

A Social Work Analysis of the Facilitators of and Barriers to Adopting Technology in Older Adults: A Systematic Literature Review

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Abstract:	<p>There is growing concern in social work regarding the provision of comprehensive and high-quality care for older adults which demands an exploration of their interests in information and communication technologies and how these technologies could meet their needs. The objective of this study is to determine how scientific literature addresses the experiences of older adults as a diverse population group regarding the use of technology based on the Technology Acceptance Model (TAM) via a systematic review using the PRISMA method. The review differentiates between enabling factors and barriers that influence older adults' use and acceptance of technology from their own perspective. It provides social workers with a comprehensive overview of the effective use of technologies that cater to the needs of older adults and their families and enables them to identify general guidelines in order to bridge the intergenerational digital divide to enhance the personal and communal autonomy of older adults.</p>

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Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 2
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Pages 2-6
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 7
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Pages 8-9
Information sources	6	Specify all databases, registers, websites, organizations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Pages 7-8
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 8
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 8
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Pages 9-10
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Pages 8-9
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Pages 8-9
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 9
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Pages 8-9
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	N/A
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Pages 9-10
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	N/A
	13e	Describe any methods used to explore possible causes of	N/A

		heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/A
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 10
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 10
Study characteristics	17	Cite each included study and present its characteristics.	Page 10
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Pages 10-21
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Pages 10-21
Results of syntheses	20a	For each synthesis, briefly summarize the characteristics and risk of bias among contributing studies.	Pages 10-21
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Pages 23-24
	23b	Discuss any limitations of the evidence included in the review.	Pages 23-24
	23c	Discuss any limitations of the review processes used.	Pages 23-24
	23d	Discuss implications of the results for practice, policy, and future research.	Pages 21-22, 24-25
OTHER INFORMATION			
Registration and	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	No registered

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60	protoco l	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page 7
		24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
	Support t	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	N/A
	Compe ting interest s	26	Declare any competing interests of review authors.	Page 26
	Availab ility of data, code and other materia ls	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	N/A

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4 **A Social Work Analysis of Facilitators of and Barriers to Adopting**
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6 **Technology in Older Adults: A Systematic Literature Review**
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A Social Work Analysis of the Facilitators of and Barriers to Adopting Technology in Older Adults: A Systematic Literature Review

There is growing concern in social work regarding the provision of comprehensive and high-quality care for older adults which demands an exploration of their interests in information and communication technologies and how these technologies could meet their needs. The objective of this study is to determine how scientific literature addresses the experiences of older adults as a diverse population group regarding the use of technology based on the Technology Acceptance Model (TAM) via a systematic review using the PRISMA method. The review differentiates between enabling factors and barriers that influence older adults' use and acceptance of technology from their own perspective. It provides social workers with a comprehensive overview of the effective use of technologies that cater to the needs of older adults and their families and enables them to identify general guidelines in order to bridge the intergenerational digital divide to enhance the personal and communal autonomy of older adults.

Keywords: older adults, technology, quality of life, social work, digital divide, TAM (Technology Acceptance Model).

Introduction

Growing concern regarding the comprehensive and quality care of older adults from the perspective of social work has led to the need to understand how and which Information and Communication Technologies (ICT) could meet their needs. Using specific technologies could make older adults' daily lives more accessible in both private and community settings, especially as regards vulnerable individuals and groups. In the process of active aging, older adults could meet their social needs and increase their autonomy through the appropriate use of technological advancements, particularly in

