The Impact of Digital Skills Perceptions on Work-Related Anxiety and Motivation Among Late-Career Employees Within the Grey Digital Divide

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Abstract

This study examines how late-career employees' perceptions of their digital skills influence anxiety and motivation at work. Much of the existing research on the digital divide in the workplace focuses on structural factors, such as access to technology and the design of optimized training programs, with the individual experiences of late-career employees receiving little attention. Quantitative approaches employed by previous research have been useful in identifying broad patterns but often miss the deeper aspects of how late-career employees engage with new technology. This study aims to fill this gap through semi-structured interviews with ten Greek employees aged 50 and above. Participants highlighted how new digital tools, like ChatGPT, improve efficiency, motivation, and performance, but also pointed to obstacles like insufficient time for training and the fast pace of technological advancements. Despite common stereotypes, the participants expressed confidence in their digital skills and reported no experiences of age-related bias. According to the findings, late-career employees may not be as negatively impacted by the digital divide as previously assumed, challenging current views about their experiences. Future studies should build on this work by including larger and more varied participant groups and examining the long-term impact of digital engagement on older employees.

Keywords: late-career employees, digital divide, work motivation, self-efficacy, digital skills

The Impact of Digital Skills Perceptions on Work-Related Anxiety and Motivation Among Late-Career Employees Within the Grey Digital Divide

With the aging of the global workforce and the transformation of work environments by advanced digital technologies, late-career employees are facing the difficulties associated with a growing digital divide in the workplace. In Greece, for instance, the percentage of people between 55-64 who are participating in the labor force rose from 42.4% in 2013 to 58.1% in 2023 and has been steadily increasing (AGE Platform Europe, 2023; OECD, 2013, 2023). Many of these workers operate in professional environments that are becoming more reliant on advanced technologies, such as Artificial Intelligence (AI) and Large Language Models (LLMs). Tools like ChatGPT, which have been rapidly integrated into workplaces since their release to the public (Glassdoor Economic Research, 2024), illustrate the growing digitalization of both every day and work-related tasks.

This research examines the overall effects of technological advancements on the workplace rather than concentrating on specific tools. Late-career employees have witnessed the complete evolution of workplace digitalization, beginning their careers when computers were just starting to make their way into offices, with software like Word and Excel seen as standard and highly valuable (Kruse & Rapp, 2023). While these tools were remarkable in their time, they now appear to be basic compared to AI-driven technologies present in contemporary workplaces. For these employees, this transition not only brings technical challenges but also signifies major changes in the work environment that have required continuous adaptation over the years. Although these technological advancements provide significant benefits in efficiency and productivity, they also underscore an increasing grey digital divide – a term first introduced by Millward (2003) to describe the differences in digital engagement between younger and older adults.

The digital divide describes the gap between those with access to computers and those without (Hoffman & Novak, 1998). As digital technologies evolved, the divide has broadened to include not only access but also digital proficiency (Mwim & Kritzinger, 2016; Pick & Sarkar, 2016). Studies on the digital divide have identified multiple factors at play, including race, gender, educational and socioeconomic backgrounds, and, relevant for this research, age (Krueger et al., 2018; Wessels, 2013). Older adults, particularly those who have had limited exposure to newer technologies such as AI, often find themselves on the less proficient side of this divide. Younger people however, who have grown up immersed in digital environments, adapt more easily to new systems, further widening the gap (Kiser & Washington, 2015). The grey digital divide, therefore, not only affects how older adults perform everyday tasks but also shapes how they perceive their own digital skills, influencing their overall confidence and competence (Choi-Allum, 2024; Orduña, 2023).

In the workplace, the grey digital divide is exacerbated by recent technological advancements, as they are introduced in the work processes. Older employees are increasingly expected to learn and adapt to these new digital tools, a task that can be overwhelming as it can lead to "technostress," a phenomenon characterized by anxiety stemming from the need to adopt unfamiliar digital technologies (Seberini et al., 2022). In contrast, younger colleagues, who are generally more familiar with digital systems, experience fewer barriers when adopting these tools (Zirar et al., 2023). The resulting gap between generations impacts how older employees perceive their digital abilities relative to their younger peers, which, in turn, can affect their motivation, job satisfaction, and overall work performance (Lagacé et al., 2016; Sheng et al., 2022).

Beyond the technical challenges, the grey digital divide is further intensified by psychosocial factors, particularly ageism. Ageism can be defined as discrimination against individuals based on their age, which often undermines the ability of older adults to

contribute to various social contexts, including the workplace (Butler, 1969). Negative stereotypes about older workers' ability to learn and adapt to new technologies can lead to a self-fulfilling prophecy, where older workers disengage from digital tools and often avoid seeking training opportunities, in fear that they will be judged by their younger colleagues (Hampel & Kunze, 2023). As Lagacé et al. (2016) note, this digital disengagement not only widens the divide but also limits older workers' participation in digital tasks, further marginalizing them in the workplace. This disengagement has significant implications for organizational productivity, as older employees who could contribute valuable experience are sidelined due to their perceived digital incompetence (Chetty, 2023; Lagacé et al., 2016).

The psychological effects of the grey digital divide in the workplace are also crucial to consider. Late-career workers who view themselves as less digitally competent often report reduced self-efficacy, lower motivation, and heightened job-related anxiety (Dust et al., 2020; Teichmann et al., 2019). These feelings can undermine their confidence and willingness to engage with new digital tools, which in turn affects their job performance and overall satisfaction (Rafiq & Chin, 2019). In contrast, younger employees, who generally feel more at ease with digital technologies, are more likely to take on new challenges and seize opportunities for professional growth.

Furthermore, to my knowledge, the majority of research on the grey digital divide has used quantitative approaches, such as surveys, which are important for detecting broad patterns but frequently fail to capture the complex and intensely personal experiences of older employees. In contrast, qualitative approaches, like interviews, are ideally suited to investigating how late-career individuals evaluate their digital abilities in the context of workplace dynamics. They specifically enable for an analysis of how these beliefs connect with age-related preconceptions, such as ageism, and how this interaction influences their confidence in adopting new technology. Interviews, which allow participants to express their

experiences in their own words, might reveal previously unknown factors – such as organizational culture, informal peer relationships, or implicit biases – that may worsen work-related anxiety or impair motivation. This particular approach gives insights that are important in tackling the complex reality of the grey digital divide, which cannot be adequately captured using quantitative approaches alone (Heyink & Tymstra, 1993).

Despite the growing body of literature on the digital divide, little attention has been paid to the specific challenges faced by late-career employees in digitalizing workplaces. While prior research has primarily focused on structural factors, such as access to technology and training programs, significant psychological and social aspects, such as work motivation, job satisfaction, and the relationship between ageism and digital disengagement, remain unaddressed (Komp-Leukkunen et al., 2022).

To address these gaps, this study is going to examine how late-career employees perceive their digital abilities and how these beliefs influence their emotional and motivational experiences at work, approaching the grey digital divide from a psychosocial viewpoint, considering both the individual and social context (Psychology Glossary, 2018). This study seeks to provide deeper insights into the interaction between digital skills, ageism, and work-related motivation through interviews with late-career employees in Greece, eventually leading to a better understanding of the issues encountered by an ageing workforce. The following research question will lead this study: “How do late-career employees’ perceptions of their digital skills influence work-related anxiety and motivation, and to what extent do they consider age a significant factor?”

Theoretical Framework

In the beginning of this section the concept of the digital divide is outlined by introducing key theories that explain its different dimensions. Subsequently, the focus shifts toward the grey digital divide, first considering age-related barriers to digital engagement

before focusing on the specific impact in professional settings. Following this, terms essential to the study - digital skills, self-efficacy, motivation, and job anxiety - are defined, with attention given to how they intersect. The structure of this section allows for a comprehensive understanding of the psychological and motivational aspects of digital engagement among late-career employees, in alignment with the study's goal of moving beyond the conventional emphasis on technical barriers.

The Digital Divide

The concept of the digital divide emerged in the late 20th century to describe disparities in access to information and communication technologies (ICTs) across different societal groups. Initially, the digital divide distinguished between individuals who had access to ICTs, such as computers and the internet, and those who did not (Hoffman & Novak, 1998). This early perspective focused on physical access, emphasizing the technological "haves" and "have-nots." However, as ICTs became more common in daily life and more accessible, this binary framing proved insufficient for capturing the full complexity of digital inequalities.

Over time, researchers recognized that divides in digital inclusion extend beyond physical access to include differences in skills and usage. Van Dijk (2013) proposes a multi-dimensional model encompassing motivational, material, skill-based, and usage-related barriers. Motivational barriers include a lack of interest or perceived relevance, which may prevent individuals from engaging with technology. Material barriers refer to the unequal access to devices and connectivity. Skill-based barriers highlight the importance of differences in digital literacy, while usage-related barriers are related to differences in the extent to which digital tools are used for meaningful purposes, for example to assist with one's work. This model underscores that digital divides are not only caused by whether a

group of people have or do not have access to ICTs – there is a complex grid of underlying factors that shape how individuals engage with technology.

