work… that's probably one of the most important policies for influencing engagement levels"* (OR8).

Additionally, we found that flexibility was associated with diversification of work settings: *"having a variety of different spaces is important because then you can flex it to your particular needs, which may change multiple times a day as well… that's not something that is fixed even for a portion of time necessarily… you might have varying different needs over the hours of the day… people work better and engage better when their needs are being met"* (OR7). Hence, a workplace ecosystem was found to better support individual needs: *"one person might be very different to another, and that's not just in the type of space. It might also be the hours that they work… locations that they choose to work in… from an engagement perspective to maximize that, an employer has to take into account all those different aspects"* (OR7).

2. 'Face-to-face' Interactions

Another theme which emerged in our interviews was related to 'face-to-face' interactions. We observed that self-reported engagement was very often experienced by our participants as a result of having positive social relationships (e.g., private and professional) at work. For example, an engaged employee was defined as someone who is *"passionate about the team*

and company that they work for, one that actively seeks out ways in which they can improve what the company does and improve what they do for the company. Somebody that tries to build and nurture relationships with colleagues and other people around the business" (OR2), and who is *"happy to meet other people and chat to them and interested to see how other people are working"* (OR3).

Also, our interviewees pointed out the relevance of the type of workplace environment (e.g., home/office and indoor/outdoor) in that context. For example, the interviewees found that 'face-to-face' interactions are better facilitated by the office environment compared to a home environment: *"when you're in the office environment at a face to face…you have relationships with people, you form bonds with people… I can give you an example. I was in the head office after such a long time yesterday and it was great to just have lunch with my colleagues and then go for a walk in the sun and just chat. And about nothing in particular"* (OR5). *"And when you are online, you tend to be more focused on just reducing the chat because it's usually for a very specified time you're meeting"* (OR5). Hence, the office environment (i.e., open-plan office design) can better facilitate collaboration and teamwork among employees: *"when you're in the office you're sitting at your desk and you might be working on something, and there may be other people working on the same thing as you. And it's often the case that somebody says something and you can wish round your chair and take part. At home that does not happen"* (OR5). Other interviewees reflected on the importance of casual relationships at work: "*I think working from home restricts you from interacting with people that you don't need to interact with, and the random coffee chats that you bump into each other"* (OR6), and *"having people physically co-located makes ad hoc conversations easier. You may talk to people around the water cooler who you wouldn't normally talk to"* (OR2), or: *"the role of the office has become more important as a result of hybrid working and… organisations and people have understood the connection between people and place and the importance of the physical connection between people and… there's a strong relationship between physical connection and engagement"* (OR10). The relevance of social relationships was observed after working hours as well: *"being co-located encourages things like going out for lunch together or going out for a beer after work. And that's important because that encourages emotional and social bonds with your colleagues as well as work bonds, which brings the team closer together and makes you value each other more"* (OR2), or "*coming together is the key thing, more than anything… being able to see people and talk to people is far better in the workplace as opposed to through a screen… the workplace provides… more collaborative engagement route"* (OR3).

3. Office Workplace

Our interviewees observed the impact of an office workplace and its quality on self-reported employee engagement: *"having an office like that* [high quality] *does make a difference to engagement"* (OR9), and *"it* [physical workplace environment] *plays a huge role in employee engagement"* (OR8), or "*the quality of workspace and the environment itself overall… needs to be at a very good level to attract people in"* (OR3), and *"much of our… data shows a correlation between workplace experience and engagement of staff"* (OR1). Our respondents noticed the value of physical quality for employee engagement: *"nature around the building… the air quality… the temperature and lighting and that's what organisations can do… individuals are engaged by embracing all of that"* (OR9). Hence, the workplace environment should allow *"to focus and concentrate"* and *"to allow collaboration"* (OR7), "*a comfortable office… it's certainly a driver for people to come into"* (OR6). An office workplace environment was associated with improved teamwork: "*our workplace is a very… collaborative… positive and engaging workplace. But it works because every time I go there, I.. sit somewhere different. And I talk to different people… that's probably the way they can contribute to that* [engagement]" (OR9), "*the hot-desking system… allows better engagement with a greater number of people because you are moving around more"* (OR5), or "*a workplace environment that aids productivity and helps with collaboration has a massive impact on engagement in the office and teamwork"* (OR9), and *"the availability of a meeting room enables you to solve problems quicker as relates to technical… issues"* (OR2). Also, office environmental quality was perceived in the context of socialising at work: "*they provide breakout areas and they're not designed just for work. They're designed for full social interaction with your colleagues"* (OR1), *"areas where you can sit and have lunch with not just your team"* (OR4). Via our interviews, we found the value of an outdoor workplace environment as well: *"*[outdoor environment] *provides a breath of fresh air and gives people a different space to use, but also it's more than that because you can connect better with nature... The noise of traffic or people… to help you connect to a different environment… to facilitate better thinking"* (OR7), and: *"the ease of access to the outdoor environment impacts engagement and particularly… COVID-19 has given rise to this… people are spending longer at their desks… having access to be able to take short breaks during the day to outdoor spaces is important for engagement"* (OR8), or *"it must be a correlation between places with an outside area and engagement"* (OR9). This is how one of our respondents reflected on the importance of office location for self-reported engagement: *"My base office is in the heart of the City of London… the location is incredible. And in the morning… you can see all the big glass towers. It does make you feel somewhat thrilled to be working in… one of the hearts of business on the planet… and the glamorous towers with the nice lobbies and the sculptures and the marble and*

everything like that does make you feel somewhat important and somewhat glamorous and up to do it to increase levels of engagement… it's emotionally important." (OR2).

4. Commuting

Moreover, our results showed that a reduction in commuting in a workplace ecosystem was associated with self-reported employee engagement: *"they're [employees] less tired during the commute… the reduction in commute allows people to be a bit more energized as well and recharge a little bit more. So when people come to work, they're in work and they are present more than they would be if they were coming in five days a week"* (OR3), or *"you're not going in every single day battling with that tube… And… that has a lot better engagement because of the days you are in it's quite exciting… you're meeting your colleagues after a week and you're not tired because you've done the commute five days a week. And… that gives rise to people feeling more positive and therefore it gives rise to better engagement"* (OR5).

5. Challenges

Finally, employee engagement in a workplace ecosystem was recognized by our respondents to be very challenging in the context of the whole organisation. For example, *"what… we need to do is have the conversation with wider groups within the organization like in the HR department and look at their policies, we need to be including the IT department and look at what their policies are because… to improve workplace engagement, it's all interwoven across different departments within the organization. But we tend to come at it from our perspectives. And we would benefit more from a more holistic and joined-up approach"* (OR8). A workplace ecosystem was found to be underpinned by a virtual workplace: *"now organisations need to consider their policies in light of physical and virtual, in-person and remote"* (OR10), or *"organizations are looking at the purpose and the role of the office much more now to improve engagement levels"* (OR8) by *"set up that allows a hybrid situation… where some people may join virtually and some people may be physically in the same place"* (OR7). One of our respondents noticed the role of the organisation in enhancing employee engagement by ensuring "*the tools and also the environment that they want to go that the extra"* (OR4), and *"facilitating the engagement as much as possible, depending on individual's needs… as… everybody's different"* (OR7). However, one of our respondents found managing those expectations around a workplace ecosystem a very challenging task: "*we've also had people who have moved away from their home location… to… Devon to York, but their obvious location is made across London… However, we're not going to pay for them to come into the location where they're employed to work"* (OR4)*. Some of our interviewees pointed out some pros and cons of such a physical separation from an office

environment. For example, one of our interviewees noticed a risk that *"people that are not engaged find more places to hide when they're not physically co-located"* (OR2). Also, remote work may impact teamwork: *"somebody might prefer to work from home all the time, but that may not be the best thing for the team. They may need to be in to interact with others, to knowledge share in a more effective way, etc."* (OR10).

The next section presents our discussion in the context of relevant studies in the field.

DISCUSSION

Our research used a qualitative approach to investigate to what extent a workplace ecosystem predicts employee engagement in knowledge-based organisations working in a hybrid way. As we previously demonstrated the positive relationship between environmental factors, employee behaviours and employee engagement in the workplace ecosystem (Study 2), we focused in this paper on the specific role of the workplace ecosystem for employee engagement. We observed that our interview results were aligned with the previously conducted survey study. However, in this study, we were able to provide some additional insights which did not emerge earlier in our research due to the quantitative nature of the previous one.

First, the interview results emphasized the role of flexibility (understood in the context of both work and place) as a contributor to employee engagement post-pandemic. We observed that the frequently mentioned aspect of flexibility was perceived by our participants very broadly - ranging from flexible work patterns to flexible workspaces – both associated with a workplace ecosystem. Our study indicated that employee engagement post-pandemic was very often experienced by knowledge employees in the context of greater flexibility offered by organisations. This is not a surprising result given that previous studies emphasized the role of flexible human resource management for better engagement (Bal and De Lange, 2015). However, post-pandemic flexibility has become associated with many additional aspects, including work-life balance and the physical location/type of workplace, among others. Also, greater employee autonomy and control over work (both positively related to engagement) have become affiliated with the workplace ecosystem. We observed that a workplace ecosystem can play a major role in employee engagement post-pandemic (e.g., a workplace environment can be better suited to conduct certain work tasks: a home environment for focused work, and an office workplace for teamwork). Therefore, in line with previous findings that engagement facilitates successful task completion (Halbesleben and Wheeler, 2008, Salanova et al., 2005), we demonstrated that a hybrid environment does play a role in that context as well, as it can be more suited to different tasks (e.g., teamwork, focused work, etc.)

(Sailer et al., 2021). Hence, we argue that a workplace ecosystem offers more options for individual adaptation of the workspace than activity-based office design (i.e., including a variety of work settings within an office building).

While revising quotes from the respondents, we noticed that many talked about the topic of equity and the fact that many decisions about the extent of work done from the office or from elsewhere was very much determined by line managers. Subsequently, we argue that there might be both positive and negative consequences of decentralising decision-making regarding hybrid work. As flexibility in our study was associated with better employee engagement, we assume that greater organisational awareness should be put on employee decisions in terms of 'where' and 'when' to work during the working week. Therefore, this would help to increase employee flexibility by allowing them to make individual-based decisions reflecting personal responsibilities and professional needs, contributing to improved organisational outcomes (e.g., employee engagement). Hence, we infer that decentralising decision-making would help to create a better alignment between private needs (e.g., caring duties and home workplace location/quality) and professional requirements (e.g., job requirements and mobility). However, we are aware that the proposed flexible model of work should not be left out of control as it may lead to decreased organisational outcomes. For instance, employees who make an individually-based decision on when/how/where to conduct hybrid work may not be fully conscious of a 'bigger organisational picture' whilst working on a collaborative project. This is why in some cases there may be greater demand for in-person rather than online meetings, which may sometimes interfere with duties in private life (e.g., family life) and/or preferred home workplace location (e.g., distance from the office workplace location). On the one hand, decentralising decision-making would contribute to greater control over work by employees and better employee engagement. On the other hand, increased flexibility would demand different management styles that can effectively merge subjectively-reported employee engagement with organisational needs in a workplace ecosystem. Also, it can be expected that ongoing trends towards hybrid work, greater digitalisation and the related popularity of virtual workspaces may become key factors driving organisational policies in favour of employee flexibility.

In light of the above, we argue that the workplace ecosystem is an important contributor to employee engagement for two main reasons. First, it allows a better fit with daily duties in personal life (i.e., everyday responsibilities). Secondly, it helps to adjust the *physical* conditions (i.e., indoor environmental quality) of a certain workplace type to the specific job-related duties (e.g., collaborative work and individual work) and subjective comfort levels (e.g., temperature

and design) according to individual needs. Therefore, a workplace ecosystem allows knowledge work to be a more fluid process and physically 'adjustable' to either home, office, or third-place location. As a result, the decision on the 'preferred' physical workplace environment becomes under the control of employees which automatically gives them more freedom and power, but this situation demands more trust between both sides (see 'Challenges'). However, we argue that greater flexibility – related to both employee behaviours and the physical workplace – is a significant driver of employee engagement post-pandemic, and this was observed by both employees and their managers.

Moreover, our research confirmed the results of previous studies highlighting the importance of social relationships at work for better employee engagement (Bakker and Demerouti, 2008, Nahrgang et al., 2011, Saks, 2006a). We observed that technological advances supporting remote work in knowledge-based organisations cannot compensate for direct human relationships, both private and professional. Therefore, we argue that the quality of relationships at work will remain one of the key drivers of employee engagement in the post-pandemic scenario. Also, we observed, that the construct of employee engagement itself was very often affiliated by our participants with good collaboration/teamwork among employees. Hence, the 'face-to-face' interactions with colleagues - were pointed out as the main driver of engagement whilst in the office, encouraging employees to come in. Our results showed that both professional and private relationships were equally valued by participants. On the one hand, employee engagement was understood by our employees as the interaction with others. On the other hand, we observed that the physical office environment (i.e., indoor/outdoor) did play a substantial role in that context to facilitate engagement with work as well. Therefore, we argue that the workplace ecosystem can effectively facilitate employee behaviours conducive to employee engagement.

In light of the above, we found the physical office environment was perceived as an important moderator of social relationships at work. Our results showed that both indoor and outdoor spaces remain an important driver for working and socialising. In this context, we found that office quality is an important contributor to employee engagement via interior design (e.g., hot-design space, breakout areas), and location (e.g., access to city amenities for a work break). Also, our results suggest that the quality of the office workplace (e.g., aesthetics) additionally contributes to self-reported well-being. The findings from our study additionally suggest that the workplace environment is usually linked to the office rather than a home workplace. We observed that most of our interviewees explored the physical workplace quality in the context of the corporate office. This may be explained by the fact that discussion around the home and

its quality is the new one. Employees working for knowledge-based corporations were never asked about it, and the post-occupancy workplace evaluations were strongly rooted in indoor (office) environmental quality. The other explanation could be that we interviewed higher organisational representatives who may be more focused on having direct control over their employees and favouring 'face-to-face' interactions. Nevertheless, we observed that the importance of direct human connectivity for better employee engagement emerged in both employee surveys and organisational interviews.

Moreover, our study results shed new light on commuting as an integral factor directly associated with the demand for more flexibility around the expectations of having to work at the office. The majority of our participants needed to travel to work for more than one hour daily, resulting in the view that flexible work arrangements 'added value' to organisational outcomes; this was reinforced through participants' self-reported performance, and productivity when allowed to work out of office. Therefore, we argue that workplace flexibility and a decreased need for daily commutes can substantially contribute to employees' ability to balance the physiological strain and psychological costs of this travel with working from home (e.g., providing extra time and money for health and well-being activities). Our participants associated fewer commutes with both economic and time savings.

The interview part provided additional insights in terms of challenges for the workplace ecosystem which may impact employee engagement. Some of the 'most pressing' factors included a virtual workplace adoption underpinned by organisational policies. Also, the physical distance from the main headquarter was pointed out as an organisational risk for employee engagement. However, the earlier discussion highlighted that work-from-home has some benefits for employee engagement as well.

Considering that "employees will be more engaged in workplaces that provide them with physical, emotional, and psychological resources necessary for role performance" (Saks and Gruman, 2014, p.160), we argue that a workplace ecosystem can better facilitate employee engagement than the traditional office environment, contributing to feelings of vigour, dedication, and absorption with work. Both employee survey results and organisational interviews confirmed this.

Contributions

Our findings contributed to the organisational psychology and environmental psychology literature by focusing on the interaction effects of a workplace ecosystem and organisational

outcomes (e.g., employee engagement). We referred to recent studies on a workplace ecosystem and organisational outcomes (e.g., productivity, satisfaction with working from home and work-life balance) (Yang et al., 2021, Gauger et al., 2022), but we focused on the relevance of a workplace ecosystem for employee engagement.

Researchers have been examining the beneficial outcomes of a physical workplace environment for employee performance, productivity, etc. for a few decades. However, no explicit study has shown how a physical workplace environment impacts employee engagement in light of a post-pandemic reality. Though, we adopted a definition of employee engagement by Schaufeli et al. (2002) for this new context of work. Therefore, our research contributed to further informing this relationship. Our work complements the existing studies by showing that a workplace ecosystem as a job resource is more suited "to reduce job demands and the associated physiological and psychological costs, and functional in achieving work goals" (Schaufeli and Bakker, 2004a, p.296), to facilitate optimal engagement. Hence, our study helps to better understand the relationship between employee engagement and the physical workplace which received so far less attention among researchers (Bergefurt et al., 2022).

By explicating the nuanced relationship between a workplace ecosystem environment and employee engagement, we challenged the assumption that employee engagement is negatively related to hybrid work patterns (Sardeshmukh et al., 2012). Theoretically, our findings built upon organisational psychology research on employee engagement (Bakker et al., 2008, Demerouti et al., 2001, Maslach et al., 2001b, Xanthopoulou et al., 2007, Saks and Gruman, 2014) and environmental psychology studies examining direct environmental effects on organisational outcomes (Kegel, 2017, Feige et al., 2013c). However, we looked at the role of a workplace ecosystem in employee engagement as an interplay of both social and physical factors. Hence, we found flexibility - affiliated with a workplace ecosystem - to be an important driver of employee engagement. Practically, results underscored the importance of distributed workplaces for employee engagement. In sum, we concluded that neither home nor office environments are more conducive to employee engagement, but the hybrid version of both.

Practical Applications

Our study shows that different environmental characteristics can offer different conditions to support certain work tasks. For example, an office environment is more suited to facilitate human interaction that matters for teamwork, collaboration, private relationships, etc. In contrast, a home environment is more appropriate to do focused work. Our results confirm that

a home environment offers more personal space which cannot be offered by a modern open-plan office. This finding refers to the previous studies emphasising that modern open-plan offices are very often a source of employee acoustic complaints (Danielsson and Bodin, 2009, Mak and Lui, 2012, Haapakangas et al., 2017, Pejtersen et al., 2006, Kaarlela-Tuomaala et al., 2009) and low privacy level (Sundstrom et al., 1980, Weber et al., 2021). Hence, an office environment needs reconsideration (e.g., activity-based office design) in light of a workplace ecosystem, to better fit with new expectations posed by employees (Oygür et al., 2022).

Moreover, our results suggest that an office environment better facilitates social relationships at work (e.g., private and professional) - and these are important drivers of employee engagement. On the one hand, our research confirms that an office environment is a source of distractions from other people (Baethge and Rigotti, 2013) impacting concentration on individual work (Oldham and Rotchford, 1983). On the other hand, it creates opportunities for human interaction that matter for social/professional life. Given that 'task privacy' (i.e., one of the work privacy types) is defined as "the ability of being able to focus on work" (Weber et al., 2021, p.70), there are clear linkages with employee engagement (i.e., absorption). Assuming that there are different work tasks in organisations (e.g., individual/teamwork) (Soriano et al., 2020), the office environment should rather help with these that are based on collaboration in teams of different sizes to effectively facilitate a social space (Will-Zocholl, 2021) for face-to-face interactions (Weijs-Perrée et al., 2020, Appel-Meulenbroek et al., 2017) rather than simultaneously fit with all tasks performed at work (e.g., activity-based workspaces) (Eismann et al., 2022, Hoendervanger et al., 2022, Davis et al., 2020b, Wohlers et al., 2019, Gerdenitsch et al., 2018). Hence, we conclude that dynamic interaction and concentrated work can be facilitated by a workplace ecosystem, in opposite to the pre-pandemic research focused on open-plan settings within traditional office environment (Hua et al., 2011, Bodin Danielsson and Theorell, 2019). Concluding, our study has practical implications for organisations considering a transition to hybrid work practices post-pandemic.

Limitations and Future Directions

Our studies are limited in several ways. Although our study focused on employees based in Greater London Area and its surrounding, hybrid work should theoretically benefit knowledge workers in all geographical regions – future research taking a comparative approach between different cities can help clarify the potential effect of hybrid work on organisational outcomes.

Our sample featured primarily knowledge workers from the real estate sector, suggesting concerns of generalizability to the wider knowledge workers population.