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3 family, institutional, or community relationships. In line with the EU's European
4 Declaration on Digital Rights and Principles for the Digital Decade (2023/C 23/01),
5 efforts are being made to minimize the "digital divide" and evaluate the economic
6 impact of implementing and using new technologies in new environments. The goal is
7 to "facilitate" the lives of older adults while ensuring their social and "digital" inclusion
8 (Watling & Crawford, 2010).
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17 A recent event that has highlighted the social isolation experienced by older
18 adults due to difficulties in accessing and using ICT is the COVID-19 pandemic. This
19 issue is particularly relevant for individuals whose loss of personal autonomy prevents
20 them from engaging in daily activities. The pandemic highlighted society's dependence
21 on technology and the global digital divide by age (Spears & Zheng, 2020). The
22 generational digital divide has become a new image of inequality for older adults
23 worldwide (Kidron & Yang, 2021). Lacking the skills needed to use technology may
24 result in exclusion from essential information and social participation, limit access to
25 basic public services, and potentially violate human rights (Schmidt-Hertha & Strobel-
26 Dümer, 2014). Access to information, which is not only a fundamental element for
27 people's survival but also an aspect of social position in today's society (Mihelj et al.,
28 2019) can be compromised when digital competencies are lacking. During the COVID-
29 19 pandemic, there were cases of over 75-year olds in the USA who attempted to
30 schedule a COVID-19 vaccine appointment using online healthcare systems despite
31 lacking digital competencies and prior experience (Saha, 2021). Conversely, other
32 examples show how older adults in China who failed to install the digital healthcare
33 code on their smartphones were unable to use public transport or visit hospitals (Hu,
34 2021). The end of the COVID-19 lockdown led to a digital transformation in the public
35 sphere, with many social agents and public authorities rapidly implementing new
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3 technological measures that facilitated interaction between people without physical
4 contact. However, this further alienates older adults, especially those lacking digital
5 competencies (Iqbal & Campbell, 2021). It also excludes older adults who, intentionally
6 or unintentionally, do not have smartphones, quality internet connectivity, or minimum
7 digital competencies to participate (Morrison et al., 2023).
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12 In a global process that “prioritizes the digital”, inequalities are increasing,
13 particularly among disadvantaged groups such as ethnic minorities, individuals with
14 limited socioeconomic resources, people with disabilities, and older adults (Nguyen et
15 al., 2021).
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19 According to the United Nations World Population Prospects, one in eleven
20 individuals will be over the age of 65 in 2050. In Europe, this will be even higher,
21 representing 25% of the total population (United Nations, 2022). The need to provide an
22 adequate response to the predicted progressive increase in the older adult population in
23 the coming years presents us with the challenge of developing a new sustainable social
24 model that promotes long-term autonomy and self-care in individuals (Lafortune &
25 Balestat, 2007). Using technology could enhance the quality of older adults’ lives,
26 increase their relationships, and support networks, and foster greater independence
27 (Guner & Acarturk, 2020; Czaja et al., 2018). However, most older adults are falling
28 behind when it comes to technological advances due to their limited interaction with
29 ICT tools and perceived lack of familiarity, which is widening the digital divide
30 between generations (Fischer et al., 2014).
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34 The objective of this review is to analyze how scientific literature explains
35 theoretical models of behavior regarding technology use, experiences, and acceptance in
36 older adults as a diverse population group. Additionally, it aims to explore how this
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3 knowledge might be useful for social workers to detect and comprehensively address
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5 the needs of this population group on a global scale.
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8 9 ***Theoretical Framework***

