Factors and consequences of loneliness in the digital workplace: A systematic literature review and framework for empirical testing

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Abstract

This paper presents a systematic literature review investigating the factors and well-being consequences of loneliness in digital workplaces. Using PRISMA guidelines and thematic analysis, 15 peer-reviewed articles published between 2021 and 2024 were identified and analyzed. Four principal themes emerged as antecedents of workplace loneliness: technology affordances, job design, personal characteristics, and behaviour/context in digital workplaces. Two major impacts on employee well-being were identified: psychological outcomes (e.g., emotional exhaustion, depression) and job-related outcomes (e.g., satisfaction, productivity). The review highlights how workplace loneliness can undermine employee engagement and organizational performance, emphasizing the need for management strategies that foster connection in digital environments. A conceptual framework is proposed to guide future empirical research. By synthesizing current evidence, the study contributes practical insights for workforce leaders and advances human-centered business-IT alignment strategies.

Keywords

digital workplace, loneliness, professional isolation, remote work, SLR

1. Introduction

The digital transformation of workplaces has led to diverse work settings in which employees work from different locations and time zones. During the COVID-19 pandemic, employees were sent out of the office to work from home, and technology was further developed to create the digital workplace most office workers use today [1]. This trend continued after the pandemic, motivating scholars and practitioners to understand the well-being-related implications of digital workplaces [2, 3, 4, 5]. Digital transformation is not only a technological shift but also a profound change in organizational structures, leadership roles, and workforce management practices. As organizations adapt to remote and hybrid work models, they face new challenges in maintaining employee engagement, collaboration, and well-being. One such well-being-related implication is loneliness [6, 7].

A Digital Workplace (DWP) is "an integrated technology platform that provides all the tools and services to enable employees to effectively undertake their work, both alone and with others, regardless of location" [5, p. 480]. It involves "... not only the physical space, employees and tasks, but also a set of strategically accepted procedures and rules to maximise productivity and improve collaboration, communication and knowledge management" [8, p. 10]. This approach highlights that DWPs are more than a mere bridge between different locations and working times, they require elaborate planning and consideration of multiple factors.

Given the recent developments causing a massive shift towards these forms of working, workplace loneliness, "the perception of relationship deficit in any organisation which hampers the employee's psychological well-being, which is an essential attribute for overall organisational performance" [9, p. 1] is an important topic for organisations to explore. Loneliness has been described as a critical public health concern with almost one in six people around the world experiencing loneliness [10]. Within the

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workplace, loneliness has been associated with employee dissatisfaction, burnout and adverse effects on employee performance and commitment [11]. The causes of loneliness in the workplaces include, but are not limited to, how inclusive the workplace is, levels of task independency, and access to emotional support (i.e., opportunities to vent) [12, 13].

Understanding the factors and consequences of workplace loneliness is critical for organizations seeking to manage workforce well-being and sustain employee engagement. Addressing such humanistic aspects is increasingly recognized as essential for effective business-IT alignment (BITA), as organizations aim to ensure that digital initiatives support both organizational performance and employee needs [14]. This perspective aligns with calls to prioritize human capabilities and embed employee well-being within enterprise architecture approaches [15].

Business-IT alignment is typically examined across four dimensions: strategic, structural, social, and cultural [16]. Yet, the social dimension, encompassing human experiences and perceptions, remains under-researched [17] and is often described as "mechanistic and fail[ing] to capture real life" [16, p. 298]. Neglecting loneliness in digital workplaces can undermine BITA efforts, as disengaged employees are more likely to resist digital innovation or fall short of realizing intended productivity gains [18]. As organizations increasingly pursue sustainability goals that also encompass employee mental health and wellness [19], BITA plays a crucial role. Optimal IT and strategic alignment may position organizations to meet business objectives [20], but such efforts are likely to be fruitless without sustainable working practices that enable employees to flourish.

Business-IT alignment can act as a job resource when supporting goal accomplishment through sound strategic planning [21]. Conversely, it may become a job demand by hindering task completion, limiting social interaction, or failing to address psychosocial hazards in the workplace [22]. Through the lens of loneliness and psychosocial risk [23], sustainable alignment practices can mitigate risks such as task independence and lack of emotional support. Importantly, empirical evidence shows that stress-related absenteeism, often linked to workplace loneliness, costs organisations billions each year [24].

