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Age differences in the adoption of technology at work: a review and recommendations for managerial practice

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Abstract

Purpose – The adoption of technology is a key question for nowadays' organizations. The present literature review analyzes the role of workers' age in the adoption of technology at work.
Design/methodology/approach – A comprehensive literature review based on PRISMA resulted in 51 papers which highlighted age-related differences in technology adoption inside organizational context.
Findings – Findings were grouped considering age-related differences in five technology adoption antecedents (i.e. performance expectancy, effort expectancy, social influence, facilitating conditions, attitude toward using technology), affecting behavior intention to use technology, and use behavior. Overall, the literature revealed age-related differences in the adoption's antecedents affecting workers' behavior intention to use technology and use behavior.
Originality/value – This study presents a comprehensive summary of evidence and practical recommendations for organizations navigating technology implementation in an increasingly age-diverse workforce environment. Additionally, it outlines several future research directions to address the limitations of current studies in this area.

Keywords Technology adoption, Age, Sustainable innovation, Systematic review, Managerial practice
Paper type Literature review

Introduction

Organizations are facing profound demographic changes in their workforce. For the first time in history, four generations are working together inside organizations (DelCampo *et al*., 2017). This trend is leading to higher attention to age-related differences in the adoption of working technology, which represents a strategic asset for today's organizations (Jeffrey and Dafoe, 2021). The impact of technology can only materialize if workers use technology (Venkatesh and Zhang, 2010), and individual differences, such as age, may contribute substantially (Venkatesh *et al*., 2003). In fact, research highlighted differences in technology adoption based on workers' age (Adams *et al*., 2021; Brown *et al*., 2019; Tam *et al*., 2014; Venkatesh and

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Zhang, 2010). For example, Venkatesh and Zhang (2010) in their longitudinal cross-cultural study showed that technology usage behavior declines with age in both U.S. and Chinese worker sample. Therefore clarifying the role of age in technology adoption is important for today organizations to successfully implement technologies. Despite the growing research evidence on this topic (Becker *et al*., 2020; Grünloh *et al*., 2022; Knight *et al*., 2022; Park *et al*., 2021), research is still fragmented, showing an array of different and contrasting findings. Hence, our objective is to address the following research question: Do antecedents of workplace technology adoption (i.e. performance expectancy, effort expectancy, social influence, facilitating conditions, attitude toward using technology) affecting intention to use technology and actual use behavior differently considering workers' age? To answer this question, we first identify the key antecedents of technology adoption that have been linked to age-related differences, examining the most influential theories on technology adoption. Then, we analyzed age-related differences identified in the literature, taking into account additional contextual factors such as the Country in which the study was conducted, the type of technology examined, and the industry sector. By synthesizing scientific evidence, our goal is to provide insights into the limitations of current research, propose directions for future studies, and offer theoretical and practical recommendations for managing technology adoption in the workplace, fostering greater use among workers of all ages.

Materials and methods

Consistent with the Bibliometric-Systematic Literature Reviews (B-SLRS) approach (Marzi *et al*., 2024), our first step was an initial informal literature screening on technology adoption and aging, using the keywords ("technology" AND "adoption" OR "use" AND "age*" OR "older*" OR "younger*" AND "work*"). This preliminary exploration informed the development of our research question and the establishment of specific inclusion and exclusion criteria. Our inclusion and exclusion criteria were set as follows. Studies focusing on workplace technology adoption and addressing age-related differences were included. In contrast, studies examining technology adoption among aging individuals outside organizational settings (e.g. elderly technology adoption) and those not on age-related differences in technology adoption were excluded. Only empirical studies employing both quantitative and qualitative data collection methods were included. No restrictions were imposed regarding the publication year, Country, or type of technology examined. Table 1 provides a summary of the inclusion and exclusion criteria, structured according to the PICO search framework. Next, we formulated our search string as follows: ("age" OR "young*" OR "middle-age*" OR "old*" OR "elderly" OR "age-related" OR "age comparison" OR "age-based" OR "age differen*") AND ("technolog*" OR "ict" OR "digit*" OR "information system" OR "computer") AND ("use" OR "adoption" OR "acceptance") AND ("workplace" OR "employee*" OR "worker*" OR "work environment"). To create and validate the set of keywords we involved experts in age-related differences and technology adoption in the workplace (Marzi *et al*., 2024). Third step was the database selection. We conducted our search

Table 1. Summary of inclusion and exclusion criteria based on PICO method

	Inclusion	Exclusion
Population	Workers	All the others (e.g. customers, users)
Intervention	Quantitative and qualitative empirical studies	Theoretical and conceptual contribution
Comparison	Test of age-related differences	Papers which no considered age-related differences
Outcome	Antecedents of adoption of working technology and adoption	Consequences of adoption of working technology

Source(s): Authors' work

across multiple databases, of management, organizational and social psychology studies, specifically, Web of Science (i.e. Clarivate), Scopus (i.e. Elsevier), PsycINFO and APA PsycArticles (i.e. EBSCO), and Psychology Database (i.e. ProQuest). A total of $n = 7{,}564$ articles were found, published from 1933 to 2025. In the fourth step, we screened the data, selecting only peer-reviewed articles published in English while excluding dissertations, conference proceedings, and book chapters. Two researchers independently conducted the analysis and cross-validated the data. The screening processes have been conducted using Rayyan online software (Ouzzani *et al.*, 2016), which align with the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). After removing the duplicates, abstracts and full texts were screened. Finally, $n = 51$ empirical articles were identified and retained (the flow chart is shown in Figure 1). The excluded articles fell into one or more of the following categories: those focusing on a not pertinent population (e.g. non-working individuals), an unsuitable study type (e.g. non-empirical research), or unrelated content (e.g. studies not addressing technology adoption or age-related differences). We assessed the quality of the sources using the Scimago Quartiles (Marzi *et al.*, 2024). The 22% of the sources were ranked in Q3 and Q4 according to the Scimago Quartiles (Figure 2). However, we chose to include all sources to ensure a comprehensive representation of various sectors (e.g. Tourism, Museums, Utilities) and countries (e.g. Africa, India,

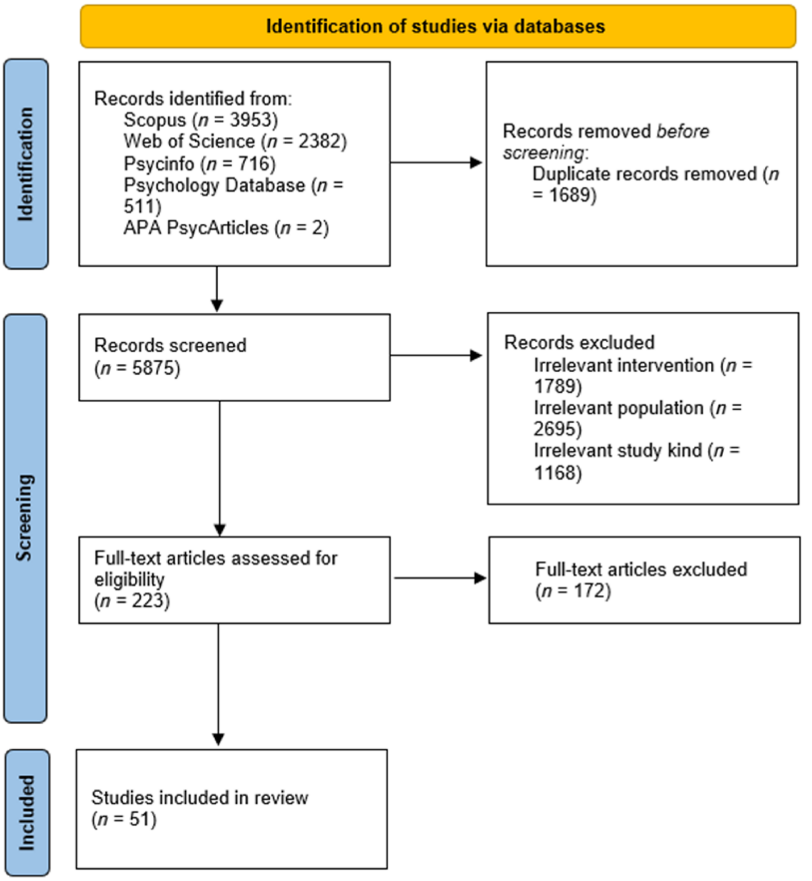

Figure 1. Flowchart of the study selection for the systematic review (Source: Authors' work)