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11 Analyzing older adults' behavior as regards using technology provides experts,
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13 professionals, and users themselves with a new perspective on how technology
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15 improves their quality of life, reduces vulnerabilities, and mitigates exclusionary
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17 situations. Various learning and behavior theories have been employed to explore the
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19 awareness and behavior of older adults regarding technology use. These theories
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21 include:
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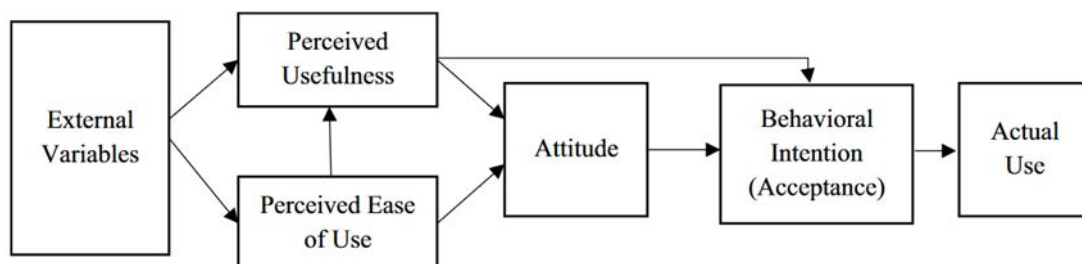
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27 • Unified Theory of Acceptance and Use of Technology (UTAUT): This theory
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29 suggests that four central factors (performance expectancy, effort expectancy,
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31 social influence, and facilitating conditions) directly determine behavioral
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33 intention and, therefore, behavior, and are “moderated by gender, age,
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35 experience, and voluntariness of use” (Williams et al., 2015, p.444).
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39 • Theory of Planned Behavior (TPB): This theory maintains that an individual's
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41 behavior is influenced by their beliefs, attitudes, subjective norms, and
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43 perceptions of control, as well as the social and cultural environment in which
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45 they operate. The key explanatory variables for behavioral intention are attitude,
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47 subjective norm, and perceived behavioral control (Ajzen, 2011).
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51 • Diffusion of Innovations: This theory suggests that innovations will experience
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53 greater and a more rapid rate of diffusion if they offer relative advantages are
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55 compatible with current practices and beliefs, are not overly complex, can be
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57 tried before being implemented, and can be easily measured (Al-Rahmi et al.,
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59 2019).
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- Theory of Reasoned Action: This theory proports that intention proceeds behavior; the stronger the intention the greater the likelihood of a behavior being performed (Ajzen & Fishbein, 1980). This theory gave rise to the Technology Acceptance Model (TAM), which is the most widely used model by professionals to study acceptance and use of technology in older adults.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) was proposed by Fred Davis and Richard Bagozzi in 1989. This information systems theory suggests that an individual's attitudes, beliefs, and predisposition towards technology directly influence their final decision regarding its potential usefulness (Davis et al., 1992). TAM provides a theoretical basis for understanding and evaluating user acceptance of digital technology and offers the opportunity to develop and implement better systems (Davis, 1989).

Over time, the model has evolved and additional variables such as gender, age, and experience have been added to the original factors, as they might influence users' utilization of a particular technological system (López-Bonilla & López-Bonilla, 2017; Cabero Almenara et al., 2016). According to the TAM model, the main factors that influence users into using and accepting technology are perceived usefulness and perceived ease of use (Davis, 1989).



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3 **Figure 1.** Final Technology Acceptance Model (TAM) (Davis et al., 1989)
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6 **Method**
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10 ***Systematic Literature Review***
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12 The PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-
13 Analyses) ensures a rigorous and transparent review process (Page et al., 2021).
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15 PRISMA enhances the readability and understanding of research by including the most
16 relevant studies on a topic and minimizing the possibility of bias (PRISMA-P Group et
17 al., 2015). It consists of a 27-item checklist that facilitates replication and comparison
18 between selected studies (Tricco et al., 2018). Based on TAM, the systematic review
19 aims to analyze how scientific literature explains the experiences of older adults, as a
20 diverse population group, as regards adopting technology. It addresses the following
21 research questions:
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34 (1) What is the profile of the selected samples of older adults in the studies
35 reviewed?
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37 (2) How are the positive and negative factors of technology adoption in older adults
38 defined in the studies reviewed?
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40 (3) How are ethical and privacy aspects addressed in the studies reviewed?
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47 The review includes documents such as articles published in the last five years,
48 from 2019 to March 2023, to obtain the most up-to-date information possible. The
49 search process was conducted from November 2022 to January 2023, with an additional
50 search in March 2023 to account for any studies that might have been published during
51 the article extraction and assimilation/writing period. All duplicate studies were
52 removed. The working databases used were Web of Science (Clarivate), ProQuest
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Central, and PubMed. The search terms used were: (“Gerontology” OR “Older adults” OR “Older people” OR “Senior” OR “Senior citizens” OR “Elderly” OR “Aging populations”) AND (“TAM”) AND NOT (“Dementia” OR “Cognitive impairment”) in titles, abstracts, keywords, and main topics. In PubMed, the full-text field was included, but not in ProQuest Central (NOFT). The acronym TAM was also included in the study given that it is well established and accepted in international literature. Therefore, it is assumed that any study that uses this theoretical model would include the term in one of the basic identification fields such as the title, keywords, or abstract (Murciano-Hueso et al., 2022, p. 106-108). Table 1 describes the inclusion and exclusion criteria for conducting the systematic literature review.

