9-17-2023

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Pacific Asia Journal of the Association for Information Systems

ISSN 1943-7544

Research Paper doi: 10.17705/1pais.XXXXX Volume XX, Issue X (202X)

Designing Digital Workplaces: A Four-Phase Iterative Approach with Guidelines Concerning Virtuality and Enterprise Integration

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Abstract

Background: *The current workforce comprises individuals with varied characteristics and work expectations. Consequently, many companies are currently investing resources to design effective work environments with the aim of enhancing their ability to retain top talent.*

Method: *We conducted a Systematic Literature Review (SLR) to investigate how organizations can design effective digital workplaces for their workforce.*

Results: *Our primary contributions encompass a definition of a digital workplace rooted in literature, and a four-phase iterative approach for crafting a digital workplace. This includes a comprehensive set of actionable guidelines for each phase, which were previously dispersed within existing literature. Additionally, we introduce a rubric for assessing Enterprise Integration, employed in conjunction with Virtuality Level to characterize various workplace configurations. Finally, we have also listed a set of additional research gaps and promising avenues for researchers interested in this field.*

Conclusion: *In response to new challenges, companies must reassess their current workplace arrangements, specifically in light of a workforce that increasingly prioritizes flexible work options. This endeavor is most effectively achieved by taking into consideration a set of actionable guidelines that account for various typologies of digital workplaces. These guidelines should be considered when designing work arrangements that seamlessly integrate processes, individuals, and technology. Surprisingly, such an approach is yet to be explored in existing literature.*

Keywords: Digital Workplace, Workplace Typologies, Design Guidelines.

This research article was submitted on February-2023 and under three revisions, accepted on August-2023.

Citation: de Moraes, C. R., da Cunha, P. R., & Ramos, I. (in press). Designing Digital Workplaces: A Four-Phase Iterative Approach with Guidelines Concerning Virtuality and Enterprise Integration. *Pacific Asia Journal of the Association for Information Systems, XX*(X), XX-XX. https://doi.org/10.17705/1pais.XXXXX

Introduction

According to Marsh (2018), over the past two decades, digital workplaces have offered employees a varied range of interconnected technologies to facilitate their daily tasks. By enabling employees to work from any location, digital workplaces have eradicated the need for a physical office as a prerequisite (White, 2012). However, the acceptance and adoption of these technological tools by employees are pivotal for their effective implementation (Marsh, 2018). Consequently, it becomes imperative for organizations to establish an engaging digital workplace (Brockner et al., 2006; Larkin, 2017), as employees are naturally drawn to companies that share congruent values (Mukherjee et al., 2012). Recent research also emphasizes the importance of further studies on the impact of information technology in the digital work setting (Lu et al., 2021). With companies estimated to have invested $1.8 trillion in digital transformation projects in 2022, enhancing our comprehension of establishing a rewarding digital work environment will result in enhanced organizational efficiency (Shirer, 2022). According to Perry et al. (2018), *"[e]ngaged individuals fully invest themselves and their resources in their work and the workplace, whereas disengaged employees are detached, withdrawn, and avoid significant investments in work"* (p.579). Moreover, disengaged employees can have an adverse effect on the performance of the organization (Shaik & Makhecha, 2019). Other authors estimate that about 70% of the employees are not engaged, resulting in companies losing up to $355 billion of their revenue per year (Byrne et al., 2016). Hence our research question:

RQ: *How can organizations design effective digital workplaces?*

Based on a systematic literature review, we suggest a definition of a digital workplace that is firmly grounded in prior research. We also delve into the nuances distinguishing various workplace configurations, such as physical, remote, virtual, and digital, and present a structured set of principles to aid organizations in establishing effective digital workplaces. This paper extends a previous inquiry into this subject (de Moraes et al., 2022). It contributes to research on workplace design by organizing the previous theoretical base and identifying practical applications in organizations. In addition to the previous publication, we outline some theoretical background for the digital workplace and employee engagement to support an understanding of how previous studies applied these theories in an organizational environment. Furthermore, we highlight the differences between virtual and face-to-face workplace approaches and propose practical measurement tools to identify workplace arrangements.

The remainder of this paper is structured as follows. First, we present the methodology, followed by our literature analysis. Next, we present our contributions on designing effective digital workplaces. Finally, we describe various research gaps and avenues for future research just before closing with conclusions.

Methodology

To substantiate the significance of our research and pinpoint gaps and constraints in the existing body of knowledge, we conducted a systematic literature review (SLR). Adhering to the recommendations of Webster and Watson (2002) and aligning with our research question, we surveyed six scholarly databases - EBSCO, AISeL, ScienceDirect, IEEE, ACM, and Web of Science - with the goal of comprehensive publication coverage. Our search was initially conducted from the last week of June 2020 to the first week of July 2020 and was updated in March 2023. Our inclusion criteria consisted of conference and journal papers, written in English and available in PDF format, that had been published since 2000, the year in which

Jeffrey Beir first used the phrase “digital workplace” in his influential article (Beir, 2000). The search phrase we initially selected was:

((“digital workplace” OR “remote work” OR “future of work” OR “virtual teams”) AND (“engagement” OR “motivation” OR “satisfaction” OR “organization” OR “organization”)).

Preliminary Google Scholar searches suggested that “effectiveness,” “millennial,” “individual,” and “employee” were also pertinent to further refine the results. Furthermore, they revealed a scarcity of papers that took generational characteristics into account. As a result, we adopted a strategy of using “OR” combinations of keywords to obtain broader coverage. This approach enabled us to encompass various workplace configurations, such as virtual teams, remote work, and digital workplace, as well as different constructs related to engagement, including motivation, job satisfaction, and effectiveness. The final search phrase we employed was:

((“digital workplace” OR “remote work” OR “future of work” OR “virtual team”) AND (engage OR “motivation” OR “satisfaction” OR “effectiveness”) AND (millennial OR organization OR organization OR organizational OR organizational OR individual or employee))

In our initial search, we focused on the title, abstract, and keywords of the publications, yielding a total of 560 entries. Following the elimination of twenty-nine duplicated papers, two researchers individually analyzed the title and abstract of the remaining 531 articles and determined their suitability for our research using a relevance classification system of Yes/No/Maybe. Our criteria encompassed the inclusion of any construct associated with a digital workplace arrangement, such as engagement or motivation, as well as an exploration of individual characteristics within a digital workplace setting, such as personality traits or individual values. Following the triangulation of the results (Carter et al., 2014), which involved discussions on classification discrepancies and ambiguous findings (“Maybes”). We discarded 470 articles that were not relevant to an organizational context, such as those focused on students or nursing studies and the full text of the remaining 61 articles was analyzed in detail. Figure 1, inspired on Mitchell et al. (2022), represents the paper selection process.

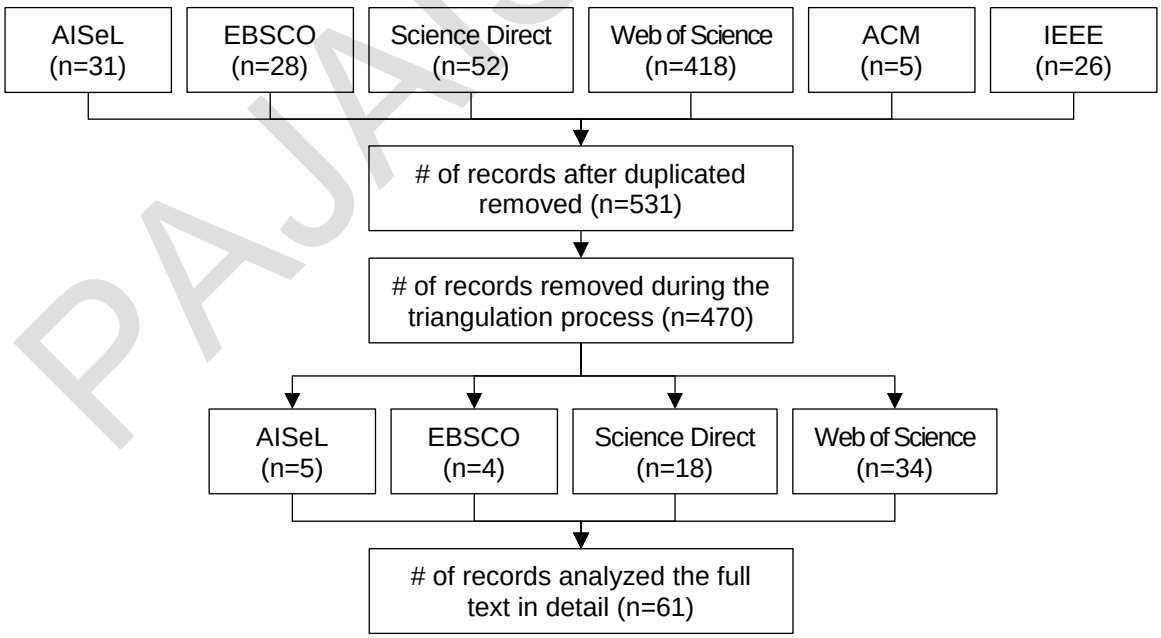

Figure 1 – Phases of the Systematic Review Webster and Watson (2002)

The results obtained from each database for each year are shown in Figure 2.