This study utilizes a systematic literature review (SLR) to investigate the antecedents and outcomes of loneliness in digital workplaces from a well-being perspective. It addresses two primary questions: (i) What factors influence loneliness in the digital workplace? and (ii) How does loneliness in the digital workplace impact employee well-being? Section 2 elaborates on the SLR process. Section 3 details the findings. Section 4 discusses these findings in depth, and Section 5 presents the conceptual model for quantitative validation. The paper aims to inform strategies that foster employee engagement and well-being in digital work environments.

2. Methods

The study utilised the 2020 PRISMA Framework [25], combined with thematic analysis [26] to report the systematic review results. Bramer et al. 's search strategy framework guided the search process [27]. The following boolean search terms were used in ProQuest Central and Scopus:

> ("digital workplace*" OR "remote work*" OR "virtual workplace*" OR "Home Office" OR "digital work" OR "new way of work*" OR "online work*" OR "telework*" OR "telecommute") AND ("workplace loneliness" OR "social isolation at work" OR "work solitude" OR "work-induced solitude" OR "occupational loneliness" OR "work environment isolation" OR "professional solitude") AND ("manifestations of loneliness" OR "displays of loneliness" OR "signs of loneliness" OR "symptoms of loneliness" OR "appearances of loneliness" OR "antecedents of loneliness" OR "influencing factors" OR "determinants" OR "drivers" OR "contributors" OR "causes" OR "antecedents" OR "moderators" OR "alleviators" OR "mitigators" OR "relievers" OR "Well-being" OR "employee mental health" OR "job satisfaction" OR "employment satisfaction" OR "work happiness" OR "job performance" OR "work effectiveness" OR "job productivity")

Table 1
PRISMA Phases and Steps

PRISMA Phase	Steps (Inclusion)	Steps (Exclusion)
Identification	Records identified from databases (n=35)	Duplicate records removed (n=1)
Screening	Records screened (n=34)	Records excluded (n=16)
	Records sought for retrieval (n=18)	Reports not retrieved (n=0)
	Reports assessed for eligibility (n=18)	Excluded: - Not focused on loneliness (n=1) - Not focused on digital work environments (n=2)
Included	Studies included in this review (n=15)	

ProQuest Central was chosen as an extensive multidisciplinary research database with access to the major subject areas relevant to this study including, business, health, and science and technology. According to 2022 data, Scopus is the largest existing multidisciplinary database with 40,562 peer-reviewed journals indexed compared to 24,831 for Web of Science [28]. Hence, utilising both databases enables the researchers to access a wide range of multidisciplinary articles.

Inclusion criteria were peer-reviewed English articles published between 2021-2024 (April), available in full text. 35 records were identified through the boolean search. The PICO Framework [29] helped determine further eligibility criteria: (P) Population focusing on remote and hybrid work knowledge workers, (I) Intervention/phenomenon of interest being loneliness in digital workplaces, (C) Comparison with non-lonely employees or pre-digital workplace conditions, and (O) Outcomes related to employee well-being effects.

Exclusion criteria included an absence of focus on loneliness or digital workplace context. Comments and conference proceedings were also excluded. The selection process followed the PRISMA Flow [25], resulting in 15 records for review (see Table 1). The hits for each database are included in the supplementary material along with the rationale for inclusion and exclusion. For instance, reasons for exclusion included, but were not limited to, duplications across databases, abstracts missing a digital environment or workplace loneliness context, and a study focus not relevant to the topic e.g., crisis management and resilience, creativity and innovation, and wellness strategies.

Following Brown and Clark's "six steps of thematic analysis framework" [26], data was collected and coded by the principal researcher, which were quality-checked and updated by the other researchers. Themes were created manually around each research question with the help of a synthesis matrix in a spreadsheet guided by Ingram et al. [30]. For parsimony purposes, final themes and sub-themes had to be supported by at least three records. Supplementary information including the Prisma Flow Diagram, the collation of initial themes, the synthesis matrix, excluded literature with reasons, scales used in the studies, sample characteristics, a collection of the applied theories from the included literature are available in Section A, Online Resources.