Another issue that has not been addressed in our study of a workplace ecosystem is the inclusion of co-working spaces where people may be from different organisations, but work together in a shared space. As such workspaces are primarily dedicated to small organisations (e.g., start-ups and freelancers) by providing cheaper office rental offers than the prime office real estate sector, they additionally allow social interaction and collaboration with other professionals, resulting in additional benefits (e.g., increasing visibility on the market, exchanging ideas, and getting new clients). However, it is not known yet how this type of workspace contributes to employee engagement in large global corporations where knowledge workers are primarily co-located in a dedicated prime office environment shared with their colleagues from the same organisation. For instance, it would be worth addressing in future research how the office quality in such third spaces resonates with vigour, dedication, and absorption. Given that many of these types of 'supportive' workspaces are in prime city districts with quality indoor spaces, it can be expected that the workplace environment they offer may contribute to employee engagement as well. Moreover, a wide distribution of such workspaces across the city can be well adapted to the workplace ecosystem scenario as they may be situated near many home workplaces. It can be expected that leasing co-working space will decrease their prime office footprint and let their employees work in a way that suits them best. However, the common access to co-working spaces would demand organisations to cover employee memberships and add extra costs to their business operation. Given that employees in large knowledge-intensive organisations are required to collaborate within their respective organisations, it is not known how co-location to third spaces benefits social interaction with colleagues from their own companies. In our study, the participants reported a very limited use of such spaces so we excluded this data from our analysis.

Finally, data were collected in the pandemic time, so the individual perception of a workplace ecosystem may be unique to that period – replicating results in non-pandemic circumstances would be beneficial. Acknowledging these limitations, we contend this study advances a nuanced understanding of employee engagement in a workplace ecosystem.

Conclusion

In conclusion, we are contributing to the literature on hybrid work practices and employee engagement, by examining the relationship between a physical workplace environment and employee engagement. Based on the primary data, we investigated that a workplace ecosystem is more conducive to employee engagement in knowledge-intensive organisations, in comparison with a single-place workplace environment (i.e., home or office). We found that a workplace ecosystem offers a better fit with non-work related duties and provides environmental conditions suited to individual/professional needs. Such findings theoretically challenge the ongoing debates regarding work-from-home versus fully office-based work. Practically, this study underscores the need for wider adoption of hybrid policies by knowledge-based organisations.

CHAPTER 7: 'Engaging' Workplace Ecosystem Post-Pandemic: A Fit with Future Workplace Strategies?

Martyna Joanna Surma, Richard Joseph Nunes, and Caroline Rook

Abstract

Purpose – Triggered by the acceleration of hybrid work practices during the COVID-19 pandemic, this study sheds light on future development and utilisation of the workplace environment for knowledge-based organisations and investigates how/if the global real estate (workplace) sector aims to catalyse this transition. The specific focus is put on the development of an 'engaging' workplace post-pandemic.

Design/methodology/approach – A qualitative study was conducted to explore future workplace scenarios via in-depth interviews with eleven experts representing the global real estate (workplace) sector. All interviewed experts came from the real state (workplace) sector and focused on different aspects of the workplace environment (e.g., management, design, and evaluation).

Findings – The findings highlight that the evaluation of a workplace ecosystem needs better alignment between organisational and the workplace industry metrics in the wider city context to ensure a successful transition to an 'engaging' workplace ecosystem post-pandemic. The study emphasises the necessity of wider adoption of workplace certificates/metrics in the city context to fully embrace the post-pandemic workplace ecosystem.

Originality/value – This is a topical and timely study that presents future workplace scenarios projected by global workplace leaders. The findings obtained through in-depth interviews provide recommendations for organisations considering a permanent shift to hybrid work practices, corporate real estate leaders, and city planners. Additionally, the findings of this study provide a practical lens to look at future changes in the evaluation of an 'engaging' workplace in a wider city context.

Keywords Employee engagement, Environmental satisfaction, Post-COVID-19 workplace ecosystem, Office workplace environment, Corporate real estate, Corporate social responsibility

Paper type Research paper

1. Introduction

The COVID-19 pandemic has widely accelerated new trends in how knowledge work is performed (Ipsen et al., 2021), subsequently affecting all sub-sectors of real estate markets (e.g., office and housing) (Balemi et al., 2021, Carson et al., 2021) and the way we envisage the new

dynamics of post-pandemic cities (Batty, 2020). A global shift from '5-day in the office' to fully remote work-from-home (WFH) has unexpectedly encouraged many organisations and the real estate sector to think differently about what constitutes a workplace environment (e.g., home, office, third places, etc.) and how this workplace ecosystem impacts organisational outcomes (Boland et al., 2020). The generally positive WFH employee experience (Barrero et al., 2021) has been accompanied by statements made by the most prominent global agencies projecting a permanent transition to a 'total workplace ecosystem' (Cushman & Wakefield, 2020b) with 'adaptive workplaces' (Deloitte, 2021) underpinned by a high-quality urban realm to fully embrace 'workplacemaking' as a whole (IPUT & ARUP, 2020). Given that hybrid work practices became a 'new normality' for the majority of global organisations nowadays, it also has an unpreceded impact on organisations and their employees (Future Forum Pulse, 2022). After the initial debate 'home versus office', there is growing evidence of 'hybrid' as the best option for all (Williamson and Colley, 2022, Naor et al., 2021, Teevan et al., 2021), including the youngest workforce (Pataki-Bittó, 2021). Also, the latest research confirms an acceleration of hybrid work patterns (Fiorentino et al., 2022). However, this creates a new set of challenges for both organisations and the real estate sector in terms of ensuring a smooth transition to an 'engaging' workplace environment post-pandemic (Surma et al., 2021). Therefore, the role of the office post-pandemic needs to be re-examined to better accommodate a hybrid workforce (Vinopal, 2022, Orel, 2022, Gillen et al., 2021). Additionally, performance measurement in corporate real estate requires adaptation to the new world of work (Puybaraud et al., 2022). Considering the key role that the real estate (workplace) industry sector (e.g., IWBI; Leesman; Skanska; Arup; CBRE; Cushman & Wakefield; and WiredScore) plays in providing global standards on how to create and evaluate the office workplace environment, we argue that a new set of guidelines is needed to allow knowledge organisations to operate successfully in an 'engaging' workplace ecosystem post-pandemic.

Research questions and structure of the article

This study aims to answer the following research questions (RQ):

> *RQ1*. Is there an alignment between an 'engaging' workplace ecosystem and future workplace strategies?
>
> *RQ2.* What are the options for the development of an 'engaging' workplace ecosystem post-pandemic?

The remainder of this paper proceeds as follows. Section 2 presents the literature review. Section 3 outlines the research methods of this study. Section 4 reports the results, and Section

5 further discusses the findings. Section 6 concludes the study by highlighting the value of this study and the future directions regarding the 'engaging' workplace post-pandemic.

2. Literature review

2.1 The impact of the COVID-19 pandemic on real estate markets

The COVID-19 pandemic has substantially changed the way we think about the future of real estate markets (Balemi et al., 2021, Carson et al., 2021) and how to plan our cities in this new context (Batty, 2020, Batty, 2022, Florida et al., 2021). There is observed a major shift in the prevalence of remote and hybrid work arrangements affecting residential and commercial real estate values and the future of cities with consequences for productivity, innovation, local public finance, and the climate (Van Nieuwerburgh, 2023). For example, in terms of commercial real estate, investors expect rents to rise in suburban areas relative to urban areas shortly (Rolheiser et al., 2022). The commercial rent gradient falls by roughly 15% in transit cities, and the premium for proximity to transit stops also falls (Rosenthal et al., 2022). In 2023, the real estate industry reports that take-up in Central London's offices totalled 2.1m sq. ft., standing below the long-term average by 33% in the first quarter of the year (CBRE, 2023). Even pre-pandemic, over the two years from 2018 to 2020, the residential property increased in value by 10% whilst the value of the commercial property stock has fallen by 9% (Mansley, 2022). In effect, landlords expend into flexible space due to increased demand from corporate tenants for shorter leases and greater agility (JLL, 2022). The real estate industry reports that 56% of corporates consider operationalizing hybrid work models to support agility and flexibility a top priority between 2023 and 2025 (JLL, 2023a).

In light of the above pandemic-related consequences, the global agencies project that the office real estate sector – due to the expected increase in office vacancy – may need to be adapted to other (i.e., non-office) functions (CBRE, 2022, Boland et al., 2020) which may potentially meet housing demand in future (Cunningham and Orlando, 2022, Ward and Schwam, 2022). The newest research documents large shifts in lease revenues, office occupancy, lease renewal rates, lease durations, and market rents affecting both current and expected future cash flows for office buildings (Gupta et al., 2022). While some changes in the current use of offices may be temporary or more dynamic, other adjustments may be permanent (e.g., working from home and portfolio rationalisations) and trigger structural changes across cities (Fiorentino et al., 2022). For example, nowadays companies invest in the "new office," bringing in more conference rooms and technology to blend in-person and remote workers (JLL, 2023b).

2.2 Environmental, social, and corporate governance in the workplace ecosystem

The built environment contributes almost half of the global greenhouse emissions, so there is constant pressure on the property and real estate sector to develop more sustainably-oriented investments (Wilkinson et al., 2018). Given that the owner of real estate assets may be either an investor or an owner-occupier, both should be equally aware of the wider sustainability issues of social and environmental responsibility concerning real estate and considering the emerging role of sustainability as a driver for real estate decision-making (Smith et al., 2006). For instance, some studies report that eco-certified buildings have both a rental and sale price premium (Fuerst and McAllister, 2011). However, sustainable building owners and tenants often benefit from reduced operating costs during the building lifecycle (Wilkinson et al., 2011), but the adoption of sustainable principles suffers due to a lack of evidence relating to the financial benefits and uneven distribution of costs and benefits between owners (investors) and occupiers (Falkenbach et al., 2010). Some studies suggest that a green workplace offers greater psychological benefits (i.e., taking pride of the workplace environment) to occupiers than physical improvements (i.e., health and productivity gains) (Kato et al., 2009).

Given that corporate social responsibility (CSR) is a "rapidly expanding high-profile phenomenon that influences organisations to consider the impact that their working practices have on the environment and society" (Barthorpe, 2010, p.5), paying higher rental costs for green-certified buildings makes intuitive sense if tenants perceive benefits in human talent retention, increased productivity, and/or corporate social responsibility (CSR) advantages (Robinson and Simons, 2018). Hence, the property development industry is considered to be responsible for sustainable practices in the built environment by adopting more rigorous measurement tools (Wilkinson et al., 2015). Although location remains the dominant consideration in decision-making for occupiers, sustainability is key to CSR and 'value-add' in certain sectors (Livingstone and Ferm, 2017).

In light of the above discussion on sustainable real estate, Langston and Al-khawaja (2018) elaborated on the term 'workplace ecology' understood as a "balance of factors that contribute to the health of an 'eco-system' that is fundamental to corporate success and continuous improvement" (abstract). Subsequently, the authors considered the 'workplaces' as "eco-systems that are important to business goals and ultimate success" (p.277), and the 'workplace ecology when organisation, space and technology are in harmony to support human endeavour" (p.277). Given this paper's interest in the 'workplace ecosystem', it can be argued that hybrid work practices can contribute to CSR compliance due to reduced CO2 emissions (and related carbon footprint) resulting from working from home and improving

employee health and well-being due to greater flexibility offered. Therefore, in light of hybrid work patterns, the model proposed by Langston and Al-khawaja (2018) should not be limited to the office real estate sector but extended to the wider workplace ecosystem.

The research conducted by Dixon et al. (2009) suggested that occupiers in certified buildings (e.g., BREEAM) from business sectors with strong environmental and corporate responsibility policies, placed more emphasis on sustainability than other groups in the final choice of office, but location and availability remained paramount. Considering the growing popularity of hybrid work patterns, it can be discussed now if knowledge-intensive organisations should subsidise living expenses related to occupying sustainable residential markets by their workers. Additionally, it remains a question for future studies, if offices more widely distributed across the city (e.g., satellite offices in suburban areas) to ensure greater connectivity with residential areas, are of higher interest to knowledge-intensive organisations. The latest research confirmed that, in terms of commercial real estate, investors expect rents to rise in suburban areas relative to urban areas shortly (Rolheiser et al., 2022). However, more research is needed to investigate the perception of tenants in sustainable residential buildings as current studies are largely limited to the office sector (Jailani et al., 2015) located in central business districts (Levy and Peterson, 2013).

Since this paper is focused on the 'workplace ecosystem' dedicated to knowledge-intensive organisations, it can be argued that – in the context of hybrid work patterns – both the office and residential sector's workplaces would play a substantial role in contributing to both sustainable property markets and the social and environmental responsibility (i.e., Environmental, Social, and Corporate Governance – ESG). Hence, there are clear linkages between cities and organisational approaches to sustainability that can be merged for mutual benefits. For example, expanding the real estate certification portfolio to the wider urban environment can contribute to both sustainable urban development and improving organisational performance. Still, more research is needed to fully understand how sustainable real markets in a wider urban/suburban context can contribute to knowledge employee outcomes (e.g., employee engagement, performance, and productivity).

2.3 Employee engagement post-pandemic

Employee engagement is a relatively novel construct which is originally rooted in the field of organisational psychology and is still evolving (Schaufeli and Salanova, 2007, Saks and Gruman, 2014). It is one of the key organisational outcomes, so both researchers and businesses are equally interested in how to create an 'engaging' workplace environment (Schaufeli and

Salanova, 2014b, Harter et al., 2002). It can be observed that due to a wide interest in the construct itself, there is a constantly evolving number of definitions elaborated in different fields of research (e.g., human resources and management studies) (Saks, 2006a), not to mention those which emerged out of academic circles (e.g., business-oriented magazines) (Attridge, 2009, Albrecht, 2010a, Bailey et al., 2017). As a result, there are many metrics developed to measure engagement according to various characteristics (Shirom, 2003). However, it can be noticed a strong focus on the quality of a social rather than the *physical* workplace environment (Kumar and Sia, 2012, Osborne and Hammoud, 2017, Rana et al., 2014). Subsequently, the physical workplace remains an underestimated point of consideration in terms of what constitutes an 'engaging' workplace environment per se, especially in the context of "a post-COVID-19 workplace ecosystem—a network of physical and virtual places where work occurs, including office, home, third places, and surrounding urban realm" (Surma et al., 2021, p.4).

In contrast to the socially-focused understanding of 'employee engagement', there is growing evidence of the relationships between the indoor environmental quality (IEQ) of the physical office workplace environment, environmental satisfaction of employees, and organisational outcomes (e.g., productivity, performance, job satisfaction, and workplace well-being) (Appel-Meulenbroek et al., 2016, Haynes, 2007, Brunia et al., 2016, Kegel, 2017, Wyon, 2004b, Vischer, 2008, Chadburn et al., 2017a, Brinkley et al., 2010a). For example, there are numerous studies on environmental factors, including air quality, biophilic design, daylight, views, and temperature, among others (Jamrozik et al., 2019, Clements-Croome, 2004, Kwallek et al., 2007a). Additionally, there is a significant number of findings around office design and related employee activities (e.g., open-plan office design and activity-based office design) (Candido et al., 2021, Kroemer and Kroemer, 2016). But research on employee engagement and the physical workplace remains scattered and focused on full-time office work (Smith, 2011, Feige et al., 2013c, Klotz, 2020, Augustin, 2020). In contrast, some of the pre-pandemic studies demonstrate that different physical environments influence the satisfaction of occupants depending on the type of activities performed at work (Chacon Vega et al., 2020). However, it remains unclear how the office quality standards are relevant for employee engagement with a focus on the post-pandemic (i.e., hybrid) workplace scenario. Therefore, a more interdisciplinary approach is needed to further advance the broad and diverse field of physical office environment studies and to clarify the causal relationship with organisational outcomes (Appel-Meulenbroek et al., 2018).

2.4 The role of the office in the workplace ecosystem

It can be observed that the recent studies largely emphasize the importance of redesigning the office workplace post-pandemic (Hou et al., 2021) highlighting the emergence of multi-location of work, a new value for the headquarters and diversity empowerment as avenues for future real estate strategies (Tagliaro and Migliore, 2021). However, some studies point out that hybrid working preferences differ among employees which creates extra challenges in terms of attracting them back to the office (Appel-Meulenbroek et al., 2022). These results are in line with pre-pandemic research indicating differences between office users' work environment preferences concerning some characteristics of the work environment based on, for example, how they work (Rothe et al., 2011). Therefore, more studies on a post-pandemic office workplace are needed to present convincing business cases for organisations, as office buildings are effective when they do account for basic individual and organisational needs (Oseland, 2009). Given a growing number of studies on WFH (Cuerdo-Vilches et al., 2021, Davis et al., 2020a, Waizenegger et al., 2020, Xiao et al., 2021) and its relevance for organisational outcomes (Awada et al., 2021, Ipsen et al., 2021, Kotera and Correa Vione, 2020, Colley and Williamson, 2020, Yang et al., 2021, Hickman and Robison, 2020, Russo et al., 2021), we argue that a new perspective on an office workplace is needed to adequately support organisations working in a hybrid mode. Referring to the concept of 'flexible workplaces' aiming to stimulate new ways of working (i.e., dynamic, less closely linked to place and time), without reducing employee satisfaction (Van Der Voordt, 2004), we argue that the office post-pandemic and its quality should be more tighten to the new context of work. For example, as face-to-face interaction with colleagues is one of the most important reasons for employees to return to the office post-pandemic (Marzban et al., 2021), more research is needed to explore the relevance of a quality office environment to facilitate this interaction.

Although one of the latest pre-pandemic studies suggests that hybrid work practices (i.e., activity-based office work with occasional teleworking) are conducive to engagement (Appel-Meulenbroek et al., 2020), more research is needed to clarify a new role of the quality office environment in employee engagement, with the focus on organisations operating in a fully hybrid mode. The previously mentioned study identified three physical work environment constructs (i.e., distraction, office comfort, and teleworking) to have significant relations with employee engagement. However, distraction in the office environment which has a direct and indirect (through overload) negative relation with the individual strain (meaning increased exhaustion) (Appel-Meulenbroek et al., 2020), may be reduced in many cases by WFH. Also, a

home workplace may increase feelings of autonomy, which has a positive relationship with work engagement (Maslach and Leiter, 2008). Considering that office comfort has indirect positive relations (through recognition and appreciation) with interpersonal strain (meaning increased involvement), we argue that there is a growing need to explore how environmental satisfaction in the office workplace post-pandemic is related to vigour, dedication and absorption (i.e., all employee engagement components according to the Utrecht Work Engagement Scale - UWES) (Schaufeli and Bakker, 2003). Therefore, we can assume that a workplace ecosystem can significantly contribute to 'full engagement' - a broader conception of engagement beyond 'a commitment-based view' to a more 'human-oriented' holistic sense of thriving and well-being (Robertson and Cooper, 2010).

In light of the above, in this paper, we seek to explore the future development and utilisation of an 'engaging' workplace for knowledge-based organisations and investigate how/if the global workplace sector aims to catalyse this transition. The literature review conducted for this research suggests that research on the workplace environment and employee engagement post-COVID-19 is limited. Additionally, the relationship between the physical workplace environment and employee engagement is underestimated. We argue that the role of the office workplace post-pandemic needs to be reconsidered in the context of a wider workplace ecosystem scenario. Also, we aim to explore options for a successful transition to an 'engaging' office workplace post-pandemic for knowledge-based organisations. To elucidate this, in-depth interviews with global office workplace professionals were conducted to collect empirical data.

Our previous findings indicated a positive relationship between the physical workplace environment, employee behaviours (e.g., work breaks) and all employee engagement components, and the value of hybrid work in that context. In the present study, we aim to further explore how these preconditions of an 'engaging' workplace are addressed in future workplace scenarios by global workplace leaders and what steps might be needed for a successful transition to an 'engaging' workplace post-pandemic.

3. Method

3.1 Data and sample

Study 4 was based on 11 in-depth semi-structured online 40-min interviews (MS Teams) with global industry experts/consultants for workplace design/evaluation/management recruited externally (i.e., vice president of research, executive managing director and global lead, head of

EMEA, senior environmental advisor, senior product manager, chief insights & research officer, workplace strategist, head building-environment, senior associate market solutions in Europe, integrated cities & planning leader in Europe, and country director in the UK & Ireland). Aside from individual professional backgrounds, the organisational focus on the office workplace was another criterion for interviewee selection.

Table 1 shows the background information of the eleven interviewees, including their positions and the nature of the organisation in which they are working.