The workplace serves as a small-scale version of society where these dimensions of the digital divide manifest with particular intensity (Stone et al., 2017). The competitive character of the workplace, where workers are regularly evaluated on their output and ability to learn new tools, is sometimes the cause of this increased intensity. Employees with and without digital fluency are in contrasting circumstances as a result of the strain to keep up with the fast integration of modern digital technology into professional environments. This gap can frequently become worse for senior staff members by generational disparities in digital exposure and familiarity. Older workers may experience challenges related to skill gaps and anxiety when adopting unfamiliar digital tools, such as AI-driven platforms or collaborative workspaces, in contrast to their younger colleagues who are more accustomed to these technologies (Chee, 2024). This disparity may result in unequal opportunities for career advancement and workplace marginalization, thereby reinforcing societal inequalities associated with age, education, and socioeconomic status (Raihan et al., 2024). Thus, the workplace digital divide is not merely a technological issue but a complex challenge that intertwines technical, social, and psychological factors.

Theories of the Digital Divide

The challenges older adults face in engaging with digital technologies can be better understood through theories that examine the complexities of the digital divide. DiMaggio and Hargittai (2001) introduced the concept of digital inequality, extending beyond access and exploring differences in skills, autonomy, and usage. Their framework highlights that even among those with physical access to technology, significant inequalities persist in how effectively these tools are utilized. This understanding is particularly relevant in the employment context, where digital engagement is not merely a personal challenge but a

professional necessity. In the workplace, for example, certain individuals may be able to use digital tools to improve their work performance, while others may lack the necessary digital literacy or autonomy. By exploring these qualitative distinctions in digital engagement within professional settings, this theory sheds light on the various ways in which late-career individuals experience the digital change of their workplace.

Wei et al. (2011) approached the digital divide through a social cognitive lens, which emphasizes the interplay between personal factors, behaviors, and environmental influences in shaping individuals' engagement with digital technologies (Bandura, 1999). This viewpoint recognizes digital engagement as a process shaped by an individual's confidence in their abilities (self-efficacy), behavioral patterns (e.g., seeking training or avoiding digital tools), and the wider context in which they operate, such as workplace demands or cultural norms. The approach they used distinguishes three distinct categories of the digital divide. The access divide reflects disparities in physical access to ICTs, such as hardware and internet connectivity. The capability divide illustrates differences in digital literacy and self-efficacy, focusing on individuals' ability to effectively use digital tools. Moreover, the outcome divide examines how these factors influence the benefits individuals derive from technology use, such as productivity, job satisfaction, or career advancement. This framework emphasizes the role of self-efficacy – defined as a person's confidence in their ability to use their own actions to achieve desired results (Bandura, 1997; Maddux, 2016). Low self-efficacy in the workplace, particularly among older employees, can lead to avoidance behaviors, such as reluctance to accept new technology or participate in digital training programs. These behaviors, in turn, contribute to the digital divide by limiting opportunities for skill development and meaningful technology use, further excluding older workers in increasingly digitalized workplaces.

Van Dijk (2013) further advanced the theoretical understanding of the digital divide through his sequential model of access. This model identifies motivational, material, skills, and usage dimensions as sequential barriers that can prevent individuals from fully adopting and benefiting from ICTs. For instance, a lack of perceived relevance (motivational barrier) may prevent individuals from acquiring devices (material barrier), which in turn limits opportunities to develop digital literacy (skills barrier). This iterative cycle of exclusion is particularly relevant for older employees, who may face overlapping motivational and skills-related challenges in engaging with workplace technologies.

The Grey Digital Divide

Although these theories illustrate the digital divide in general, they also offer the opportunity to further investigate age-specific divides, which are summarized in the concept of the grey digital divide. The grey digital divide, introduced by Millward (2003), focuses specifically on age-related disparities in technology use and adoption. Unlike the broader digital divide, which covers various demographic and socioeconomic groups, the grey digital divide addresses the unique challenges older adults face in engaging with ICTs. These challenges arise from generational differences in exposure to technology, age-related changes in cognitive and physical abilities, and societal attitudes toward aging.

Perhaps the best-known aspect of the grey digital divide is in the perception of usability; older people consider digital tools very much to be about complexity or irrelevancy. Such perceptions are formed by lack of exposure and often have been turned into negative past experiences on the part of older individuals. Millward (2003) emphasizes this point: such usability problems have morphed from purely technical to highly psychological considerations which shape self-perception of capabilities and willingness to engage by older persons in technology. For instance, imagine a senior employee in a logistics company who has to cope with a changeover from an old paper-based inventory system to a new state-of-

the-art software platform for supply chain management. After several decades spent at the office, he might find the interface intimidating because it uses many technical words he is not used to, or because the ways of navigating it differ entirely from paper systems. When this older employee participates in a training session, he is probably sitting through a program designed for younger staff who are expected to have much higher initial familiarity with such tools and thus may move much faster than this employee can keep up with. As Neves et al. (2013) reported, this exacerbates the distance between training design and the true needs of older employees, which further lowers their self-confidence levels toward adapting to changes.

Motivational barriers also play a critical role in the grey digital divide. Unlike younger individuals, whose technology use is often driven by professional or educational needs, older adults often do not identify the relevance of these digital tools in assisting with such needs. This lack of motivation can lead to disengagement, even when material access and basic training are available. Moreover, societal attitudes and workplace cultures often reinforce these barriers through ageist stereotypes, which portray older workers as resistant to change or incapable of learning new skills (Lagacé et al., 2016). These stereotypes not only influence external perceptions but also internal self-stereotypes, further reducing older employees' self-efficacy and engagement (Hampel & Kunze, 2023).

The Grey Digital Divide in the Workplace

The workplace is an environment where some effects of the grey digital divide can be observed. Organizations apply advanced technologies, including AI and automation tools, yet it is the older workforce who face specific hurdles in coping with them. Technostress, a term used to define the strain in adjusting to new, modern technologies, is especially common among older workers who are close to concluding their working years. They usually find it very challenging to learn and adapt with rapid changes and shifting expectations (Seberini et

al., 2022). Such alienation is intensified by organizational cultures, which undervalue the contributions of older employees, placing this group even further (Komp-Leukkunen et al., 2022). Addressing how the grey digital divide reshapes workplaces requires taking into account the possible implications of technological advancements on mental health, job satisfaction, and overall well-being.

AI tools like predictive analytics software or chatbots often force employees to familiarize themselves with new apps or remain open to new apps, creating hurdles for all those who have not encountered such applications. A study by Shandilya and Fan (2022) highlights how generative AI, while enhancing workplace efficiency, simultaneously tends to widen the age-related digital divide, since older workers, particularly those with lower self-efficacy, are more likely to perceive these tools as overly complex, leading to frustration and disengagement. Moreover, training programs for such tools are not tailored to the older workers' specific needs and requirements, as observed by (Chetty, 2023). Most training programs are developed in a way that supports learning for younger employees, not considering anyone who may require them to be more paced and hands-on. The above could make matters worse, as it provides validity to the claim that late-career workers are incapable of being trained.

Digital Skills

Digital skills refer to the skills required to use ICTs effectively. Van Dijk and van Deursen (2014) introduce six types of skills: operational, formal, information, communication, content creation, and strategic skills. These skills are applied to different media, including print, audiovisual, computer, and internet. Each medium requires specific skills such as reading and writing for print media, understanding audiovisual structures for audiovisual media, and operating hardware and software for computers.

In the digital age, the internet requires additional skills like navigating webpages and managing different file formats. Online communication skills also differ from traditional media due to the reduction of nonverbal cues and asynchronous communication. Effective use of the internet requires a range of skills, including the ability to search, select, process, and evaluate information, as well as create content and make strategic decisions.

Van Dijk and van Deursen (2014) underscore the importance of digital skills and the potential consequences of digital exclusion. They argue that inequalities in digital skills have a more significant impact than traditional media skills, as the internet offers a wide range of interactive and transactional functionalities that require active user engagement. Developing these skills is critical for succeeding in technology-driven workplaces. However, older employees often lack these skills due to limited opportunities for digital engagement earlier in their careers. Additionally, the way individuals perceive their digital skills plays a crucial role in whether they feel capable or even motivated to use them or develop them further.

Digital Skill Levels Among Older Adults in Greece

Expanding upon the exploration of digital skills as essential for meeting the demands of contemporary technology, Greece provides a relevant context for further research. Factors such as its demographic profile and documented gaps in digital skill levels make it a compelling case for examining these issues.

Greece demonstrates notable disparities in digital skills across different age groups. According to recent data, while 51% of Greeks aged 16-74 possess at least basic digital skills, this percentage drops among older adults. For individuals aged 55-74, only 19% exhibit basic digital skills, a significantly lower percentage than the EU-27 average of 33% (Gavroglou, 2020). These figures highlight the challenges the older working population of Greece might experience in an increasingly digital workplace.