Table 2
Papers and Themes

Category	Theme	Source Papers	N
Factors	Technology Affordances	[31, 32, 33, 34, 35, 36, 37, 38]	8
	Job Design	[31, 39, 32, 33, 40, 41, 36, 42, 37]	9
	Personal Characteristics	[31, 39, 32, 33, 43, 40, 36, 37]	8
	Behaviour + Context in Digital Workplaces	[39, 33, 44, 35, 43, 45]	6
Outcomes	Psychological Outcomes	[33, 36, 45, 37, 38]	5
	Job-related Outcomes and Performance	[31, 33, 44, 35, 36, 42, 38]	7

3. Findings

3.1. Factors influencing loneliness in the digital workplace

Four themes were found within the included literature: 1) technology affordances, 2) job design, 3) personal characteristics, and 4) behaviour and context in digital workplaces. Table 2 provides an overview of the papers in each theme.

3.1.1. Technology affordances

Eight records mentioned the theme of technology affordances in digital workplaces, highlighting two key variables: visibility and association. Visibility, afforded through conferencing and external social media, plays a role in shaping communication experiences. The lack of face-to-face interaction, as noted by several studies [31, 32, 37, 34, 33], relates to reduced visibility in virtual environments, potentially leading to increased loneliness.

Association, which involves connecting information and people through digital means, is another critical factor. The efficacy of direct communication channels directly impacts the ability to form and maintain associations in digital workplaces [31, 37, 34]. Informal exchanges are necessary to create bonds with colleagues and establish trust and belonging in remote working conditions [35, 42]. However, these informal exchanges are reduced in remote settings due to a perceived lack of availability [42]. Optimising the use of Information and Communication Technologies (ICTs) to enhance both visibility and association can potentially mitigate loneliness, as suggested by the Social Presence Theory and Media Richness Theory [34].

3.1.2. Job design

The theme of job design was found in nine records. It included factors related to 1) task interdependence and clarity and 2) job autonomy.

Particularly task interdependence emerged as a crucial factor in workplace loneliness. As technology enables more flexibility, many digital tasks are designed for independent execution, potentially isolating team members and damaging virtual teams [36, 41]. Task interdependence is identified as a moderator of workplace loneliness [36, 42]. Research suggests that time restrictions in tasks and the amount of high-concentration work play a relevant role in forming social connections at work [40]. Additionally, task clarity was recognised as a mitigating factor for loneliness, especially in digital workplaces with limited communication [31, 42, 39]. Missing clarity can result in task conflicts that disrupt cooperation and thereby divide the team [31].

A further job design related factor was job autonomy. Four records observed a mitigating effect on loneliness when employees were given more control and autonomy over their situation, leading to less task interdependence. This also included the choice of their work setting and the ability to optimise their working conditions to meet their social needs [33]. A lack of autonomy and controls like monitoring comes with more loneliness in remote environments [36, 37], with benefits depending on segmentation preferences [32].

3.1.3. Personal characteristics

Personal characteristics, including demographics and individual traits affecting loneliness in the digital workplace, were drawn from eight records. The most considered socio-demographic characteristics predicting loneliness in the digital workplace were age and gender [37, 39]. However, studies included in the review controlling for these variables did not report significant differences [31, 36, 43, 37, 39]. [32, 43, 33] highlight that workplace loneliness is impacted by the individual need to belong or need for affiliation. It is argued that telecommuters with a high need for belonging and affiliation are more likely to feel these needs are unfulfilled in the digital workplace. However, as noted in [40], loneliness

at work cannot be blamed on the individual alone, as the concept is a product of the interplay between individual and contextual factors.

3.1.4. Behaviour and context in Digital Workplaces

Identified in six records, the theme includes 1) the separation of work and home and 2) leadership behaviour and organisational culture. The separation of work and home emerges as a critical factor in digital workplace loneliness. High job and home demands significantly increase workplace loneliness by causing interference between work and private life, leading to reduced social contact and emotional exhaustion [44, 39]. The lack of physical separation between work and home in remote work makes it challenging to manage the demands of both domains, leading to spillover effects that contribute to emotional exhaustion and workplace loneliness [35]. The difficulty in separating work and home life can lead to individuals restricting their communication in digital settings to conserve mental resources, as explained by the Conservation of Resources (COR) theory [44, 43].

Leadership and culture also impact loneliness in digital environments. Servant, supportive, transformational, and ethical leadership styles are identified as positive influences [45, 44]. Servant leadership is named for its positive influence on social capital, contributing to adaptation and diminishing depression; transformational leadership avoids role conflict and reduces stressors such as anxiety and isolation effects. Emotional leadership is known to preserve mental well-being in times of crisis, thereby preserving emotional resources [45]. As for the organisational culture, a collaborative team climate is negatively associated, whilst a competitive climate is positively associated with digital workplace loneliness [43]. Finally, the perception of remote work stigma is another factor. Remote workers may be perceived to receive a 'special treatment' and be resented by in-office coworkers [33], leading to loneliness.