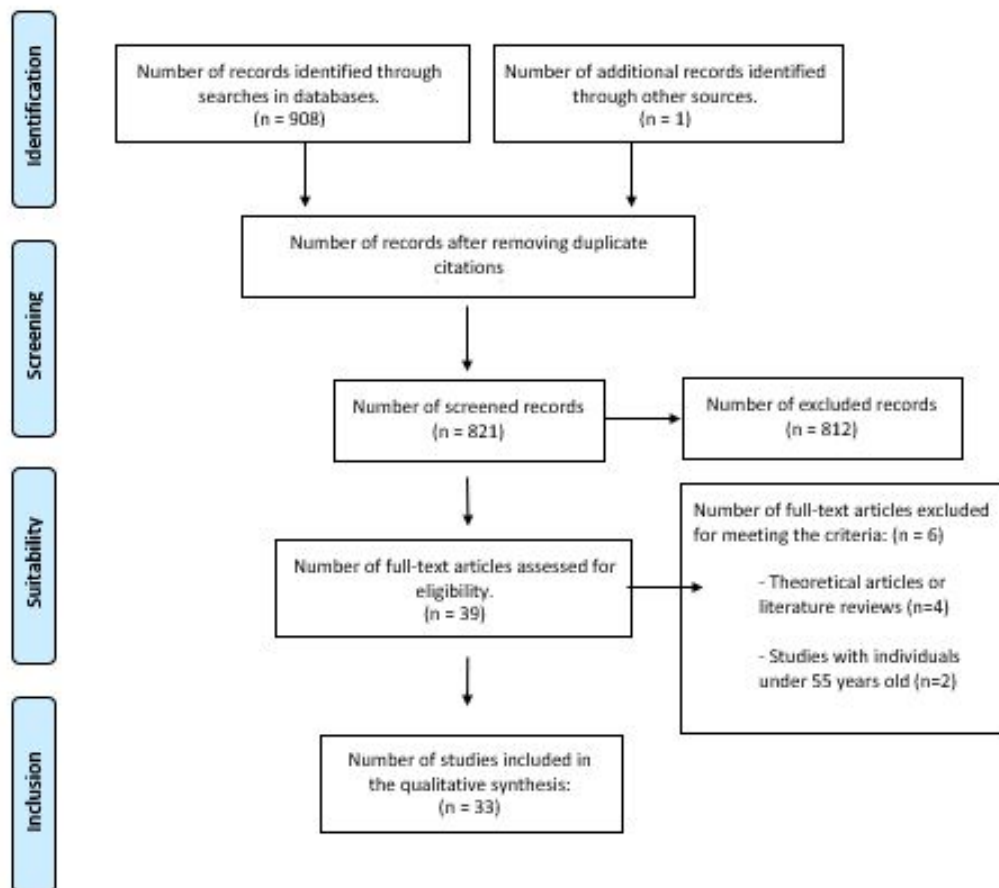
Table 1. Summary table of the inclusion and exclusion criteria established in the systematic literature review.

Inclusion criteria	Exclusion criteria
- Studies in English or Spanish.	- Studies with a sample exclusively
- Empirical studies with quantitative or mixed methodology.	comprising individuals under the age of 50.
- Studies that wholly or partially analyze the population of individuals aged over 50.	- Studies with individuals aged over 50 that do not wholly or partially analyze TAM.
- Studies that wholly or partially analyze TAM.	- Studies using only qualitative methodology, theoretical studies, or literature reviews.
- Studies that wholly or partially analyze the use of ICT as an intervention tool.	- Studies that exclusively analyze individuals with cognitive impairment.

- Studies not available in English or Spanish.

The World Health Organization (WHO) considers older adults as anyone over 60 years of age. However, for this review, we decided to include adults over 50. This age group has had to adapt to technology at a later stage of life than generations such as Generation Y or Generation Z, who are referred to as “digital natives” (Wong et al., 2022). Exploring the perceptions and acceptance of technology in this older age group could provide valuable insights, and significantly contribute to the development of effective strategies for integrating technology into the lives of the elderly.