The country's overall digital readiness, which refers to the capacity of individuals and organizations to effectively understand, utilize, and benefit from digital technologies (Horrigan, 2016), is low when compared to other countries of the EU. This lack of readiness has profound consequences for late-career employees, who often struggle with acquiring and applying digital skills in the workplace (Kaminioti, 2020). Considering the above, Greece emerges as a relevant case study for research on the topic of the gray digital divide in the workplace.

Psychosocial Dimensions of the Divide

Self-Efficacy

Self-efficacy, a concept developed by Bandura (1997), refers to an individual's belief in their ability to execute tasks and achieve goals. In the context of digital skills, self-efficacy plays a pivotal role in determining whether individuals attempt to learn how to use new technologies. Bandura posits that self-efficacy is shaped by four sources: mastery experiences, vicarious learning, verbal persuasion, and emotional states. For older employees, negative experiences with technology, such as frustration with complex interfaces or unsuccessful attempts at learning new tools, often diminish self-efficacy. This can lead to avoidance behaviors, where employees choose not to engage in digital tasks, reinforcing skill gaps.

The interaction between digital skills and self-efficacy is cyclical. Low self-efficacy reduces the likelihood of engaging in digital learning opportunities, which in turn limits skill development. Conversely, positive reinforcement through training programs, mentorship, or gradual exposure to technology can enhance self-efficacy, breaking this cycle (Hecker et al., 2021). As self-efficacy improves, employees are more likely to approach new technological challenges with confidence, leading to skill development and greater workplace engagement (Choi et al., 2020; Rodríguez-Cifuentes et al., 2018).

Work Motivation

Strong self-efficacy is a critical driver of work motivation, influencing how employees approach tasks and challenges. Work motivation refers to the psychological forces that drive an individual's direction, intensity, and persistence in work-related behavior (Diefendorff & Seaton, 2015). Self-Determination Theory (SDT), proposed by Deci and Ryan (2000), provides a nuanced framework for understanding these motivational drivers, emphasizing the importance of fulfilling three basic psychological needs: competence, autonomy, and relatedness.

Competence, the ability to effectively apply one's skills to tasks, serves as a crucial motivator in the workplace. For older employees, changes in workplace technology can threaten perceptions of competence, particularly if they struggle to adapt to new tools or processes (Feißel et al., 2018; Komp-Leukkunen et al., 2022). Autonomy, the need for self-direction, becomes increasingly important in late-career stages as employees seek alignment between their personal values and professional roles (Gagné & Deci, 2005). Relatedness, the need to feel connected to others, is fulfilled through collaboration and meaningful workplace relationships, which can also buffer the negative effects of workplace stressors (Wu et al., 2021).

Motivation performs a considerable role in the grey digital divide. Older employees with low self-efficacy may struggle to see themselves as competent users of digital tools, undermining their intrinsic motivation to engage with new technologies. For example, if they perceive digital tools as overly complex or irrelevant, they are less likely to experience a sense of competence, a key psychological need identified by SDT. Rather, such an environment, in conjunction with a changing corporate culture, can facilitate peer collaboration and mentoring, allowing people to address such problems and be motivated both extrinsically and organically to narrow the digital divide (Nikolova et al., 2024).

Job Anxiety

A lack of motivation can render employees vulnerable to feelings of anxiety related to their work (Meng & Yang, 2023). Job anxiety is a well-documented construct in occupational psychology, often defined as work-specific anxiety that arises in anticipation of or in response to workplace demands. Unlike general anxiety, which is broader and less context-bound, job anxiety is directly linked to job-related stressors, such as task complexity, performance evaluations, or workplace changes (Muschalla et al., 2013). It is characterized by feelings of tension, worry, and apprehension about one's ability to meet job expectations, and it can manifest through behaviors such as avoidance, hesitation in decision-making, and withdrawal from workplace interactions. In theoretical terms, job anxiety bridges cognitive and affective responses to workplace stressors, making it a key variable in understanding employee behavior in challenging environments.

A related theoretical perspective is the Conservation of Resources (COR) theory, which suggests that job anxiety results from a perceived loss of valuable resources, such as time, energy, or skills (Hobfoll, 1998). The COR theory highlights the cyclical nature of resource loss, where individuals experiencing anxiety may become less effective at conserving resources, thereby perpetuating their stress. For older employees, the introduction of advanced workplace technologies can represent a dual resource loss: the irrelevance of previously mastered skills and the demand for additional time and effort to acquire new skills. When a healthcare organization, for example, transitions from paper records to a digital health management system, older employees may feel disappointed (Baniulyte et al., 2023). The difficulties in adapting can imply that previously acquired skills are no longer offering a competitive advantage, with the expectation of being able to use increasingly complex digital tools putting additional strain on both time and energy. Such instances clearly

exemplify the resource loss cycle outlined in COR theory, as anxiety caused by such stressors can further impair the capacity of individuals to properly adapt.

This is consistent with the findings of Muschalla et al. (2010), who suggest that job anxiety commonly manifests in various dimensions. Stimulus-related anxiety is triggered by certain occupational duties, such as using unfamiliar software. Social anxiety is caused by a fear of being judged by coworkers or supervisors, such as being viewed as incapable of adapting to technological developments. Finally, cognitions of insufficiency pertain to employees' perceived weaknesses, in which they believe they lack the necessary abilities or expertise to achieve organizational standards. For example, an employee who struggles with a new AI-driven tool may be concerned not only about accomplishing their job, but also about being perceived as a liability by their colleagues, adding to their stress. These psychological characteristics highlight the need of resolving the grey digital divide in professional contexts. Without focused interventions, such as tailored training programs and supportive workplace cultures, the cyclical impacts of resource loss and job anxiety may continue to devalue older employees in increasingly digitalized workplaces.

The role of self-efficacy in influencing motivation was mentioned, but it can also serve as a lens for understanding job anxiety. Individuals with low self-efficacy are more likely to experience anxiety when facing demanding tasks, as they doubt their ability to meet performance standards (Bandura, 1997). This connection becomes notably relevant for late-career employees, whose reduced exposure to digital technologies and internalized ageist stereotypes often contribute to diminished self-efficacy, thereby exacerbating job anxiety (Hampel & Kunze, 2023; Hecker et al., 2021). As previously noted, self-efficacy can impact how employees perceive and respond to challenges in the workplace. This perspective aligns with Muschalla et al. (2013), who emphasize that job anxiety is not merely a reaction to external demands but also a function of internalized beliefs about one’s competencies and

limitations. Integrating the motivational and psychological aspects of self-efficacy reveals that resolving the grey digital divide entails not just increasing digital skills but also instilling positive beliefs in older employees' abilities to adapt and develop in digitalized work contexts.

Bridging the Gap in Current Research

Despite the understanding of the grey digital divide in providing appropriate information about the difficulties encountered by older adults, there still exists an issue with respect to such an understanding when it comes to late-career employees. For instance, Zheng and Wang (2024) qualify the role of growth-mindedness in alleviating the psychological effects relating to the digital divide, but their consideration is mainly for older people as a broad category, since unique workplace contexts have special pressures. Lagacé et al. (2016) have established that ageism also has effects on workplace disengagement with late-career employees and lower job satisfaction; however, their quantitative approach misses out on the more experiential personal storytelling of these workers regarding digital tools and workplace anxieties.

Taneva et al. (2016) offer valuable qualitative insights into aging and organizational support, yet their study does not directly address the digital divide. Soja and Soja (2020) investigate age-related barriers to technology adoption by late-career employees, but their emphasis on organizational strategies leaves the individual perspectives underexplored. These studies collectively underscore the importance of understanding how digital skills and workplace dynamics intersect, yet they do not adequately examine the lived experiences of older employees grappling with the grey digital divide in their professional lives.

This thesis seeks to address these gaps by studying the actual experiences of late-career individuals in the workplace, with an emphasis on how perceptions of digital skills affect motivation, anxiety, and self-efficacy. Unlike prior studies, it incorporates

psychological, social, and technological components to provide an extensive overview of how the grey digital divide affects the professional life of older workers. This study uses a qualitative approach to capture the complicated psychological and emotional aspects of digital competence perceptions that quantitative methods have frequently neglected.

Rapid improvements in workplace technology have fundamentally altered professional contexts, exacerbating the issues stemming from the grey digital divide. Tools such as AI, Machine Learning (ML), and cloud-based platforms are now integral to many workplace operations. These technologies demand advanced digital literacy and continuous upskilling, placing older employees at a distinct disadvantage. The shift from simpler structures, such as basic office software, to these more complicated ones has produced a steep learning curve for many late-career employees, compounding feelings of insufficiency and anxiety (Arbogast et al., 2018; Card & DiNardo, 2002). Addressing how these technology advances affect older employees is very important as far as understanding the extent of the grey digital gap in modern organizations is concerned. By focusing onto these elements, this thesis not only addresses an important gap in the literature but also provides ideas towards supporting older employees in an increasingly digital workplace. It aims to contribute to the development of inclusive organizational strategies that promote digital competence and reduce workplace disparities linked to age.