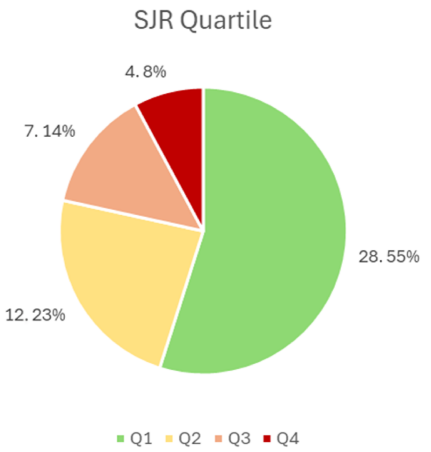

Figure 2. Sources Journal Ranking based on Scimago Quartiles (Source: Authors' work)

Pakistan, Turkey, Saudi Arabia) that would have been excluded if we had considered only Q1 and Q2 journals. For the analysis and cluster identification, we conducted a full-text review to identify paper characteristics aligned with our theoretical approach.

Table A1 (Appendix) summarizes the main aspects (i.e. title, author(s), type of technology, sector, country, data type, and key results) for each paper retained for the review.

Theoretical framework of the literature review

Technology adoption and age

In developing our model, we identified critical antecedents of workplace technology adoption and use that may differ considering the age of the workers. Davis (1987) introduced the Technology Acceptance Model (TAM) to explain the influence of perceived usefulness, perceived ease of use, and attitude toward technology on behavioral intention and actual use. TAM has been previously linked to the aging literature (Fasbender *et al*., 2023). Moreover, additional factors influencing technology adoption have been identified, which may also vary with age. Venkatesh *et al*. (2003) systematically reviewed existing theoretical models of technology adoption and conducted a longitudinal study to examine the factors affecting workers' adoption and use of technology (summarized in Table 2). Their systematic approach integrated key dimensions from prior models (e.g. TAM) into four overarching constructs influencing technology adoption: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Beyond dimensions already considered in TAM (i.e. Perceive Usefulness, Perceived Ease of Use, Attitude Toward Using Technology), Social Influence and Facilitating Conditions are included in Unified Theory of Acceptance and Use of Technology (UTUAT), which may vary with age (Morris and Venkatesh, 2000; Morris *et al*., 2005). For instance, Morris and Venkatesh (2000) proposed that differences in the need to please (Carstensen *et al*., 1999) may alter the role of Social Influence in technology adoption, leading to higher relevance of Social Influence for older workers. Additionally, they suggested that age-related declines in cognitive abilities (Baltes and Baltes, 1990; Savolainen, 2015) might influence individuals' perceived difficulty in using technology, thereby affecting Perceived Behavioral Control (i.e. Facilitating Conditions) in determining adoption. Therefore, in addition to the TAM dimensions, Social Influence and Facilitating Conditions, as conceptualized in the UTAUT model, have to be considered from an aging perspective. Our analysis of the reviewed literature supports these considerations, identifying 51 studies on age-related differences in workplace technology adoption, the results are

Table 2. UTUAT systematization of theories and dimensions of technology adoption and use

Theories before UTUAT	Dimensions before UTUAT	UTUAT systematization
Theory of Reasoned Action (TRA)	Attitude toward using technology	Not included
	Subjective norm	Social influence
Technology acceptance model (TAM) - Technology acceptance model 2 (TAM2)	Perceived usefulness	Performance expectancy
	Perceived ease of use	Effort expectancy
	Subjective norm	Social influence
Motivational Model (MM)	Intrinsic motivation	Not included
	Extrinsic motivation	Performance expectancy
Theory of planned behavior (TPB)	Attitude toward using technology	Not included
	Subjective norm	Social influence
	Perceived behavioral control	Facilitating conditions
Combined TAM and TPB	Perceived usefulness	Performance expectancy
	Attitude toward using technology	Not included
	Subjective norm	Social influence
Model of PC utilization (MPCU)	Job-fit	Performance expectancy
	Complexity	Effort expectancy
	Long-term consequences	Not included
	Affect toward use	Not included
	Social factors	Social influence
	Facilitating conditions	Facilitating conditions
Innovation Diffusion Theory (IDT)	Relative advantage	Performance expectancy
	Ease of use	Effort expectancy
	Result demonstrability	Not included
	Trialability	Not included
	Visibility	Not included
	Image	Social influence
	Compatibility	Facilitating conditions
	Voluntariness	Not included
Socio-Cognitive Theory (SCT)	Outcome expectations	Performance expectancy
	Self-efficacy	Not included
	Affect	Not included
	Anxiety	Not included

Note(s): Not included: dimensions that do not increase the variance explained by the individual acceptance of technology
Source(s): Authors' work

summarized in Table 3. Consequently, our review considers five antecedents of technology adoption (i.e. Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, and Attitude Toward Using Technology), as well as Behavioral Intention and Use Behavior. A summary of these dimensions and their definitions is provided in Table 4.

After identifying the dimensions, we analyzed the role of age in the relationship between technology adoption antecedents and use behavior. On one hand, the literature on technology adoption considers the interaction effect between age and technology adoption antecedents in

Table 3. Dimensions considered in the literature about age-related differences in technology adoption

Dimension	Number of papers using the dimension
Performance expectancy or Perceive usefulness	22
Effort expectancy or Perceive ease of use	17
Social influence or Subjective norms	14
Facilitating conditions, Perceived behavioral control, Confidence in use, IT support or IT knowledge	19
Attitude toward using technology	9
Behavior intention to use technology or use behavior	22

Source(s): Authors' work

Table 4. UTUAT overarching constructs and attitude toward using technology

Construct	Definition based on Venkatesh *et al*. (2003)
Performance expectancy	The degree to which an individual believes that using the system will help him or her to attain gains in job performance
Effort expectancy	The degree of ease associated with the use of the system
Social influence	The degree to which an individual perceives that important others believe he or she should use the new system
Facilitating conditions	The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system
Attitude toward using technology	The degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question

Note(s): Other aspects included in UTUAT's extension (i.e. UTUAT-2, Venkatesh *et al*., 2012) have not been considered because they are not relevant for organizational context
Source(s): Authors' work

shaping behavioral intention and actual usage behavior, thereby treating age as a moderator (Venkatesh *et al*., 2003). On the other hand, age can directly influence the perception of technology adoption antecedents (Fasbender *et al*., 2023), as well as behavioral intention and actual technology use (Brown *et al*., 2019; Fasbender *et al*., 2023). The literature review model is illustrated in Figure 3, and the results section is structured in alignment with our proposed literature review model.