Interviewee	Position	Nature of the organisation
1	vice president of research	workplace design
2	executive managing director and global lead	workplace management
3	head of EMEA	workplace management
4	senior environmental advisor	workplace design
5	senior product manager	workplace evaluation
6	chief insights & research officer	workplace evaluation
7	workplace strategist	workplace management
8	head building-environment	workplace design
9	senior associate market solutions, Europe	workplace design
10	integrated cities & planning leader, Europe	workplace design
11	country director, UK & Ireland	workplace evaluation

Table 1. Background of the interviewees

3.2 Procedure

A qualitative approach was similarly adopted in Study 4. To explore an 'engaging' workplace ecosystem post-pandemic, in-depth interviews were considered to be the most efficient way to obtain information from global workplace practitioners. In-depth interviews are particularly suited to developing knowledge about poorly understood areas, often having an exploratory-discovery orientation (Legard et al., 2003). Estimating an adequate sample size to achieve saturation is a long-standing problem in interview-based qualitative research. A blend of non-probability convenience and snowball sampling (Onwuegbuzie and Collins, 2007) was used for interviews to identify the respondents based on a combination of requests for participation from professional contacts and/or recommendations from these professional contacts.

As an incentive for participation, an information leaflet with information about the project was provided. Consent was obtained from all participants. All participants participated voluntarily and did not receive any reward. The study was conducted remotely during the 4 months of February - May 2022. Respondents were provided with an information sheet on the research project in advance and completed a consent form. The interviews were transcribed, anonymised, and then analysed. Initially, the data was coded to identify common themes and

then re-coded to rationalise the list of themes and identify connections. Findings are centred on themes which have emerged from the interviews. Experts' views on an 'engaging' post-COVID-19 workplace ecosystem and future workplace strategies were explored. The main focus was to obtain deeper insights into how future workplace strategies were aligned with hybrid work post-pandemic, to enable the identification of factors shaping hybrid work practices, which may have been overlooked in questionnaire-based surveys with employees.

4. Results

Interviewees' responses were categorised according to three topics: 1) The post-COVID-19 expansion of the 'workplace' definition, 2) 'Engaging' post-pandemic workplace, and 3) Future workplace strategies. Under each topic, we identified themes that emerged from the interviews inductively.

4.1 The post-COVID-19 expansion of the 'workplace' definition

Interviewees' responses regarding the expansion of the 'workplace' definition were synthesised according to the following timeline: pre-pandemic, at the very beginning of the pandemic (first 6 months), during the pandemic (2 years), and post-pandemic (future). Under each period, they described how the understanding of the workplace evolved/will evolve.

According to interviewees, the pre-pandemic workplace was generally perceived in the context of the commercial corporate office as a central hub (a primary workplace location) for knowledge workers (interviewees 5, 6) - a place where employees travel to, with occasional use of third spaces (e.g., hotel rooms, cafes, airports, train, etc.) with the support of mobile technologies (interviewee 1). Our interviewees emphasised that the pre-pandemic workplace was a created/designed space for employees in the form of an office (interviewee 10) to ensure the completion of work tasks (interviewee 1).

However, at the very beginning of the pandemic (first 6 months), office-based knowledge work transitioned to physically isolated work-from-home (WFH), minimising employee capabilities of using shared co-working environments (e.g., corporate office, flex space, etc.). As a result, the physical workplace environment was dramatically limited to the home environment's facilities (e.g., kitchen table, living room sofa, etc.) and without ergonomic support from organisations (interviewee 9). Nevertheless, this new situation forced organisations to improve the functioning of the virtual workplace, subsequently allowing employees to effectively work from home (interviewee 9). As observed by our interviewees, work from home became productive mostly due to technological advances (interviewee 1) and the workplace environment

transformed into something created by employees (interviewee 10). Hence, the pandemic positively changed the perception that homework can be as effective as office work (interviewee 11). Moreover, the mass adoption of remote working speeded up due to the pandemic (interviewee 3) and allowed knowledge workers to effectively 'work from anywhere' as the workplace environment accelerated beyond the physical boundaries. A generally positive experience of working from home led to global discussion around the necessity of investment in office-related infrastructure (e.g., commercial office workspace, workplace certifications, etc.) (interviewee 1). The global interest in remote work has been accompanied by growing organisational resiliency in producing successful results without coming to the physical office (interviewees 1, 2). Our interviewees noticed that the first two years of the pandemic significantly contributed to the acceleration of pre-pandemic trends about the workplace understood as an expanded platform upon which work happens (i.e., home, office, third places, etc.) (interviewees 1, 2, 3) where both the home and the office became the primary work environments, and other places (e.g., cafés, airport lounges, etc.) remained transient (interviewee 10).

Moreover, our interviewees observed that the post-pandemic workplace will comprise different layers, including the physical/spatial (interviewees 5, 6, 8, 9, 10), virtual/digital (interviewees 2, 5, 6, 9, 10), cultural/societal (interviewees 5, 6, 9), and experiential (interviewee 2). All of these layers will be merged in a variety of distributed locations (Interviewees 3, 5) creating blurred lines between the physical workplaces (e.g., home/office) (interviewee 11). This definition of the workplace will be especially relevant in the context of white-collar workers (interviewee 11). Our interviewees agreed that the pandemic has broadened the definition of workplace environment (interviewees 6, 7, 10) as an ecosystem of spaces comprising the physical and the cultural/team environments (interviewee 7). As a result, the pandemic has affected how we work now as a society in a flexible workplace (interviewee 4) allowing greater productivity and collaboration (interviewee 11). Practically, the workplace environment will be anywhere work is conducted (interviewees 1, 3, 6) with the support of mobile technologies (interviewee 1).

4.2 'Engaging' post-pandemic workplace

Interviewees' responses regarding an 'engaging' post-pandemic workplace were synthesised according to the following themes: social relationships, a quality office environment, and a home workplace.

According to our interviewees, employee engagement post-pandemic will be perceived in the context of 'affiliation' (a shared experience which creates lasting connection) driven by a workplace platform to develop relationships and engagement (interviewee 2). Therefore, organisations can incentivise engagement by organising activities for employees (e.g., free lunch) (interviewee 5). Our interviewees observed that employee engagement understood as communication/networking is more important in a workplace ecosystem due to the increase in the physical separation between employees (interviewee 4). Hence, the role of the office will increase due to hybrid working, as a connection between people and place/other people is important for engagement (interviewee 3). In light of the above, an office workplace is a tool for engagement and well-being, encourages interaction, knowledge sharing more effectively, etc. (interviewee 3), and helps to facilitate in-person collaboration (interviewee 8).

An 'engaging' workplace post-pandemic means creating affiliation through employee 'experiences' (physical and digital) at the workplace to foster connection and work effectively and efficiently, underpinned by technology support (interviewee 2). In general, a quality office increases engagement (interviewee 4, 6) and productivity (interviewee 4) due to the observed correlation between workplace experience and engagement (interviewee 3). In light of the above, a quality office contributes to the overall workplace experience (interviewee 6) and encourages employees to work there (interviewees 1, 11). Specifically, our interviewees noticed a positive role of an open-plan office for an 'engaging' workplace. As explained, a diversified workplace environment (e.g., focused work, collaborative work, etc.) can better fit with different work tasks (interviewee 8) allowing better engagement (interviewee 10). Additionally, sitting in different office areas increases engagement due to greater networking/collaborating opportunities (interviewee 4). Also, a quality office environment (e.g., ergonomics, lighting, acoustics, etc.) has an impact on the sense of being taken care of and a sense of trust and pride and leads to better employee engagement (interviewee 1). However, an office workplace should be designed to holistically address human health and well-being, offering, for example, recovery spaces (interviewee 1) and healthy food options (interviewee 7). Moreover, our interviewees noticed that an outdoor environment is an extension of an indoor workplace environment (interviewees 6, 9, 11) and can contribute to engagement. For example, the ease of access to an outdoor environment (e.g., work breaks) impacts employee engagement through the restorative effect of nature (interviewees 4, 7, 9), subsequently impacting productivity (interviewee 4), focus (interviewee 9), well-being (interviewee 3), and interaction between employees (interviewee 11). Nevertheless, an 'engaging' workplace environment needs to be

underpinned by several elements, including physical quality, relevant managerial/HR practices and technological advances (interviewee 7).

Moreover, our interviewees pointed out the significant role of the home workplace in employee engagement post-pandemic. For example, work-from-home (WFH) was associated with work-life balance and allows employees to better cope with everyday life (e.g., the possibility of picking children up from school during a work break, doing laundry during a work break, going for a walk, etc.) and avoid long daily commuting (interviewee 1). In light of the above, a long commute is one of the main benefits of WFH over working in the office (interviewee 1). Nevertheless, as homework allows formal work activities (e.g., video conferencing), it negatively affects non-formal casual activities at work (e.g., socializing, exchanging ideas, and impromptu connections) (interviewee 2), so it hurts teamwork (interviewee 3).

4.3 Future workplace strategies
Interviewees' responses regarding a future workplace scenario were synthesised according to the following themes: flexible work patterns, a new role of a corporate office, digital experience, a home workplace, and mixed-use type developments.

Our interviewees pointed out that future workplaces should adopt general employee autonomy and 'flexible' work patterns to specific employee/organisational needs (e.g., number of days in the office / at home) (interviewees 1, 3, 4, 7, 8, 9, 10, 11). However, this needs to be based on employee individual productivity rather than a top-down organisational approach (interviewees 2, 10), so it all depends on the type of organisation as there is no 'one-size fits all' (interviewees 6, 11). It was observed that working flexibility encourages employees to be in the office according to individual needs (interviewee 5). Therefore, flexibility should relate to both workplace location and working hours (interviewees 4, 8) as people are more engaged if their day-to-day life doesn't interfere with work (interviewee 4).

Our interviewees projected a new role of the corporate office in future, as there will be a lot of experimentation on the future workplace understood more broadly as a 'work platform' meeting employee expectations (interviewee 2). Therefore, there is a growing importance of talking to employees about their workplace expectations, as the office workplace should be arranged according to employee needs (e.g., allowing focused work, collaborative work, etc.) (interviewee 1). An office environment has value for organisational innovation and productivity,

but it needs to 'magnetize' employees to encourage them to come in, so it needs to be a dynamic, vibrant, and exciting place to be (interviewee 2). Additionally, the office workplace increases innovation due to greater interaction among employees (interviewee 5) and has a critical role in centralising employees (interviewee 5). Nevertheless, employees need a reason to be in the office (interviewee 5). In light of the above, a corporate office as an attractive work destination (e.g., investing in events/amenities) should be measured by foot traffic rather than the square feet per employee (interviewee 2).

Moreover, our interviewees found the role of digital experience to be an integral component of the future workplace: connecting the digital experience with the physical environment (interviewee 5), allowing hybrid meetings by digital set-up (interviewee 8), and allowing greater productivity (interviewee 10).

Also, there is a greater emphasis on a home workplace as the extension of the key office, like a 'baby organisation' (interviewee 5). For example, in future, organisations may be more willing to subsidise any costs associated with WFH (e.g., the Internet, heating, chairs, etc.), and use a co-shared space (e.g., membership) more broadly (interviewee 9). In light of the above, one of the interviewees suggested that mixed-use type developments (e.g., '15-min city' concept – leisure, retail, housing, etc.) tailored to satellite offices' location will drive engagement in the future workplace (interviewee 5).

The next section presents our discussion in the context of relevant studies in the field.

5. Discussion

The COVID-19 pandemic will have a long-time impact on how the physical workplace environment is defined and understood, especially in the context of knowledge-based organisations and their employees. Hence, we argue that the workplace ecosystem will have an impact on our understanding of employee engagement as well (Schaufeli and Salanova, 2007, Saks and Gruman, 2014) as previously demonstrated by limited studies on the effect of hybrid work practices on employee engagement (Appel-Meulenbroek et al., 2020). Given that a home workplace pre-pandemic has been rarely considered a 'workplace environment', the COVID-19 pandemic has dramatically shifted it to a new role – integral to the corporate office. As a consequence, the 'knowledge-based workplace' post-pandemic has expanded to the hybrid scenario (Williamson and Colley, 2022, Naor et al., 2021, Teevan et al., 2021). Therefore, the dominance of these two primary workplace locations (home/office) subsequently escalates the

role of 'transient workplaces', including third places (e.g., cafes, libraries, etc.) and other co-working spaces (e.g., flex offices), which have been occasionally chosen to work at in the pre-pandemic era. Moreover, the analysis suggests that the workplace industry leaders are aware of a changing world of work in a distributed ecosystem (i.e., home, office, and third place) and the necessity of re-designing future workplace strategies in that context which reflects the latest academic findings (Fiorentino et al., 2022).

Although there is a growing interest in a workplace ecosystem among industry leaders, this work still falls short of what our earlier study suggests (Surma et al., 2021). However, our results highlight that to some extent the workplace industry visions of an 'engaging' post-pandemic workplace reflect the previous findings indicating a positive relationship between the physical workplace environment and employee engagement, and the value of hybrid work in that context. For example, the workplace leaders highlight the new role of the office environment post-pandemic focused on facilitating human interaction at work. This is aligned with our previous study which found the relevance of the office workplace for socialising at work and therefore better employee engagement. This importance of social relationships at work was highlighted in numerous pre-pandemic studies as well (Kumar and Sia, 2012, Osborne and Hammoud, 2017, Rana et al., 2014). We argue that an 'engaging' workplace environment can be understood as a platform facilitating interactions between employees – 'engaging with others'. This social-oriented context of employee engagement – facilitated by an office environment – emerged previously in our study whilst interviewing organisational high-level representatives. However, workplace leaders point out the relevance of both virtual and physical connectivity. Although the physical (office) workplace remains a core space to enable human interaction, there is a growing interest in merging both the virtual and the physical reality for better employee engagement. The digital aspect was identified previously whilst interviewing organisational representatives as a 'challenge' for a workplace ecosystem. Hence, wider adoption of the virtual workplace aims to facilitate employee engagement 'anywhere' by offering smooth communication between employees either face-to-face or remotely. It can be observed that future workplace strategies are dominated by ensuring a high-quality corporate office environment (i.e., physical quality) extended by a virtual environment for better connectivity among employees and their organisations. Therefore, a blended virtual/physical workplace environment is a flagship workplace strategy in a digital era of knowledge work. This is an indisputable fact considering organisational willingness for permanent adoption of hybrid work patterns in future.

Our results suggest that a workplace ecosystem is more conducive to employee engagement as it offers greater flexibility in terms of work and space, and therefore a better alignment between an employee and their professional/personal life. We argue that vigour, dedication, and absorption with work increase when individual preferences are met. This finding is in line with previous studies in the fields of environmental psychology and real estate emphasising the relevance of comfort (i.e., environmental satisfaction) in the workplace for organisational outcomes (Appel-Meulenbroek et al., 2016, Haynes, 2007, Brunia et al., 2016, Kegel, 2017, Wyon, 2004b, Vischer, 2008, Chadburn et al., 2017a, Brinkley et al., 2010a). Our results suggest that blended physical and virtual environments can effectively support a workplace ecosystem post-pandemic, allowing employees to perform work from a variety of places across the whole 'total workplace ecosystem'.

In light of the above, there is a need for further reflection on the level of employee autonomy/freedom regarding hybrid work. Although the findings of this study underscore the need for wider adoption of hybrid policies by knowledge-based organisations, we argue that the extent to which hybrid work should be imposed or chosen by employees should be discussed internally within organisations. On the one hand, choosing the days on which people come to the office to some point would limit employee autonomy. On the other hand, the top-down decisions help to better coordinate work that needs to be done in-person (e.g., employee collaboration on a joint project). However, our research suggests that keeping the balance between organisational/managerial needs and employee preferences would be the most beneficial for both sides, ensuring an improved level of employee engagement within organisations. There is a question for further research on how to achieve it in the best way. For example, it can be expected that employees living further distances from the core office would be more willing to spend more time at their home workplaces. Therefore, having access to satellite offices or membership in co-working spaces would help to achieve better employee engagement among those working relatively far from the central business districts. Hence, organisations should consider such issues whilst planning their long-term workplace strategies, office leasing preferences, office real estate locations, fit-out-costs, etc.

We argue that the importance of office environmental quality will remain stable as it will play the role of 'centralising' employees in a wider ecosystem of workplaces. This finding is aligned with other studies emphasizing that 'face-to-face' contact is a key value of the office post-pandemic (Marzban et al., 2021). However, to effectively increase 'foot traffic' in the office, it is necessary to re-think an office workplace's function in a workplace ecosystem (Vinopal, 2022, Orel, 2022, Gillen et al., 2021) and develop a new set of performance measures (Puybaraud et

al., 2022) across the whole workplace ecosystem. Although a corporate office has lost the 'privilege' of being the only 'work hub' for knowledge workers, our results suggest that its dominating role in centralising employees will remain stable post-pandemic. However, an 'engaging' workplace needs to be embedded into relevant 'flex' policy allowing employees to work both from home and in the office according to individual preferences and conducted work tasks to maximise the effectiveness of an 'engaging' workplace ecosystem. However, in light of our previous findings stressing the importance of behavioural aspects (e.g., work breaks for replenishing energy) linked with environmental factors (i.e., indoor/outdoor and home/office) for employee engagement, it might be appropriate to re-consider the proposed workplace metrics/standards more broadly. In contrast to previous studies (Candido et al., 2021, Kroemer and Kroemer, 2016), we argue that analysis of employee interaction with the physical workplace should not be limited to behaviours within an office environment.

Although there is a common acceptance of a workplace ecosystem in future strategies, still little is known about the specific evaluations of the home workplace and the wider urban ecosystem in that context (i.e., assessment criteria). Considering the relevance of both environmental and human factors for employee engagement in hybrid work practices, there is a greater need to fully embrace this complexity through the accurate evaluation methodology addressing the whole workplace ecosystem which can be reflected in future workplace strategies. Hence, our results suggest that the workplace environmental quality post-pandemic should be considered more broadly (e.g., physical/virtual, indoor/outdoor, and home/office/third/places), and go beyond the indoor environmental quality assessment (Jamrozik et al., 2019, Clements-Croome, 2004, Kwallek et al., 2007a). Therefore, we argue that an 'engaging' workplace post-pandemic needs more consolidation between the physical infrastructure, i.e., high-quality urban environment (e.g., access to city amenities, green space, sustainable transportation, and quality residential districts), digital infrastructure (e.g., virtual workplace), and organisational management (e.g., flex policy).

In light of the above, our results emphasise that the evaluation of a workplace ecosystem needs better alignment between organisational and workplace industry metrics in the wider city context to ensure a successful transition to an 'engaging' workplace ecosystem post-pandemic. The results also suggest that the new work dynamic will need greater consolidation of the physical spaces where work occurs (i.e., home, office, and third spaces) with the virtual workplace. However, a 'total workplace ecosystem' will need to be underpinned by a high-

quality IT infrastructure to increase the availability of 'work from anywhere' within a wider ecosystem of work. Additionally, wider implementation of a 'total workplace ecosystem' across the whole city area will help to expand high-quality commercial real estate properties (e.g., office and flex space) within different city locations (e.g., core hub, satellite hub, and 'transition' workspaces) and help to attract employees back to the office(s) (Appel-Meulenbroek et al., 2022). Given the considerable role of the housing environment and the growing popularity of WFH, a home workplace will demand greater consideration among organisations (e.g., home workplace set-up) and the workplace industry (e.g., home workplace standards/metrics).

There is also a greater need of rethinking how to successfully implement such a broad spectrum of the workplace ecosystem's metrics in the city context. This is a challenging task considering the high number of stakeholders involved in the process (e.g., city authorities, the real estate industry, and knowledge-intensive organisations). Therefore, we argue that the current workplace certification bodies (e.g., IWBI and BREEAM) might consider expanding the relevant schemes by looking at cities more broadly through the lens of environmental, social, and corporate governance. Hence, the property evaluation in a workplace ecosystem needs to be embedded within a wider city framework. For instance, there might be a need to establish different city typologies that are more conducive to vigour, dedication, and absorption with work according to different human dynamics in a workplace ecosystem (e.g., home, core office, co-working space, etc.). However, this is a long-term process that requires further transdisciplinary research via different methods (e.g., big spatiotemporal data analytics, charrettes, behavioural studies, etc.) and more in-depth collaboration between relevant parties. Nevertheless, more developed cities' characteristics in the context of hybrid work would help to better evaluate how/if existing and planned real estate investment and supportive infrastructure fit with the concept of an 'engaging' workplace in a wider city context. Considering the post-pandemic workplace ecosystem in the wider city context would help to comprehensively compare different indicators according to a variety of trends and patterns that have an impact on employee engagement components. This is an emerging academic/industry research gap that should be addressed in future studies. We believe that the proposed more extended approach towards the workplace ecosystem evaluation will significantly contribute to more informed decisions in terms of where knowledge-intensive businesses can successfully operate without compromising employee engagement.