Method

This study employs semi-structured interviews to explore how late-career employees' perceptions of their digital skills influence their work-related anxiety and motivation, with particular focus on the role of age as a potential factor. Previous research on the grey digital divide predominantly relies on quantitative approaches like surveys, which despite being an effective tool in finding general patterns, do not capture the depth of individual perceptions, experiences, and emotions. By contrast, interviews allow participants to express their

experiences in their own words so that one can get richer insights about how they perceive their digital competencies and how these perceptions could affect their work-related anxiety and motivation.

The semi-structured format offers flexibility, allowing for follow-up questions to clarify responses or delve into emerging themes during the conversation. This approach ensures that the research captures the complexity of participants' experiences, leading to a cultivated understanding of how the grey digital divide affects late-career workers' perceptions of self-efficacy. As suggested by Brinkmann and Kvale (2014), semi-structured interviews strike a balance between structure and openness, making them ideal for exploring elaborate topics such as workplace dynamics and digital skill perceptions.

Participants

The study involves ten (10) late-career employees working across sectors in Greece, such as education, information, and technology. In this study, "late-career employees" are defined as individuals aged fifty (50) and above, a common threshold in literature (Fasbender et al., 2019; Kooij et al., 2008; Nagy et al., 2019; Salminen et al., 2022). A noteworthy benefit of this age range is avoiding confounding effects of retirement planning and transitions (Froidevaux, 2018), given that the retirement age in Greece is 67 (EFKA, 2022).

Recruitment was made possible through a combination of convenience and snowball sampling, aiming for gender representation and diversity of roles and experience, to the extent that recruitment allowed (Table 1). Initial participants were recruited through my personal network, where individuals who fit the study's criteria were contacted and invited to participate. These participants were then asked, if possible, to refer other colleagues or acquaintances, which allowed for further recruitment. In total, fourteen (14) people were recruited, of which three (3) had to cancel due to personal issues and one (1) chose to withdraw from the study.

Table 1

Overview of Participants

Participant	Gender	Age	Highest Education	Sector
A	F	53	High School	Fundraising, NGO
B	F	54	Bachelor's	Education
C	F	54	Bachelor's	Education
D	F	56	MBA	Communication, Consulting
E	M	53	Bachelor's	Sales
F	M	58	PhD	Managerial Position, Teaching
G	F	55	Bachelor's	Public Transport
H	M	63	PhD	Research
I	M	61	Master's	Marketing
J	M	59	Bachelor's	Finance, Pharmaceutical

While varying levels of digital proficiency were accepted, participants needed to have regular exposure to workplace technologies (e.g., email systems, digital reporting tools, or specialized software) to ensure relevance to the study's focus on the grey digital divide. Additional characteristics were noted to provide context for the sample. All participants resided in urban or semi-urban areas, reflecting the concentration of workplace opportunities in these regions in Greece. These factors help situate the findings within a specific demographic and geographical context without compromising anonymity.

Data Collection

Data was collected through semi-structured interviews lasting 39 to 62 minutes (the average duration was 48.7 minutes). The interviews were conducted via video conferencing

using Zoom, with the exception of one interview conducted over the phone. The interviews were held in Greek, the native language of all participants, to allow them to more easily express their feelings and experiences (Dewaele, 2010). All interviews were audio-recorded and transcribed with participants' explicit consent (Appendix A). The transcripts were later edited to ensure readability and conciseness, without altering the meaning, by removing filler words like "uhm" and "uh" and repetitions.

Conducting the interviews online may have limited the scope of the study, as it required participants to possess a certain level of digital skills. Online interviews, however, were generally appropriate for this research; given that the target group comprised late-career professionals who regularly use computers for work, and considering the widespread reliance on digital tools during the COVID-19 pandemic (Karl et al., 2022), it was reasonable to assume that most had prior experience with Zoom or similar platforms. This was reflected in the smooth conduct of the interviews, which proceeded without technical difficulties, as participants had learned to use the platform during the pandemic. Not all participants, however, were equally comfortable. One required assistance from their spouse to join the meeting, while another, as mentioned, opted for a phone interview due to discomfort with using the Zoom platform. A third participant also faced some difficulties connecting to the online meeting and required some assistance over the phone.

The interviews explored several key themes, including (a) participants' perceptions of their digital skills, (b) their motivation to engage with new digital tools, and (c) any anxiety they experience when required to use these tools in the context of their work (Appendix B). Questions were informed by the AI Self-Efficacy Scale (AISES), which measures individuals' confidence and perceived skills in using AI technologies (Wang & Chuang, 2024), the Multidimensional Work Motivation Scale (MWMS) by Gagné et al. (2015) which assesses work motivation, and the Job Anxiety Scale (JAS) as described in Muschalla and

Linden (2017). By taking inspiration from the scales, the interview questions lead to answers that provide a clear indication of the experiences of late-career employees, connecting them to research.

To adapt these quantitative scales into qualitative interview questions, subjective criteria were applied, taking into account the Greek workplace context and cultural nuances. For instance, questions were reformulated to encourage open-ended responses, such as “Do you feel confident using digital tools at work?” or “What motivates you to do your best at work?”

Data Analysis

The data was analyzed using thematic analysis, a method that allows for the identification of key patterns and themes across the interviews (Braun & Clarke, 2012). Transcripts were reviewed and coded to identify recurring themes related to digital self-efficacy regarding AI tools, work motivation and work-related anxiety.

Coding also allowed for the identification of other common themes. These themes were then organized and interpreted to provide a comprehensive understanding of how older employees perceive their digital skills and how these perceptions influence their workplace experiences (Appendix C). The coding process was conducted in English, and all relevant quotes were translated from Greek before they were included in the following Results section.

The analysis followed a primarily inductive approach, where themes and codes emerged organically from the data during the process of reviewing the transcripts. However, the analysis was also informed by deductive elements, as initial codes were derived from the research question and theoretical framework, such as self-efficacy and job anxiety. For example, codes inspired by the theory included “comparison with younger colleagues” and

"workplace ageism," while inductive codes such as "confidence with digital tools" and "opinions on new digital technologies" emerged during the iterative process of coding.

The coding process involved several steps. First, the transcripts were carefully read multiple times to ensure familiarity with the data. Initial codes were assigned to segments of text that appeared relevant to the research question. As additional interviews were coded, similar codes were grouped into broader categories, some examples being "challenges with new technologies" and "rapid technological evolution". To ensure consistency, the codes were reviewed and refined iteratively, with some being merged or redefined as patterns and relationships became clearer. This process helped structure the data in a way that highlighted recurring themes while preserving the nuances of individual experiences.

The final themes, described in the following section, were developed by grouping related codes and interpreting their connections within the context of the study's goals. This iterative approach allowed for a detailed exploration of the effects of the grey digital divide in the workplace as experienced by late-career employees.

Results

The findings of this study address the research question, exploring how late-career employees perceive their digital skills, how these perceptions affect their work-related anxiety and motivation, and whether age plays a role in this relationship. Four key themes emerged from the data: (1) self-efficacy and confidence in technology use, (2) challenges in learning digital skills, (3) the effects of technological advancements on work motivation, and (4) the role of age in adapting to a digital workplace. Within the third theme a subtheme was identified: (3a) positive perceptions of AI tools.

These themes stand in contrast to previous research, which often emphasizes age-related obstacles and disengagement in the context of the digital divide. Work-related anxiety, when present, was linked more to the pace of technological advancements and workload

demands rather than to difficulties related to age. Participants presented themselves as motivated users, describing digital tools as essential for enhancing efficiency and reducing workload, rather than perceiving the digitalization of the workplace as a source of anxiety. Rather than showing indifference, they expressed interest in engaging with new digital technologies, challenging a key assumption of previous grey digital divide research. These findings suggest that factors like workplace support and individual attitudes possibly hold a more critical role in digital engagement than age alone. The emergence of these surprising themes prompts a reevaluation of common assumptions regarding late-career employees and digital technologies.

The following sections explore each theme in detail, showcasing the perspectives and experiences shared by the participants.

Self-Efficacy and Confidence in Technology Use

The first theme emerging from the data concerns participants' self-efficacy and confidence in using digital tools and technologies. Understanding how the participants perceive their own digital skills is crucial to answering the research question, and the extent of their confidence in using digital tools at work will help determine whether they view digitalization as a challenge, as assumed from previous research. While the levels of confidence varied, most participants expressed competence in performing work-related tasks with the tools they were familiar with, despite occasionally encountering challenges.