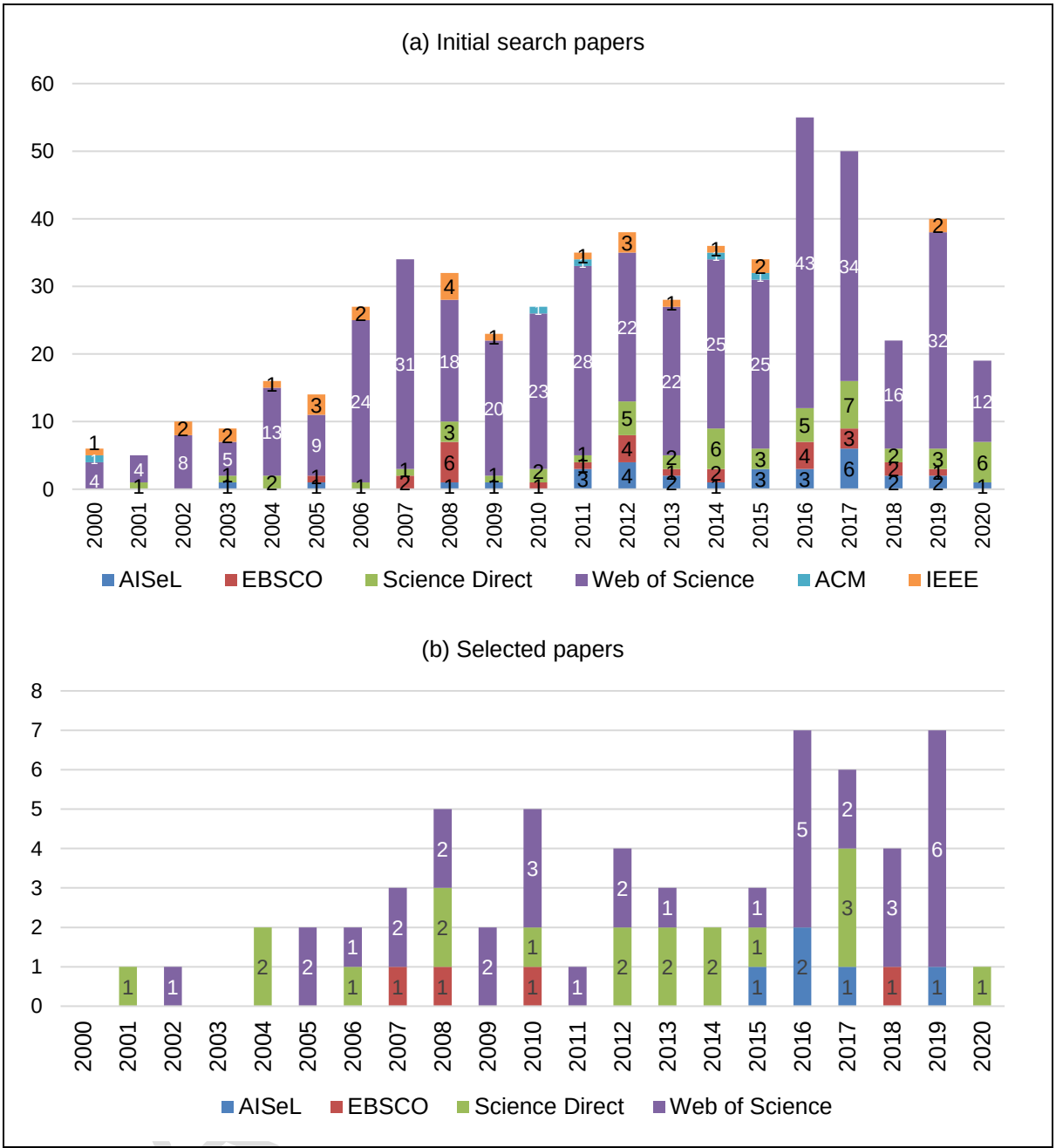

Figure 2 – Steps of the Search Process

Despite the concept of digital workplace being known for over two decades (Marsh, 2018), the volume of published studies starting increased in 2007, with peaks between 2017 and 2019. The following sections provide detailed results from the analysis obtained from the selected papers.

Literature Analysis

The details of the 61 selected papers are presented in Appendix A, Table A.1. We detected eleven papers that were also literature reviews, as indicated in column four of Table A.1. Most papers focus on one main aspect of the digital workplace, such as trust (Breuer et al., 2016), leadership (Walvoord et al., 2008), or virtuality (Ferretti, 2016; Schmidtke & Cummings, 2017). We opted for a comprehensive perspective on the digital workplace to scrutinize how it can

satisfactorily address the disparities in employee engagement, with the aim of bridging this gap in the literature.

Most of the selected papers (79%), consider the virtual workplace arrangement. Nine studies focused on remote working. Only one article studied the digital workplace context. Most of the papers (63%) focus primarily on performance or effectiveness. Nine articles analyze the engagement. We also identified satisfaction, motivation, and well-being as the main objects of study.

Despite the importance attributed by some authors to the new generations, specifically Generation Y and Z, who will represent about 75% of the workforce by 2030 (Buchanan et al., 2016), and claims that they hold distinct values, attitudes, and behaviors in the workplace (Bencsik et al., 2016; Civelek et al., 2017), only six out of the sixty-one analyzed papers consider the individual characteristics of these generations, as identified in Table 1. Concordantly, some authors state that this "*remain[s] a topic not well presented in research*" (Großer & Baumol, 2017, p.303).

Table 1 – Identified Papers with Generational Context

Ref.	Brief Description	Year	Workplace Arrangement	Primary Focus
Santana & Cobo	A classification of social, technological, political, and economical aspects of the future of work.	2020	Digital Workplace	Satisfaction and engagement
Shaik & Makhecha	The influence of cultural intelligence, communication (formal and informal), technology, trust, and individual maturity on employee engagement in virtual teams.	2019	Virtual Workplace	Engagement
Großer & Baumol	The influence of the degree of virtuality and the presence of shared mental models on the virtual teams' performance.	2017	Virtual Workplace	Performance
Graham et al.	The influence of technical proficiency on virtual team' effectiveness.	2016	Virtual Workplace	Effectiveness
Gilson et al.	A review of the inputs, mediators, moderators, and opportunities in virtual teams.	2015	Virtual Workplace	Performance
Brockner et al.	The segmentation of work styles, human resource policy, workplace design, and the effective use of technology.	2006	Does not specify	Performance

Considering this reality, we consolidate the main findings regarding generations in the following sub-section. However, there is much future work to be done in this dimension, and insufficient content was found in this SLR to include in the outcomes of this study.