6. Conclusion

Our research findings suggest that wider adoption of a workplace ecosystem scenario in future workplace strategies can significantly contribute to better employee engagement in knowledge-

intensive organisations post-pandemic. However, this is not a straightforward task considering the complexity of the whole process, the number of actors involved, and still limited research on a workplace ecosystem. Although some significant shortcomings, it can be observed that the current works (academic/industry) regarding future workplaces are in the transition towards a more flexible, digital and physically distributed workplace ecosystem. We, therefore, argue that the quality of such an extended workplace environment will subsequently inform employee engagement levels across the whole ecosystem. Additionally, the growing importance of a home workplace should encourage the global workplace industry to think about the current standards/metrics more broadly. For example, the certification of office workplace quality needs to be underpinned by residential, district, and city-scale developments. This joint approach will holistically contribute to more sustainable employee engagement – with a greater awareness of employees' subjective well-being leading to 'full engagement' – a broader conception of engagement beyond 'a commitment-based view' to a more 'human-oriented' holistic sense of thriving and well-being (Robertson and Cooper, 2010).

CHAPTER 8: Discussion and Conclusions

Chapter 7 summarises and critically discusses the findings of the research (Chapter 7.1.), considering the theoretical and practical implications of the work and how it advances the field (Chapter 7.2.) and sets out suggestions for future work (Chapter 7.3.) with concluding remarks (Chapter 7.4.). Table 1 summarises the research objectives, questions, and findings of the PhD project in light of relevant studies.

Table 1. Research objectives, questions, and the findings of the PhD project in light of relevant studies.

STUDIES	RESEARCH OBJECTIVES	RESEARCH QUESTIONS	RESEARCH FINDINGS
1.	To investigate options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management.	How do academic employee engagement metrics correspond with industry approaches to monitoring workplace design and management? What are the options for the future development of employee engagement metrics and industry approaches to monitoring workplace design and management?	Employee engagement metrics are focused on the quality of social relationships at work whilst industry approaches to monitoring workplace design and management prioritise the physical (office) quality assessment. Traditional employee engagement metrics and industry approaches to monitoring workplace design and management do not fully reflect the recent shift to hybrid work patterns. Hybrid work patterns have implications on our existing knowledge of 'sustainable' property markets in a wider city context. The future development of employee engagement metrics and industry approaches to monitoring workplace design and management should embrace the whole workplace ecosystem (i.e., home,

			office, third places, and urban realm).
2.	To explore the interplay of employee behaviours and environmental factors for employee engagement in hybrid work practices.	To what extent are we able to point to consistent sets of relationships between employee behaviours, environmental satisfaction and employee engagement considering the varying environmental factors of hybrid work?	The physical workplace quality has a positive impact on employee engagement components (i.e., vigour, dedication, and absorption). Environmental satisfaction in the workplace ecosystem has a positive effect on employee engagement components (i.e., vigour, dedication, and absorption) and replenished energy during work breaks. A workplace ecosystem has a positive impact on employee engagement.
3.	To better understand the impact of a workplace ecosystem on employee engagement in hybrid work practices.	How to understand the interplay of employee behaviours, the physical workplace and employee engagement in hybrid work practices? To what extent does the workplace ecosystem contribute to employee engagement in hybrid work practices?	The physical workplace interacts with employee behaviours conducive to employee engagement. A workplace ecosystem supports employee behaviours conducive to employee engagement. A workplace ecosystem can better facilitate employee engagement than the traditional office environment. Flexibility - associated with both employee behaviours and the physical workplace - was identified as the main drivers of employee engagement in a workplace ecosystem.
4.	To explore options for a successful transition to	Is there an alignment between an 'engaging	The future workplace strategies to some extent

	an 'engaging' workplace post-pandemic.	workplace ecosystem and future workplace strategies?	are aligned with an 'engaging' workplace ecosystem.
		What are the options for the development of an 'engaging' workplace post-pandemic?	Future workplace strategies support hybrid work practices via a greater shift to workplace digitalisation.
			Office workplace remains a core element of future workplace strategies.
			A home workplace, third places and wider urban realm remain an underestimated context of future workplace strategies.
			The evaluation of a workplace ecosystem needs better alignment between organisational and workplace industry metrics in the wider city context to ensure a successful transition to an 'engaging' workplace ecosystem post-pandemic.

8.1. Discussion of the Main Findings

In this chapter, the research findings of the four presented studies (Table 1) are drawn together and aggregated as the key findings of the PhD project (sections 7.1.1-7.1.4), and further discussed in the context of the current studies.

8.1.1. Traditional employee engagement metrics and industry approaches to monitoring workplace design and management do not fully reflect the recent shift to hybrid work patterns in the context of the post-pandemic workplace ecosystem (i.e., home, office, third places, and urban realm)

The conducted analysis demonstrates the impact of the built environment on employee engagement in a post-COVID-19 world in which changes to the way we work have been triggered or reinforced. This empirical evidence is aligned with projections made by the global

workplace industry regarding the necessity of adopting home, office, and remote work patterns for the future (Study 1). However, the existing metrics/standards still fall short of what this PhD research suggests in terms of a multi-disciplinary approach to researching the interplay of environmental factors and employee engagement. Therefore, the proposed visions of a 'total workplace ecosystem' (Cushman & Wakefield, 2020b), underpinned by high-quality 'workplacemaking' (IPUT & ARUP, 2020) practices that ensure 'adaptive workplaces' (Deloitte, 2021) for 'hybrid workforce network' (CBRE, 2021b), need wider industry adoption to capture this emergent understanding of a physical workplace that embraces both virtual and physical realities across a variety of workplaces. Yet, considering how early approaches to employee engagement were primarily based on traditional workplace environments, future considerations of different workplace types and their distribution at the city scale, alongside the growing flexibilisation and digitalisation of work, this PhD project sheds new light on our understanding of employee engagement.

Moreover, the PhD research suggests that employee engagement metrics and workplace design and management monitoring tools should overlap to effectively measure employee engagement post-pandemic. Although a growing amount of industry research on 'employee experience' in the physical workplace environment encourages organisations to use indoor environmental quality as a proxy for organisational benefits (e.g., better employee engagement), this PhD project highlights that both indoor *and* outdoor environmental qualities matter for employee engagement in a workplace ecosystem (Study 2 and Study 3). In this context, their role in facilitating better employee engagement can be understood in a two-folded way: i) as physical parameters (e.g., comfortable temperature and quiet workspace allow better absorption with work and successful work task completion), and ii) as city amenities (e.g., access to a nearby restaurant during a lunch break allows replenishing work break and improved vigour whilst creates social bonds among colleagues). Therefore, a link to the 'workplacemaking' concept can be observed, where the workplace environment (i.e., home, office, and third places) is embedded within a wider urban context having a more holistic impact on employee engagement. However, the existing measurement tools do not reflect the consolidated effect of such a network of (work)places on employee engagement. For example, high-performing office buildings may ensure outstanding indoor environmental qualities, but poor connectivity between a home and a core office may affect employee decision to work from home more often. As a result, the quality of social relationships at work – a contributor to employee engagement – may suffer. Hence, considering the total workplace ecosystem post-COVID-19, it may be relevant to consider the 'bigger picture' and to expand existing employee engagement metrics

and workplace tools to the city scale (e.g., wide access to Wi-Fi in third places, development of healthy communities, access to green space for cognitive refreshment, satellite offices located nearby residential districts, and sustainable transportation). The above adaptations to the workplace ecosystem will certainly contribute to more sustainable property markets (Study 1) and help knowledge-intensive organisations to create an 'engaging' workplace for their employees (Study 3).

Study 1 contributes to our understanding of 'sustainable property markets' in a wider city context, especially concerning the 'sustainable' workplace environment for knowledge-intensive organisations based in global cities (e.g., London) where knowledge-intensive businesses agglomerate. Given that the 'sustainable' workplace pre-pandemic was generally referred to as the commercial office real sector and all organisational outcomes were measured in this context, the massive acceleration and adoption of hybrid work patterns have opened up new opportunities for the implementation of certification schemes and subsequent expansion on the real estate market. Additionally, Study 1 highlights that organisational metrics (e.g., employee engagement) should be well integrated with the workplace metrics elaborated by the real estate industry as it helps to achieve all sustainability dimensions (i.e., environmental, social, and economic) more holistically and achieve better alignment with environmental, social, and corporate governance. Hence, it can be argued that the recent shift and ongoing adoption of hybrid work patterns among knowledge-intensive organisations may strengthen the real estate industry's efforts towards more sustainable property markets.

Study 1 emphasises that, for the post-pandemic workplace scenario, it is crucial to develop metrics holistically evaluating the sustainable 'workplace ecosystem' as a distributed network of workplaces (i.e., home, office, and third places). Therefore, such a 'workplace ecosystem' can no longer be limited to central business district development and dedicated metrics for the office real estate sector. Planning of the sustainable office real estate sector should be well integrated with sustainable housing development and providing access to satellite offices, all underpinned by high-quality public spaces (e.g., entertainment, shopping, green space, and restaurants) and supportive infrastructure (e.g., public transportation). Hence, it can be argued that 'sustainable property markets' post-pandemic need to be understood more holistically on the city scale, but implemented locally around the idea of a '15-min city'. Also, Study 1 is aligned with recent studies indicating that urban planners may consider adjusting the amount of land allocated to different usages to meet the evolving demands of urban space in the post-pandemic era (Wen et al., 2022).

Study 1 contributes to research in several disciplines. First, it provides new interdisciplinary insights into the field of real estate and planning by exploring academic/industry measurement technics of the relationship between employee engagement and the physical workplace environment in a post-COVID-19 workplace ecosystem. Second, it contributes to the organisational behaviour field by investigating new research directions on the phenomenon of employee engagement in the workplace ecosystem. Third, it provides robust evidence on the necessity of wider adoption of hybrid work patterns in the fields of both real estate and planning and organisational behaviour.

This PhD research emphasises that existing approaches to both employee engagement metrics and workplace tools are still far from considering this emerging workplace ecosystem despite some recent adaptations (e.g., the home environment assessment). Moreover, this PhD project suggests that this is a complex subject with many variables. That is, future considerations of workplace ecosystems will inevitably require substantial changes in the way we think about the relationship of 'employee engagement' to the 'workplace'.

Study 1 provides robust evidence on the necessity of greater alignment between organisational (i.e., employee engagement) and real estate (i.e., physical workplace environment) metrics in light of a more distributed workplace ecosystem post-COVID-19 (i.e., home, office, and third places). This is an emerging issue considering the wide adoption of hybrid work patterns among knowledge-intensive organisations globally as a result of the COVID-19 pandemic. Study 1 suggests that there is a greater need to reconsider existing organisational and real estate metrics to fully capture the actual impact of the workplace ecosystem on knowledge employees. For example, further research is needed to investigate the validity of the Utrecht Work Engagement Scale (UWES) in different physical workplace environments. Given that this specific scale was elaborated primarily for organisations working full-time in the office, the thorough evaluation of social interactions remains the core aspect of assessing employee engagement. Therefore, Study 1 assumes that more studies are needed with the support of different control variables (e.g., home/office/third places and in-person/remote work) to completely capture any nuances informing employee engagement in a workplace ecosystem. Hence, instead of the development of an alternative scale, more focus is needed on existing tools to be further developed, tested, and validated.

8.1.2. A workplace ecosystem has a positive effect on employee engagement components (i.e., vigour, dedication, and absorption) via the interplay of environmental and behavioural factors

Previous studies found that the quality workplace environment contributes to a variety of organisational outcomes (Kegel, 2017), but the specific focus on employee engagement has been very limited up-to-date. Therefore, this PhD research is in line with the extremely limited literature (e.g., environmental psychology) on the links between the physical workplace environment and its impact on engagement (Feige et al., 2013c). The PhD finding is supported by empirical evidence that environmental satisfaction (i.e., comfort) in the workplace ecosystem is associated with all employee engagement components (i.e., vigour, dedication, and absorption) (Study 2), shedding new light on existing studies on employee engagement that have long been focused on the social rather than the physical environment (Bakker et al., 2014, Rana et al., 2014, Kumar and Sia, 2012, Osborne and Hammoud, 2017). As such, this PhD finding suggests that the notion of employee engagement might be questionable considering a workplace ecosystem. Hence, it can be argued that environmental satisfaction (i.e., comfort) can be considered as one of the antecedents of employee engagement, alongside other significant factors, like leadership and workplace well-being (Anitha, 2014b). Study 2 demonstrates that a part of employee engagement can also be driven by aspects of the work environment such as design and work environment quality (i.e., air quality, thermo-comfort, lighting), which not only create a sense of well-being but indeed might energise cognition, emotion, and behaviour towards common goal attainment and ability to be engaged in the sense of vigour, dedication, and absorption with work (Schaufeli and Bakker, 2003).

Given that staying vigorous throughout the day is important for work-related behaviour (Sonnentag and Niessen, 2008), it can be argued that the physical office workplace can help to facilitate social relationships at work, and then the resulting positive emotions contribute to better employee engagement (Study 3). This PhD finding is in line with previous studies demonstrating how positive relationships enable individuals to personally engage in their work (Kahn, 2017) and resulting how high levels of baseline arousal increase levels of work vigour (Sosnowska et al., 2019). For example, an open-plan office design ensures greater human interaction, meeting rooms allow space for discussion, water coolers provide a chance for random chats, etc. (Study 3).

Moreover, the PhD finding builds on previous studies that have found a positive association between employee engagement and work breaks (Bosch et al., 2018, Kühnel et al., 2017, Sonnentag et al., 2012) but enriches and extends this framework by adding that the physical workplace environment can facilitate replenishing work breaks whilst at work (Study 2). This is in line with previous research stressing the importance of engaging in pleasant activities during work and off work for daily recovery (van Hooff et al., 2011). Hence, in this context, the physical workplace environment contributes to employee recovery which is a necessary process to stay vigorous until work is over (Sonnentag and Niessen, 2008) and supports a psychological detachment that is also positively related to vigour after lunch break (von Dreden and Binnewies, 2017). In contrast to other studies focused predominantly on the indoor characteristics of the workplace environment and organisational outcomes (Wyon, 2004b, Clements-Croome, 2004, Kwallek et al., 2007a, Vischer, 2007, Chan et al., 2007, Chadburn et al., 2017a), this PhD research emphasises the relevance of both indoor *and* outdoor environmental factors for employee engagement. It extends the previous studies on work breaks by demonstrating a positive effect of environmental satisfaction (indoor/outdoor) on replenished energy during work breaks in the workplace ecosystem – understood as the interplay of both employee behaviours *and* the physical workplace. However, the previous studies (and metrics – Study 1) are focused on either human or the physical components and their possible implications for employee engagement. Overall, this PhD research suggests that an 'engaging' post-COVID-19 workplace environment needs to be considered holistically on different levels (i.e., organisational policy, city planning, housing quality, transportation network, office real estate properties, and ICT technology) to fully address all the complexity around it (Study 4).

Although this PhD thesis has focused on global corporations representing the knowledge-intensive sectors, some further reflection is needed in terms of equal treatment of those who cannot work in a hybrid manner and have to perform their jobs 'face-to-face'. For example, in terms of the generalisability of the findings, it can be argued that improved level of environmental conditions at 'face-to-face' workplaces (e.g., hospitals and schools) may have a positive impact on employee engagement as well. Given that some workers (e.g., doctors and teachers) cannot perform their work in a workplace ecosystem, they can be offered (to some extent) more flexible working conditions (e.g., time) adjusted to their schedule with a positive impact on their vigour, dedication, and absorption with work. These co-located workers can also be attracted by their respective organisations by offering them other bonuses (e.g., extra days-off and extra financial compensation).

8.1.3. Flexibility - associated with both employee behaviours and the physical workplace – is one of the main drivers of employee engagement in a workplace ecosystem

Both quantitative (Study 2) and qualitative (Study 3) analyses shed new light on the UWES – the most used employee engagement tool in academic research. On the one hand, this PhD research emphasises the positive role of social relationships in employee engagement post-pandemic which is directly aligned with the content of the tool (i.e., the quality of relationships with supervisors, colleagues, clients, etc.) and the importance of social relationships at work for better employee engagement (Bakker and Demerouti, 2008, Nahrgang et al., 2011, Saks, 2006a) (Study 3). On the other hand, the regression analysis indicates the positive impact of the physical environment (i.e., environmental satisfaction) on the level of vigour, dedication, and absorption with work (i.e., all components of employee engagement according to the UWES) (Study 2). However, the existing version of the UWES does not offer to explore the interplay of environmental factors and employee engagement. Therefore, this PhD research questions to some extent the assumptions behind the notions of vigour, dedication, and absorption which all underpin employee engagement.

While Study 2 highlights the relevance of the interplay between environmental factors and employee behaviours for employee engagement in a workplace ecosystem, Study 3 reinforces this PhD finding by adding that a workplace ecosystem is conducive to better employee engagement via greater flexibility offered (in terms of both employee behaviours and the physical environment), resulting in better alignment between an employee and the physical workplace, and contributing to 'adaptive workplaces' (Deloitte, 2021). This is not a surprising result given that previous studies emphasized the role of flexible human resource management for better engagement (Bal and De Lange, 2015). Therefore, it can be argued that a workplace ecosystem reinforces the alignment between the physical workplace environment, employee behaviours conducive to employee engagement (e.g., work breaks) and all employee engagement components measured by the UWES (i.e., vigour, dedication, and absorption). Therefore, in line with previous findings that engagement facilitates successful task completion (Halbesleben and Wheeler, 2008, Salanova et al., 2005), this PhD research demonstrates that a hybrid environment does play a role in that context as well, as it can be more suited to different tasks (e.g., teamwork, focused work, etc.) (Sailer et al., 2021). It strengthens the role of environmental factors for better employee engagement. As a result, the meaning of employee engagement remains associated with the social environment but is linked with environmental factors. Additionally, it can be argued that a workplace ecosystem is a job resource more suited

"to reduce job demands and the associated physiological and psychological costs, and functional in achieving work goals" (Schaufeli and Bakker, 2004a, p.296).

Study 3 stresses the relevance of different physical workplaces for certain types of behaviours conducive to employee engagement in the workplace ecosystem (i.e., the interplay between behavioural and environmental factors). For example, when participants are asked to elaborate on employee engagement, they point to the conclusion that a home workplace better fits with personal duties, and an office workplace allows direct human interactions at work. But when they are asked to elaborate on an 'engaging' workplace environment, they usually refer to the office workplace as a space allowing 'to be engaged' with others. Therefore, it can be argued that a hybrid version of the workplace offers the best fit to maximise employee engagement.

The level of employee engagement can potentially be strengthened by wider adoption of third places (e.g., café and library) by knowledge-intensive employees. Given the relatively small number of participants using such spaces in this PhD research, these places were excluded from the in-depth analysis. However, considering the wide distribution of these workspaces across the city, it can be expected that they can also contribute to an increased level of employee flexibility and have an impact on employee engagement as well. Therefore, it can be argued that such workspaces embedded within quality urban environments can provide knowledge employees with less formal working environments closer to home workplaces. The high-quality café spots with speed Wi-Fi connectivity are very often an integrated part of contemporary office and residential developments, so it can be expected that they can also contribute to a workplace ecosystem network, similar to co-working spaces. This PhD research suggests that urban amenities can be not only perceived in the context of physical places for conducting knowledge work but also as places where employees can form social bonds and relationships (Study 3). Therefore, it can be argued that such third places understood in light of a workplace ecosystem can benefit employee flexibility by providing additional working/socialising spots in a wider urban realm. Nevertheless, more research is needed to empirically validate the relevance of both types of workspaces and associated urban quality on employee engagement in a workplace ecosystem. Given different organisational cultures and natures, it has to be noted that the above flexibility needs to be adopted by the relevant organisational policies, allowing employees to work from diversified settings. Some organisations may be more willing to stick to a certain working scenario (e.g., two days at home and three days in the office), rather than opt for uncontrolled employee mobility across a variety of workspaces. Therefore, this is a proposed area of investigation further through experiences with different organisations.