For the majority of the participants, the frequency of using a digital tool mattered a lot in developing comfort in using it for work. Participant E (M, 53) expressed his established comfort with certain tools, stating, "Software like Excel and PowerPoint have become very easy to use; they are now part of our everyday routine." Similarly, Participant G (F, 55) described feeling secure in her abilities to navigate the tools necessary for her work: "I think my skills are quite good because I use the computer a lot, and when I encounter problems, I

first try to solve them on my own, and I usually find the solution." Participant H (M, 63) shared a similar thought stating: "I am quite comfortable with technology, especially the tools I need for work. I use a computer every day, so I've inevitably learned to handle various programs."

However, some participants noted limitations in their confidence when faced with rapidly evolving technologies. Participant C (F, 54) shared a feeling of uncertainty caused by constant technological advancements as he explained: "I cannot be certain because this evolves so quickly; at any given moment, I feel that as I am using one tool, the next one has already come out, and I have yet to familiarize myself with it." Similarly, Participant H (M, 63) acknowledged that even with tools they are familiar with, they experience discomfort when updates introduce changes: "The worst part for me is when they change! You've gotten used to a menu or a way of operating, suddenly there's an update and you have to search again how it works, starting from the beginning."

Despite these challenges, participants often demonstrated willingness to improve their skills to keep up with the changes. Participant A (F, 53) shared her experience with learning new tools, saying, "Three years ago, when we started using Google Drive as a company, we didn't know how to use it, so I attended training sessions to learn about the features it offers." A similar experience was shared by Participant I (M, 61): "When we adopted the company's CRM, I had to figure it out on my own. After a while, I was even helping the younger ones!" His closing remark was accompanied by laughter, and he appeared very proud of his accomplishment. This eagerness was also showcased by Participant D (F, 56), who noted that she actively "pursues learning by doing" when it comes to new available digital tools, sharing the following example: "With websites, while I use developers for some, there are sites I've built myself on Wix, learning how to use it through trial and error."

These quotes highlight the participants' efforts to maintain and develop their digital skills. Their responses illustrate a combination of confidence in familiar tools, caution when navigating newer systems, and a willingness to continue learning.

Challenges in Learning Digital Skills

The second theme that emerged from the interviews focuses on the challenges participants faced in learning and adapting to digital tools. These findings are crucial in answering the research question, since identifying the specific difficulties late-career employees face when learning new digital tools can provide insight into potential sources of work-related anxiety and barriers to motivation.

Despite their willingness to engage with technology as portrayed in the first theme, participants frequently struggled to keep up with advancements and changes in digital tools. Participant A (F, 53) described her initial difficulty when transitioning to using Google Drive: "It was very interesting, but it was challenging because it was a completely different way of working." She emphasized the added pressure of shifting to remote work: "since it was during the period when remote work had become part of our lives, it was a multifaceted difficulty. You had to figure out how to coordinate based on technological developments in order to be able to work."

Participant F (M, 58) highlighted his struggles with the process of learning new technologies, stating, "I get tired of the time it takes to go from not knowing something to learning about it […] For example, if you tell me now that I have to learn something, I find it tedious." Additionally, Participant J (M, 59) shared his frustration with learning how to use new tools: "I hate it when we switch to a new system, and I have to learn how to use it. It's just endless training videos and it will probably change again in a few months." He jokingly added: "Sometimes I wish we never went digital, even though I don't mean it," which indicates that despite the trouble of adapting, the benefits often outweigh the effort necessary.

Another common issue was the complexity of certain tools and their interfaces. Participant E (M, 53) discussed the challenges of transitioning from a PC to a Mac system: “It’s been six months. I really hope it’s just a matter of adjustment.” Moreover, Participant H (M, 63), when asked about what makes learning a new tool difficult, noted that overly complex tools pose a challenge: “I think the problem is when a tool has too many features and it’s not clear where to find what you need.”

The observed resistance to change, identified in the responses of most participants, can be partly interpreted through the cultural context of Greece, where natives often rely on long-established habits and yearn for familiarity – a broader cultural characteristic of Greece, where adaptability to change is often mediated by resource constraints and practicality, fueled by major socioeconomics alters of recent years.

Most participants (8 out of 10) emphasized that adapting to newer technologies requires training and practice, but finding the time to engage in these activities often proves challenging. Participant C (F, 54) acknowledged the necessity of ongoing learning “I have to search each time and dedicate time so that I can handle a new tool with the same ease.” Participant B (F, 54), who also considers dedicating time in training as a necessity for keeping up, mentioned: “I’ve planned to attend a related training, but I haven’t found the time yet,” and so did Participant A (F, 53) noted “I’m ready to learn the basics, but I don’t have time to learn more.” Similarly, Participant D (F, 56) noted: “I sign up for seminars to stay updated, but often I don't have time to finish them” and explained “you need to continuously work on it because advancements keep happening, and you risk falling behind. At the moment, I genuinely don’t know what to prioritize. Surely, if I had the time, I would like to improve myself further.” Finally, Participant H (M, 63) also shared: “if something new or more complex comes up, I need time or a little guidance to learn how to use it, and often there is no available time.”

These reflections highlight the challenges of learning new digital skills. Rapidly evolving technologies, according to participants, make it difficult to keep pace with the latest advancements, which is further exacerbated by the lack of time available for research and training.

The Effects of Technological Advancements on Work Motivation

The third theme explores how the integration of digital tools and the overall digitalization of the workplace has influenced participants' work motivation, directly addressing the research question. Participants mostly highlighted positive impacts, noting how the implementation of new technologies can sometimes enhance efficiency and help alleviate intense workloads. Nonetheless, some participants acknowledged that reliance on digital tools, including AI, can lead to a sense of dependency.

Participant C (F, 54) reflected on how digital tools have made her teaching more engaging and fulfilling: "I can no longer teach without incorporating something digital. Simulations, videos, and even quizzes, electronic crosswords, and experiments are used to capture the students' interest, mainly to help them understand the concepts." She further described the motivational boost from student interactions facilitated by these tools: "My main motivation is that I enjoy it. I enter the classroom, and I like teaching – it's a bit theatrical, this whole process. I enjoy it; I have a good time." Her work motivation appears to be boosted by the comparison of her digital skills to those of her peers: "I see that I am more familiar with technology than some of my peers, and this gives me confidence in my work."

Similarly, Participant J (M, 59) highlighted how the introduction of digital tools over the years significantly improved working conditions, both in a practical and psychological sense: "Moving from having everything on paper to keeping digital records was a game changer. Not just in things like automated reporting, but in restoring confidence in our numbers." He further explained: "Doing everything by hand often lead to mistakes and you

always had to be extra cautious. When you get rid of manual errors, you're not just saving time, you're reducing the mental burden that comes with constant second-guessing."

Participant F (M, 58) shared a positive perspective on how technology has the potential to enhance both his professional and personal life. "I have already integrated these technologies into my life without anyone asking me to." He proceeded to share, "if I could have a personal AI assistant, whatever that might entail, I would be absolutely thrilled. I would gladly incorporate it into my life." He justified his motivation: "The first priority would be for it to save me time on tedious tasks, and the second would be for it to free up more creative time for me."

However, he also acknowledged the potential for dependency: "I feel that I am becoming dependent and gradually developing a weakness." To support his claim, he shared the following example: "In the past, you didn't need to open Google Maps to get from one place to another, whereas now, after taking just three steps, you feel like you need Google Maps." This view was mirrored by Participant I (M, 61) who also shared his concerns regarding the possible long-term effects of increased reliance on digital tools: "If we use it wisely, it can be invaluable. But if we simply let it do all the work, well, I don't know if that's good in the long run."

Overall, the introduction of digital tools at the workplace appears to be viewed positively, but participants emphasized mindful adoption to preserve autonomy. Ensuring metered use of new technologies emerged as key to sustaining motivation and preventing the possibility of developing an unhealthy dependency.

Positive Perceptions of AI Tools

A notable subtheme surfaced as part of the broader discussion of how technological improvements might affect work motivation, related to AI technologies. All ten (10) participants considered AI tools in particular to be useful, recognizing their potential to

enhance efficiency and motivation at work. This perception was largely based on their experiences with using ChatGPT, a tool which was described as highly valuable for streamlining tasks and improving productivity. Nevertheless, some also emphasized the importance of engaging critically with these technologies and avoiding blind trust in their outputs, which once more highlights that mindful adoption is a priority according to the participants.

These technologies were often described as beneficial for saving time and improving efficiency. Specifically, 8 out of 10 participants associated using ChatGPT with streamlining their work more easily, reducing the effort required for certain tasks, and improving their overall performance. For example, Participant A (F, 53) described her experience with ChatGPT, stating: “I asked ChatGPT to write me another letter in different words. [...] It saved me a lot of time because otherwise, I would have had to sit down and think about how to say my name in ten different ways. She went on to explain, “I have nicknamed ChatGPT as ‘my best friend,’ because it is truly very helpful.” Furthermore, she expressed her excitement for AI technologies, demonstrating a noticeable interest in using them: “I’m fascinated by this whole aspect of AI. [...] I use it almost daily.”