3.2. Impact of loneliness in the digital workplace on employee well-being

The second research question regarding the impact of loneliness in the digital workplace on well-being focuses on two topics of interest: 1) psychological outcomes and 2) job satisfaction and performance (see Table 2).

3.2.1. Psychological outcomes

Five records suggest an impact of workplace loneliness on emotional exhaustion. Interestingly, it emerges as both an antecedent and outcome of workplace loneliness in digital environments. Studies highlight this bidirectional relationship, noting that loneliness depletes emotional resources, hindering quality social interactions and creating a vicious cycle [36, 38]. Several records mention depression as a direct or indirect outcome of workplace loneliness. [32] found indirect effects of loneliness through emotional exhaustion, while others identified direct links [36, 33]. Loneliness also predicts related issues such as technostress and psychological distress [37]. Digital diseases such as nomophobia and fear of missing out are significantly explained by loneliness [41], addressing the interplay between loneliness, emotional exhaustion and related psychological outcomes in digital workplaces.

3.2.2. Job-related outcomes and performance

Job satisfaction and performance are significantly impacted by loneliness in digital workplaces, as mentioned in eight studies. [42] found a negative relationship between social isolation and adjustment to remote work, indicating lower job satisfaction. Similarly, [35] and [33] reported negative associations between loneliness and work engagement as well as job satisfaction, respectively. Performance is also affected, with studies reporting reduced productivity [33] and creativity [31, 44] due to loneliness. Factors contributing to this include less organisational commitment, lower quality feedback, and lack of role clarity [33, 42]. Counterproductive behaviours such as cyberloafing [38], knowledge hoarding

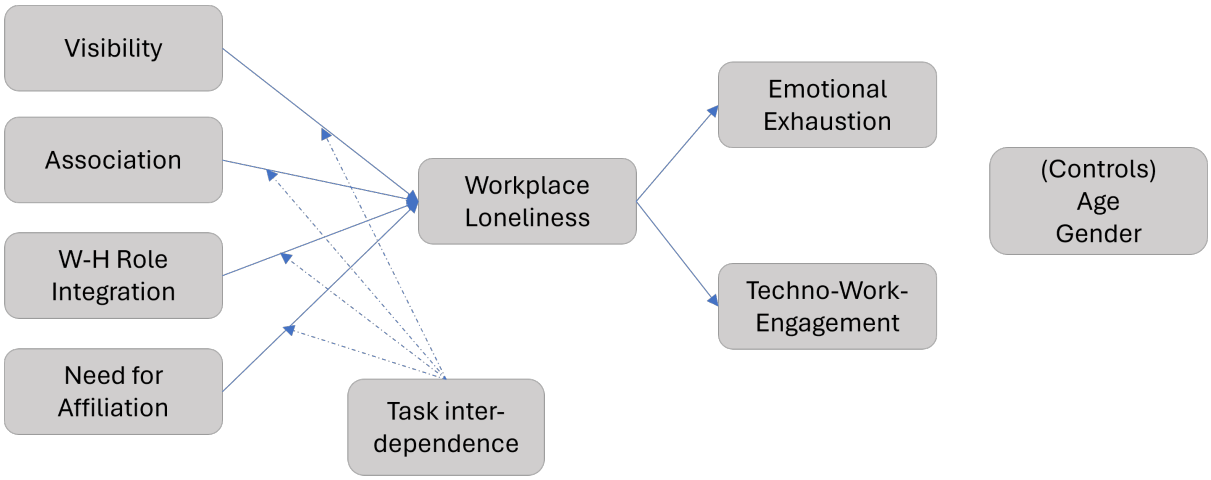

Figure 1: Empirical model

[36, 43], and reduced organisational citizenship behaviour [33] further impact performance negatively in digital workplaces.

4. Discussion

This SLR demonstrates how strategies to enhance the social dimension of BITA should encompass the four factors influencing loneliness as a means to address the two outcomes detailed above. Specifically, job design featured as the most popular factor influencing digital workplace loneliness, with nine of the fifteen studies discussing this. Risks of loneliness attributed to job design can be tackled by assessing the levels of task interdependence, clarity and job autonomy. Task interdependence is enabled by great strides in technology; however, by its nature it enables employees to work independently and in some cases this can create loneliness. A practical means of assessing this is through tools such as the JD-R-Monitor. Crucially, this tool should be used by key persons to identify the most relevant hazards [22]. We argue that enterprise architects and similar employees ought to be classified as such.