Generational Characteristics

According to Mukherjee et al. (2012), companies typically attract employees whose personal values align with the organization's values. As a result, understanding the factors that motivate different generations is crucial. For instance, Millennials tend to value teamwork, while Gen Z often prefers to work independently, especially in a virtual environment (Larkin, 2017). In terms of work experiences, work-life balance, and feedback, Millennials place greater importance on

these factors (Larkin, 2017). Additionally, they prioritize positive feedback, recognition, and support in their personal lives. Both Millennials and Gen Z view their work as an opportunity for personal growth and fulfillment, rather than just a means of earning a living (Pfeffer, 1998). To promote employee commitment among these generations, adequate leadership and continuous personal growth opportunities through mentoring are critical (Santana & Cobo, 2020). Flexible working arrangements are also highly valued by both groups (Larkin, 2017).

Although limited research has been conducted on the impact of generational differences in digital workplace environments (Großer & Baumol, 2017), it is possible that younger generations perceive working in a digital setting as the norm, with face-to-face office work being viewed as the exception (Gilson et al., 2015).

Theoretical Background for the Design of Digital Workplaces

We found diverse theoretical underpinnings in the various papers analyzed in the literature review.

The effective implementation of a digital workplace hinges on both the adoption of appropriate strategies and the capacity to acclimate to new digital work techniques (Buchanan et al., 2016; Hamburg, 2019), as well as prioritizing the experience of employees. The digital workplace needs to fulfill the employee needs, such as autonomy and flexibility, to gain their acceptance (Shin, 2004). This underscores the need for organizations to adopt a human-centered approach while designing the new digital work environment (Buchanan et al., 2016; Tavanapour et al., 2019). Culture and engagement are cited by 87% of organizations as two of their major challenges (Buchanan et al., 2016). A recent Gallup study indicates that a mere 21% of employees across the globe are actively engaged in their work (Gallup, 2022). A digital workplace also involves redesigning work activities and processes and using adequate tools for the active participation of employees (Attaran et al., 2019). Due to the relevance of both technical and human aspects of digital workplace implementations, existing studies often combine information processing theories with psychological, social, or communication theories (O'Neill, Hambley, & Bercovich, 2014; Shaik & Makhecha, 2019; Walvoord et al., 2008).

Media richness (MRT), Media synchronicity (MST), channel expansion, and cognitive load theories are extensions of information processing theory, which studies how the mind analyzes information from the environment (Walvoord et al., 2008). In 1986, Daft & Lengel presented MRT as a framework to evaluate the richness of communication media, such as phone calls, video conferencing, and email. Ngwenyama and Lee (1997) demonstrate the influence of culture and social background on media choice. Some authors combine MRT with Social Presence Theory to explore how digital technologies can influence the sense of "presence" of the other person (Walvoord et al., 2008). Media Synchronicity Theory (MST) was proposed to better explain MRT. The MST provides a general understanding of the communication processes and the fit between media capabilities to support a specific task (Wang & Carte, 2018). Furthermore, the Multi-Motive Information Systems Continuance Model (MISC) focuses on understanding individuals' motivation to continue using information systems, particularly in collaborative contexts. This model acknowledges that individuals are driven by multiple motives or needs that influence their decision to persist in using a system (Tavanapour et al., 2019).

The utilization of information processing, communication, and social theoretical perspectives can aid in determining the most suitable tools for each task performed within a digital workplace, as well as identifying employees, job roles, and organizational characteristics. In designing collaboration systems, the application of the MST holds particular relevance. It aligns with the fundamental elements of collaboration, encompassing communication, cooperation, coordination, and the pursuit of a common goal. MST underscores the

significance of considering both task and technological aspects when individuals subjectively evaluate fit and express preferences for specific technologies. It emphasizes that technology preference should stem from a comprehensive understanding of the task that the technology supports (Nguyen et al., 2021).

In our pursuit of a more comprehensive understanding of how to design effective digital workplaces through a socio-technical approach, we recognized the importance of incorporating insights from social theories, such as Social Exchange Theory which supports the understanding of how digital tools and social interactions influence employee engagement in an organization (Robert & You, 2018). Also, Reasoned Action (Park et al., 2015) and Personality-Job fit (O'Neill, Hambley, & Bercovich, 2014) theories emphasize the individual's personality, attitudes, and behaviors to understand the individual's decision to engage in something. Selimović et al. (2021) emphasize that *"employees' attitudes and perceptions regarding new technologies do not imply the classic question of adoption, but their expectancies towards a future working environment".*

By integrating these theoretical perspectives, organizations can make informed design decisions that align with the unique needs and characteristics of their digital workplace, ultimately leading to enhanced employee engagement.

Digital Workplace

The concept of digital work is vast and does not have a universally accepted definition. The current literature utilizes various terms to describe the model of work arrangement, such as digital workplace, teleworking, telecommuting, e-working, remote working, and agile working (Wibowo et al, 2022). The physical workplace represents the traditional office environment, where employees share the physical space (Mukherjee et al., 2012). Remote work accounts for when employees perform their job away from their primary office, at any other location (Perry et al., 2018). The virtual workplace is defined as an environment where a "*group of individuals that are geographically dispersed and collaborate via electronic technologies to accomplish a specific goal*." (Shin, 2004, p. 732). On the other hand, the digital work environment consists of the collective knowledge, technology, instruments, and methodologies utilized by the workforce in a professional setting (Perry et al., 2018). It facilitates an interactive, instantaneous, mobile-responsive, and cooperative digital work experience (Attaran et al., 2019).

Drawing on the various contributions in the extant literature we propose the following consolidated working definition of Digital Workplace:

> A digital workplace is the ensemble of people, business processes, and technology, designed to enable work to be done seamlessly from any location, such as home, collaborative space, office, or other, without compromising efficiency or effectiveness.

Employee Engagement

In our literature review, we came across various concepts related to engagement. One is organizational engagement, which pertains to the level of commitment that an employee has towards their role in the enterprise (Shuck et al., 2017). Another is social and intellectual engagement, which refers to the degree to which an employee is mentally invested in their job responsibilities and socially integrated with their colleagues in the team (Shuck et al., 2017). The literature suggests that work engagement is marked by the employee's vigor, dedication, and absorption in their assigned duties (Crowe, 2016). Job engagement is related to the effort and energy dedicated by workers to perform their tasks (Shuck et al., 2017). Employee engagement is a favorable mental and emotional state that arises from a combination of cognitive, emotional, and behavioral energies pertaining to work-related matters (Cordery &

Soo, 2008; Florea & Stoica, 2019; Shuck et al., 2017). While job engagement centers around individual tasks, employee engagement delves into the broader experience of the employee (Shuck et al., 2017). In our research, we focused on employee engagement to capture the overall work experience of the individual.

Engagement is a multidisciplinary phenomenon studied over the last 35 years (de Vreede et al., 2019). Kahn (1990) first conceptualized engagement using these three dimensions: affective, cognitive, and physical. He used Goffman's (1961) role theory, motivation, and group theories to envisage engagement as an independent construct. Some authors state that engagement is a unique construct *"due to psychometric problems exploiting the same measure to assess both burnout and engagement"* (Byrne et al., 2016, p.1203).

For the past twenty years, scholars have regarded engagement as the positive counterpart to burnout, which is linked to a state of mental depletion. Traditionally, these two constructs were assessed together as interdependent and opposing concepts. Around the year 2000, researchers reached the conclusion that engagement and burnout have distinct dimensions and should thus be evaluated separately using different instruments (Schaufeli & Bakker, 2004). Employee engagement can be measured using the EES-Employee Engagement Scale (Shuck et al., 2017).

EES differs from other engagement measurements due to its conceptualization of personal engagement (Khodakarami et al., 2018). Shuck et al. (2017) argued that

> *"EES is [...] inclusive of the full spectrum of the immediate work experience (i.e. work, job, team, and the active experience of working) (p. 4). It is also a more comprehensive scale when taking into consideration the experience of employees' active roles within their work, job, team, and organization".*

The instrument comprises 12 questions, with four of them allocated to each of the three dimensions: cognitive, emotional, and behavioral (Shuck et al., 2017). Gallup introduced a different scale for measuring employee engagement, which evaluates employees according to their basic needs, individual needs, team needs, and opportunities for personal development (Gallup, 2013). Unlike the cognitive, emotional, and behavioral aspects emphasized by the EES, Gallup's approach categorizes employees as follows:

- **Engaged**: workers actively and fervently engaged in their job duties and passionate about their work and workplace. These individuals can have a positive impact on their company's performance and foster innovation within the organization.
- **Not engaged:** workers emotionally detached from their work and organization. While they may spend time on their job, they do not invest their energy or enthusiasm into their tasks.
- **Actively disengaged:** workers dissatisfied and resentful in their jobs can have a negative impact on their engaged colleagues, creating a detrimental work environment.