Participant B (F, 54) shared her experience of using ChatGPT for the first time, describing her initial hesitation: “I didn't believe it could help with such general things,” followed by the realization of its potential benefits: “But in the end, I would be better off. […] I would avoid two weeks of stress.”

Participant F (M, 58) highlighted the efficiency gains made possible through tools like ChatGPT: “I use it a lot, and it has saved me. Not only has it saved me, but it has significantly increased how much I earn per hour because of it.” He elaborated further: “First of all, I had many scattered materials from conducting interviews, the transcription, and text. I essentially threw all of this at it (ChatGPT) and asked it to generate the final report from it.” These

reflections highlight how AI tools hold the potential to serve as a valuable tool in reducing anxiety, saving time and enhancing efficiency.

However, 4 of the 10 participants acknowledged the importance of engaging critically with these technologies to ensure effective and appropriate use. Participant F (M, 58), for instance, described his frustration with AI-generated outputs that required careful review by sharing the following experience:

> I argue a lot with it, I must say, and I get furious! Three consecutive times it inserted quotes that don't exist. I told it I don't want quotes that don't exist; I want quotes that are present in what I have uploaded to it. It responds with 'I'm sorry' and 'I apologize,' then generates its own again. I let it know, 'This is the second time; there can't be a third, because that is unethical.'

This example illustrates the need for caution when relying on the output of such tools, to ensure accuracy and integrity. The participant indicated that the repeated mistake might possibly have unethical consequences.

Similarly, Participant I (M, 61) expressed reservations about the outputs generated by ChatGPT: "If we start relying too heavily on these tools, the personal touch might be lost." Moreover, Participant H (M, 63) had this to say about his first time generating content with ChatGPT: "I felt like the result was somewhat impersonal. Somewhat? Completely impersonal. Well-written, sure, but without my own style." Similarly, Participant B (F, 54) presented ethical concerns by stating, "I thought it was very easy, and it writes everything so well for me, but then I wondered, can I use this? I mean, it's not mine; I didn't think of it myself." These views comment highlights a sense of unease tied to the perception of rightful ownership when utilizing AI-generated content.

Despite her skepticism, Participant B (F, 54) recognized that AI generated output can be used in a mindful manner. Sharing her approach, she noted: "I like how it presents things

to me, and then I build on it myself. That way, I feel like I'm not cheating, that I'm not just copying and pasting."

Finally, Participant C (F, 54) emphasized the importance of having foundational knowledge when using AI tools, and not blindly trusting information it generates, particularly in specialized fields. She explained:

> For everything I ask, I already know the theory behind it. If it's something I don't know at all, I can't trust it 100% because there is a vast repository of information, and some of it might not be entirely accurate. It even advises you to double-check. So, I approach it cautiously, using it mainly for things I already know, just to organize and structure them the way I want to see them.

This underscores the necessity of already being familiar with the subject to effectively evaluate the outputs of these tools. Participant A (F, 53) also stressed the need for thoughtful engagement, explaining: "I believe that no one should feel ashamed to use them; however, I think it requires a lot of critical thinking and processing of the results they provide."

These perspectives reveal that digital tools, including AI tools, can improve workplace motivation and reduce anxiety in late-career employees when used effectively, which requires a level of critical engagement. This includes both cautiously examining the generated content and ensuring that users bring their own personal touch and expertise to validate the outputs.

The Role of Age in Adapting to a Digital Workplace

The last theme which emerged from the analysis addresses the final part of the research question regarding the significance of age in navigating the digitalized workplace. The interview data were examined to determine whether participants consider age to hold a notable role in their experiences. Additionally, this theme explores whether participants feel

that ageist stereotypes or biases are present in the workplace, as frequently assumed in digital divide research.

Four (4) participants embraced learning from younger colleagues and did not perceive asking for help as a sign of weakness. Instead, they viewed it as an opportunity for continuous learning and professional growth. For example, Participant A (F, 53) shared: “I don’t feel bad. I mean, I don’t know these things and I learn from them [younger colleagues]. I constantly seek to learn from younger people who know these things better. I feel very curious about what else is out there.” Similarly, Participant J (M, 59) said: “I don’t mind younger colleagues showing me how to use these tools. It’s not about hierarchy or ego. They grew up with this stuff, so it’s natural they understand them more easily.” He added “As long as we’re all improving, I’m happy to learn from anyone.”

According to most participants, the way digital tools are approached is dependent on age, with younger generation tending to adapt more effortlessly, due to having grown up with technology. Participant B (F, 54) stated: “The younger ones adopted it [ChatGPT] immediately. Us, the older ones, start using it just now.”, highlighting a lag of older employees in adopting newer technologies. Moreover, Participant H (M, 63) noted: “ The younger generation has grown up with technology, so they use it more spontaneously, without even thinking about it […] they’ll try it out right away, without even asking how it works.” He proceeded with comparing his approach: “Me, on the other hand, if you give me something new, I’d want to read a bit first, see how it works before I start using it.” However, he clarified, “it’s not like there’s a gap. I mean, yes, they’re more comfortable with it, but we’ve also learned to use these tools, just maybe at a slightly slower pace or with a different approach.”

This remark, along with participants’ willingness to learn from younger coworkers, suggest that an age-related divide may not be strongly experienced. Therefore, potential

negative consequences of late-career employees comparing themselves to younger employees appear to be mitigated.

Two (2) of the ten (10) participants positioned themselves as highly competent users of digital tools, separating themselves from their peers. Specifically, Participant D (F, 56) noted: “I’ll say that so far, I haven’t felt [the age gap] because I’ve always been ahead of things.” Participant E (M, 53) also shared: “I believe I belong to a category of people who have been familiar with digital skills since a young age.” Both participants added that their proficiency is recognized in the workplace. Participant D said: “Many times, I spoke with younger people, […] and I had to show them the basics – they were clueless.” Participant E added: “I am often asked for help on such issues [technical].”

Furthermore, three (3) of the participants associated age with increased difficulty in accepting change and adapting to new technologies. Participant F (M, 58) shared: “The process of learning it frustrates me; it tires me. This has changed a lot with age,” indicating that as they get older, the patience required to learn a new skill diminishes. While Participant E (M, 53) expressed determination to adapt, he acknowledged the added effort required: “Now, at my age, the differences in many of the Mac’s functions compared to a Windows PC perhaps make it more challenging for me.” Finally, Participant C (F, 54) noted: “Generally, I think regarding technology, people our age find it harder to break free and start training in something theoretically new to us.” She concluded by stating that “so many refuse [...] but those who start, see that it offers many solutions,” conveying her recognition of the benefits associated with the development of digital skills.

An unexpected finding was the lack of negative experiences related to ageist stereotypes. While existing literature often highlights ageism as a significant barrier for older employees in digitalized workplaces (Hampel & Kunze, 2023; Lagacé et al., 2016), none of the participants in this study reported experiencing discrimination or marginalization due to

their age. The absence of reported age-related negativity could be attributed to the specific characteristics of the sample, such as their working environments or roles. Alternatively, this result might reflect a positive trend in the evolving attitudes towards late-career employees, suggesting that some workplaces are beginning to challenge traditional ageist perceptions. However, it is important to recognize that this finding cannot be generalized to all late-career employees. Ageism remains a documented issue in many contexts, and its absence in this study does not negate its relevance.

Discussion

This research sought to explore how late-career employees' perceptions of their digital skills influence work-related anxiety and motivation, and to what extent do they consider age a significant factor. A main goal of this study was to expand the existing body of digital divide literature by examining the grey digital divide in the workplace from a psychosocial viewpoint, focusing on personal experiences and perceptions rather than from a technical perspective as encountered in previous research. Contrary to expectations deduced from the theoretical framework, this study contests assumptions regarding potential negative effects of age on self-efficacy and motivation.

The findings do not align with previous digital divide research, which suggests that late-career employees often struggle with adapting to technological advancements and encounter ageistic stereotypes in the workplace. Instead, the data revealed overall positive perceptions of digital skills among participants, with self-perceptions ranging from average to notably competent. This indicates that age might play a less deterministic role in influencing the extent of digital engagement than previously thought. This discrepancy invites a deeper exploration of factors such as self-efficacy, organizational culture, and changing societal attitudes toward the digitalization of the workplace, especially for late-career employees.

The generally positive self-perceptions of digital skills among participants appears to encourage engagement with digital tools, including newly implemented AI tools. This finding is consistent with the concept of self-efficacy, where the confidence of individuals in their capabilities influences their willingness to engage with challenging tasks (Bandura, 1997). Participants frequently presented themselves as eager to use digital tools, particularly tools like ChatGPT, as they perceive them as useful means of improving efficiency and enhancing their performance overall by saving them valuable time. This reflects van Dijk's (2013) dimensions of digital engagement, since participants perceive these tools as highly relevant, (motivational dimension), which motivates them to implement them in their work (material dimension), which in turn motivates them to develop their digital skills further (skills dimension) in order to benefit fully from using them.