Additionally, Study 3 highlights that understanding employee engagement in a workplace ecosystem by higher-level organisational representatives is aligned with the general employee experiences (Study 2). Therefore, it can be argued that a workplace ecosystem can be appreciated by both employees and their organisations which shows promise for the permanent organisational shift to hybrid work patterns post-pandemic. This transition might be especially relevant for knowledge-intensive organisations, helping them to upgrade employee engagement statistics (Gallup, 2022b). Considering that "employees will be more engaged in workplaces that provide them with physical, emotional, and psychological resources necessary for role performance" (Saks and Gruman, 2014, p.160), it can be argued that a workplace ecosystem can better facilitate employee engagement than the traditional office environment, contributing to feelings of vigour, dedication, and absorption with work. Hence, this PhD finding should be addressed in existing employee engagement / workplace metrics (Study 1) and taken into consideration by the real estate and planning sector (Study 4).

8.1.4. The evaluation of a workplace ecosystem needs better alignment between organisational and workplace industry metrics in the wider city context to ensure a successful transition to an 'engaging' workplace ecosystem post-pandemic

The COVID-19 pandemic will have a long-time impact on how the physical workplace environment is defined and understood, especially in the context of knowledge-based organisations and their employees. Hence, it can be argued that hybrid work practices will continue an increasingly diverse impact on our understanding of employee engagement (Schaufeli and Salanova, 2007, Saks and Gruman, 2014) as previously demonstrated by limited studies on the effect of hybrid work practices on employee engagement (Appel-Meulenbroek et al., 2020). Given that a home workplace pre-pandemic has been rarely considered a 'workplace environment', the COVID-19 pandemic has dramatically shifted it to a new role – integral to the corporate office. Consequently, the 'knowledge-based workplace' post-pandemic has expanded to the hybrid scenario (Williamson and Colley, 2022, Naor et al., 2021, Teevan et al., 2021). The dominance of these two primary workplace locations (home/office) subsequently escalates the role of 'transient workplaces', including third places (e.g., cafes, libraries, etc.) and other co-working spaces (e.g., flex offices), which have been occasionally chosen to work at in the pre-pandemic era.

Study 4 suggests that workplace leaders are aware of a changing world of work in a distributed ecosystem (i.e., home, office, and third place) and the necessity of re-designing future workplace strategies in that context which reflects the latest academic findings (Fiorentino et

al., 2022). Although there is a growing interest in both the hybrid work practices and employee engagement, this work still falls short of what Study 1 suggests. However, Study 4 highlights that to some extent the workplace industry visions of an 'engaging' post-pandemic workplace reflect the previous findings indicating a positive relationship between the physical workplace environment and employee engagement (Study 2), and a value of hybrid work in that context (Study 3). For example, the workplace leaders highlight the new role of the office environment post-pandemic focused on facilitating human interaction at work. This is aligned with Study 3 which found the relevance of the office workplace for socialising at work and therefore better employee engagement. This importance of social relationships at work was highlighted in numerous pre-pandemic studies as well (Kumar and Sia, 2012, Osborne and Hammoud, 2017, Rana et al., 2014). It can be observed that an 'engaging' workplace environment is understood by workplace leaders as a platform facilitating interactions between employees – 'engaging with others'. This social-oriented context of employee engagement – facilitated by an office environment – emerged previously in Study 3 whilst interviewing organisational high-level representatives. However, workplace leaders point out the relevance of both virtual and physical connectivity. Although the physical (office) workplace remains a core space to enable human interaction, there remains a growing interest in merging both the virtual and the physical reality for better employee engagement. The digital aspect was identified previously in Study 3 whilst interviewing organisational representatives as a 'challenge' for a workplace ecosystem. Hence, wider adoption of the virtual workplace aims to facilitate employee engagement 'anywhere' by offering smooth communication between employees either face-to-face or remotely. It can be observed that future workplace strategies are dominated by ensuring a high-quality corporate office environment (i.e., physical quality) extended by a virtual environment for better connectivity among employees and their organisations. Therefore, a blended virtual/physical workplace environment is a flagship workplace strategy in a digital era of knowledge work. This is an indisputable fact considering organisational willingness for permanent adoption of hybrid work patterns in future.

Study 3 suggests that a workplace ecosystem is more conducive to employee engagement as it offers greater flexibility in terms of work and space, and therefore a better alignment between an employee and their professional/personal life. It can be observed that vigour, dedication, and absorption with work increase when individual preferences are met. This finding is in line with previous studies in the fields of environmental psychology and real estate emphasising the relevance of comfort (i.e., environmental satisfaction) in the workplace for organisational outcomes (Appel-Meulenbroek et al., 2016, Haynes, 2007, Brunia et al., 2016, Kegel, 2017,

Wyon, 2004b, Vischer, 2008, Chadburn et al., 2017a, Brinkley et al., 2010a). Study 4 suggests that blended physical and virtual environments can effectively support a workplace ecosystem post-pandemic, allowing employees to perform work from a variety of places across the whole 'total workplace ecosystem'.

Considering the above, it can be argued that the importance of office environmental quality will remain stable as it will play the role of 'centralising' employees in a wider ecosystem of workplaces. This finding is aligned with other studies emphasizing that 'face-to-face' contact is a key value of the office post-pandemic (Marzban et al., 2021). However, to effectively increase 'foot traffic' in the office, it is necessary to re-think an office workplace's function in hybrid work practices (Vinopal, 2022, Orel, 2022, Gillen et al., 2021) and develop a new set of performance measures (Puybaraud et al., 2022) across the whole workplace ecosystem. However, an 'engaging' workplace needs to be embedded into relevant 'flex' policy allowing employees to work both from home and in the office according to individual preferences and conducted work tasks to maximise the effectiveness of an 'engaging' workplace ecosystem. However, while Study 2 does highlight the importance of behavioural aspects (e.g., work breaks for replenishing energy) linked with environmental factors (i.e., indoor/outdoor and home/office) for employee engagement, it is necessary to re-consider the proposed workplace metrics/standards more broadly. In contrast to previous studies (Candido et al., 2021, Kroemer and Kroemer, 2016), it can be argued that analysis of employee interaction with the physical workplace should not be limited to behaviours within an office environment.

Moreover, Study 4 emphasises the need for greater collaboration between organisations, the real industry sector and city planning to fully embrace the full spectrum of a post-COVID-19 workplace ecosystem. Also, Study 4 suggests that the new work dynamic resulting from a workplace ecosystem will need greater consolidation of the physical spaces where work occurs (i.e., home, office, and third spaces) with the virtual workplace to increase the availability of 'work from anywhere' within a wider ecosystem of work. Additionally, wider implementation of a 'total workplace ecosystem' across the whole city area will help to expand high-quality commercial real estate properties (e.g., office, flex space) within different city locations (e.g., core hub, satellite hub, and 'transition' workspaces) and help to attract employees back to the office(s) (Appel-Meulenbroek et al., 2022). Given the considerable role of the housing environment and the growing popularity of WFH, a home workplace will demand greater consideration among organisations (e.g., home workplace set-up) and the workplace industry (e.g., home workplace standards/metrics).

Although there is a common acceptance of a workplace ecosystem in future strategies, still little is known about the specific evaluations of the home workplace and the wider urban ecosystem in that context (i.e., assessment criteria). Considering the relevance of both environmental and human factors for employee engagement in a workplace ecosystem, there is a greater need to fully embrace this complexity through the accurate evaluation methodology addressing the whole workplace ecosystem which can be reflected in future workplace strategies. Study 4 suggests that the workplace environmental quality post-pandemic should be considered more broadly (e.g., physical/virtual, indoor/outdoor, and home/office/third/places), and go beyond the indoor environmental quality assessment (Jamrozik et al., 2019, Clements-Croome, 2004, Kwallek et al., 2007a). Therefore, it can be argued that an 'engaging' workplace post-pandemic requires more 'adaptive workplaces' (Deloitte, 2021) understood as consolidation of physical infrastructure, i.e., high-quality urban environment (e.g., access to city amenities, green space, sustainable transportation, and quality residential districts), digital infrastructure (e.g., virtual workplace), and organisational management (e.g., flex policy) factors.

8.2. The Theoretical and Practical Implications

This section (7.2.) presents the theoretical (section 7.2.1) and practical (section 7.2.2.) implications of the PhD research.

8.2.1. The Theoretical Implications

This section (7.2.1.) presents the contributions of the PhD project to the relevant literature concerning identified research gaps.

8.2.1a. The Theoretical Implications for the Literature on the Physical Work Environment

The PhD project contributes to limited environmental psychology literature on the impact of the physical work environment on employee engagement (Kegel, 2017, Appel-Meulenbroek et al., 2018, Smith, 2011). Study 2 found that different environmental conditions in the workplace ecosystem and related environmental satisfaction play a moderating role in employee engagement. Therefore, this PhD research emphasises that the studies on the physical work environment cannot be limited to indoor environmental quality in the office workplace. In the context of a workplace ecosystem, both home and office quality are equally important for employee engagement. Study 3 demonstrated that despite environmental differences, both home and office workplace conditions play a supportive role in employee engagement (e.g., an office environment is more conducive to collaborative work, and a home workplace is more

suited to focused work). Hence, Study 4 shows that different work environments in a wider city context (e.g., residential districts) should be taken into consideration in future workplace evaluations and related standards/metrics.

8.2.1b. The Theoretical Implications for the Literature on Employee Engagement

The PhD project contributes to organisational behaviour literature on employee engagement (Irvine, 2009, Bakker and Demerouti, 2008, Anitha, 2014a). Study 1 found that employee engagement metrics are focused on evaluating the quality of social relationships. However, Study 2 demonstrated that the physical workplace quality and related environmental satisfaction impact all employee engagement components (i.e., vigour, dedication, and absorption). Additionally, Study 2 and Study 3 found that employee engagement in the workplace ecosystem is informed by both the physical factors and related employee behaviours that are not limited to either the office environment or the social relationships at work. Therefore, this PhD research shows that "a positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption" (Schaufeli et al., 2002, p.74) is also informed by the quality of the physical work environment in a wider city context, as well as the quality of private life that is improved due to hybrid work patterns. Hence, this PhD project highlights some new dimensions of our understanding of employee engagement in the workplace ecosystem.

8.2.1c. The Theoretical Implications for the Literature on Work Breaks

The PhD project contributes to organisational psychology literature on work breaks emphasising the relative importance of recovery experience during work breaks for better employee engagement (Sonnentag et al., 2012, ten Brummelhuis and Bakker, 2012, Kühnel et al., 2017). In this context, Study 2 found an association between environmental satisfaction in the workplace ecosystem and replenished work breaks. Therefore, this PhD research states that workplace environmental quality has relevance for revitalising work breaks which positively impact employee engagement (e.g., access to city amenities encourages employees to have lunch together or socialise after working hours). Hence, the physical workplace (e.g., home/office and indoor/outdoor) can facilitate taking replenishing work breaks either at home or in the office workplace and contribute to employee engagement.

8.2.1d. The Theoretical Implications for the Literature on the Hybrid Work Practices

The PhD project contributes to the literature on the relevance of remote work patterns for employee engagement (Duque et al., 2020, Gerards et al., 2018). In the context of a hybrid work practices, Study 3 found that neither a home nor the office is better suited to employee engagement, but the hybrid version of both. Therefore, this PhD research states that the hybrid work practices - due to greater flexibility offered in terms of both the physical workplaces and employee behaviours – is more conducive to employee engagement in knowledge-intensive organisations post-pandemic. The PhD project found that the compilation of both a home and the office can strengthen and sustain employee engagement (e.g., work from home can help with personal duties or family life, and work in the office can facilitate collaboration among employees). Hence, this PhD research provides a more nuanced understanding of hybrid work practices in the context of employee engagement post-pandemic.

8.2.2. The Practical Implications

This section (7.2.2.) presents the contributions of the PhD project for different stakeholders.

8.2.2a. The Practical Implications for Real Estate and Planning

The research findings demonstrate that a workplace ecosystem is positively related to employee engagement. Hence, there is a greater demand for the development of flexible cities allowing knowledge employees a smooth transition between distributed workplaces across the city (i.e., home, core office, satellite office, and third places). However, the allocation of such mixed-use developments needs to be equally distributed across the whole city to minimise time/expenses related to daily travel. This flexible city development should be underpinned by the network of high-quality infrastructure (e.g., digital, transport, and green), and a wide range of city amenities (e.g., café, school, shopping centre, and entertainment). The research findings suggest that employee interaction with an outdoor environment can effectively 'recharge' employees during working hours. Therefore, a higher concentration of such 'adaptive workplaces' (Deloitte, 2021) will allow knowledge employees to flexibly merge work-related tasks and private duties (e.g., child requirements) resulting in better employee engagement in a workplace ecosystem. Moreover, the development of traditional business districts in core centres needs better coordination with their local/satellite hubs. Hence, employee engagement in a workplace ecosystem can be reinforced by the greater flexibility offered by both the real estate sector and city planning.

8.2.2b. The Practical Implications for the Workplace Industry

The PhD findings suggest that there is a greater need for more holistic workplace standards/metrics. Therefore, the workplace industry should expand its scope of interest by looking at the physical workplace more broadly (e.g., more focus on the residential sector evaluation). However, the existing standards/metrics are largely focused on corporate real estate characteristics. The research findings of this PhD project suggest that indoor environmental quality should be extended by outdoor environment components (e.g., access to city amenities of a different type) in a larger (i.e., district/city) context, not to mention a virtual environment. Hybrid work itself demands greater considerations around space – in the physical and virtual sense. Hence, the workplace evaluation should demonstrate how all of the components of the post-COVID-19 workplace ecosystem 'work together' for better employee engagement in 'adaptive workplaces' (Deloitte, 2021). Therefore, focusing solely on the corporate office real estate assessment will limit organisational knowledge of employee engagement within a wider workplace ecosystem.

8.2.2c. The Practical Implications for the Knowledge-Intensive Organisations

The PhD research suggests that knowledge-intensive organisations should develop and promote flexible policies within their organisations. The research findings demonstrate that hybrid work is more engaging if it's tailored to a specific workplace environment. Therefore, organisations should allow employees to conduct specific work tasks according to individual/professional duties. It can be questioned that performing hybrid work according to a unified pattern (e.g., work from home – 2 days/week and work from the office – 3 days/week) does not suit everyone's needs. However, such a scheme can provide a good starting point for encouraging greater flexibilisation of work in 'adaptive workplaces' (Deloitte, 2021), and consequently better employee engagement. This can also be reinforced by a more flexible approach in terms of management (e.g., allowing employees to take work breaks in the preferred locations (e.g., indoor/outdoor).

8.3. Limitations and Suggestions for Future Research

Several limitations of this study should be overcome in future research. First, the study is based on a case study conducted on employees working in a specified geographic location within a few months. Thus, there is a need for longitudinal analysis in the future, based on a larger number of employees from diversified knowledge-based sectors to quantify the effects of a

workplace ecosystem over time on employee engagement. Along these lines, the effect of a variety of physical/geographical locations on subjectively measured employee engagement could be examined. Although the study focused on employees based in Greater London Area and its surrounding, hybrid work patterns should theoretically benefit knowledge workers in all geographical regions – future research taking a comparative approach between different cities can help clarify the potential effect of a workplace ecosystem on organisational outcomes. Also, the current results do not address the impact of third places on employee engagement. Due to the significant acceleration of remote work patterns since 2020, there is a greater need to examine the virtual workplace as well as the role of remote work (Vendramin et al., 2021) and the information space(s) (Will-Zocholl, 2021) as an integral component of a workplace ecosystem, as well as the use of portable electronic devices (Jiang et al., 2019). Considering the projected shift toward hybrid work patterns with the dominance of remote work, virtual relationships may dramatically change the way we conceive of employee engagement, its metrics, and the role of the physical workplace environment.

Second, the analysis conducted in this study did not consider objectively measured environmental qualities (e.g., home/office type). While environmental satisfaction presumably is considered the final point of interest, considering objectively measured environmental qualities in addition to employee workplace perception can provide a fuller picture of environment-related externalities arising from different built environment conditions. In future, more data on using third places (e.g., cafés, libraries, etc.) can also be considered in addition to the comprehensive built environment data considered in this study. Additionally, this research did not focus on organisational context (e.g., culture).

Finally, caution must be taken in generalizing these findings to other cities since the Greater London Area is one of the largest and most populated urban agglomerations in the world and this may impact employee preferences in terms of work travels, preferred workplace locations, and hybrid work practices. These potential limitations suggest a need for examining the effects of the workplace ecosystem in different configurations and related employee behaviours using similar data collected in other regions. It remains a question for the future as to what extent the workplace ecosystem will become a default workplace for global organisations in the post-pandemic reality. Nevertheless, more research (and time) is needed to determine whether environmental quality can contribute to more sustainable employee engagement in the long term.

The presented findings suggest that a variety of workplace environments allows more options for supporting individual needs via 'environmental crafting' and contributing to employee engagement (Roskams et al., 2021). And this observation should not be neglected by those considering the implementation of flexible working policies within their organisations. This finding is important and may track a higher level of policy support (e.g., organisational, governmental, etc.) for a workplace ecosystem. The analysis emerging from this study largely follows expectations, that is, a workplace ecosystem is associated with greater employee flexibility (e.g., improved work-life balance), economic values for employees and organisations (e.g., greater productivity, less commute), and improved employee well-being (e.g., more time for wellness activities). However, further research is required to examine whether a hybrid model of work relies on the wider urban quality in terms of its impact on employee engagement. Therefore, future research should focus on designing interventions aimed at employee interaction with the environment - external to the network of distributed workplace environments.

8.4. Conclusions

This PhD research demonstrates that wider adoption of hybrid work practices in future workplace strategies can significantly contribute to better employee engagement in knowledge-intensive organisations post-pandemic. However, this is not a straightforward task considering the complexity of the whole process, the number of actors involved, and still limited research on a workplace ecosystem. Nevertheless, it can be observed that current work (academic/industry) regarding future workplaces is transitioning toward a world of work that is more flexible, digital and physically distributed across a workplace ecosystem. Therefore, it can be argued that the quality of such an extended workplace environment will subsequently inform employee engagement levels across the whole ecosystem. Additionally, the growing importance of a home workplace should encourage the global workplace industry to think about current standards/metrics more broadly. For example, the certification of office workplace quality needs to be underpinned by residential, district, and city-scale developments. This joint approach will holistically contribute to more sustainable employee engagement – with a greater awareness of employees' subjective well-being leading to 'full engagement' – a broader conception of engagement beyond 'a commitment-based view' to a more 'human-oriented' holistic sense of thriving and well-being (Robertson and Cooper, 2010).

As pointed out by Franklin Becker (2005, p.5), "minimally, where we work should be part of a healthy ecosystem in which we, as individuals, teams, and organizations, cannot just survive or be productive but flourish". This PhD project shows that an 'engaging' workplace ecosystem can accelerate this transition

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Appendices

Regression

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	Cases Used	Statistics are based on cases with no missing values for any variable used.