Figure 2 presents the PRISMA 2020 flow diagram as a synthesis of the studies selected, analyzed, and screened throughout the review, starting with the initial 908 articles, and finishing with the 33 articles that met the specified criteria.



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Figure 2: Data Collection and Selection Process Diagram based on the diagram provided by PRISMA 2020.

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The qualitative analysis was conducted using NVivo 12 software, which facilitates the classification of key themes and coding of selected publications, detects relationships between articles, and creates framework matrices.

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Results

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The review yielded a total of 33 studies from 2019 to the first quarter of 2023, which enabled us to identify the limitations (barriers) and facilitators of technology use in older adults. The number of articles published per year varied, with 8 articles published annually except for 2021 with 5, and 4 articles published in the first quarter of 2023.

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3 There were 17 publications from Asia, with China contributing the most with 8
4 studies (Li et al., 2019; Li et al., 2021; Liu & Zhang, 2023; Song et al., 2022; Wong et
5 al., 2022; Xu et al., 2022; Zhou et al., 2019; Zin et al., 2023), and South Korea with 3
6 (Han & Nam, 2021; Kwak et al., 2020; Lee, 2019). All the reviews conducted on the
7 studies from Asia were published in journals of countries with languages different from
8 the country of origin. A total of 12.1% of the articles were published in the same
9 country where the study was conducted, with 3 articles from the USA (Jun et al., 2021;
10 Wang et al., 2019; Wu & Song, 2021) and 1 from Spain (Almenara & Cejudo, 2020).
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21 Figure 3 shows the USA as the country with the highest number of publications,
22 a total of 13 (Alam & Khanam, 2022; Alexandrakis et al., 2020; Alsswey & Al-
23 Samarraie, 2020; Han & Nam, 2021; Jokisch et al., 2022; Jun et al., 2021; Lee, 2020;
24 Liu & Zhang, 2023; Ren & Klausen, 2023; Tsai et al., 2020; Wang et al., 2019; Wu &
25 Song, 2021; Xu et al., 2022). The other publications were from Europe, with 11 articles
26 from Switzerland (Ahmad et al., 2020; Bong et al., 2019; Chimento-Díaz et al., 2022;
27 Kwak et al., 2020; Lee, 2019; Li et al., 2021; Pérez-Rodríguez et al., 2021; Ramírez-
28 Correa et al., 2019; Song et al., 2022; Yang et al., 2023; Zin et al., 2023), 6 from
29 England (Li et al., 2019; Mariano et al., 2022; Roberts et al., 2019; Sancho-Esper et al.,
30 2022, Syed-Abdul et al., 2019; Wong et al., 2022), and 1 from Germany (Guner &
31 Acarturk, 2020), Ireland (Zhou et al., 2019), and Spain (Almenara & Cejudo, 2020),
32 respectively.
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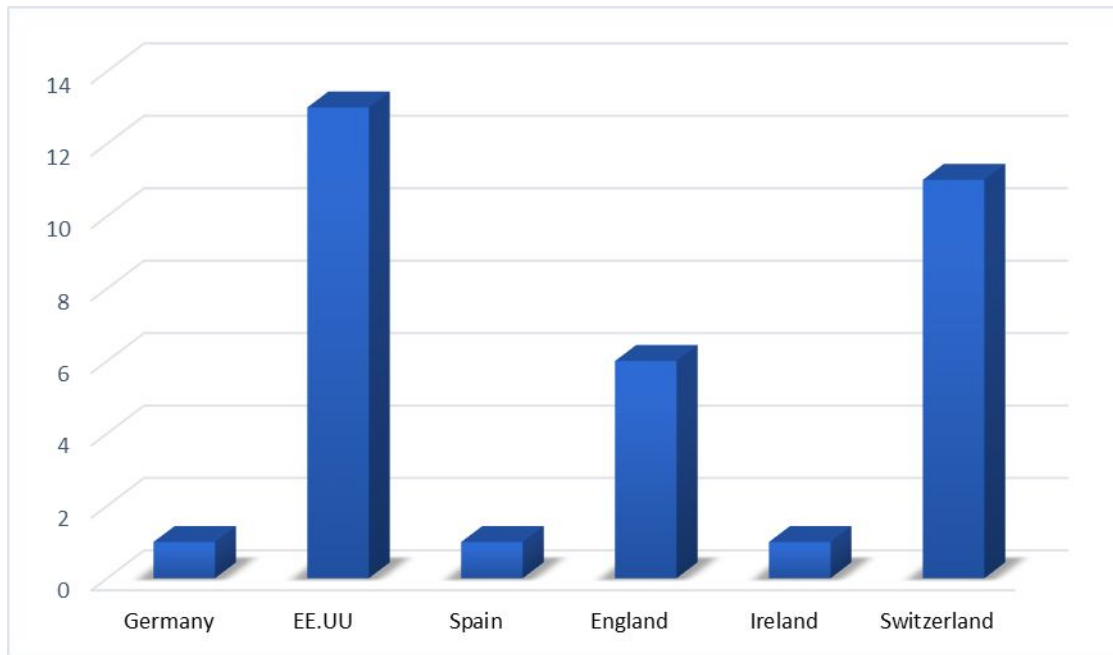