Furthermore, according to Wei et al. (2011), the aforementioned effects of high self-efficacy can lead to positive knowledge and skill outcomes, which can boost the confidence of late-career employees. These behaviors suggest that a strong sense of self-efficacy may not only reduce work-related anxiety by fostering a sense of competency and control but also enhance motivation by highlighting the benefits of adapting to technological advancements. These findings indicate a shift in the traditional grey digital divide narrative, suggesting that positive self-perceptions toward digital skills might mitigate the digital divide experienced by late-career employees, further narrowing the gap between younger and older workers in increasingly digitalized workplaces.

Although digital skills were generally perceived positively, participants also noted difficulties in adapting to new technologies. Regardless of the participants' willingness to participate in training programs, the analysis revealed that the most prominent obstacle was the lack of available time for the development of digital skills. Many participants conveyed feelings of stress and frustration induced by time constraints, particularly since they

acknowledge the potential advantages of developing their skills further. The concept of technostress, as described by Seberini et al. (2022), which emphasizes how the pressure to keep up with the pace of technological advancements, can increase work-related anxiety.

Additionally, participants pointed to the rapid evolution of digital technologies as a source of difficulty. This rapid advancement exacerbates the grey digital divide, as older employees, unlike their younger counterparts, have not grown up immersed in digital environments, a fact acknowledged by both previous research (Kiser & Washington, 2015) and the participants. As a result, they require more structured and continuous learning opportunities to adapt effectively (Hecker et al., 2021), which was also mentioned by multiple participants when comparing the speed at which they adapt to new technologies to that of their younger coworkers.

The analysis of the interview data, however, indicates that all participants appear to successfully cope, benefiting from the use of new technologies without experiencing the negative effects of time restraints and the rapid pace at which technology advances. While the lack of time for training and the perceived need to keep up with rapidly changing technologies can possibly increase anxiety, high self-efficacy appeared to mitigate work-related anxiety and help maintain motivation. These observations suggest that when late-career employees hold positive self-perceptions, the impact of cognitive demands to adapt to the digitalizing workplace can possibly be reduced.

The analysis also revealed that technological advancements, particularly the integration of AI tools such as ChatGPT, had a largely positive impact on participants' work motivation. Most participants described these tools as necessary for freeing up valuable time and enhancing overall work satisfaction. This perspective aligns with research suggesting that when digital tools are perceived as useful and relevant, they can boost motivation by reinforcing a sense of accomplishment and efficiency (Elias et al., 2012; Rafiq & Chin,

2019). Additionally, participants highlighted how technological advancements reduce the need for manually completing repetitive and mundane tasks, contributing to a renewed sense of engagement. These findings suggest that while the grey digital divide is often associated with potential obstacles, positive perceptions of technology may not only help overcome these barriers but also significantly diminish age-related digital divides experienced in the workplace.

The role of age in adapting to a digital workplace emerged as a noteworthy theme in this study. While existing research on the grey digital divide presents age as a significant barrier to digital engagement (Antonio & Tuffley, 2015; Krueger et al., 2018; Raihan et al., 2024), the present findings may challenge this notion. None of the participants viewed their age as a primary obstacle to developing digital skills or integrating new technologies into their work. Some limitations posed by their age were mentioned, such as the need for more structured and incremental training compared to younger employees. This generational difference, while recognized, did not seem to undermine the participants' confidence or motivation. Instead, it underscored the importance of structured learning opportunities and adequate time for skill development, allowing late-career employees to keep pace with digital transformation. These insights suggest that while age may influence the ease of learning new technologies, it does not necessarily determine outcomes. When late-career employees maintain positive self-perceptions and receive appropriate support, age-related challenges can be effectively tackled, contributing to both reduced anxiety and sustained work motivation.

Overall, the findings suggest that late-career employees maintain positive self-perceptions of their digital skills, which fosters engagement with new technologies and helps mitigate work-related anxiety. While challenges such as time constraints and the rapid pace of technological advancements were acknowledged, high self-efficacy and structured learning opportunities appeared to counteract potential negative effects

Practical Implications

The findings of this study underscore the importance of adopting a holistic approach to addressing the grey digital divide in the workplace. Rather than focusing solely on technical training, organizations and researchers should also consider the psychological well-being of late-career employees.

A key recommendation is the implementation of tailored training programs that prioritize gradual learning and accommodate time constraints, which can help late-career employees adapt to new technologies, while maintaining high levels of self-efficacy. Additionally, it is crucial to promote critical thinking skills alongside technical skills, particularly in the use of AI tools, where effective and confident use requires cautious and mindful engagement. Research suggests that confidence-building strategies such as incremental learning and practical training can enhance motivation and reduce work-related anxiety (Chetty, 2023; Hecker et al., 2021).

One participant in this study highlighted the importance of small-group training sessions as an effective way to bridge the gap in digital skills. They mentioned, “A training in small groups. That’s what’s needed. So that you also have the chance to ask questions, for each person to have their own computer or laptop to work on what we’re learning, to see it in practice.” (Participant G; F, 55) This insight illustrates how tailored training programs, with an emphasis on hands-on practice and direct interaction, can help late-career employees gain confidence and competence in using new technologies.

Additionally, creating supportive workplace cultures that counteract ageism is crucial. None of the participants in this study mentioned negative experiences in the workplace related to these stereotypes, however that is not necessarily the case for all late-career employees. Negative stereotypes about older workers’ technological abilities remain prevalent in various work-related contexts (Hampel & Kunze, 2023; Lagacé et al., 2016).

Such stereotypes can undermine the motivation and self-efficacy of late-career employees. Therefore, by fostering inclusive environments, organizations can encourage active participation of older employees, improving both job satisfaction and productivity, and reducing feelings of marginalization.

Finally, on a broader societal level, addressing the digital divides in the workplace is essential for promoting fair participation in the digital economy. Supporting late-career employees not only promotes inclusion but also leverages the valuable experiences these individuals bring to the workplace. By implementing inclusive and tailored support policies, organizations can create environments where late-career employees thrive, contributing to both economic productivity and workplace diversity. As societies continue to evolve through digital transformation, prioritizing the digital inclusion of older adults will be crucial for ensuring long-term economic prosperity and social cohesion.

Limitations and Future Research

While these practical implications offer valuable guidance for organizations, it is important to acknowledge the limitations of this study and identify areas for future research. First, the sample size was relatively small and geographically specific, focusing exclusively on workers in urban regions of Greece. While this context provides a detailed understanding of the challenges faced by older employees in this particular setting, the findings are not generalizable.

The cultural and economic context of Greece presents an additional limitation to the generalizability of the results. The sample consisted exclusively of late-career employees in urban regions of Greece, where established work routines, familiarity with specific technologies, and broader cultural traits may influence digital adaptation. The 2008 economic crisis led to significant cultural transformations, including shifting views on age and generational roles (Mavridis, 2018; Pavlopoulos & Rachiotis, 2024), which may have shaped

participants' openness to digital tools. Additionally, Greece's limited AI adoption – primarily 30% in financial services – alongside low adoption rates among businesses (12%) and widespread public skepticism about job loss (69.7%) (Christodoulou, 2023; Krompas, 2024), highlights the unique challenges of digital transformation in this setting. These factors suggest that while the study offers valuable insights into the Greek workplace, further research with more diverse geographical and cultural contexts is needed to fully understand the grey digital divide on a broader scale.

Another notable limitation is the implementation of convenience and snowball sampling, which may have introduced selection bias. As participants were primarily recruited through personal networks, the sample may not accurately represent the broader population of late-career employees. This choice of method may have inadvertently led to an overrepresentation of individuals with positive experiences, excluding individuals with significantly differing workplace experiences. Future research should aim to employ more systematic sampling methods, to ensure a more diverse and representative sample.

Additionally, the reliance on qualitative methods, while offering rich and nuanced insights, inherently limits the ability to draw broader statistical conclusions. Combining qualitative interviews with quantitative measures, such as surveys, could provide a more comprehensive understanding of the factors influencing work-related anxiety, motivation, and digital engagement among late-career employees within the grey digital divide.

Another limitation of this study is that while the theoretical framework initially highlighted age as a significant factor influencing adaptability to digital tools, the final findings did not align with this expectation. Although age was observed to play some role in shaping perceptions of digital skills and confidence, the results suggested that other factors, such as available time for training, organizational support, and self-efficacy, were more influential. This discrepancy between the theoretical expectations and the empirical findings

highlights the complexity of the grey digital divide, indicating that age alone may not be a deterministic factor. Future studies should further investigate the relationship between age and other contextual factors to provide a more coherent understanding of digital engagement among late-career employees.