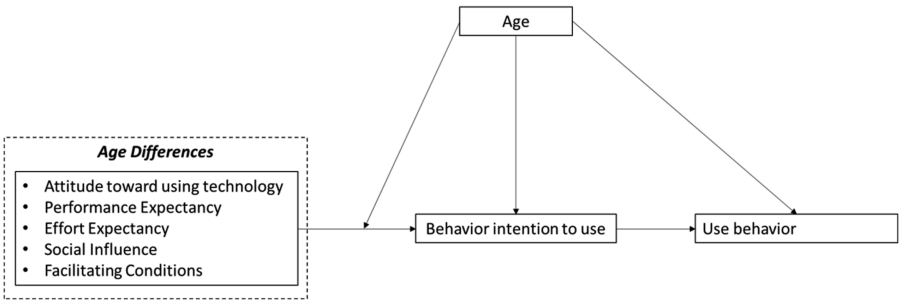

Figure 3. Model of the literature review (Source: Authors' work)

Literature analysis: general trends

Over the past 25 years, the number of studies examining age-related differences in technology adoption in the workplace has increased significantly. Notably, only two articles on this topic were identified as published before the year 2000 (Figure 4). This trend aligns with the growing integration of technology within organizations and the rapid aging of the workforce. More than half of the studies (51%) were conducted in the USA and Europe, the remaining in Asia (20%) and Africa (16%) (Figure 5). Among the studies reviewed, eleven (25%) utilized convenience samples or examined multiple sectors. Ten studies (22%) focused on healthcare settings, while seven (14%) were conducted in the agricultural sector (Figure 6). This sectoral distribution is also reflected in the types of technology investigated (Figure 7). Specifically, agricultural studies primarily explored age-related differences in the adoption of productivity-enhancing technologies (4 out of 6 studies; 67%). In contrast, other studies predominantly examined information and communication technology (16 out of 51 studies; 31%), computers and software (7 out

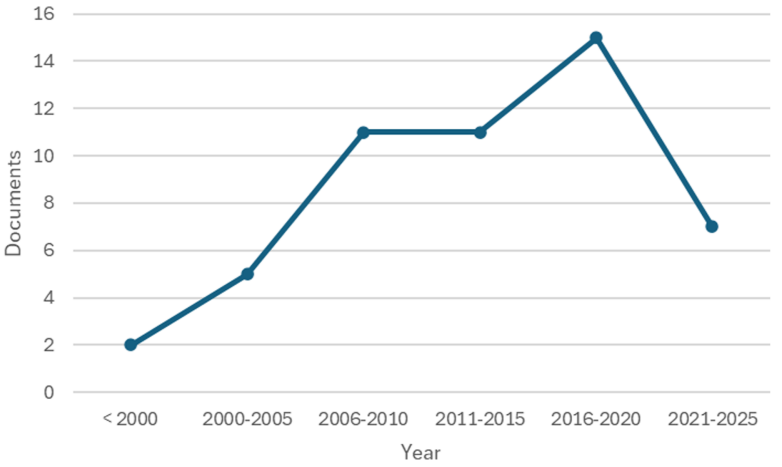

Figure 4. Publication trend (Source: Authors' work)

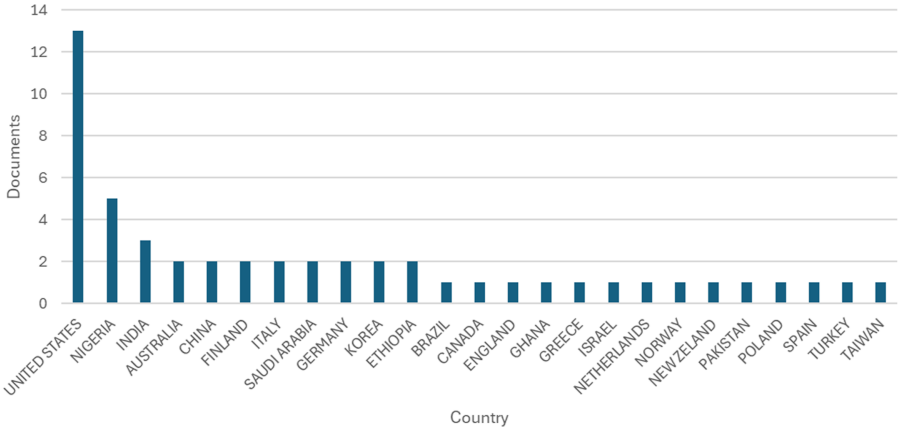

Figure 5. Publication by country (Source: Authors' work)

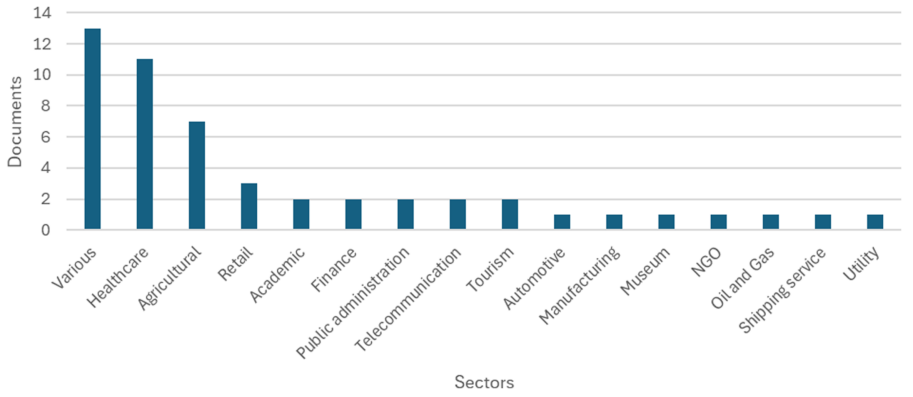

Figure 6. Publication by sectors (Source: Authors' work)

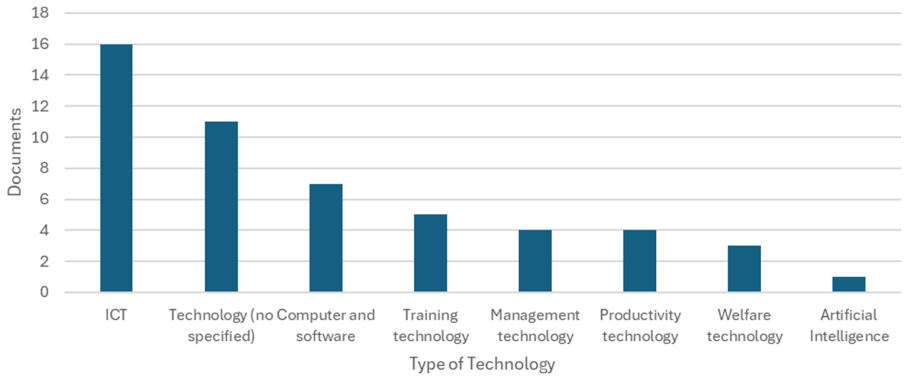

Figure 7. Publication by type of technology (Source: Authors' work)

of 51 studies; 14%). There is comparatively less research focusing on management technologies (e.g. customer relationship management systems) (4 out of 51 studies; 8%), training technologies (e.g. e-learning platforms) (5 out of 51 studies; 10%), or welfare technologies (e.g. rehabilitation technology) (3 out of 51 studies; 6%).

Our review showed heterogeneous approaches regarding the theoretical framework utilized. In fact, among the 51 articles included in this review, 12 (23%) used the UTUAT as a theoretical foundation. The remaining articles used other theories (i.e. 10 papers used the Technology Acceptance Model, 3 papers used the Theory of Planned Behavior) or none (i.e. 25 papers were based on previous empirical evidence).

The age variable has been explored under different roles (Table A1). More specifically, 35 papers analyzed the effect of age across the technology adoption dimensions (e.g. levels of behavioral intention to use technology across ages). Sixteen papers analyzed age as a moderator in the relationship between different technology adoption dimensions (e.g. the impact of age on the relationship between performance expectancy and behavioral intention to use technology). Age, from a methodological perspective, has been operationalized in different ways. 27 out of 51 studies (53%) used age as a continuous variable. The other 24 studies (47%) used age in categorical intervals. A summary of age distribution and use is presented in Figure 8.