Numerous studies have indicated the beneficial outcomes associated with engaged employees, including improved work quality in terms of efficiency and efficacy, as well as enhanced individual performance (Crowe, 2016). Additionally, research has shown that engagement is linked to reduced absenteeism, greater organizational commitment, and lower turnover rates (Crowe, 2016; Schaufeli et al., 2006). It is worth noting that engaged employees have the potential to positively impact overall organizational performance (Shaik & Makhecha, 2019). According to Crowe (2016), several management processes can promote employee engagement, including efforts to reduce employee stress, promote employee well-being, and support self-management. These enablers of engagement can be categorized into job

resources, job demands, leadership, job characteristics, individual differences, and personal resources (Saks & Gruman, 2014). Job resources, for instance, can include factors such as autonomy, supportive colleagues, coaching, feedback, opportunities for professional development, social support, a positive workplace culture, recovery time, recognition and rewards, job variety, and work role fit (Saks & Gruman, 2014). Challenging demands can have a positive effect on employee engagement, whereas physical and hindrance demands may decrease engagement levels (Saks & Gruman, 2014). Job characteristics that can positively impact engagement include task variety, task significance, feedback, problem-solving processes, job complexity, and social support (Saks & Gruman, 2014). Individual factors that can influence engagement levels include core self-evaluations, conscientiousness, positive affect, and a proactive personality (Saks & Gruman, 2014). Additionally, personal resources such as self-efficacy, organization-based self-esteem, and optimism can have a positive influence on employee engagement (Saks & Gruman, 2014).

As Hambley et al. (2007) suggest, leaders cannot rely on the same strategies for leading virtual teams as they would with face-to-face teams. To effectively engage employees, transformational and empowering leadership is essential (Neufeld et al., 2010; Saks & Gruman, 2014). According to Neufeld et al. (2010), transformational leadership involves inspiring, developing, and intellectually stimulating followers to transcend their individual interests and work towards a shared purpose or vision.

Schullery (2013) suggests that employee engagement can be perceived differently across various generations as a result of their distinct needs, interests, and values. A North American study conducted in 2011 indicated that the Millennial generation was one of the least engaged generations, with only 16% of respondents exhibiting high levels of engagement. To our knowledge, there are no similar studies that focus on employee engagement among Generation Z. It is crucial for organizations to identify and prioritize the factors that drive employee engagement in order to enhance net revenue, product quality, and retention rates, among other key performance indicators (Schullery, 2013).

Designing Effective Digital Workplaces

Building on the outcomes of the SLR, we propose to define the workplace arrangement model as a function of virtuality and enterprise integration. Furthermore, we contribute a systematization of a set of guidelines across four phases to support organizations in the implementation of an effective digital workplace.

In creating our socio-technical process to support the implementation of a digital workplace, we rest on three pillars: (1) people; (2) process; and (3) technology (Morgan & Liker, 2020). The first pillar focuses on understanding employees' motivators and needs in a digital workplace. The second pillar defines and standardizes how employees perform their work. The third pillar represents technological tools and infrastructure available in an organization (such as communication tools) and how employees interact with it. The level of enterprise processes and technology represents the workplace arrangements model.

Workplace Arrangements

As organizations embrace virtuality and adopt digital technologies, the number of systems, applications, and platforms they use increases. These disparate systems may include communication tools, project management software, customer relationship management systems, and more. To ensure smooth operations and effective collaboration in a virtual environment, integration becomes necessary to connect and synchronize these systems. The workplace arrangements as a function of virtuality and enterprise integration (Figure 3) were developed to bridge a gap identified in the literature. As highlighted by Attaran et al. (2019),

"[c]ompanies that are not adopting an integrated approach [...] are failing to capitalize on a significant opportunities digital workplace could deliver" (p.2)

Figure 3 shows how we view different workplace arrangements, according to the level of virtuality and the level of enterprise integration.

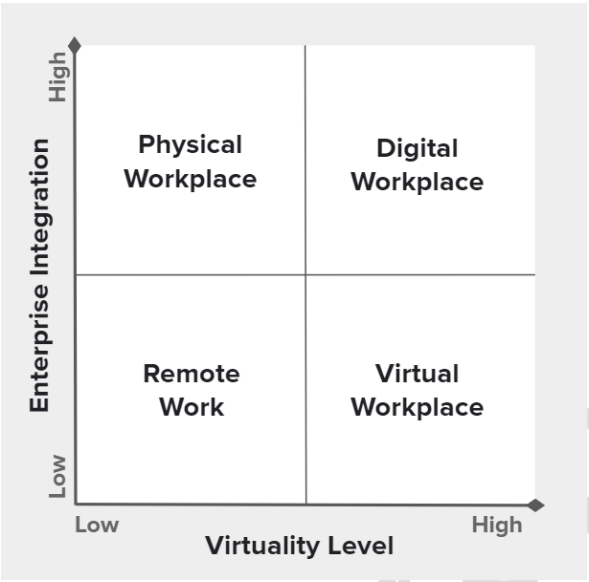

Figure 3 – Workplace Arrangements as a Function of Virtuality and Enterprise Integration

The physical workplace quadrant represents the traditional scenario where employees share a common office space (Mukherjee et al., 2012). It is characterized by a low level of virtuality and a high level of enterprise integration. In such organizations, employees do not typically have access to company-provided devices like laptops or cell phones for working outside the physical workspace. Conversely, a remote work model is implemented when an organization enables some employees to work remotely using devices like laptops or cell phones, but with limited access to information. This model exhibits low levels of virtuality and enterprise integration, with employees relying solely on electronic communication for connecting with colleagues and lacking face-to-face interaction (Santana & Cobo, 2020). Remote workers often work independently and have limited access to information and collaboration with their co-located office team (Deshpande et al., 2016). In contrast, the virtual workplace quadrant involves the use of information technology (IT)-mediated communication to facilitate collaboration between employees in different geographic locations (Park et al., 2015). In a virtual workplace, employees heavily rely on technological platforms to share information and complete interdependent tasks (De Guinea et al., 2012). This environment is characterized by a high level of virtuality but a low level of enterprise integration. The organization provides the necessary equipment to all employees, regardless of their physical location. Although geographical distance between team members is not a barrier, effective knowledge sharing, trust, and collaboration can be hindered by factors such as different time zones and communication challenges. Finally, the digital workplace aims to provide a comprehensive solution that enables enterprise integration and fosters socialization between team members, knowledge sharing, trust, and collaboration. It seamlessly connects people, processes, and technology throughout the organization, allowing employees to work from anywhere without the need for a shared physical space. The digital workplace offers a digitally-driven experience, characterized by a high level of both virtuality and enterprise integration. A company is considered to adopt a digital workplace when people, technology platforms, and processes from different departments are seamlessly connected, eliminating compromises in their activities compared to the physical workplace.

The Virtuality and Enterprise Integration Levels

All four workplace arrangement models share virtuality level as a defining element. Scholars have highlighted virtuality as a feature that sets apart virtual teams from traditional face-to-face teams (Ferretti, 2016). Virtuality is a multifaceted concept, with authors mentioning from two to six dimensions, including (1) geographic or spatial separation, (2) differences in time zones or work schedules, (3) variations in organizational structures, (4) cultural divergence, (5) the extent of in-person interactions, and (6) technology utilization (Ferretti, 2016). To focus on the scope of our research question, we excluded the temporal, organizational, and cultural dimensions. To thoroughly examine the cultural aspect, it is essential to conduct targeted research on digital work that delves into the various stages of each country's digital transformation journey. The Asia Pacific region stands out for its diverse national cultures that exist across different countries (Wibowo et al, 2022).