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Notes

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Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break[b]	.	Enter

a. Dependent Variable: vig_home

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,276[a]	,076	,069	1,31982

a. Predictors: (Constant), Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

b. Dependent Variable: vig_home

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18,767	1	18,767	10,774	,001[b]
	Residual	228,192	131	1,742		
	Total	246,959	132			

a. Dependent Variable: vig_home

b. Predictors: (Constant), Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	5,961	1,231		4,844
	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	,263	,080	,276	3,282

Coefficients[a]

Model		Sig.
1	(Constant)	,000
	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	,001

a. Dependent Variable: vig_home

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	8,8550	10,4335	9,9825	,37706	133
Residual	-4,97754	2,14505	,00000	1,31481	133
Std. Predicted Value	-2,990	1,196	,000	1,000	133
Std. Residual	-3,771	1,625	,000	,996	133

a. Dependent Variable: vig_home

Histogram
Dependent Variable: vig_home

Mean =-3,34E-15
Std. Dev. =0,996
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Regression

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Notes

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Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break[b]	.	Enter

a. Dependent Variable: abs_home

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,207[a]	,043	,036	1,02148

a. Predictors: (Constant), Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

b. Dependent Variable: abs_home

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6,149	1	6,149	5,894	,017[b]
	Residual	136,687	131	1,043		
	Total	142,836	132			

a. Dependent Variable: abs_home

b. Predictors: (Constant), Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	8,163	,952		8,571
	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	,151	,062	,207	2,428

Coefficients[a]

Model		Sig.
1	(Constant)	,000
	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	,017

a. Dependent Variable: abs_home

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,8195	10,7231	10,4649	,21584	133
Residual	-3,63676	1,87931	,00000	1,01760	133
Std. Predicted Value	-2,990	1,196	,000	1,000	133
Std. Residual	-3,560	1,840	,000	,996	133

a. Dependent Variable: abs_home

Histogram
Dependent Variable: abs_home

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Std. Dev. =0,996
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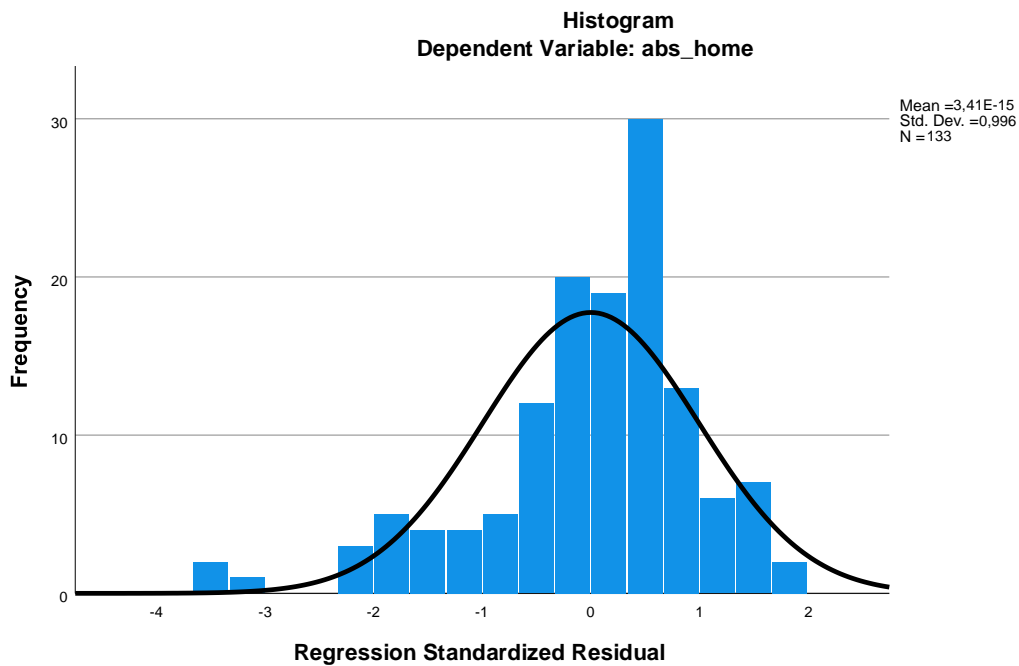
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Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION
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Notes

	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break[b]	.	Enter

a. Dependent Variable: ded_home

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,281[a]	,079	,072	1,04537

a. Predictors: (Constant), Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

b. Dependent Variable: ded_home

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12,315	1	12,315	11,269	,001[b]
	Residual	143,157	131	1,093		
	Total	155,472	132			

a. Dependent Variable: ded_home

b. Predictors: (Constant), Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	7,410	,975		7,603
	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	,213	,063	,281	3,357

Coefficients[a]

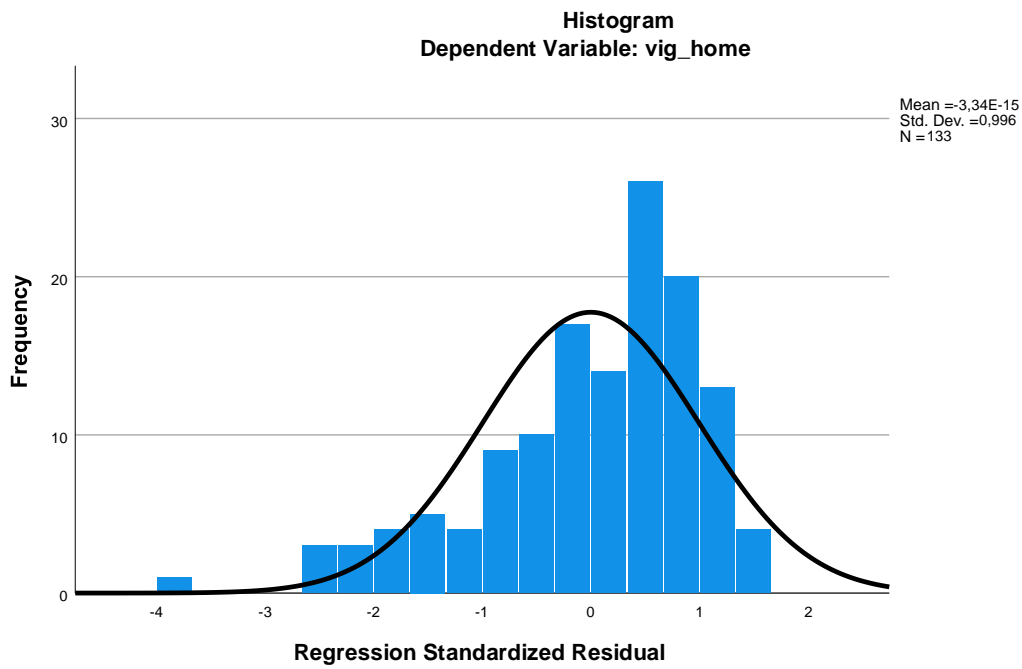| Model		Sig.
1	(Constant)	,000
	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	,001

a. Dependent Variable: ded_home

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,7546	11,0333	10,6679	,30545	133
Residual	-4,03327	2,24545	,00000	1,04140	133
Std. Predicted Value	-2,990	1,196	,000	1,000	133
Std. Residual	-3,858	2,148	,000	,996	133

a. Dependent Variable: ded_home

Histogram
Dependent Variable: ded_home

Mean =1,09E-15
Std. Dev. =0,996
N =133

Regression

Output Created		17-JUN-2022 11:16:33
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT vig_office /METHOD=ENTER Q52_1 /RESIDUALS HISTOGRAM(ZRESID).
Resources	Processor Time	00:00:00,17
	Elapsed Time	00:00:00,17
Notes		
	Memory Required	198208 bytes

	Additional Memory Required for Residual Plots	312 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break[b]	.	Enter

a. Dependent Variable: vig_office

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,386[a]	,149	,142	1,47824

a. Predictors: (Constant), Does your office workplace environment help you to replenish your energy
when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

b. Dependent Variable: vig_office

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46,043	1	46,043	21,070	,000[b]

Residual	262,224	120	2,185		
Total	308,267	121			

a. Dependent Variable: vig_office

b. Predictors: (Constant), Does your office workplace environment help you to replenish your energy
when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

Coefficients[a]

| Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	3,647	1,292		2,824
	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	,423	,092	,386	4,590

Coefficients[a]

Model		Sig.
1	(Constant)	,006
	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when take a work break	,000

a. Dependent Variable: vig_office

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	8,2964	10,8326	9,5437	,61686	122
Residual	-4,65386	2,70356	,00000	1,47212	122
Std. Predicted Value	-2,022	2,089	,000	1,000	122
Std. Residual	-3,148	1,829	,000	,996	122

a. Dependent Variable: vig_office

Histogram
Dependent Variable: vig_office

Mean = 3,34E-17
Std. Dev. = 0,996
N = 122
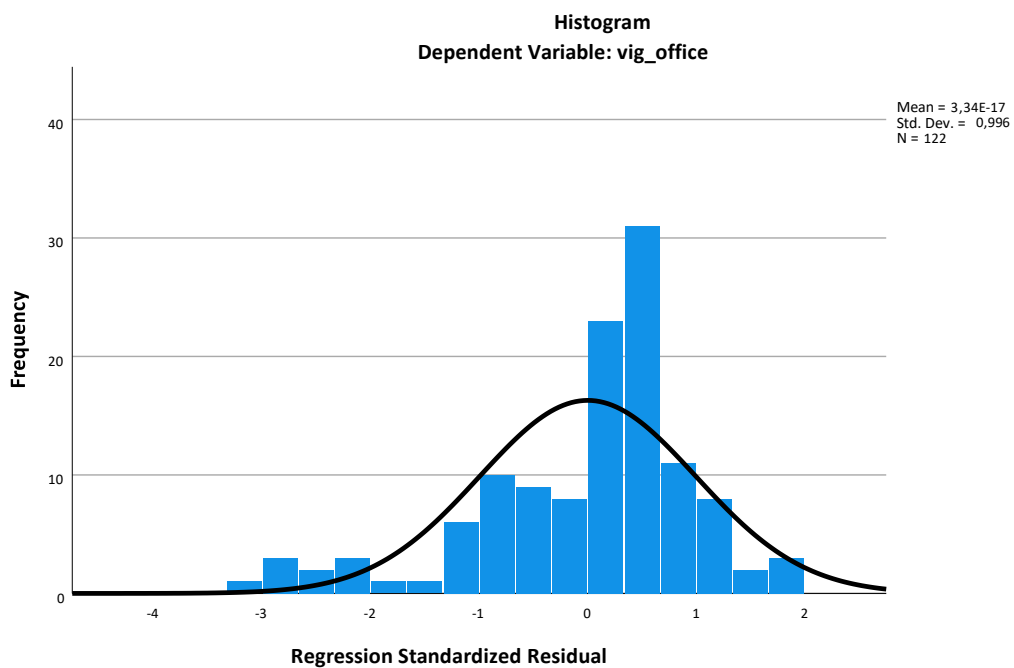
Regression

Output Created		17-JUN-2022 11:17:56
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>

	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION
		  /MISSING LISTWISE
		  /STATISTICS COEFF OUTS R ANOVA
		  /CRITERIA=PIN(.05) POUT(.10)
		  /NOORIGIN
		  /DEPENDENT abs_office
		  /METHOD=ENTER Q52_1
		  /RESIDUALS HISTOGRAM(ZRESID).

Resources	Processor Time	00:00:00,19
	Elapsed Time	00:00:00,17

Notes

	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break[b]	.	Enter

a. Dependent Variable: abs_office

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,329[a]	,108	,101	1,23002

a. Predictors: (Constant), Does your office workplace environment help you to replenish your energy
  when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

b. Dependent Variable: abs_office

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21,999	1	21,999	14,541	,000[b]
	Residual	181,553	120	1,513		
	Total	203,552	121			

a. Dependent Variable: abs_office

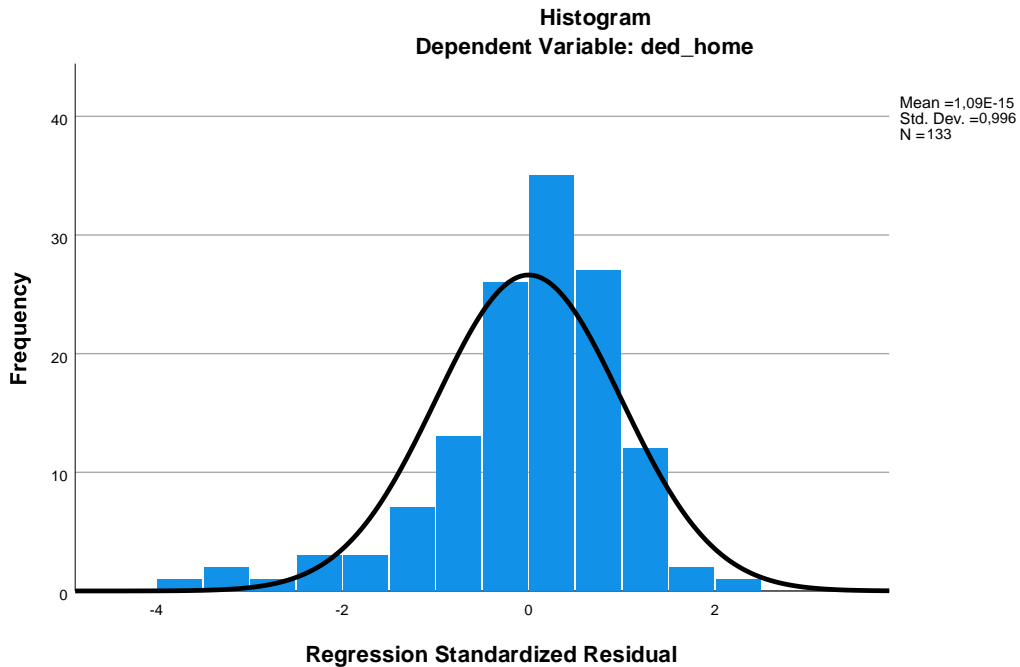b. Predictors: (Constant), Does your office workplace environment help you to replenish your energy
when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	6,056	1,075		5,635
	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	,292	,077	,329	3,813

Coefficients[a]

Model		Sig.
1	(Constant)	,000
	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when take a work break	,000

a. Dependent Variable: abs_office

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,2704	11,0234	10,1325	,42640	122
Residual	-3,89587	2,43747	,00000	1,22492	122
Std. Predicted Value	-2,022	2,089	,000	1,000	122
Std. Residual	-3,167	1,982	,000	,996	122

a. Dependent Variable: abs_office

Histogram

Dependent Variable: abs_office

Mean = 6,13E-15
Std. Dev. = 0,996
N = 122
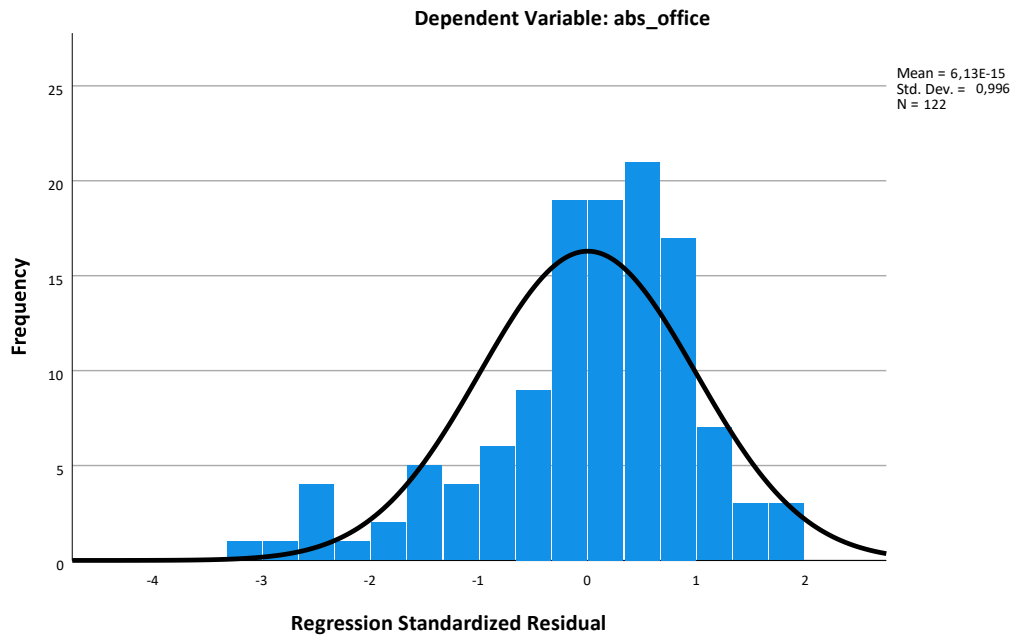
Notes

Output Created		17-JUN-2022 11:19:04
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.

	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION
		  /MISSING LISTWISE
		  /STATISTICS COEFF
		OUTS R ANOVA
		  /CRITERIA=PIN(.05)
		POUT(.10)
		  /NOORIGIN
		  /DEPENDENT ded_office
		  /METHOD=ENTER
		Q52_1
		  /RESIDUALS
		HISTOGRAM(ZRESID).

Resources	Processor Time	00:00:00,17
	Elapsed Time	00:00:00,17

Notes

	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break[b]	.	Enter

a. Dependent Variable: ded_office

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,309[a]	,096	,088	1,11858

a. Predictors: (Constant), Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

b. Dependent Variable: ded_office

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15,867	1	15,867	12,681	,001[b]
	Residual	150,148	120	1,251		
	Total	166,015	121			

a. Dependent Variable: ded_office

b. Predictors: (Constant), Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	7,085	,977		7,249
	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	,248	,070	,309	3,561

Coefficients[a]

Model		Sig.
1	(Constant)	,000
	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	,001

a. Dependent Variable: ded_office

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,8142	11,3031	10,5464	,36212	122
Residual	-4,55865	1,93762	,00000	1,11395	122
Std. Predicted Value	-2,022	2,089	,000	1,000	122
Std. Residual	-4,075	1,732	,000	,996	122

a. Dependent Variable: ded_office

Histogram
Dependent Variable: ded_office

Mean =-1,24E-15
Std. Dev. =0,996
N =122

Regression

Output Created			17-JUN-2022 11:20:45
Comments			
Input	Data		
	Active Dataset		ZbiórDanych1
	Filter		<none>
	Weight		<none>
	Split File		<none>
	N of Rows in Working Data File		169
Missing Value Handling	Definition of Missing		User-defined missing values are treated as missing.
	Cases Used		Statistics are based on cases with no missing values for any variable used.
Syntax			REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT vig_office /METHOD=ENTER place_attachment /RESIDUALS HISTOGRAM(ZRESID).
Resources	Processor Time		00:00:00,17
	Elapsed Time		00:00:00,17

Notes

	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	place_attachment[b]	.	Enter

a. Dependent Variable: vig_office

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,357[a]	,128	,120	1,49693

a. Predictors: (Constant), place_attachment

b. Dependent Variable: vig_office

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39,369	1	39,369	17,569	,000[b]
	Residual	268,897	120	2,241		
	Total	308,267	121			

a. Dependent Variable: vig_office

b. Predictors: (Constant), place_attachment

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4,153	1,293		3,212	,002
	place_attachment	,394	,094	,357	4,192	,000

a. Dependent Variable: vig_office

a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	8,4857	10,7502	9,5437	,57041	122
Residual	-5,00053	2,18098	,00000	1,49074	122
Std. Predicted Value	-1,855	2,115	,000	1,000	122
Std. Residual	-3,341	1,457	,000	,996	122

a. Dependent Variable: vig_office

Histogram

Dependent Variable: vig_office

Mean =-1,87E-16
Std. Dev. =0,996
N =122
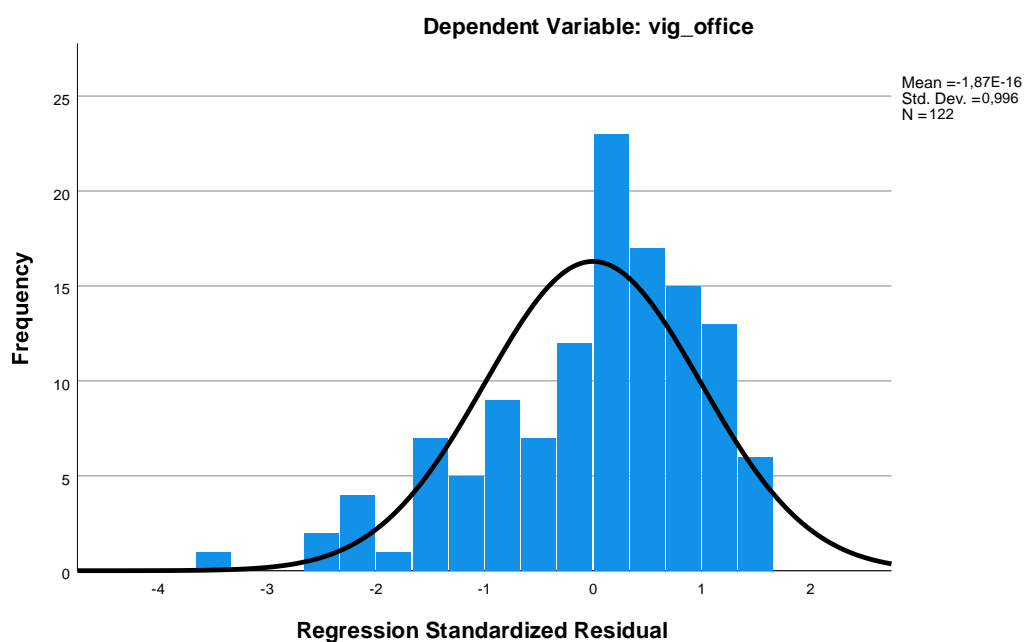
Regression

Output Created		17-JUN-2022 11:24:01
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>