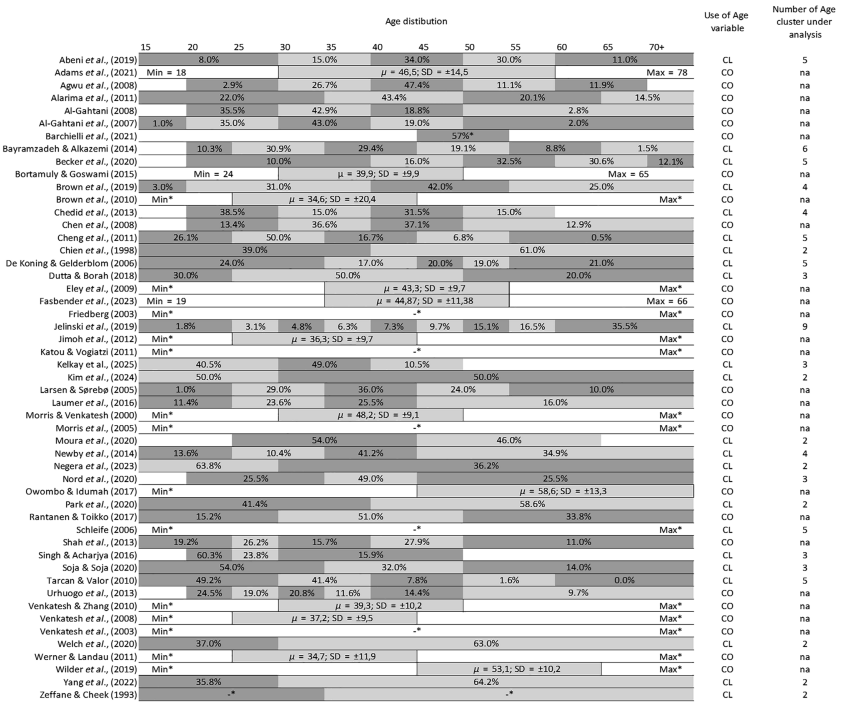

Figure 8. Age distribution and use for each study. *Note.* For each study is reported clusters range and distribution (%), or the Mean, SD, Min and Max of participants Age. Use of age variable refers to the use of age as continuous variable or in cluster. CO: Continuous. CL: Cluster. For the use of age in cluster, is reported the number of clusters considered. Na: Not applicable. *Data not available. (Source: Authors' work)

Literature analysis: evidence about age differences on technology adoption antecedents, behavior intention and use behavior

A graphical synthesis of the evidence is provided in Figure 9.

Attitudes toward using technology at work and age

Evidence summary #1: Younger workers tend to have more positive attitudes toward technology, and attitude plays a role in predicting technology adoption for both older and younger workers.

Age differences in attitude toward using technology. We identified four studies that examined the relationship between age and attitudes toward technology use. When technology is designed for employees' use, younger workers tend to have more positive attitudes toward it (Bayramzadeh and Alkazemi, 2014; Morris and Venkatesh, 2000). For instance, Morris and Venkatesh (2000) showed that the pleasure to use a system was higher for younger than their older counterpart. Similarly, Bayramzadeh and Alkazemi (2014) reported comparable findings. However, when technology is implemented by an organization for client use (e.g. patients), age does not appear to be correlated with attitudes toward work-related technology (Rantanen and Toikko, 2017; Werner and Landau, 2011). This aligns with the idea that age-related differences in attitudes are more likely to emerge when technology is intended for personal use rather than external purposes.

Age as a moderator on the relation between attitude toward using technology and behavior intention. Research on age as a moderating factor in the relationship between attitudes toward technology and behavioral intention or actual technology use in the workplace has yielded

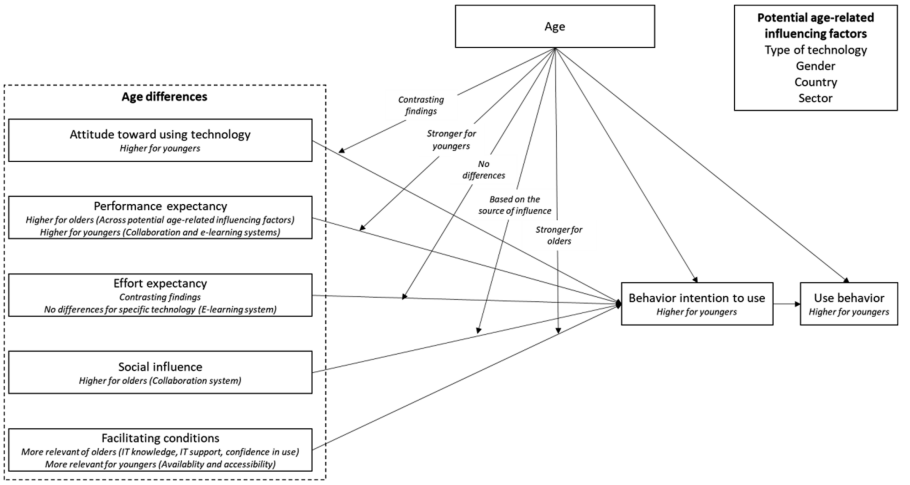

Figure 9. Graphical representations of main findings (Source: Authors' work)

mixed findings (Dutta and Borah, 2018; Morris and Venkatesh, 2000; Morris *et al*., 2005; Venkatesh *et al*., 2003). Morris and Venkatesh (2000) found that younger employees exhibited a stronger link between positive attitudes toward technology (e.g. enjoyment of use) and behavioral intention to adopt it. In contrast, Morris *et al*. (2005) reported the opposite effect: across five organizations implementing new technology, older workers demonstrated a stronger attitude-intention relationship. Two other studies found no significant moderating effect of age on this relationship (Dutta and Borah, 2018; Venkatesh *et al*., 2003). These conflicting results suggest that contextual factors, such as industry type and implementation strategies, may influence how age moderates technology adoption, highlighting the need for further investigation.

Performance expectancy about technology use at work and age

Evidence summary #2: Older workers tend to perceive technology as more useful, except when it is used for networking or knowledge acquisition (e.g. collaboration and e-learning tools). Performance expectancy plays a more significant role in predicting technology adoption for younger workers.

Age differences in performance expectancy. We identified eight studies examining the relationship between age and performance expectancy. Four of these studies suggest that older workers perceive technology as more useful (Dutta and Borah, 2018; Laumer *et al*., 2016; Singh and Acharjya, 2016; Tarcan and Varol, 2010). Evidence from diverse professional settings—including postal workers, nurses, employees in hotels, and automotive firms—indicates that older workers tend to recognize greater utility in technology compared to their younger counterparts. This finding aligns with the cognitive characteristics of older (i.e. crystallized intelligence; Beier *et al*., 2022), which enhances their ability for integrative thinking and applying past experiences to new technological contexts (Horn and Raymond, 1967).

Conversely, the literature suggests that younger workers tend to perceive collaboration and e-learning technologies as more useful (Brown *et al*., 2010; Shah *et al*., 2013), probably driven by a stronger need for social networking and continuous skill development (Carstensen *et al*., 1999).

Age as a moderator on the relation between performance expectancy and behavior intention. Our review identified thirteen studies examining the impact of age on the relationship between performance expectancy and behavioral intention to use technology.

Six studies suggest that performance expectancy plays a more significant role in predicting technology adoption among younger employees (Al-Gahtani, 2008; Barchielli *et al*., 2021; Park *et al*., 2020; Venkatesh *et al*., 2003; Venkatesh and Zhang, 2010; Welch *et al*., 2020). This pattern holds across specific sectors such as healthcare and cultural services. For instance, Barchielli *et al*. (2021) found that performance expectancy was a stronger predictor of behavioral intention to use technology among younger nurses. Similar findings were reported in health center employees (Park *et al*., 2020) and science museum workers (Welch *et al*., 2020). However, when considering different industries and cultural contexts, performance expectancy appears to be more intertwined with gender, reducing the effect of age alone. For example, Venkatesh *et al*. (2003) and Venkatesh and Zhang (2010), considering different organizations and Countries (i.e. USA and China), found that age was a significant factor in technology adoption only when considered alongside gender.