To conduct a more comprehensive study of organizational environments, we propose the inclusion of a second concept: the level of enterprise integration. It assesses the seamlessness of material, information, decision, and control flows throughout the organization, linking functions with information, resources, applications, and people. It improves communication, cooperation, and coordination, besides supporting the enterprise to behave as a whole and operate according to its strategy (Ortiz et al., 1999).

We consider three dimensions: the first is the geographic or spatial distance, the physical distance that exists between employees who work in different locations (Kirkman et al., 2002; Schweitzer & Duxbury, 2010). The second dimension is the proportion of time that team members have in-person interactions vs. virtual ones. It highlights the relevance of promoting face-to-face interactions in some moments (Derven, 2016; Hambley et al., 2007; Stratone, 2019). Many studies discuss the need of maintaining at least some face-to-face interactions to build trust and manage conflicts, especially during the formation of a team (Adamovic, 2018; Kauppila et al., 2011; Stratone, 2019).

The third dimension is the relative degree of the use of technology (Gilson et al., 2015). To assess the degree of technology usage, we propose an adaptation of the IT Value Hierarchy (Urwiler & Frolick, 2008), represented in Figure 4.

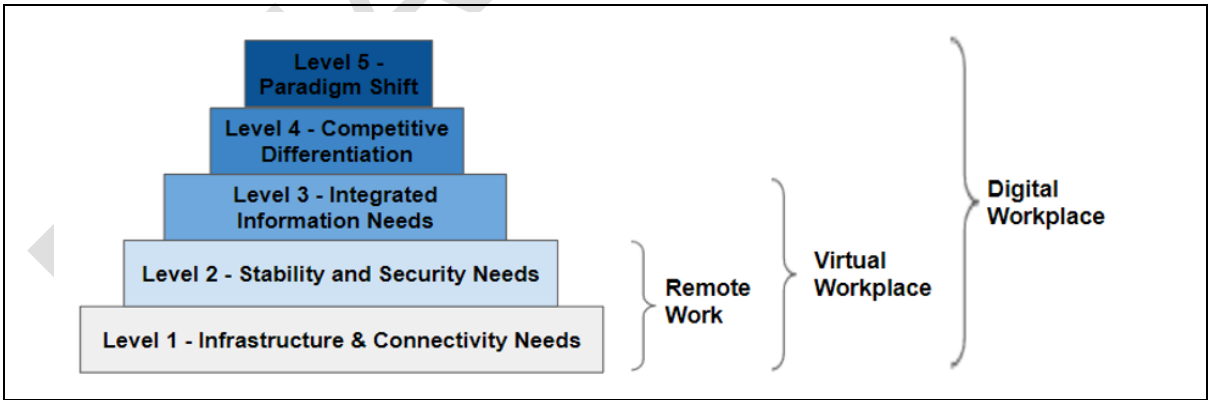

Figure 4 – IT Value Hierarchy (Adapted from Maslow's Hierarchy Model)

We used the five levels and criteria proposed by Urwiler & Frolick (2008) and associated them with the tools and technologies identified during our SLR and related to each level. Table 2 details the rubric we propose to measure the technology usage dimension of the virtuality construct.

Table 2 – Rubric Proposed to Measure the Technology Usage (Adapted from Urwiler & Frolick, 2008)		
Level of Tech Usage	**Type of Technology or Tool**	**Virtuality Enablers**
Level 1	Internet; Mobility devices (mobile, laptop, cloud solution); Support & Maintenance tools	Networked PC/Laptops. Access to the internet and email. Deploy of simple departmental applications. Little if any IT standardization. Few if any IT policies. Dedicated IT resources provide reactive technical support.
Level 2	Security & Monitoring tools	Change management policies and processes. Standards for hardware, software, and production control. Controlled access to systems, data, and infrastructure. Predictable system availability and support levels. Dedicated IT resources that provide deep infrastructure enablement expertise to the organization.
Level 3	Communication tools (chat, video conference, eMail); Daily activities tools; Management tools	Portfolio of Business Applications is part of the ecosystem. Departments have access to relevant cross-functional organizational information. Departments can interact with each other in pursuit of goals. Departments can model various decision outcomes. Dedicated IT resources are assigned to core business functions to provide deep applications enablement expertise.
Level 4	Collaboration tools (file sharing, social network); Chatbots	Development and deployment of IT solutions to achieve a competitive advantage that sets the organization apart from its peers.
Level 5	Analytics tools; Augmented Reality and immersive tools	Unique use of IT that can fundamentally change a generally accepted business model.

This information will be used as one of the dimensions of the virtuality level to classify the workplace arrangement model. Besides the classification of technology usage, the geographic distance and the frequency of face-to-face interactions should also be considered when measuring the virtuality level.

Enterprise integration involves connecting and integrating various systems, applications, and processes to enable seamless communication, collaboration, and data sharing. Drawing from the various contributions in the extant literature we propose, in Table 3, a rubric to measure enterprise integration.

Table 3 – Rubric Proposed to Measure Enterprise Integration		
Level of Enterprise Integration	**Classification**	**Criteria**
Very Low	Physical Integration	Employees share physical workplace and activities that are performed independently and consolidated manually.
Low	Application Integration	The process is based on connected and independent applications.
Medium	Team Integration	A multidisciplinary group of people who share responsibility and objectives. They use information technology (IT) to perform their tasks.
High	Business Integration	Information technology (IT) is synchronized with business strategy and goals.
Very High	Enterprise Integration	Processes and daily activities are integrated to provide data exchange capabilities, improve customer and partner relationships, and reduce costly errors through automated workflows.

Enterprise integration plays a crucial role in a digital workplace by enabling seamless communication, collaboration, and data sharing across different systems, applications, and departments within an organization. By fostering interoperability among the various systems and processes present in the enterprise, it enables a comprehensive understanding of the most beneficial processes, especially in a virtual environment (Ortiz et al., 1999).

Connecting Virtuality and Integration: Guidelines to Design Effective Digital Workplaces

Previous studies have demonstrated that the increasing virtuality of the workplace brings about certain barriers, including poor team relationships (Westover et al., 2020), miscommunication (Bejtkovský, 2016), and role overload (Bejtkovský, 2016). These challenges arise due to the difficulty of building trust and facilitating effective collaboration among team members in a virtual setting, as compared to face-to-face interactions (Chudoba et al., 2005; Florea & Stoica, 2019; Furumo & Pearson, 2007; Hassell & Cotton, 2017; Neufeld et al., 2010; Pinjani & Palvia; 2013). According to Kirkman et al. (2002), trust in virtual teams is fostered through the reliability, consistency, and responsiveness of team members when interacting with one another.

Face-to-face interactions are often considered preferable for making prompt decisions (Schmidtke & Cummings, 2017), managing conflicts (Hassell & Cotton, 2017), and cultivating a more cohesive team (Neufeld et al., 2010). This approach is also more effective for disseminating corporate culture and facilitating the swift sharing of information (Chudoba et al., 2005). Face-to-face interactions provide greater access to information, particularly informal communication (Deshpande et al., 2016). Challenges such as physical dispersion and time zone differences can impede the flow of information (Hassell & Cotton, 2017; Schmidtke & Cummings, 2017). In the absence of physical proximity, team members often resort to synchronous information and communication technologies (ICTs), such as telephones or shared applications, as substitutes for face-to-face interactions (Montoya et al., 2009).

Enterprise integration can help mitigate these perceived barriers by creating a supportive environment that encourages open communication among employees, learning from mistakes, and progress (Westover et al., 2020). It facilitates information flow between teams and departments (Bencsik et al., 2016) and enables discussions and alignment of individual and group goal settings (Bencsik et al., 2016). Additionally, a participative management style fosters employees' contributions and creativity (Jonck et al., 2017).

Regarding performance and decision quality, previous studies have produced varied findings when comparing face-to-face and virtual workplace arrangements. Some suggest that virtual teams perform worse than face-to-face teams, while others indicate that virtual approaches yield similar or even better performance (Schmidtke & Cummings, 2017). Meanwhile, Breuer et al. (2016) concluded that virtual teams exhibited stronger trust and performance compared to face-to-face teams.