Figure 3. Articles published by country.

The articles used in the systematic review came primarily from the following databases: 82% Web of Science (n=27), 12% from ProQuest (n=4), and 6% from PubMed (n=2) (Figure 4).

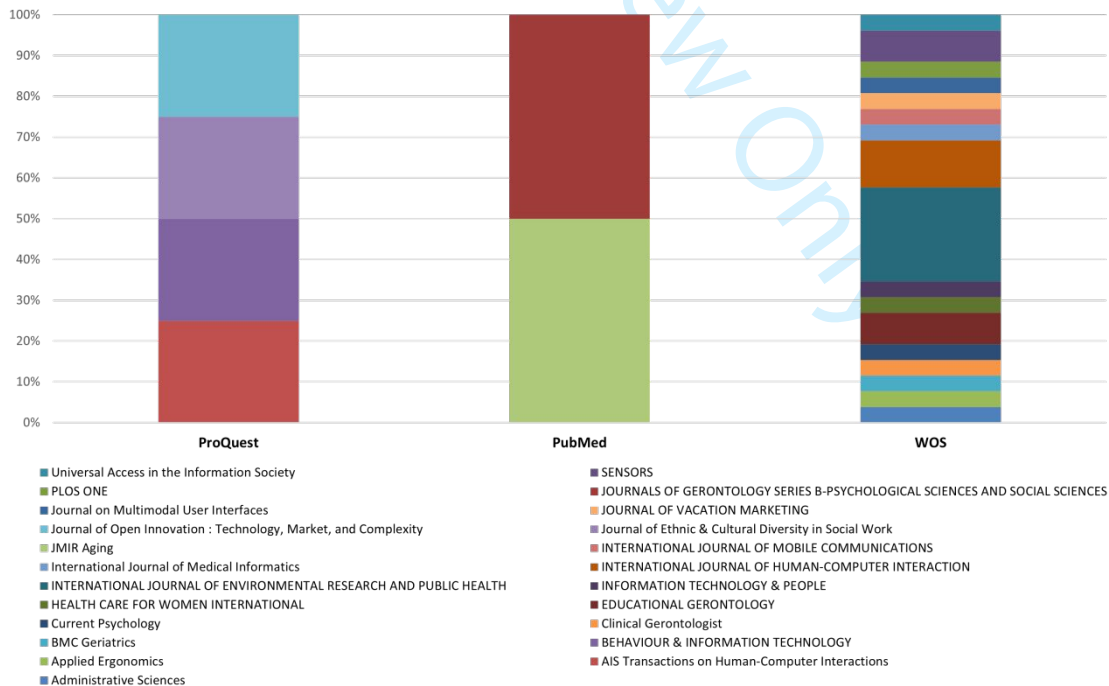


Figure 4. Distribution of analyzed publications by database.