In contrast, in specialized sectors such as ocean freight shipping, performance expectancy appears to be more influential for older workers (Yang *et al*., 2022). This suggests that sector-specific demands may shape how age interacts with technology adoption, making the relationship more nuanced.

Meanwhile, six studies found no significant relationship between age, performance expectancy, and behavioral intention to use technology (Al-Gahtani *et al*., 2007; Brown *et al*., 2010; Cheng *et al*., 2011; Kelkay *et al*., 2025; Kim *et al*., 2024; Moura *et al*., 2020), indicating that additional moderating factors may influence this relationship.

Effort expectancy about technology use at work and age

Evidence summary #3: The perception of ease of use is similar for older and younger workers when considering specific technology such as e-learning system, and this perception affects technology adoption similarly across workers of all ages.

Age differences in effort expectancy. We found seven studies examining the relationship between age and effort expectancy, revealing contrasting findings. Two studies suggest that older workers may perceive technology as easier to use (Laumer *et al*., 2016; Jimoh *et al*., 2012). In contrast, Brown *et al*. (2010) and Dutta and Borah (2018) reported that younger workers exhibited higher effort expectancy. Meanwhile, studies focusing on e-learning systems found no significant age-related differences in effort expectancy (Chen *et al*., 2008; Shah *et al*., 2013).

Age as a moderator on the relation between effort expectancy and behavior intention. Our review identified eleven studies examining the role of age in the relationship between effort expectancy and behavioral intention to use technology. The majority of these studies, encompassing data from various countries, sectors, and technologies, found no significant effect of age on this relationship (Al-Gahtani, 2008; Al-Gahtani *et al*., 2007; Brown *et al*., 2010; Kelkay *et al*., 2025; Moura *et al*., 2020; Park *et al*., 2020).

Among the studies that did report significant findings, the results were contradictory, some found a stronger relationship between effort expectancy and behavioral intention among younger workers (Barchielli *et al*., 2021; Kim *et al*., 2024), while others found this relationship to be stronger among older workers (Welch *et al*., 2020). Moreover, studies by Venkatesh *et al*. (2003) and Venkatesh and Zhang (2010) indicate that age was only a significant factor when considered alongside gender, highlighting the importance of intersectionality in understanding technology adoption patterns.

Social influence about technology use at work and age

Evidence summary #4: The perception of social influence may be higher for older workers in the case of collaboration technologies, and the impact of age on social influence – technology adoption relationship potentially depending on the source of that influence (e.g. peers, leaders).

Age differences in social influence. Two papers focused on the relationship between age and social influence (Brown *et al*., 2010; Rantanen and Toikko, 2017). Brown *et al*. (2010)

found that perceptions of social influence to use collaboration technology in Fortune 500 tech companies in Finland were higher for older than for younger workers. Differently, Rantanen and Toikko (2017) highlighted no age-related differences in the perceptions of subjective norms (i.e. the belief of how closely people value the desirability of a particular behavior) to use welfare technology among Finnish home care workers.

Age as a moderator on the relation between social influence and behavior intention. We identified thirteen studies examining the effect of age on the relationship between social influence and behavioral intention to use technology. Seven studies found no significant effect (Brown *et al*., 2010; Dutta and Borah, 2018; Kelkay *et al*., 2025; Kim *et al*., 2024; Moura *et al*., 2020; Park *et al*., 2020; Venkatesh and Zhang, 2010), suggesting that age has a weak influence on the role of social influence in technology adoption. This finding is further supported by evidence that age alone does not have a meaningful impact unless considered alongside intersectional factors such as gender and experience.

However, some studies highlight significant effects. Specifically, three studies found that peer or senior staff influence played a stronger role in technology adoption among younger workers (Barchielli *et al*., 2021; Welch *et al*., 2020), an effect that was also evident in high power distance cultural contexts (Al-Gahtani *et al*., 2007).

Conversely, two studies reported opposite findings when measuring general social influence (i.e. people who influence my behavior/who are important to me) suggesting that the source of influence (e.g. peers, leaders) may affect younger and older workers differently.

Facilitating conditions about technology use at work and age

Evidence summary #5: Environmental conditions (e.g. the number of computers) are more relevant for younger workers, while IT knowledge and support are more relevant for older workers. Facilitating conditions potentially increases the adoption of technology especially for older workers.

Age differences in facilitating conditions. We identified nine studies that examined age-related differences in the perception of facilitating conditions (Becker *et al*., 2020; Brown *et al*., 2010; Chedid *et al*., 2013; Dutta and Borah, 2018; Eley *et al*., 2009; Newby *et al*., 2014; Rantanen and Toikko, 2017; Soja and Soja, 2020; Urhuogo *et al*., 2013). These studies consistently indicate that older workers are more concerned about facilitating conditions (Dutta and Borah, 2018), feeling less confident using technology (Becker *et al*., 2020; Chedid *et al*., 2013; Eley *et al*., 2009; Rantanen and Toikko, 2017; Urhuogo *et al*., 2013). This pattern appears to hold across different countries (i.e. Australia, Finland, the United States), sectors (i.e. academia, healthcare, NGOs, utilities), and types of technology studied (i.e. ICT, welfare technology). Furthermore, research suggests that different facilitating conditions hold varying degrees of relevance depending on age group. According to Eley *et al.* (2009), for younger workers environmental conditions, such as the location or the availability of technology, were perceived as significant barriers to technology use. In contrast, older workers considered supportive facilitating conditions, such as IT knowledge or technical support, more critical barriers to use (Eley *et al*., 2009; Soja and Soja, 2020), possibly as a compensatory mechanism for their lower confidence in using technology (Baltes and Baltes, 1990).

Age as a moderator on the relation between facilitating conditions and use behavior. Our review identified ten studies examining the role of age in the relationship between facilitating conditions and use behavior (Al-Gahtani *et al*., 2007; Barchielli *et al*., 2021; Brown *et al*., 2010; Kelkay *et al*., 2025; Kim *et al*., 2024; Morris and Venkatesh, 2000; Morris *et al*., 2005; Moura *et al*., 2020; Venkatesh *et al*., 2003, 2008). Findings suggest that facilitating conditions play a more significant role in predicting use behavior among older workers compared to younger ones (Brown *et al*., 2010; Morris and Venkatesh, 2000; Venkatesh *et al*., 2003, 2008). Additionally, research indicates that this relationship remains stronger for older workers in both short- and long-term technology use (Morris and Venkatesh, 2000). Moreover, other individual characteristic, such as gender, have been found to intersect with age, influencing

this relationship (Venkatesh *et al*., 2008). Two studies suggest that age negatively moderates the relationship between facilitating conditions and use behavior, meaning that facilitating conditions were more relevant for younger workers, although the observed effects were weak (Al-Gahtani *et al*., 2007; Barchielli *et al*., 2021). Finally, four studies found no significant differences (Kelkay *et al*., 2025; Kim *et al*., 2024; Morris *et al*., 2005; Moura *et al*., 2020).

Behavior intention, use behavior of technology at work and age

Evidence summary #6: Younger workers adopt technology more than older workers.

Age differences in behavior intention and use behavior. Twenty scientific papers emerged from the literature search suggesting that younger workers have a higher intention to use technologies (Abeni *et al*., 2019; Brown *et al*., 2010; Rantanen and Toikko, 2017; Wilder *et al*., 2019) and they use technologies more than older workers (Adams *et al*., 2021; Agwu *et al*., 2008; Alarima *et al*., 2011; Bortamuly and Goswami, 2015; Brown *et al*., 2010, 2019; Chien *et al*., 1998; De Koning and Gelderblom, 2006; Friedberg, 2003; Jelinsky *et al*., 2019; Katou and Vogiatzi, 2011; Larsen and Sørebø, 2005; Nord *et al*., 2020; Owombo and Idumah, 2017; Schleife, 2006; Urhuogo *et al*., 2013; Zeffane and Cheek, 1993). Only one study reported that younger individuals use technology less frequently (Negera *et al*., 2023). However, this study categorized "younger" as those under 30 years old and "older" as anyone above 30. The authors themselves acknowledge that healthcare workers under 30 may be too young to have sufficient experience with the information system under investigation, highlighting the limitation of this finding.