We contend that a digital workplace ought to offer employees an integrated and all-encompassing work experience that is on par with traditional physical workplace setups. The integration of people, procedures, and technology should facilitate teams in establishing trust, exchanging knowledge, resolving conflicts, and effectively collaborating. To facilitate this aim, we have expanded upon the research conducted by Attaran et al. (2019) and formulated a four-phase iterative approach for designing a digital workplace.

The first phase is Awareness, which involves mapping individual, team, and organizational characteristics, as well as existing processes, technology usage, and employee relationships. This phase aims to gain a thorough understanding of the current state of the workplace. The second phase is Design, which focuses on defining strategies and potential solutions to

enhance the current workplace and transition towards a digital workplace. This phase involves identifying areas for improvement and envisioning the desired future state. The third phase is Build, dedicated to the development and implementation of the solutions identified in the Design phase. This includes deploying the necessary technologies, configuring systems, and establishing new processes to support the digital workplace. The fourth phase, Evaluation, is an addition to the model proposed by Attaran et al. (2019). This phase involves assessing and improving the outcomes of the previous phases. It includes monitoring key performance indicators, gathering feedback from employees, and making necessary adjustments to optimize the digital workplace experience.

By following this iterative approach, organizations can create a digital workplace that aligns with their specific needs and maximizes the benefits of technology integration. It ensures a design process that encompasses the entire employee journey and continuously improves the digital workplace over time.

For each of the four phases, we have identified actionable guidelines scattered in the literature, as shown in Table 4.

Table 4 – Key Guidelines for Designing and Implementing an Effective Digital Workplace

Phase	Guideline	Dimensions of the workplace arrangement model influenced by each guideline	Reference
Awareness	Identify actors, networks, and conflicts	Virtuality and enterprise integration	Carroll et al., 2012; Cresswell et al. 2010; Doolin & Lowe, 2002; Latour, 2005; Shin, 2016
	Identify level of virtuality	Virtuality	Ferretti, 2016; Gilson et al., 2015; Großer & Baumol, 2017
	Confirm characteristics of employees	Virtuality and enterprise integration (how each group uses the tools to perform their tasks)	Larkin, 2017; Schullery, 2013
	Identify employees, job, and organizational characteristics	Enterprise integration	Adamovic, 2018; Chudoba et al., 2005; Gilson et al.; 2015; Lurey & Raisinghani, 2001; Paul et al. 2004; Pinjani & Palvia, 2013
	Identify technologies, tools, and processes used by the teams	Virtuality and enterprise integration	Adamovic, 2018; Alsharo et al. 2017; Deshpande et al., 2016; Park et al., 2015; Pinjani & Palvia, 2013; Walvoord et al., 2008;
	Map the information flows	Enterprise integration	Attaran et al., 2019
	Map the physical workplace (distractions, ergonomic workspace, Internet connection)	Virtuality	Perry et al., 2018

Table 4 – Key Guidelines for Designing and Implementing an Effective Digital Workplace			
Phase	**Guideline**	**Dimensions of the workplace arrangement model influenced by each guideline**	**Reference**
Design	Define common procedures to establish teams' stability	Virtuality and enterprise integration	Carroll et al., 2012; Cresswell et al., 2010; Doolin & Lowe, 2002; Latour, 2005; Shin, 2016
	Define governance model with roles and responsibilities	Enterprise integration	Adamovic, 2018
	Identify the tools that best suit for each task performed in a digital workplace	Virtuality	Adamovic, 2018; Alsharo et al., 2017; Walvoord et al., 2008
	Establish a balance between work and personal life	Virtuality	Khallash & Kruse, 2012; Larkin, 2017; Santana & Cobo, 2020
	Establish face-to-face meetings when necessary	Virtuality	Adamovic, 2018; Hambley et al., 2007; Kauppila et al., 2011; Kirkman et al., 2002; Stratone, 2019
Build and adopt	Enrollment and mobilization	Virtuality and enterprise integration	Hevner et al., 2008
	Plan and manage activities	Enterprise integration	Hevner et al., 2008
	Develop employee engagement	Virtuality and enterprise integration	Crowe, 2016; Shuck et al., 2017
	Manage conflicts	Virtuality and enterprise integration	Schulze & Krumm, 2017; Shaik & Makhecha, 2019
	Align strategy and organizational culture	Virtuality and enterprise integration	Gilson et al., 2015
Evaluation	Measure effective use of IS	Virtuality	Pinjani & Palvia, 2013
	Measure employee engagement level	Virtuality and enterprise integration	Gallup, 2013; Shuck et al., 2017
	Measure changes in trust, knowledge sharing, and leadership	Virtuality and enterprise integration	Adamovic, 2018; Alsharo et al., 2017; Breuer et al., 2016; De Guinea et al., 2012; Furumo & Pearson, 2007; Graham et al., 2016; Hambley et al., 2007; Kowalski & Swanson, 2005; Lin et al., 2010; Lippert & Dulewicz, 2018; Mockaitis et al., 2012; Panteli et al., 2019; Robert & You, 2018; Schulze & Krumm, 2017; Shachaf, 2008; Shaik & Makhecha, 2019; Stratone, 2019; Vaidyanathan & Debrot, 2010

The guidelines presented in Table 4 were grouped together to create a structured iterative approach for designing a digital workplace. These guidelines aim to provide practical and evidence-based recommendations for practitioners and researchers in the relevant field.

Research Gaps and Avenues for Future Research

Our systematic literature review enabled us to identify relevant research gaps and avenues for future research.

Despite the continued growth of studies in areas such as leadership and knowledge management, which were previously recognized as gaps (Gilson et al., 2015), other aspects of the digital workplace remain underrepresented in the existing literature. We have categorized these gaps into four principal spheres of research interest: (1) methodology, (2) multidisciplinary studies, (3) diversity, and (4) new technologies.

From a methodological perspective, Schulze and Krumm (2017) state that "*[c]urrently, many studies from the virtual team literature do not make use of measures of virtuality and thus do not allow for providing causal evidence for the links that are proposed.*" (p. 84) Building on the outcomes of our SLR, we address this gap and propose how to identify and measure workplace arrangement as a function of virtuality and enterprise integration. Future research could validate and improve it. Other scholars advocate for the significance of longitudinal studies owing to the intricate nature of team dynamics (Acharya, 2019; Gilson et al., 2015). Additionally, determining the work methodologies that align most effectively with a team's processes within the digital workplace is an important avenue for exploration (Gilson et al., 2015). Interestingly, only two studies within the scope of our systematic literature review have delved into the scalability of Agile Methods within a digital workplace context (Deshpande et al., 2016; Kiely et al., 2017).

In terms of multidisciplinarity, there are opportunities to further investigate digital workplaces in a diversity of contexts including in the sectors of energy, health care, and creativity (Gilson et al., 2015). Also, a few authors argue the need for more cultural and social-related studies in the context of the digital work environment. Pedreira et al. (2015) highlight the need to investigate the social interaction between employees working in a digital environment. Ruppel et al. (2013) suggest further investigation into the relationship between communication satisfaction and the national cultures of the employees.

Regarding diversity, some authors also cite the need for broader studies considering various characteristics of a diverse workforce and how these can influence the perception of the employees in a digital workplace. This aspect is mentioned as one of the possible reasons for contradictory results regarding the performance of teams according to the workplace arrangement model (Gilson et al., 2015). Acharya (2019) argues that future research should consider the type of individuals, tasks, and the size of the team. Gilson et al. (2015) state that "*exploring the behaviors of different generations (i.e., communication, knowledge sharing, and collaboration) may provide an understanding regarding how to eliminate perceived barriers created by virtuality.*" (p. 1324) Therefore, particularly in the case of the digital workplace, adjustments to more traditional engagement approaches are expected (Panteli et al., 2019). Future research should identify design arrangements that encourage cross-generational mentorship, provide development opportunities for employees from all generations, and foster a culture of inclusiveness where employees feel valued, supported, and connected.