Future research might also benefit from a longitudinal design to discover how late-career employees adapt to new technologies over time. Such approach could allow future research to track how challenges and enablers evolve and how they impact employees' self-efficacy, motivation, and anxiety in the workplace. By capturing the temporal aspects of adaptation, longitudinal studies could highlight which organizational practices and strategies best support successful digital transformation and digital literacy for older workers (Cetindamar et al., 2024; Qiao et al., 2024).

Examining the long-term effects of AI tools, like ChatGPT, on workplace dynamics and the development of digital skills is another promising area of research. Future studies could examine whether prolonged use of AI improves or diminishes self-efficacy, motivation, and skill retention, even though study participants emphasized the efficiency and productivity gains provided by these tools. Concerns regarding dependency were raised by a few participants, who suggested that an excessive reliance on AI could weaken fundamental abilities and diminish self-efficacy. Examining these possible trade-offs could yield important information about how businesses can optimize AI technology to their full potential, while reducing long-term risks to adaptability and digital skills of employees.

Conclusion

This study explored how late-career employees perceive their digital skills and how these perceptions influence their work-related anxiety and motivation, while also considering the role of age in this dynamic. The findings challenge common assumptions associated with the grey digital divide, showing that positive self-perceptions of digital skills can play a

significant role in reducing anxiety and maintaining motivation. While age did present some challenges, particularly in the need for more structured learning approaches, it was not a deterministic factor. Instead, factors such as self-efficacy, access to tailored training, and time constraints were more influential in shaping the well-being of late-career employees.

Beyond contributing to the academic conversation on the grey digital divide, this study offers practical guidance for organizations aiming to support late-career employees. The emphasis on gradual learning, small-group training, and inclusive workplace cultures underscores the need for policies and practices that go beyond technical skill development. By acknowledging the study's limitations, including the small sample size, cultural specificity, and the employed methods, future research can build on these findings with broader, more diverse approaches. As workplaces become increasingly digital, prioritizing holistic support for late-career employees will not only boost productivity but also promote well-being, ensuring that valuable experience and expertise are not left behind in a constantly digitalizing society.

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Appendix A

Informed Consent Form

The Impact of Digital Skills Perceptions on Work-Related Anxiety and Motivation Among Late-Career Employees Within the Grey Digital Divide

Researcher
Dimitrios Kalogiannis, TSHD, Tilburg University

Signature
By signing this informed consent form, you voluntarily agree to participate in this study. Signing this form does not interfere with your right to withdraw from this study at any time without an explanation.
By signing this informed consent form, I (the participant) confirm that I have read and understood the entire information letter and confirm that:

- I have read and understood the entire information letter that belongs to this study.
- I have been given the opportunity to ask questions about the study and that these questions were answered to my complete satisfaction.
- I had sufficient time to decide whether I would participate or not.
- I know that participation is completely voluntary.
- I know that the duration of the study is 45-60 minutes.
- I know I can decide to withdraw from the study at any time, without any negative consequences and without providing any explanation.
- I know I have the right, in principle, to request access to and rectify, erase, restrict or object to the processing of my personal data.
- I know that my research data will be processed as described in the information letter and only the researcher team have access to this data.
- I give permission to use my research data for the purposes that are mentioned in the information letter that belongs to this study.
- I give permission to store my research data for the period of 10 years.

I hereby voluntarily agree to participate in the study:
The Impact of Digital Skills Perceptions on Work-Related Anxiety and Motivation Among Late-Career Employees Within the Grey Digital Divide

Name participant:

_____

Signature: Date : ____ / ____ / _____

_____

To be completed by the researcher:
I hereby declare that I have fully informed the above-mentioned participant about this study.

Name researcher:

_____

Signature: Date : ____ / ____ / _____

_____

Appendix B

Interview Guide

Introduction

- Hello, and thank you for joining me today. My name is Dimitris, and I'm conducting research for my thesis on the experiences of late-career employees with modern digital technologies in the workplace.
- Just as a reminder, you have received an informed consent form via email, which includes details about the study's purpose and your rights as a participant. By participating, you're agreeing to be part of this research voluntarily, and you may of course choose to stop at any time without any consequences. This interview will take about 45 to 60 minutes, and, with your permission, I'll record our conversation to later transcribe it into text. Everything you choose to share today will remain confidential, and any information that could be traced back to you will be anonymized.
- Do you have any questions about the consent form or the interview process before we begin? OK, let's begin! *[Start recording]*

Participant Context	*Demographic Information* 1. Could you tell me your age? 2. What is your highest level of education? 3. How long have you been working with your current organization? *Role and Responsibilities* 4. Could you describe your current role and main responsibilities?
Self-Perceptions of Digital Skills	*Self-Perception of Digital Skills* 5. Have you had any training related to digital tools or technology? 6. How would you describe your digital skills? 7. Do you feel confident using digital tools (like specific platforms or software) at work? *Challenges with Digital Tools* 8. Can you give me some examples of digital tools that you use in your current job? 9. Are there any tools that you find particularly difficult to use? - What do you think makes them challenging? *Experience with New Digital Tools* 10. Can you recall a time when you had to learn a new digital tool for your work? - What was that experience like for you? *AI Self-Efficacy* 11. Are you familiar with generative AI technologies, like ChatGPT?

	- Have you had any experience using such tools? - What is your opinion on AI technologies? - Could you provide an example of when AI was helpful? - How about an example of AI tools being too challenging or useless? 12. Can you give me an example when you last used an AI tool (like ChatGPT)? - How did it make you feel (e.g., calm, uneasy, frustrated, etc.)? - Were you able to get the AI tool to do what you want?
Workplace Experiences and Interactions	*Interactions with Younger or More Digitally Skilled Coworkers* 13. Do you think there's a difference in how employees of different ages approach digital tasks? - Could you share any experiences related to that? - How did that make you feel? *Coworkers with Different Digital Skills* 14. How do you feel about collaborating with coworkers who may have more advanced digital skills? 15. How do you think your colleagues perceive your digital skills? - Do you ever feel that your digital skills are judged by others in the workplace?
Work Motivation	*Motivation to Work* 16. What motivates you to do your best at work? 17. Do you ever question the importance of your work? - *[if yes]* When has that happened, and why? 18. What do you find enjoyable about your job? - Can you describe a moment when you felt excited for your work? 19. When was the last time you felt pride in your work? - How so? 20. Have you felt unmotivated to complete a work task recently? - How so?
Work-Related Anxiety	*General Feelings about Work* 21. Can you describe how you typically feel when thinking about going to work? 22. Have you ever felt like avoiding going to work? - How so? 23. How confident are you in your abilities to do your job? 24. Have there been moments when you felt overwhelmed by work? - How do you cope with these situations?

	25. Do you find it difficult to “switch off” from work during your personal time? - Can you share how you manage this *Job Security* 26. How secure do you feel in your current job? - Has anything made you feel unsure? 27. How does the thought of AI tools, like ChatGPT, becoming an integral part of your work make you feel? - Would such a scenario affect how you view your job?
Rounding off the Interview	*Organizational Support for Digital Skills* 28. Do you feel that your organization provides enough support for learning digital skills? - What kind of support would you find most helpful? *Final Thoughts* 29. Are there any other thoughts, feelings, or experiences in your work that you’d like to share?

Appendix C

Coding Scheme

Theme	Code	Definition	Example Quote
Self-Efficacy and Confidence in Technology Use	Self-perceived competence	Belief in one's ability to learn and use digital tools efficiently.	*"I prefer mastering the basics rather than learning something in depth"*
	Reliance on younger colleagues	Dependence on younger team members for assistance with technology.	*"I have no problem asking younger people for help if needed"*
Challenges in Learning Digital Skills	Perceived challenges in technology	Difficulties or obstacles encountered in adopting and using new technology.	*"At first, the transition to Mac was difficult, but after a few months, I got used to it"*
	Available time	Available time for necessary training.	*"I've planned to attend a related training, but I haven't found the time yet"*
Effects of Technological Advancements on Work Motivation	**Positive perceptions of AI tools**	Perception of the extent AI tools, like ChatGPT are useful to the participant.	*"ChatGPT saved me hours of work by helping rewrite thank-you letters in new ways"*
	Adaptation strategies	Methods or approaches used to cope with or learn new technology.	*"If I don't understand something right away, I try two or three times. When you practice something enough, it eventually becomes a bit easier"*
The Role of Age in Adapting to a Digital Workplace	Younger coworkers	The differences identified when compared with younger employees	*"It's clear by now that younger colleagues are much more familiar with all these tools compared to colleagues from my generation. However, not in a way that would make me feel inadequate"*
	Getting older	Characteristics justified by getting older, like lack of energy available to learn	*"The process of learning frustrates me; it tires me. This has changed a lot with age"*

Note. The above is a simplified version, featuring only a selection of quotes, and not including all of the codes identified during the analysis – just some of the most salient ones, useful to illustrate the process.