Discussion

The aim of our research was to understand how different antecedents affecting workplace technology adoption vary across ages. Our literature review suggests that younger workers tend to exhibit more favorable attitudes toward technology, perceiving it as particularly useful for acquiring knowledge and building professional networks, such as through collaboration and e-learning systems. They also emphasize the need for easily accessible and readily available technologies. Beyond these perceptions, their positive attitudes and focus regarding a system's usefulness appear to be the primary drivers of technology adoption. These findings can be explained by differences in life experiences and motivational orientations between younger and older workers. On the one hand, younger individuals, having been more exposed to technology during their formative years, tend to develop heightened expectations regarding its benefits (Morris and Venkatesh, 2000). Consequently, greater exposure to technology, particularly in early life, may foster more positive perceptions of its role in job performance. Additionally, due to a stronger inclination toward knowledge acquisition (Carstensen *et al*., 1999), younger workers may perceive knowledge-oriented technologies, such as e-learning systems, as particularly valuable in achieving their professional goals. Differently, older workers often exhibit lower confidence in using technology and experience greater pressure to adopt specific tools, such as collaboration systems, which reflect the demands of an increasingly connected work environment. While they generally recognize the usefulness of workplace technologies, they also express a stronger need for support in order to effectively adopt and utilize these systems. These findings align with age-related cognitive changes and the increasing reliance on compensatory mechanisms over time. Older workers, benefiting from greater integrative thinking abilities and extensive prior experience (Horn and Raymond, 1967), may identify more opportunities for leveraging technology to enhance work performance. At the same time, they are more likely to assess and utilize compensation mechanisms that help mitigate resource limitations and optimize their interaction with technology (Baltes and Baltes, 1990). Overall, the literature agrees that younger workers adopt technology more readily than their older counterparts. However, the underlying causes of these differences remain unclear, highlighting the need for further investigation.

Theoretical implications

By reviewing the literature on the relationship between aging and technology adoption, we highlighted that integrating the antecedents of both the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) provides a comprehensive perspective on this phenomenon in the workplace. In this context, five key antecedents of technology adoption emerged as particularly relevant when considering age-related differences: Attitude Toward Using Technology (TAM), Perceived Usefulness and Perceived Ease of Use (TAM and UTAUT), Social Influence (UTAUT), and Facilitating Conditions (UTAUT). Our findings suggest that these antecedents play different roles depending on workers' age. This underscores the need for future research to account for all relevant antecedents rather than focusing exclusively on one theoretical framework.

> #Implication 1: Five antecedents (i.e. performance expectancy, effort expectancy, social influence, facilitating conditions, attitude toward using technology), integrating elements from both TAM and UTAUT, are relevant for understanding the influence of age on technology adoption in the workplace.

We also found that the type of technology itself is a crucial factor in understanding age-related differences in adoption patterns (Evidence 2 and 3). Older and younger workers may respond differently to various technologies based on their motivations and prior experiences. For instance, younger workers may perceive collaborative systems as more useful due to their knowledge-based motivation (Carstensen *et al*., 1999), whereas older workers may experience greater pressure to use such systems due to heightened susceptibility to age-related stereotypes (Tams and Dulipovici, 2019). These findings highlight the importance of considering specific technologies when studying age-related differences in technology adoption, or at a minimum, including technology type as a control variable in research.

> #Implication 2: Focusing on specific characteristics of technology, and how these align with age-related motivations, is crucial for understanding how age influences technology adoption in the workplace.

Moreover, the intersectionality between age and gender appears to influence certain Technology adoption antecedent (i.e. effort expectancy) more than age alone (Evidence 3). Prior research has demonstrated that intersectionality between age and gender influences various workplace dynamics, including work-life balance (Thrasher *et al*., 2022) and discrimination (Holman and Walker, 2021), and similar interaction is relevant in the context of technology adoption. This highlights the importance of adopting an intersectional perspective, particularly when examining specific antecedents of technology adoption, such as effort expectancy.

> #Implication 3: Age and gender together provide a better explanation of how certain antecedents influence technology adoption.

Finally, the country in which a study is conducted is a crucial factor when examining age-related differences. There is significant variability across countries in the age distribution of the working population (International Labour Organization, 2025), which may be reflected in the age of participants in these studies. For instance, research conducted in Africa often includes samples where the majority of participants are under 40 years old (Kelkay *et al*., 2025) or even under 30 years old (Negera *et al*., 2023). This demographic variation can substantially influence the observed effects of age on technology adoption, underscoring the need for more cross-country studies to better understand these dynamics.

> #Implication 4: Cross-Country differences are important when examining the impact of age on technology adoption in the workplace.

Practical recommendations

Research indicates that younger employees generally have more positive attitudes toward technology and use it more frequently than their older colleagues (Evidence 1 and 6). Organizations can leverage this dynamic to foster a more technology-friendly culture through social learning mechanisms (Bandura, 1977). Encouraging intergenerational interactions in technology use can facilitate the transfer of positive attitudes from younger to older workers (Hatfield *et al.*, 1993), while also creating opportunities for peer-to-peer learning and knowledge sharing. This also aligns with the greater need for IT support among older workers (Evidence 5). In this context, increased intergenerational interaction during technology use can provide opportunities for peer-to-peer IT support. This form of assistance may be particularly valuable for older workers, as it allows them to receive guidance in a more informal and accessible manner. Moreover, this interaction can also benefit younger workers by exposing them to different perspectives on the usefulness of a system which older workers tend to perceive as higher (Evidence 2). This exchange can enhance younger employees' understanding of technology's practical value and encourage a more well-rounded approach to its adoption.

> Recommendation #1: Create conditions that enable the positive technological outlook and higher usage rates of younger workers to inspire older colleagues, while allowing the higher perceived usefulness among older workers to influence younger employees.

Moreover, research suggests that performance expectancy plays a crucial role in technology adoption, particularly among younger employees (Evidence 2), aligning with their greater inclination toward knowledge acquisition goals (Carstensen *et al.*, 1999). This underscores the need for organizations, once they have identified high-value technologies for their business, to clearly articulate the individual benefits these technologies offer. Effectively communicating the added value of technology to all users, but especially to younger workers, can enhance engagement by demonstrating how its use contributes to personal and professional growth.

> Recommendation #2: Clearly communicate to all users, particularly younger workers, the benefits of using a technological system to enhance their performance and advance their careers.

Our findings also indicate that facilitating conditions play a crucial role in older workers' decisions to adopt technology (Evidence 5), aligning with their greater need for compensatory mechanisms (Baltes and Baltes, 1990). In this regard, organizations should place particular emphasis on support mechanisms, such as IT assistance and knowledge-sharing initiatives, to encourage technology adoption, especially among older employees. While facilitating conditions are generally less critical for predicting technology use among younger workers, certain factors (i.e. availability and accessibility) have emerged as important for them. This highlights the practical need for organizations to tailor their approach to technology adoption, prioritizing different facilitating conditions based on the age of users.

> Recommendation #3: Design conditions and characteristics of technology based on users' age, with a particular focus on ensuring facilitating conditions for older workers.

Finally, across multiple evidences (1, 2, 3, 4, 5, 6), several age-related factors appear to influence the relationship between age and technology adoption. First, the type of technology plays a crucial role in shaping this relationship. For instance, while older workers generally exhibit higher performance expectancy, younger employees tend to perceive greater usefulness in collaboration and e-learning technologies. Additionally, gender emerges as an important factor in conjunction with age, influencing various dimensions of technology adoption. These findings emphasize the importance of considering users within their broader life cycle when implementing technology in organizations. Moreover, factors such as organizational sector and Country-specific contexts also play a role, underscoring the need for a tailored approach to technology adoption and implementation.