Technology affordances, with eight papers, described a need for visibility and association. Technolgy provides an array of tools that can increase viability and improve communications in virtual environments. [22] classify computer problems and unfavourable working conditions as job demands, with negative well-being outcomes. In contrast, they view social climate, social support from colleagues and supervisors, and team cohesion as job resources capable of buffering against job demands. With this in mind, BITA strategies should ensure that these factors are prioritised when designing digital working environments.

Personal characteristics, also with eight studies, highlight the need for organisations to understand individual differences across the workforce. Specifically, it could be that some employees have a greater need for social interaction and therefore BITA strategies should pay close attention to specific risk factors and take action accordingly.

The least prominent factor of digital workplace loneliness, behaviour and context in digital workplaces, was featured in six papers. Two critical aspects underpin this theme. Firstly, work home separation is a key component of work life balance. Yet, working from home can create imbalance. To tackle this, restrictive actions are required. In the studies they were personal actions, however, as part of BITA strategies, policies could be developed to encourage sustainable working and disconnection. Leadership and culture also impacted loneliness in digital environments. The SLR identified specific types of leadership styles with positive employee outcomes. Therefore, BITA strategies should encompass the recruitment and selection of specific types of leaders. Moreover, internal talent pools should be developed to maximise specific leadership styles. In doing so, organisations reduce risks of loneliness and enhance the organisational resource pool.

5. Future research: Empirical model for quantitative validation

Building on the findings of this SLR, a conceptual model for quantitative validation has been developed (see Figure 1), which aims to empirically test the relationships between key variables we identified in the literature on digital workplace loneliness. The model illustrates how workplace loneliness operates within the Job Demands-Resources (JD-R) theoretical framework in digital workplace contexts [46].

The proposed model includes four key antecedents of digital workplace loneliness: visibility and association (cf. Section 3.1.1) representing technology affordances that can serve as digital job resources when optimized, need for affiliation (cf. Section 3.1.3) functioning as a personal resource/ demand depending on fulfilment, and work-home interference (cf. Section 3.1.4) representing job demands from boundary blurring in digital work environments. Additionally, task interdependence (cf. Section 3.1.2 functions as a moderator that influences the strength of relationships between other predictors and loneliness outcomes. Workplace loneliness, in turn, is hypothesised to predict two outcomes: emotional exhaustion (cf. Section 3.2.1), following the health impairment process of the JD-R model and reduced techno-work engagement (cf. Section 3.2.2) representing diminished motivational outcomes. While emotional exhaustion is well-supported by the SLR as an outcome, we extend the concept of work engagement to encompass techno-work engagement considering the central role of technology in digital workplaces. This configuration demonstrates how inadequate digital job resources and heightened digital job demands can create conditions for workplace loneliness, which then triggers both the stress and motivational processes outlined in JD-R theory, ultimately affecting employee well-being and digital transformation success. By empirically validating these relationships, the model will offer evidence-based guidance for organizations navigating the human challenges related to digital workplace loneliness. Moreover, it will extend business-IT alignment research by promoting human capabilities consciousness in enterprise architectures, which aims at designing organizational structures and systems to enhance employees' fundamental capabilities, rather than focusing solely on technology or efficiency [15]. For example, scholars and organisations can identify the impact of each factor on workplace loneliness through case and cohort studies and meta-analyses. This may shed light on which factors are more powerful and for whom. That is, stratification is necessary to identify if some employees are more at risk. Beyond the health and economic argument, is the legal requirement for this, with many European Union countries requiring organisations to assess risk and take reasonable risk mitigation actions. Building on the data, learning and development (L&D) and occupational health (OH) professionals can design interventions specifically targeted at the most powerful drivers of digital workplace loneliness and well-being. However, this requires a stakeholder approach with enterprise architects working closely with L&D and OH professionals. Soliciting professional advice from each stakeholder is critical in ensuring that solutions tackle the identified problems and are organisationally workable given the resources available. In sum, we advocate for a transdisciplinary approach of multistakeholder involvement.

Declaration on Generative AI

The authors have not employed any Generative AI tools.

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A. Online Resources

The online resources can be downloaded here.