Finally, from a technological angle, Gilson et al. (2015) point to new collaboration, management, and communication tools, now available to support virtual teams in a digital workplace. The same authors state that "*new and emerging technologies that are actually being used have received scarce consideration, meaning that here, research appears not to be keeping up with practice.*" (p.1326) Additionally, Pedreira et al. (2015) call for further investigation into new tools such as Gamification platforms to improve engagement and performance, while Alsharo et al. (2017) focus on the value of Knowledge Management Systems (KMS) used by teams to better understand how task-technology fit. Finally, in the scope of our SLR, we did not identify any study related to immersive virtual environments

(IVEs). A few authors, such as Hofma et al. (2017) explore how the IVEs may change the workplace and how employees feel present in them.

Conclusion

We set out to investigate how organizations can design effective digital workplaces. To that end, we performed a systematic literature review that enabled us to provide several contributions:

a) A four-phases iterative approach, extending Attaran et al. (2019)'s work, to design an effective digital workplace;
b) A consolidated set of actionable guidelines, that were otherwise scattered in the extant literature, to support each of the four phases of the proposed approach;
c) A rubric to measure Enterprise Integration, used together with Virtuality Level to characterize workplace arrangements;
d) A set of additional research gaps and promising avenues for researchers interested in this field.

Figure 5 provides a summary of how the SLR analysis was categorized, based on the three pillars mentioned at the beginning (people, process, and technology (Morgan & Liker, 2020)) and the identified gaps in the literature provided valuable insights for developing and proposing the outcomes.

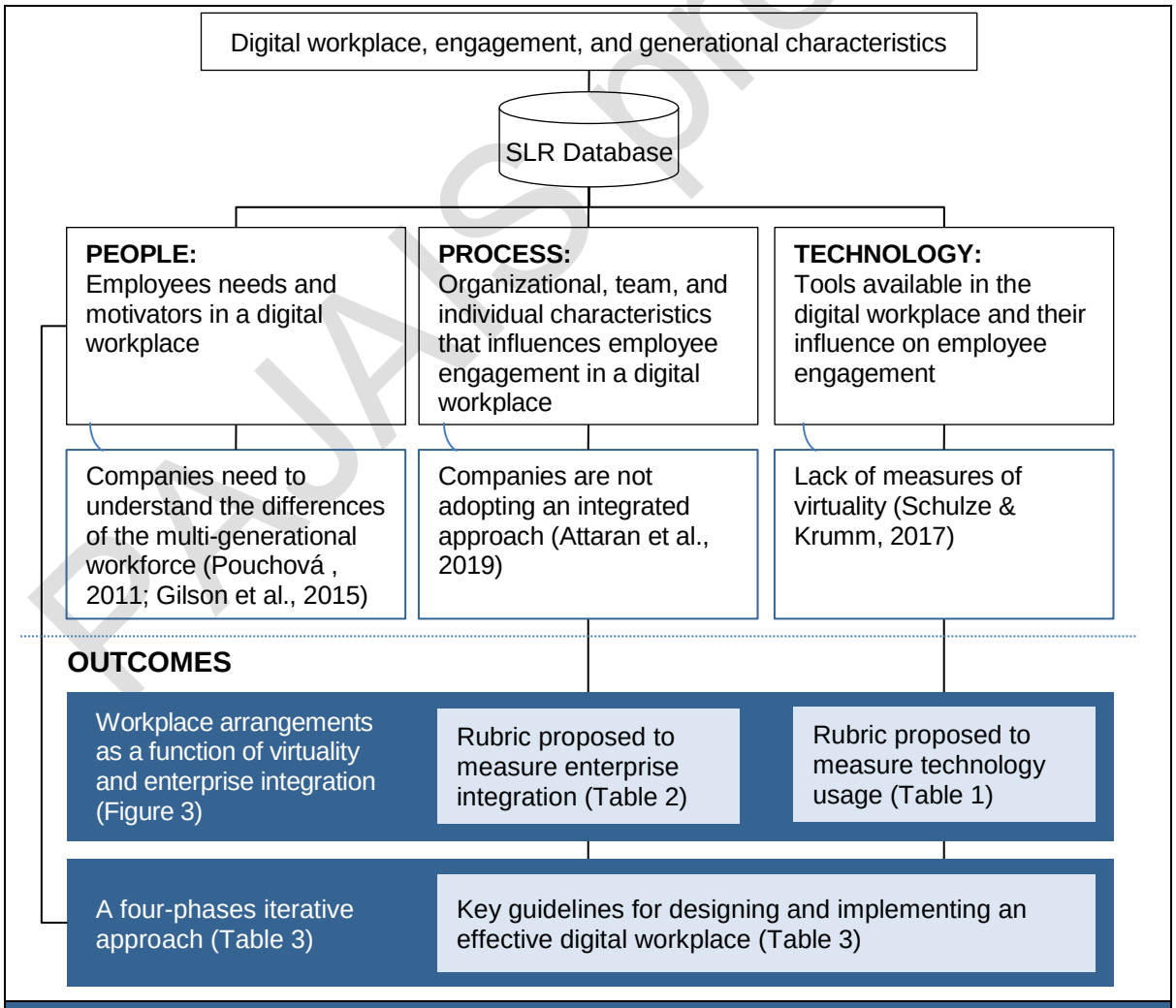

Figure 5 – SLR Insights and Outcomes

However, there are certain limitations that need to be taken into consideration. The SLR primarily focused on technology studies, despite the multidisciplinary nature of the subject. We emphasize that we did not analyze how demographic, social, and cultural factors may influence values and needs of different generations in a digital workplace. This decision was made when defining the scope of our study. Furthermore, we were unable to identify relevant aspects in the literature regarding how the interaction between different generations impacts their perception of barriers and motivators in a digital workplace. This area remains ripe for further investigation. Additionally, it is crucial to mention that our proposed approach has not yet been validated. The validation process is currently underway as part of a Design Science Research (DSR) project.

Acknowledgments

This work was partially funded by FCT—Foundation for Science and Technology, I.P./MCTES through national funds (PIDDAC), within the scope of CISUC R&D Unit— UIDB/00326/2020 or project code UIDP/00326/2020.

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Appendix A – Classification of Identified Papers

Table A.1 comprises a roster of the 61 papers we retained, categorized based on the publication year, whether it is also a literature review (Yes or No), workplace arrangement discussed (e.g., physical workplace, remote work, virtual workplace, or digital workplace), whether generational differences were addressed (Yes or No), and primary focus (e.g., performance, effectiveness, engagement, satisfaction, motivation, or well-being). Column 2 of the table provides a concise synopsis of each article.

Table A.1 – Classification of Identified Papers

Ref.	Brief Description	Year	Lit. Review	Workplace Arrangmt	Gen	Primary Focus
Alsharo et al.	The influence of knowledge sharing and trust on virtual team effectiveness.	2017	No	Virtual Workplace	No	Effectiveness
Schmidtke & Cummings	The complexity of mental models on virtual teams.	2017	Yes	Virtual Workplace	No	Effectiveness
Santana & Cobo	A classification of social, technological, political, and economical aspects of the future of work.	2020	Yes	Digital Workplace	Yes	Satisfaction and engagement
Lurey & Raisinghani	The best practices to influence positively the effectiveness of virtual teams.	2001	No	Virtual Workplace	No	Effectiveness
Lin et al.	A model to support how to achieve effectiveness in virtual teams.	2010	No	Virtual Workplace	No	Effectiveness
Shachaf	The influence of cultural diversity and information and communication technology on global virtual teams.	2008	No	Virtual Workplace	No	Effectiveness
Paul et al.	The influence of heterogeneity and conflict management on the virtual teams' performance	2004	No	Virtual Workplace	No	Performance
Pinjani & Palvia	A framework to support organizations in mapping how diversity, mutual trust, and knowledge sharing influence virtual teams' effectiveness.	2013	No	Virtual Workplace	No	Effectiveness
Walvoord et al.	A guide with principles to improve leadership communication in virtual teams.	2008	Yes	Virtual Workplace	No	Effectiveness
Shin	A framework to identify the individual qualities needed to work in a virtual team.	2004	No	Virtual Workplace	No	Effectiveness
De Guinea et al.	The influence of conflict, communication frequency, and knowledge sharing on virtual teams' performance and satisfaction.	2012	No	Virtual Workplace	No	Performance and satisfaction
Pedreira et al.	The impact of gamification in software engineering teams.	2015	Yes	Does not specify	No	Engagement and performance