Recommendations #4: Consider the specificity of the technology, as well as organizational and individual characteristics, when managing technology adoption among workers of different ages.

Limitations

It is important to acknowledge that there are some limitations in the literature reviewed and our work itself.

Firstly, a predominant proportion of the analyzed articles adopted a cross-sectional design, thereby some potential criticisms need to be taken into account in the overall validity of the research. The use of a cross-sectional design is widely acknowledged as a limitation in the field of aging workforce research, extending beyond its application to technology adoption (Beier *et al.*, 2022). This poses a significant challenge for findings in this domain, as it relies on a between-person design to examine a within-person phenomenon, such as the effects of aging.

Limitation #1: Predominant use of cross-sectional design.

Moreover, the findings across studies are based on samples that vary widely in both mean age and age dispersion. Additionally, the articles handle the age variable differently, treating it either as a continuous measure or as a categorical variable. This issue presents a significant challenge for comparing studies. While heterogeneity in terms of age can be an integral part of contextual analysis (e.g. Country, sector), the decision to operationalize age as a continuous or categorical variable, along with the number of categories used, is often not well justified in existing literature.

Limitation #2: High differences across studies in terms of age mean, distribution and operationalization.

Thirdly, more than half of the papers analyzed don't consider theoretical models of technology adoption, potentially lacking in considering all the relevant influential dimensions. This also resulted in diverse operationalizations of factors influencing technology adoption, such as attitudes toward technology and facilitating conditions. The lack of a solid theoretical framework raises concerns about research grounded in previous evidence and may partially limit the depth of insights that can be drawn from this review.

Limitation #3: Lack of consolidated theoretical frameworks.

Also, the examined articles exhibited considerable heterogeneity, encompassing different sectors (i.e. $n = 16$), Countries (i.e. $n = 16$), and technologies (i.e. $n = 8$). This heterogeneity engendered occasional discordant findings, thereby complicating the generalization of the results. Furthermore, certain Countries (e.g. the USA) and technologies (e.g. ICT) were overrepresented, making the generalizability of the findings more reflective of this specific combination rather than a broader, more diverse context.

Limitation #4: High heterogeneity and overrepresentation of certain Countries (e.g. USA) and technologies (e.g. ICT).

Finally, the present review only focused on the influence of age on technology adoption, failing to consider how workers use the technology once it is adopted, which may affect the impact of technology on workers and organizations. This is a significant shift, especially with the emergence of new artificial intelligence tools that enable a wide range of applications (e.g. content creation, self-learning, communication).

Limitation #5: Lacking to consider how workers use technology once is adopted.

Future research

Based on our findings and limitations, several considerations for future research are necessary. Future research should prioritize investigating the conditions that shape the influence of age on

technology adoption, particularly in relation to intersectionality with other characteristics (e.g. gender) and the type of technology (e.g. Artificial intelligence). Our findings indicate that the interaction between age and gender can substantially modify the role of age in technology adoption, as can the specific type of technology. However, the literature review highlights a significant gap in studies exploring these variations, underscoring the need for further research on both the differences between technologies and the intersectionality of age with other factors.

Future research questions #1: How does the type of technology change the influence of age on technology adoption and its antecedents? In what contexts is the intersection of age and gender more insightful than age alone in explaining technology adoption in the workplace?

Moreover, there is a notable gap in the literature regarding the relationship between technology adoption and age-related outcomes, such as job attitudes or career choices. To address this gap, more intervention-based research is needed, which remains limited in the current body of literature.

Future research questions #2: How does technology adoption influence job attitudes among workers of different age groups? How does technology adoption impact career choices across different age groups in the workforce?

Also, the few existing interventions primarily focus on individual-level approaches, such as training programs or IT support. Considering the significant role of organizational factors (e.g. work design) in both technology adoption (Brown *et al.*, 2010) and age-related job attitudes (Truxillo *et al.*, 2012), future research should expand beyond individual-level interventions to examine the effectiveness of organizational-level strategies.

Future research questions #3: How do organizational factors, such as work design, influence technology adoption among workers of different age groups? How do organizational factors, such as work design, affect the relationship between technology adoption and job attitudes among workers of different age groups?

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Table A1. Summary of literature review findings

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Abeni *et al.* (2019)	Productivity technology	Agricultural	IT	*n* = 490 C QN						AD. Negative relation between age and behavior intention
Adams *et al.* (2021)	Productivity technology	Agricultural	GH	*n* = 463 C QN						AD. Negative relation between age and use behavior
Agwu *et al.* (2008)	Technology (no specified)	Agricultural	NG	*n* = 135 C QN						AD. Negative relation between age and use behavior
Alarima *et al.* (2011)	Productivity technology	Agricultural	NG	*n* = 124 C QN						AD. Negative relation between age and use behavior

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Al-Gahtani (2008)	Technology (no specified)	–	SA	$n = 722$ C QN		AI. The relationship between perceived usefulness and behavior intention to use technology it was stronger for younger than older workers	AI. NS			
Al-Gahtani *et al*. (2007)	Information and communication technology	–	SA	$n = 1{,}190$ C QN		AI. NS	AI. NS	AI. The relationship between social influence and behavior intention to use technology it was stronger for younger than older workers	AI. The relationship between facilitating condition and technology use it was stronger for younger than older workers	

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Barchielli *et al*. (2021)	Technology (no specified)	Healthcare	IT	$n = 54$ C QN		AI. The relationship between performance expectancy and behavior intention to use technology it was stronger for younger than older workers	AI. The relationship between effort expectancy and behavior intention to use technology it was stronger for younger than older workers	AI. The relationship between social influence and behavior intention to use technology it was stronger for younger than older workers	AI. The relationship between facilitating condition and technology use it was stronger for older than younger workers	
Bayramzadeh and Alkazemi (2014)	Information and communication technology	Healthcare	USA	$n = 70$ C QN	AD. Younger nurses assessed more favorably tech-based communication over face-to-face interactions					
Becker *et al*. (2020)	Technology (no specified)	Utility	USA	$n = 261$ C QL					AD. Confidence in use technology was lower for older than younger workers	

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Bortamuly and Goswami (2015)	Technology (no specified)	Manufacturing	IND	$n = 500$ C QL						AD. Negative relation between age and use behavior
Brown *et al.* (2019)	Technology (no specified)	Agricultural	NZ	$n = 1984$ C QL						AD. Negative relation between age and use behavior
Brown *et al.* (2010)	Information and communication technology	–	FI	$n = 447$ L QN		AD. Performance expectancy was higher for younger than older workers	AD. Effort expectancy was higher for younger than older workers	AD. Social influence was higher for older than younger workers AI. NS	AD. Facilitating conditions was higher for younger than older workers AI. The relationship between facilitating condition and technology use it was stronger for older than younger workers	AD. Negative relation between age and behavior intention and use behavior

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Chedid *et al.* (2013)	Technology (no specified)	Healthcare	AU	$n = 13$ C QL					AD. Confidence in use technology was lower for older than younger workers	
Cheng *et al.* (2011)	Training technology	–	CN	$n = 202$ C QN		AI. NS			AI. NS	
Chen *et al.* (2008)	Training technology	Healthcare	TW	$n = 222$ C QN		AD. NS				
Chien *et al.* (1998)	Computer and software	Retail	USA	$n = 144$ C QN						AD. Over thirty-nine years old workers less computer use than workers under forty years old