215

	N of Rows in Working Data File		169
Missing Value Handling	Definition of Missing		User-defined missing values are treated as missing.
	Cases Used		Statistics are based on cases with no missing values for any variable used.
Syntax			REGRESSION /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT abs_office /METHOD=ENTER place_attachment /RESIDUALS HISTOGRAM(ZRESID).
Resources	Processor Time		00:00:00,20
	Elapsed Time		00:00:00,17

Notes

	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	place_attach ment^b	.	Enter

a. Dependent Variable: abs_office

b. All requested variables entered.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,392^a	,154	,147	1,19815

a. Predictors: (Constant), place_attachment

b. Dependent Variable: abs_office

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31,285	1	31,285	21,793	,000[b]
	Residual	172,268	120	1,436		
	Total	203,552	121			

a. Dependent Variable: abs_office

b. Predictors: (Constant), place_attachment

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5,328	1,035		5,147	,000
	place_attachment	,351	,075	,392	4,668	,000

a. Dependent Variable: abs_office

a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,1894	11,2080	10,1325	,50848	122
Residual	-4,13707	2,37180	,00000	1,19319	122
Std. Predicted Value	-1,855	2,115	,000	1,000	122
Std. Residual	-3,453	1,980	,000	,996	122

a. Dependent Variable: abs_office

Histogram

Dependent Variable: abs_office

Mean =5,47E-15
Std. Dev. =0,996
N =122
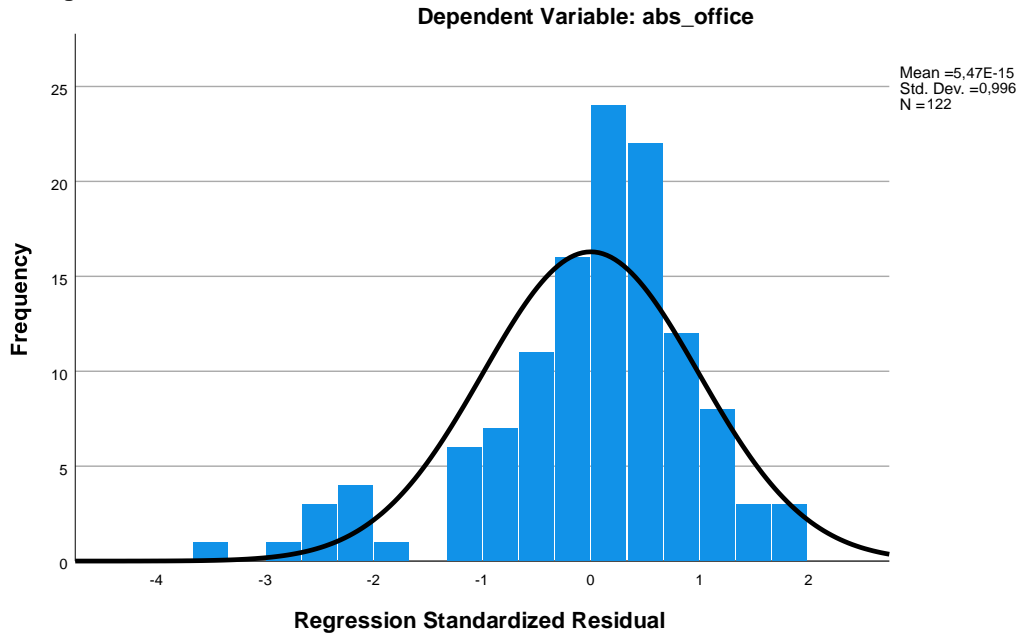
Notes

Output Created		15-JUN-2022 14:39:25
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

| Syntax | | REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT vig_home
  /METHOD=ENTER Q_1.

3
  /RESIDUALS HISTOGRAM(ZRESID). |

Notes

Resources	Processor Time	00:00:00,64
	Elapsed Time	00:00:00,30
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Descriptive Statistics

	Mean	Std. Deviation	N
vig_home	9,9825	1,36781	133
How satisfied are you with your home working set up? - I am satisfied with my home working set up	15,39	1,466	133

Correlations

		vig_home	How satisfied are you with your home working set up? - I am satisfied with my home working set up
Pearson Correlation	vig_home	1,000	,323
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,323	1,000
Sig. (1-tailed)	vig_home	.	,000

		How satisfied are you with your home working set up? - I am satisfied with my home working set up	,000	.
N	vig_home		133	133
	How satisfied are you with your home working set up? - I am satisfied with my home working set up		133	133

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	How satisfied are you with your home working set up? - I am satisfied with my home working set up[b]	.	Enter

a. Dependent Variable: vig_home

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,323[a]	,105	,098	1,29927

a. Predictors: (Constant), How satisfied are you with your home working set up? - I am satisfied with my
   home working set up

b. Dependent Variable: vig_home

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25,818	1	25,818	15,294	,000[b]
	Residual	221,141	131	1,688		

Total	246,959	132			

a. Dependent Variable: vig_home

b. Predictors: (Constant), How satisfied are you with your home working set up? - I am satisfied with my
home working set up

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	5,339	1,193		4,477
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,302	,077	,323	3,911

Coefficients[a]

Model		Sig.
1	(Constant)	,000
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,000

a. Dependent Variable: vig_home

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	8,6578	10,4679	9,9825	,44226	133
Residual	-5,80121	2,40553	,00000	1,29434	133
Std. Predicted Value	-2,995	1,098	,000	1,000	133
Std. Residual	-4,465	1,851	,000	,996	133

a. Dependent Variable: vig_home

Histogram
Dependent Variable: vig_home

Mean =-3,76E-15
Std. Dev. =0,996
N =133

Notes

Output Created		15-JUN-2022 14:40:44
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT abs_home /METHOD=ENTER Q_1. 3 /RESIDUALS HISTOGRAM(ZRESID).

Notes

Resources	Processor Time	00:00:00,28
	Elapsed Time	00:00:00,22
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Descriptive Statistics

	Mean	Std. Deviation	N
abs_home	10,4649	1,04024	133
How satisfied are you with your home working set up? - I am satisfied with my home working set up	15,39	1,466	133

Correlations

		abs_home	How satisfied are you with your home working set up? - I am satisfied with my home working set up
Pearson Correlation	abs_home	1,000	,273
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,273	1,000
Sig. (1-tailed)	abs_home	.	,001

		,001	.
	How satisfied are you with your home working set up? - I am satisfied with my home working set up		
N	abs_home	133	133
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	133	133

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	How satisfied are you with your home working set up? - I am satisfied with my home working set up[b]	.	Enter

a. Dependent Variable: abs_home

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,273[a]	,075	,068	1,00448

a. Predictors: (Constant), How satisfied are you with your home working set up? - I am satisfied with my
home working set up

b. Dependent Variable: abs_home

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10,660	1	10,660	10,566	,001[b]
	Residual	132,176	131	1,009		

Total	142,836	132			

a. Dependent Variable: abs_home

b. Predictors: (Constant), How satisfied are you with your home working set up? - I am satisfied with my
home working set up

Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t
1	(Constant)	7,481	,922		8,114
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,194	,060	,273	3,250

Coefficients^a
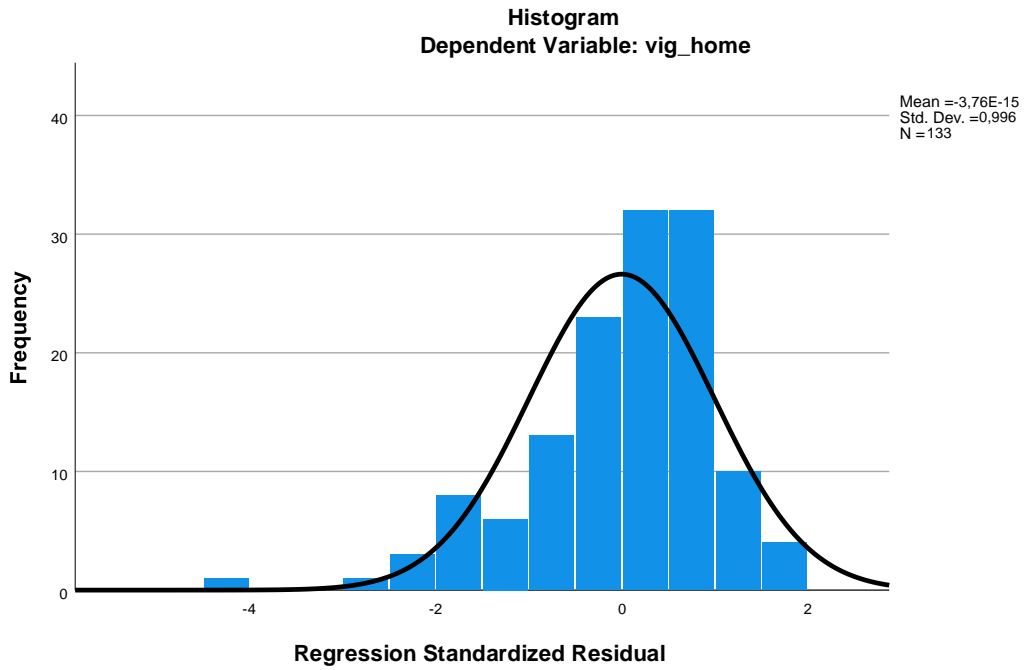
Model		Sig.
1	(Constant)	,000
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,001

a. Dependent Variable: abs_home

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,6137	10,7768	10,4649	,28418	133
Residual	-4,11017	1,99860	,00000	1,00067	133
Std. Predicted Value	-2,995	1,098	,000	1,000	133
Std. Residual	-4,092	1,990	,000	,996	133

a. Dependent Variable: abs_home

Histogram
Dependent Variable: abs_home

Mean =2,49E-15
Std. Dev. =0,996
N =133

Regression Standardized Residual
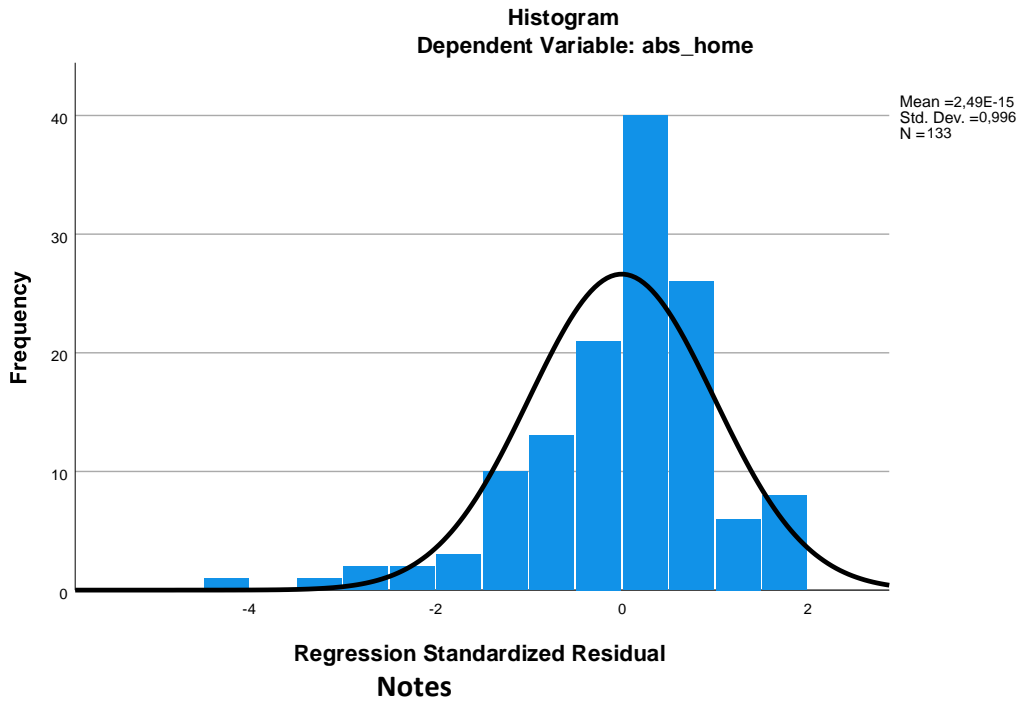
Notes

Output Created		15-JUN-2022 14:45:43
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

| | Syntax | | REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT Q_1.6
/METHOD=ENTER Q_1.3
  /RESIDUALS HISTOGRAM(ZRESID). |

Notes

Resources	Processor Time	00:00:00,19
	Elapsed Time	00:00:00,17
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

	Mean	Std. Deviation	N
Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	15,29	1,433	133
How satisfied are you with your home working set up? - I am satisfied with my home working set up	15,39	1,466	133

		Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	How satisfied are you with your home working set up? - I am satisfied with my home working set up
Pearson Correlation	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	1,000	,361
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,361	1,000
Sig. (1-tailed)	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	.	,000
	How satisfied are you with your home working set up? - I am satisfied	,000	.

		Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	How satisfied are you with your home working set up? - I am satisfied with my home working set up
	with my home working set up		
N	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	133	133
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	133	133

Model	Variables Entered	Variables Removed	Method

1	How satisfied are you with your home working set up? - I am satisfied with my home working set up[b]		.	Enter

a. Dependent Variable: Does your home workplace environment help you to replenish your energy when
you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

b. All requested variables entered.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,361[a]	,130	,124	1,342

a. Predictors: (Constant), How satisfied are you with your home working set up? - I am satisfied with my home working set up

b. Dependent Variable: Does your home workplace environment help you to replenish your energy when
you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35,353	1	35,353	19,641	,000[b]
	Residual	235,790	131	1,800		
	Total	271,143	132			

a. Dependent Variable: Does your home workplace environment help you to replenish your energy when
you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

b. Predictors: (Constant), How satisfied are you with your home working set up? - I am satisfied with my
   home working set up

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	9,852	1,231		8,000
	How satisfied are you with your home working set up? - I am satisfied with my home working set up	,353	,080	,361	4,432

Coefficients^a

Model		Sig.
1	(Constant)	,000
	How satisfied are you with your home working set up - I am satisfied with my home working set up	,000

a. Dependent Variable: Does your home workplace environment help you to replenish
   your energy when you take a work break? - My home workplace environment helps me
   to replenish my energy when I take a work break

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	13,74	15,85	15,29	,518	133
Residual	-3,795	2,911	,000	1,337	133
Std. Predicted Value	-2,995	1,098	,000	1,000	133
Std. Residual	-2,828	2,170	,000	,996	133

a. Dependent Variable: Does your home workplace environment help you to replenish
   your energy when you take a work break? - My home workplace environment helps me
   to replenish my energy when I take a work break

Histogram

Dependent Variable: Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

Mean = -1,29E-16
Std. Dev. = 0,996
N = 133
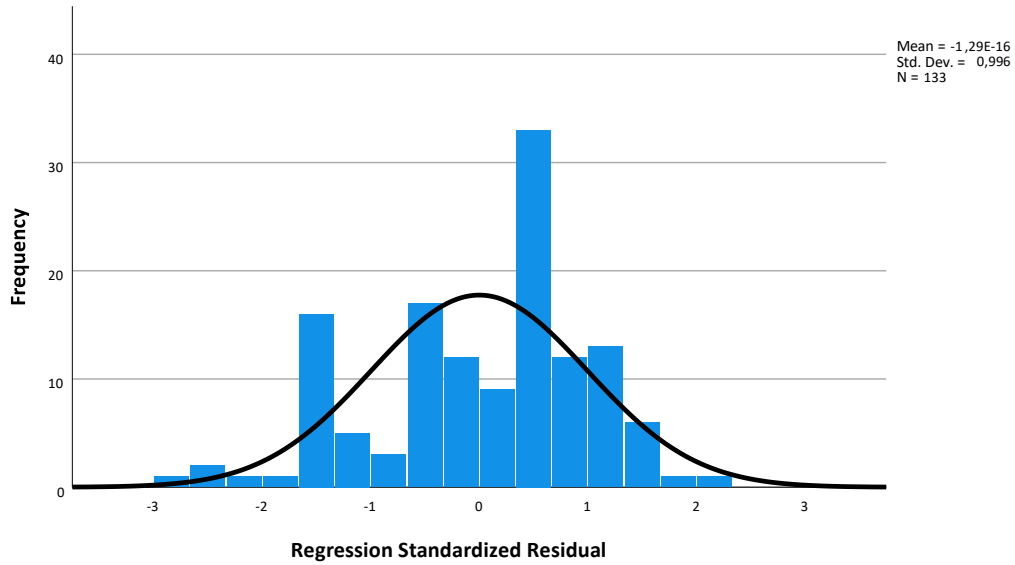
Notes

Output Created		15-JUN-2022 14:47:42
Comments		
Input	Data	
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	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

| Syntax | | REGRESSION
  /DESCRIPTIVES MEAN STDDEV CORR SIG N
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT vig_office
  /METHOD=ENTER Q50_1
  /RESIDUALS HISTOGRAM(ZRESID). |

Notes

Resources	Processor Time	00:00:00,19
	Elapsed Time	00:00:00,19
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Descriptive Statistics

	Mean	Std. Deviation	N
vig_office	9,5437	1,59614	122
How satisfied are you with your office working set up? - I am satisfied with my office working set up	14,44	1,621	122

Correlations

		vig_office	How satisfied are you with your office working set up? - I am satisfied with my office working set up
Pearson Correlation	vig_office	1,000	,447
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,447	1,000
Sig. (1-tailed)	vig_office	.	,000

		How satisfied are you with your office working set up? - I am satisfied with my office working set up	,000	.
N	vig_office		122	122
	How satisfied are you with your office working set up? - I am satisfied with my office working set up		122	122

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	How satisfied are you with your office working set up? - I am satisfied with my office working set up[b]	.	Enter

a. Dependent Variable: vig_office

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,447[a]	,200	,193	1,43374

a. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

b. Dependent Variable: vig_office

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	61,592	1	61,592	29,963	,000[b]
	Residual	246,675	120	2,056		

Total	308,267	121				

a. Dependent Variable: vig_office

b. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t
1	(Constant)	3,189	1,168		2,729
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,440	,080	,447	5,474

Coefficients[a]

Model		Sig.
1	(Constant)	,007
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,000

a. Dependent Variable: vig_office

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	8,0289	10,6690	9,5437	,71346	122
Residual	-4,24225	2,86444	,00000	1,42781	122
Std. Predicted Value	-2,123	1,577	,000	1,000	122
Std. Residual	-2,959	1,998	,000	,996	122

a. Dependent Variable: vig_office

Histogram
Dependent Variable: vig_office

Mean =1,99E-17
Std. Dev. =0,996
N =122

Regression Standardized Residual

Notes

Output Created		15-JUN-2022 14:48:45
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax	REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT abs_office /METHOD=ENTER Q50_1 /RESIDUALS HISTOGRAM(ZRESID).