Table A.1 – Classification of Identified Papers						
Ref.	**Brief Description**	**Year**	**Lit. Review**	**Workplace Arrangmt**	**Gen**	**Primary Focus**
Khallash & Kruse	The concept and challenges of the future of work in Europe.	2012	No	Remote Work	No	Does not specify
Marsden	The development of the Ushahidi platform using a Rapid Prototype Model.	2013	Yes	Virtual Workplace	No	Satisfaction
Hassell & Cotton	The relevance of effective communication in virtual team interactions.	2017	No	Virtual Workplace	No	Performance and satisfaction
Lee-Kelley	The workers' locus of control attitudes and their implications in virtual team satisfaction.	2006	No	Virtual Workplace	No	Performance and satisfaction
O'Neill, Hambley, & Bercovich, 2014	The relationship of personality with cyberslacking and its impact on satisfaction and performance.	2014	No	Remote Work	No	Performance and satisfaction
O'Neill, Hambley, & Chatellier, 2014	The relationship of personality with cyberslacking and its impact on work engagement.	2014	No	Remote Work	No	Engagement
Hassell	The media impacts and barriers in communication of virtual teams.	2016	No	Virtual Workplace	No	Performance and effectiveness
Park et al.	The influence of effective information systems uses on job satisfaction in virtual workplaces.	2015	No	Virtual Workplace	No	Satisfaction
Deshpande et al.	An analysis of collaborative remote work using agile methodologies.	2016	No	Remote Work	No	Engagement
Kiely et al.	The implementation of agile methods in a virtual team.	2017	No	Virtual Workplace	No	Performance
Tavanapour et al.	The relevance of the theories for designing and developing digital human collaboration systems.	2019	No	Does not specify	No	Motivation
Robert & You	The influence of shared leadership, individual trust, and autonomy on virtual team satisfaction.	2018	No	Virtual Workplace	No	Satisfaction
Furumo & Pearson	The differences of gender-based communication styles and their impact on satisfaction in virtual teams.	2007	No	Virtual Workplace	No	Satisfaction
Cordery & Soo	A process-oriented model to support virtual teams to achieve engagement and effectiveness.	2008	No	Virtual Workplace	No	Engagement and effectiveness
Neufeld et al.	The influence of leadership style on communication effectiveness and leader performance.	2010	No	Remote Work	No	Performance and effectiveness
Acharya	The benefits of working in virtual teams.	2019	Yes	Virtual Workplace	No	Performance
Stratone	The challenges faced in a virtual team and the differences between the virtual and traditional teams.	2019	No	Virtual Workplace	No	Effectiveness

Table A.1 – Classification of Identified Papers						
Ref.	**Brief Description**	**Year**	**Lit. Review**	**Workplace Arrangmt**	**Gen**	**Primary Focus**
Tsuji et al.	An analysis of the relevant features of communication in the workplace that impacts the well-being of employees.	2019	No	Remote Work	No	Well-being and performance
Shaik & Makhecha	The influence of cultural intelligence, communication (formal and informal), technology, trust, and individual maturity on employee engagement in virtual teams.	2019	No	Virtual Workplace	Yes	Engagement
Florea & Stoica	A comparison between virtual and face-to-face teams to identify the advantages and limitations in virtual teams.	2019	No	Virtual Workplace	No	Performance and motivation
Panteli et al.	The influence of asynchronous communication on engagement in virtual teams.	2019	No	Virtual Workplace	No	Engagement
Adamovic	An employee-focused human resource management perspective to improve well-being in virtual teams.	2018	No	Virtual Workplace	No	Well-being
Perry et al.	The influence of emotional stability influences and autonomy for remote workers.	2018	No	Remote Work	No	Satisfaction and engagement
Lippert & Dulewicz	The relative importance of the constructs of performance in virtual teams.	2018	No	Virtual Workplace	No	Performance and effectiveness
Schulze & Krumm	The requirements and challenges of knowledge, skills, abilities, and other characteristics for virtual collaboration.	2017	Yes	Virtual Workplace	No	Performance and motivation
Großer & Baumol	The influence of the degree of virtuality and the presence of shared mental models on the virtual teams' performance.	2017	Yes	Virtual Workplace	Yes	Performance
Breuer et al.	The influence of trust on virtual team effectiveness.	2016	Yes	Virtual Workplace	No	Effectiveness
Graham et al.	The influence of technical proficiency on virtual team' effectiveness.	2016	No	Virtual Workplace	Yes	Effectiveness
Derven	A framework based on process, purpose, and people to support virtual teams' effectiveness.	2016	No	Virtual Workplace	No	Effectiveness
Stowell & Cooray	The use of Action Research to conflict resolution in virtual teams.	2016	No	Virtual Workplace	No	Does not specify
Ferretti	A comparison between different definitions of virtual teams to understand the feature of virtuality.	2016	Yes	Virtual Workplace	No	Does not specify
Gilson et al.	A review of the inputs, mediators, moderators, and opportunities in virtual teams.	2015	Yes	Virtual Workplace	Yes	Performance

Table A.1 – Classification of Identified Papers						
Ref.	**Brief Description**	**Year**	**Lit. Review**	**Workplace Arrangmt**	**Gen**	**Primary Focus**
Ruppel et al.	The aspects that influence the choices of communication media in a virtual team.	2013	No	Virtual Workplace	No	Performance and satisfaction
Mockaitis et al.	The relationship between trust, task interdependence, information sharing, conflicts, and individual cultural values in a virtual team.	2012	No	Virtual Workplace	No	Does not specify
Mukherjee et al.	The development of organizational identification in a virtual team context and the role of cultural variables.	2012	No	Virtual Workplace	No	Does not specify
Kauppila et al.	The effective use of an information system that supports social networking to improve knowledge sharing and learning in virtual teams to mitigate the negative effects of physical and organizational distance.	2011	No	Virtual Workplace	No	Performance
Schweitzer & Duxbury	The construct and measurement of the virtuality on teams.	2010	No	Virtual Workplace	No	Effectiveness
Fenner & Renn	The influence of technology-assisted supplemental work (TASW) on perceived usefulness, psychological climate, and work-family conflicts.	2010	No	Remote Work	No	Performance
Vaidyanathan & Debrot	The advantages and challenges, and success factors to manage virtual teams.	2010	No	Virtual Workplace	No	Performance
Vaccaro et al.	The organizational knowledge creation processes in virtual teams.	2009	No	Virtual Workplace	No	Does not specify
Montoya et al.	The perspectives of media use in virtual teams and its influence on team performance.	2009	No	Virtual Workplace	No	Performance
Brockner et al.	The segmentation of work styles, human resource policy, workplace design, and the effective use of technology.	2006	No	Does not specify	Yes	Performance
Wakefield et al.	The influence of conflict and leadership on virtual teams' performance.	2008	No	Virtual Workplace	No	Performance
Malhotra et al	The influence of leadership on successful virtual teams.	2007	No	Virtual Workplace	No	Engagement
Hambley et al.	A guide with practical recommendations for leaders and members of virtual teams.	2007	No	Virtual Workplace	No	Effectiveness

Table A.1 – Classification of Identified Papers						
Ref.	**Brief Description**	**Year**	**Lit. Review**	**Workplace Arrangmt**	**Gen**	**Primary Focus**
Webster & Staples	A comparison of virtual to traditional teams. The inputs, process, and outputs of a model of team effectiveness.	2006	No	Virtual Workplace and Physical Workplace	No	Effectiveness
Chudoba et al.	A virtuality index to measure geography, time zone, organization, national culture, work practices, and technology aspects of a virtual team.	2005	No	Virtual Workplace	No	Performance
Kowalski & Swanson	The critical success factors on benchmarking the remote work arrangement.	2005	No	Remote Work	No	Performance and satisfaction
Kirkman et al.	The challenges and lessons learned from the implementation of a virtual team, real case from Sabre, Inc.	2002	No	Virtual Workplace	No	Performance and effectiveness

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