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
De Koning and Gelderblom (2006)	Computer and software	Retail	NL	$n = 538$ C QN						AD. Negative relation between age and use behavior among workers older than fifty years
Dutta and Borah (2018)	Information and communication technology	Public administration	IND	$n = 93$ C QN	NS	AD. Higher level of performance expectancy among workers older than 50 years old	AD. Higher level of effort expectancy among workers younger than 50 years old		AD. Higher concern about facilitating conditions among older than younger workers	

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Eley *et al.* (2009)	Computer and software	Healthcare	USA	$n = 3{,}680$ C QN					AD. Location of computers and insufficient number of computers were considered more relevant barriers for younger nurses. IT knowledge, lack of technical support and confidence in use were considered more relevant barriers for older nurses	
Fasbender *et al.* (2023)	Information and communication technology	–	DE	$n = 470$ C QN	AD. NS	AD. NS	AD. Perceived ease of use was higher for older than younger workers			

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Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Friedberg (2003)	Computer and software	–	USA	$n = 60000$ L QN						AD. Percentage of computer use decrease with age
Jelinski *et al.* (2019)	Technology (no specified)	Agricultural	CA	$n = 72820$ C QN						AD. Over forty-nine years old workers less computer use than workers under fifty years old
Jimoh *et al.* (2012)	Information and communication technology	Healthcare	NG	$n = 200$ C QN		AD. NS	AD. Perceived ease of use was higher for older than younger workers			
Katou and Vogiatzi (2011)	Information and communication technology	Tourism	GR	$n = 215$ C QN						AD. Negative relation between age and use behavior
Kelkay *et al.* (2025)	Training technology	Healthcare	ET	$n = 1,056$ C QN		AI. NS	AI. NS	AI. NS	AI. NS	

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Kim *et al.* (2024)	Artificial Intelligence	–	KR	$n = 300$ C QN		AI. NS	AI. The relationship between effort expectancy and behavior intention to use technology was stronger for younger than older workers	AI. NS	AI. NS	
Larsen and Sørebø (2005)	Information and communication technology	Oil and Gas	NO	$n = 500$ C QN						AD. Negative relation between age and use behavior
Laumer *et al.* (2016)	Information and communication technology	Automotive	–	$n = 106$ C QN		AD. Performance expectancy was higher for older than younger workers	AD. Perceived ease of use was higher for older than younger workers			

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Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Morris and Venkatesh (2000)	Information and communication technology	Finance	USA	$n = 118$ L QN	AD. Younger workers reported higher pleasure of tech use AI. The relationship between pleasure to use the system and tech use intention was stronger for younger workers				AI. The relationship between facilitating condition and technology use it was stronger for older than younger workers	
Morris *et al*. (2005)	Technology (no specified)	–	USA	$n = 342$ L QN	AI. The relationship between attitudes toward using technology and behavior intention to use technology it was stronger for older than younger workers			AI. The relationship between subjective norms and behavior intention to use technology it was stronger for older than younger workers	AI. NS	
Moura *et al*. (2020)	Information and communication technology	Academic	BR	$n = 147$ C QN		AI. NS	AI. NS	AI. NS	AI. NS	

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Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Newby *et al.* (2014)	Management technology	Retail	USA	$n = 126$ C QN					AD. NS	
Negera *et al.* (2023)	Management technology	Public administration	ET	$n = 397$ C QN						AD. Positive relation between age and use behavior
Nord *et al.* (2020)	Information and communication technology	–	SP	$n = 104$ C QN						AD. Workers between thirty-six- and forty-five-years old use more social media for business purpose
Owombo and Idumah (2017)	Productivity technology	Agricultural	NG	$n = 240$ C QN						AD. Negative relation between age and use behavior

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Park *et al*. (2020)	Management technology	Healthcare	KR	$n = 866$ C QN		AI. The relationship between performance expectancy and behavior intention to use technology it was stronger for younger than older workers	AI. NS	AI. NS		
Rantanen and Toikko (2017)	Welfare technology	NGO	FI	$n = 129$ C QN	AD. NS			AD. NS	AD. Perceived behavioral control was higher for younger than older workers	AD. Negative relation between age and behavior intention
Schleife (2006)	Computer and software	–	DE	$n = 581$ L QN						AD. Older age group show a significantly smaller probability to use a computer at work

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Shah *et al.* (2013)	Training technology	Finance	PK	$n = 172$ C QN		AD. Performance expectancy was higher for younger than older workers	AD. NS			
Singh and Acharjya (2016)	Computer and software	Healthcare	IND	$n = 164$ C QN		AD. Higher performance expectancy among age group 31–50 years old than among age group 26–30 years old				
Soja and Soja (2020)	Management technology	–	PL	$n = 187$ C QL					AD. Higher concern about facilitating conditions among older than younger workers	

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Tarcan and Valor (2010)	Information and communication technology	Tourism	TK	$n = 396$ C QN		AD. Performance expectancy was higher for older than younger workers	AD. NS			
Urhuogo *et al*. (2013)	Information and communication technology	Academic	USA	$n = 216$ C QL					AD. Confidence in use technology was lower for older than younger workers	AD. Negative relation between age and use behavior
Venkatesh and Zhang (2010)	Technology (no specified)	–	USA/ CN	$n = 149$ L QN		AI. The relationship between performance expectancy and behavior intention to use technology it was stronger for younger man than older workers	AI. The relationship between effort expectancy and behavior intention to use technology it was stronger for younger women in the early stages of their experience	AI. NS		

(*continued*)

Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Venkatesh *et al*. (2008)	Information and communication technology	Telecommunication	USA	$n = 321$ L QN					AI. NS	
Venkatesh *et al*. (2003)	Technology (no specified)	–	USA	$n = 215$ L QN	AI. NS	AI. The relationship between performance expectancy and behavior intention to use technology it was stronger for younger man than older workers	AI. The relationship between effort expectancy and behavior intention to use technology it was stronger for older women than younger workers	AI. The relationship between social influence and behavior intention to use technology it was stronger for older than younger workers	AI. The relationship between facilitating condition and technology use it was stronger for older than younger workers	
Welch *et al*. (2020)	Training technology	Museum	EN	$n = 118$ C QN		AI. The relationship between performance expectancy and behavior intention to use technology it was stronger for younger than older workers	AI. The relationship between effort expectancy and behavior intention to use technology it was stronger for older than younger workers	AI. The relationship between social influence and behavior intention to use technology it was stronger for younger than older workers		

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Table A1. Continued

Reference	Technology type	Sector	Country	*N*, study design and data collection	Attitudes toward using technology	Performance expectancy	Effort expectancy	Social influence	Facilitating conditions	Behavior intentions and use behavior
Werner and Landau (2011)	Welfare technology	Healthcare	IL	$n = 116$ C QN	AD. NS					
Wilder *et al.* (2019)	Welfare technology	Healthcare	USA	$n = 114$ C QN						AD. Younger workers were more likely to be willing to try voice technology
Yang *et al.* (2022)	Information and communication technology	Shipping service	–	–		AI. The relationship between performance expectancy and behavior intention to use technology it was stronger for older than younger workers		AI. The relationship between social influence and behavior intention to use technology it was stronger for older than younger workers		
Zeffane and Cheek (1993)	Computer and software	Telecommunication	AU	$n = 1,300$ C QN						AD. Negative relation between age and use behavior

Note(s): AU = Australia; BR = Brazil; CA = Canada; CN = China; DE = Germany; EN = England; ET = Ethiopia; FI = Finland; GH = Ghana; GR = GREECE; IL = Israel; IND = India; IT = Italy; KR = Korea; NG = Nigeria; NL = Netherlands; NO = Norway; NZ = New Zealand; PK = Pakistan; PL = Poland; SA = Saudi Arabia; SP = Spain; TK = Turkey; TW = Taiwan; USA = United States. C = Cross-sectional study; L = Longitudinal study. QN = Quantitative data collection; QL = Qualitative data collection. AD = Age differences; AI = Age interaction. NS = non-significant findings
Source(s): Authors' work