Notes

Resources	Processor Time	00:00:00,14
	Elapsed Time	00:00:00,17
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Descriptive Statistics

	Mean	Std. Deviation	N
abs_office	10,1325	1,29702	122
How satisfied are you with your office working set up? - I am satisfied with my office working set up	14,44	1,621	122

Correlations

		abs_office	How satisfied are you with your office working set up? - I am satisfied with my office working set up
Pearson Correlation	abs_office	1,000	,369
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,369	1,000
Sig. (1-tailed)	abs_office	.	,000

	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,000	.
N	abs_office	122	122
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	122	122

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	How satisfied are you with your office working set up? - I am satisfied with my office working set up[b]	.	Enter

a. Dependent Variable: abs_office

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,369[a]	,136	,129	1,21060

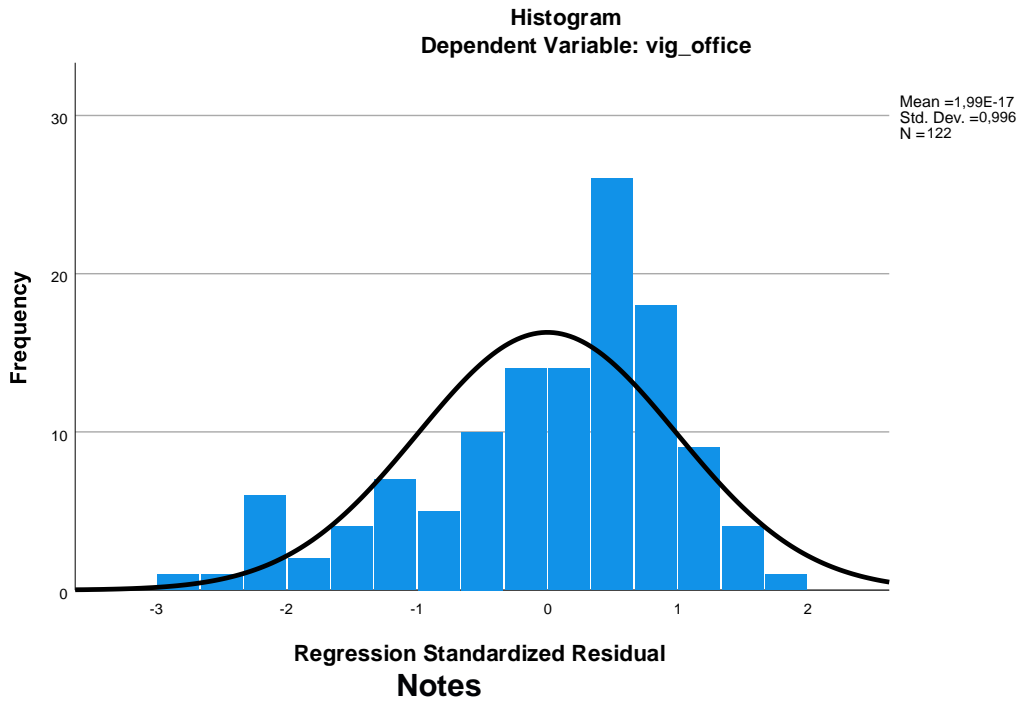a. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

b. Dependent Variable: abs_office

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27,686	1	27,686	18,891	,000[b]
	Residual	175,867	120	1,466		

Total	203,552	121			

a. Dependent Variable: abs_office

b. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

Coefficients^a

		Unstandardized Coefficients		Standardized Coefficients	
Model		B	Std. Error	Beta	t
1	(Constant)	5,872	,986		5,953
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,295	,068	,369	4,346

Coefficients^a

Model		Sig.
1	(Constant)	,000
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,000

a. Dependent Variable: abs_office

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,1169	10,8870	10,1325	,47834	122
Residual	-4,33527	2,88312	,00000	1,20559	122
Std. Predicted Value	-2,123	1,577	,000	1,000	122
Std. Residual	-3,581	2,382	,000	,996	122

a. Dependent Variable: abs_office

Histogram
Dependent Variable: abs_office

Mean =5,52E-15
Std. Dev. =0,996
N =122

Regression Standardized Residual
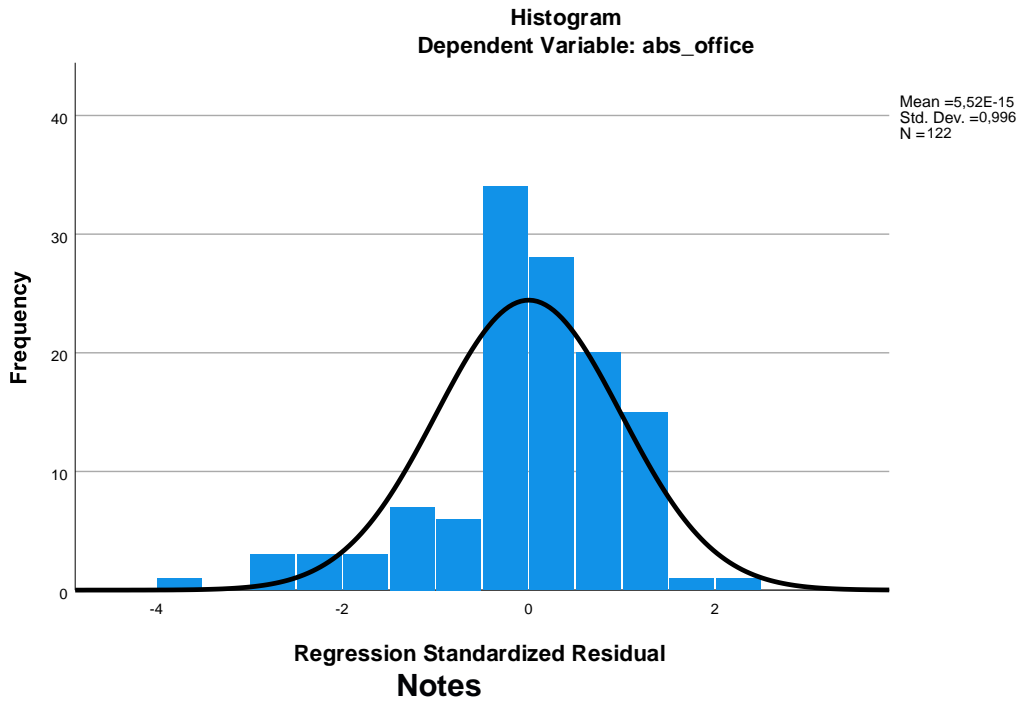
Notes

Output Created		15-JUN-2022 14:49:45
Comments		
Input	Data	
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	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION
		  /DESCRIPTIVES MEAN STDDEV CORR SIG N
		  /MISSING LISTWISE
		  /STATISTICS COEFF OUTS R ANOVA
		  /CRITERIA=PIN(.05) POUT(.10)
		  /NOORIGIN
		  /DEPENDENT ded_office
		  /METHOD=ENTER Q50_1
		  /RESIDUALS HISTOGRAM(ZRESID).

Notes

Resources	Processor Time	00:00:00,17
	Elapsed Time	00:00:00,17
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

Descriptive Statistics

	Mean	Std. Deviation	N
ded_office	10,5464	1,17133	122
How satisfied are you with your office working set up? - I am satisfied with my office working set up	14,44	1,621	122

Correlations

		ded_office	How satisfied are you with your office working set up? - I am satisfied with my office working set up
Pearson Correlation	ded_office	1,000	,350
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,350	1,000
Sig. (1-tailed)	ded_office	.	,000

		How satisfied are you with your office working set up? - I am satisfied with my office working set up	,000	.
N	ded_office		122	122
	How satisfied are you with your office working set up? - I am satisfied with my office working set up		122	122

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	How satisfied are you with your office working set up? - I am satisfied with my office working set up[b]	.	Enter

a. Dependent Variable: ded_office

b. All requested variables entered.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,350[a]	,123	,115	1,10169

a. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

b. Dependent Variable: ded_office

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20,368	1	20,368	16,781	,000[b]
	Residual	145,647	120	1,214		

Total	166,015	121			

a. Dependent Variable: ded_office

b. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	6,892	,898		7,677
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,253	,062	,350	4,096

Coefficients^a

Model		Sig.
1	(Constant)	,000
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,000

a. Dependent Variable: ded_office

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	9,6753	11,1936	10,5464	,41028	122
Residual	-4,43445	2,07163	,00000	1,09713	122
Std. Predicted Value	-2,123	1,577	,000	1,000	122
Std. Residual	-4,025	1,880	,000	,996	122

a. Dependent Variable: ded_office

Histogram
Dependent Variable: ded_office

Mean =-1,79E-15
Std. Dev. =0,996
N =122
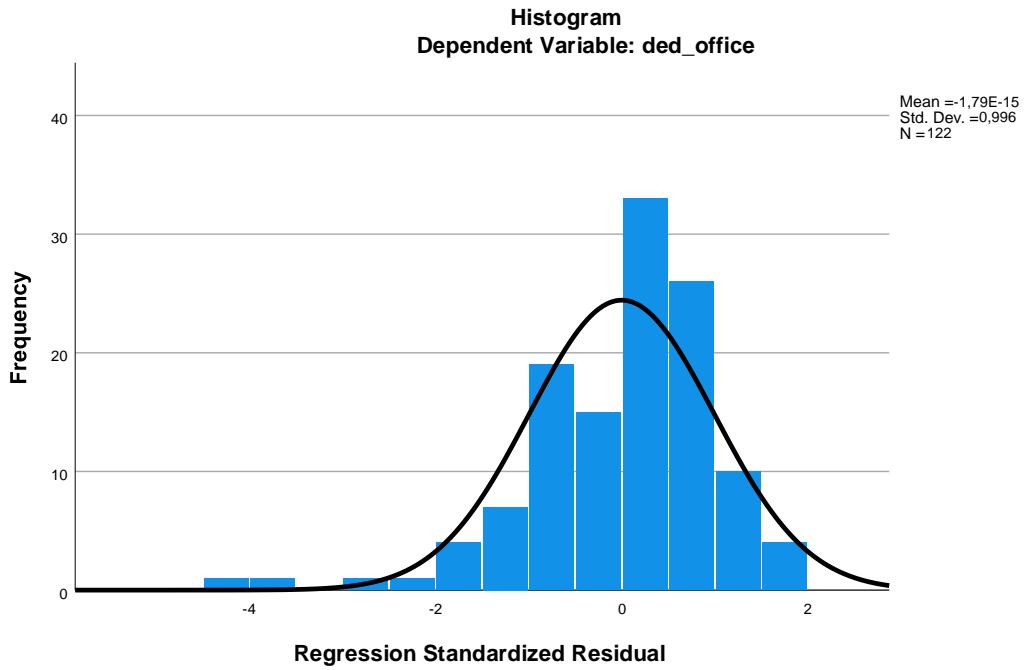
Notes

Output Created		15-JUN-2022 14:51:38
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	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax		REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT Q52_1 /METHOD=ENTER Q50_1 /RESIDUALS HISTOGRAM(ZRESID).

Notes

Resources	Processor Time	00:00:00,17
	Elapsed Time	00:00:00,17
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

	Mean	Std. Deviation	N
Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	13,95	1,459	122
How satisfied are you with your office working set up? - I am satisfied with my office working set up	14,44	1,621	122

		Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	How satisfied are you with your office working set up? - I am satisfied with my office working set up
Pearson Correlation	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	1,000	,582
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,582	1,000
Sig. (1-tailed)	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	.	,000
	How satisfied are you with your office working set up? - I am satisfied	,000	.

		Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	How satisfied are you with your office working set up? - I am satisfied with my office working set up
	with my office working set up		
N	Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break	122	122
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	122	122

Model	Variables Entered	Variables Removed	Method
1	How satisfied are you with your office working set up? - I am satisfied with my office working set up[b]	.	Enter

a. Dependent Variable: Does your office workplace environment help you to replenish your energy when
   you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

b. All requested variables entered.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,582[a]	,339	,333	1,192

a. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

b. Dependent Variable: Does your office workplace environment help you to replenish your energy when
   you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	87,313	1	87,313	61,491	,000[b]
	Residual	170,392	120	1,420		
	Total	257,705	121			

a. Dependent Variable: Does your office workplace environment help you to replenish your energy when
   you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

b. Predictors: (Constant), How satisfied are you with your office working set up? - I am satisfied with my office working set up

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	
		B	Std. Error	Beta	t
1	(Constant)	6,384	,971		6,575
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,524	,067	,582	7,842

Coefficients^a

Model		Sig.
1	(Constant)	,000
	How satisfied are you with your office working set up? - I am satisfied with my office working set up	,000

a. Dependent Variable: Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	12,15	15,29	13,95	,849	122
Residual	-3,767	2,329	,000	1,187	122
Std. Predicted Value	-2,123	1,577	,000	1,000	122
Std. Residual	-3,161	1,954	,000	,996	122

a. Dependent Variable: Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

Histogram

Dependent Variable: Does your office workplace environment help you to replenish your energy when you take a work break? - My office workplace environment helps me to replenish my energy when I take a work break

Mean = -3,23E-16
Std. Dev. = 0,996
N = 122
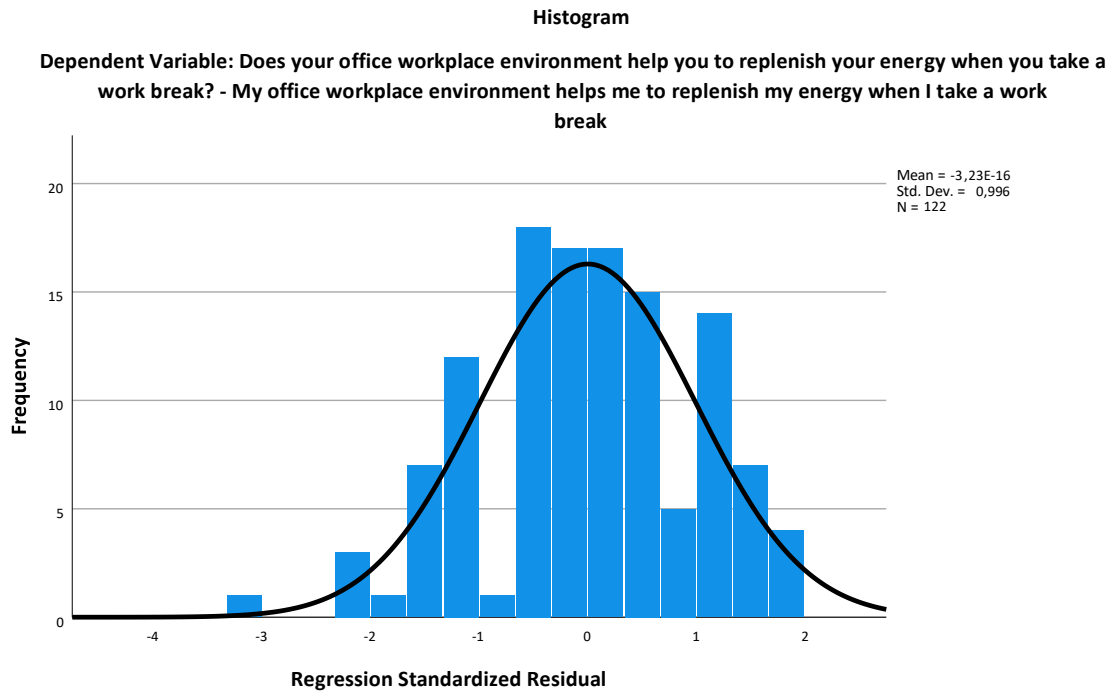
Notes

Output Created		24-JUL-2022 15:49:59
Comments		
Input	Data	
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	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.

	Cases Used		Statistics are based on cases with no missing values for any variable used.
Syntax			REGRESSION /DESCRIPTIVES MEAN STDDEV CORR SIG N /MISSING LISTWISE /STATISTICS COEFF OUTS R ANOVA /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT Q_1.3 /METHOD=ENTER ded_home /RESIDUALS HISTOGRAM(ZRESID).

Resources	Processor Time	00:00:03,17
	Elapsed Time	00:00:01,73
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

	Mean	Std. Deviation	N
How satisfied are you with your home working set up? - I am satisfied with my home working set up	15,39	1,466	133
ded_home	10,6679	1,08527	133

Correlations

		How satisfied are you with your home working set up? - I am satisfied with my home working set up	ded_home
Pearson Correlation	How satisfied are you with your home working set up? - I am satisfied with my home working set up	1,000	,229
	ded_home	,229	1,000
Sig. (1-tailed)	How satisfied are you with your home working set up? - I am satisfied with my home working set up	.	,004
	ded_home	,004	.
N	How satisfied are you with your home working set up? - I am satisfied with my home working set up	133	133
	ded_home	133	133

Model	Variables Entered	Variables Removed	Method
1	ded_home[b]	.	Enter

a. Dependent Variable: How satisfied are you with your home working set up? - I am satisfied with my home working set up

b. All requested variables entered.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,229[a]	,052	,045	1,432

a. Predictors: (Constant), ded_home

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14,882	1	14,882	7,253	,008[b]
	Residual	268,787	131	2,052		
	Total	283,669	132			

a. Dependent Variable: How satisfied are you with your home working set up? - I am satisfied with my
home working set up

b. Predictors: (Constant), ded_home

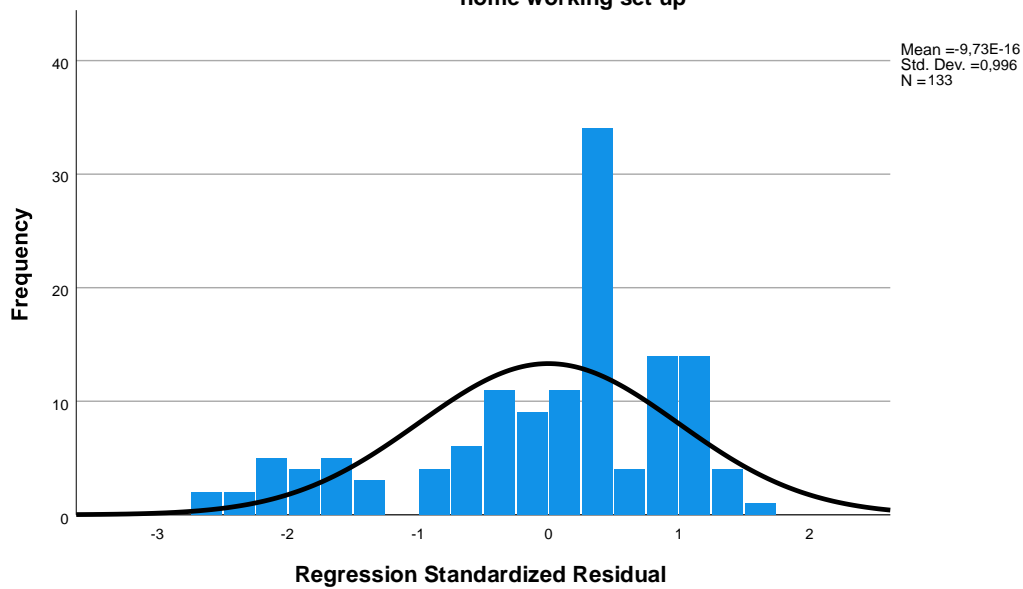| Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	12,090	1,232		9,815	,000
	ded_home	,309	,115	,229	2,693	,008

a. Dependent Variable: How satisfied are you with your home working set up? - I am satisfied with my
home working set up

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	14,26	15,80	15,39	,336	133
Residual	-3,803	2,434	,000	1,427	133
Std. Predicted Value	-3,380	1,227	,000	1,000	133
Std. Residual	-2,655	1,700	,000	,996	133

a. Dependent Variable: How satisfied are you with your home working set up? - I am satisfied with my
home working set up

Histogram

Dependent Variable: How satisfied are you with your home working set up? - I am satisfied with my home working set up

Mean =-9,73E-16
Std. Dev. =0,996
N =133

Notes

Output Created		24-JUL-2022 15:55:20
Comments		
Input	Data	
	Active Dataset	ZbiórDanych1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	169
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any variable used.

Syntax			REGRESSION
			  /DESCRIPTIVES MEAN STDDEV CORR SIG N
			  /MISSING LISTWISE
			  /STATISTICS COEFF OUTS R ANOVA
			  /CRITERIA=PIN(.05) POUT(.10)
			  /NOORIGIN
			  /DEPENDENT Q_1.6 /METHOD=ENTER ded_home
			  /RESIDUALS HISTOGRAM(ZRESID).

Resources	Processor Time	00:00:00,55
	Elapsed Time	00:00:00,24
	Memory Required	198208 bytes
	Additional Memory Required for Residual Plots	312 bytes

	Mean	Std. Deviation	N
Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	15,29	1,433	133
ded_home	10,6679	1,08527	133

Correlations

		Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	ded_home
Pearson Correlation	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	1,000	,281
	ded_home	,281	1,000

		Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	ded_home
Sig. (1-tailed)	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	.	,001
	ded_home	,001	.
N	Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break	133	133
	ded_home	133	133

Model	Variables Entered	Variables Removed	Method
1	ded_home[b]	.	Enter

a. Dependent Variable: Does your home workplace environment help you to replenish your energy when

you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

b. All requested variables entered.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,281ª	,079	,072	1,381

a. Predictors: (Constant), ded_home

b. Dependent Variable: Does your home workplace environment help you to replenish your energy when

you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21,478	1	21,478	11,269	,001ᵇ
	Residual	249,665	131	1,906		
	Total	271,143	132			

a. Dependent Variable: Does your home workplace environment help you to replenish your energy when

you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

b. Predictors: (Constant), ded_home

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11,321	1,187		9,536	,000
	ded_home	,372	,111	,281	3,357	,001

a. Dependent Variable: Does your home workplace environment help you to replenish your energy when

you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	13,92	15,78	15,29	,403	133
Residual	-4,781	3,078	,000	1,375	133
Std. Predicted Value	-3,380	1,227	,000	1,000	133
Std. Residual	-3,463	2,229	,000	,996	133

a. Dependent Variable: Does your home workplace environment help you to replenish your energy when

you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break

Histogram

Dependent Variable: Does your home workplace environment help you to replenish your energy when you take a work break? - My home workplace environment helps me to replenish my energy when I take a work break