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In the studies reviewed, most (n=26) used quantitative methods through questionnaires. However, some authors opted for a mixed methodology (n=7), employing qualitative tools such as interviews (Bong et al., 2019; Ramírez-Correa et al., 2019; Ren & Klausen, 2023; Wang et al., 2019; Xu et al., 2022) or focus groups (Roberts et al., 2019; Sancho-Esper et al., 2022). These mixed approaches enabled them to gain a deeper understanding of participants' perceptions and attitudes towards the technology under study. Although mixed methodology requires more time and resources compared to exclusively quantitative methods, the results provide a more comprehensive insight into the use and acceptance of a specific type of technology. Therefore, this type of approach is generally more recommended.

The analysis of user behavior is explored using a variety of behavior and learning theories. The studies selected for the review use TAM for their analyses, given the scientific community's high regard for the model, and incorporate moderating variables (age, gender, level of education, occupation, etc.), and cognitive accessibility for older adults. Figure 5 shows the connections between the analysis models and theories used in the selected articles.

A total of 75.8% of the studies use TAM as the sole reference model for studying the acceptance and use of technology in older adults. The remaining 24.2% of the studies combine TAM with the Unified Theory of Acceptance and Use of Technology (Alsswey & Al-Samarraie, 2020; Li et al., 2019; Song et al., 2022; Xu et al., 2022; Zhou et al., 2019), Theory of Reasoned Action (Yang et al., 2023), Theory of Planned Behavior (Wu & Song, 2021), Diffusion of Innovations Theory (Yang et al., 2023), and Internet Self-Efficacy Theory (Jokisch et al., 2022).

2022; Li et al., 2019; Li et al., 2021; Ren & Klausen, 2023; Xu et al., 2022; Zin et al., 2023) in urban areas (Alam & Khanam, 2022; Lee, 2019).

Level of education was included as a defining variable of participants' profile in 69.7% of the studies (n=23). As a minimum, participants had attained a secondary level of education (Ahmad et al., 2020; Alam & Khanam, 2022; Almenara & Cejudo, 2020; Alsswey & Al-Samarraie, 2020; Chimento-Diaz et al., 2022; Han & Nam, 2021; Jokisch et al., 2022; Jun et al., 2021; Kwak et al., 2020; Lee, 2019; Li et al., 2019; Li et al., 2021; Liu & Zhang, 2023; Pérez-Rodríguez et al., 2021; Ramírez-Correa et al., 2019; Ren & Klausen, 2023; Roberts et al., 2019; Song et al., 2022; Tsai et al., 2020; Wang et al., 2019; Wu & Song, 2021; Yang et al., 2023; Zhou et al., 2019). In 14 of the studies (42.2%), participants had previous experience with the technology under study (Alam & Khanam, 2022; Alsswey & Al-Samarraie, 2020; Guner & Acarturk, 2020; Jokisch et al., 2022; Lee, 2019; Li et al., 2019; Liu & Zhang, 2023; Ramírez-Correa et al., 2019; Ren & Klausen, 2023; Song et al., 2022; Wong et al., 2022; Wu & Song, 2021; Yang et al., 2023; Zhou et al., 2019), while 3 studies had participants who had never before used the device in question (Alexandrakis et al., 2020; Pérez-Rodríguez et al., 2021; Tsai et al., 2020).

Positive and Negative Factors of Technology Use and Perceived Usefulness in Older Adults

Table 2 presents the systematization of the studies on the process of technology adoption in older adults, differentiating between factors that have a positive impact (facilitators) and a negative impact (barriers) on the adoption and use of technology, and perceived usefulness in older adults.

Table 2. Classification and definition of the main facilitators and barriers from the studies reviewed.

ACTION	FACTOR	DEFINITION	STUDIES
F	Perceived	“The degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p.320).	Ahmad et al., 2020; Alam & Khanam, 2022; Almenara & Cejudo, 2020; Guner & Acarturk, 2020; Han & Nam, 2021; Jokisch et al., 2022; Kwak et al., 2020; Lee, 2019; Li et al., 2019; Li et al., 2021; Roberts et al., 2019; Song et al., 2022; Syed-Abdul et al., 2019; Tsai et al., 2020; Wong et al., 2022; Wu & Song, 2021; Xu et al., 2022; Yang et al., 2023; Zin et al., 2023)
O	Perceived	“The degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p.320).	Ahmad et al., 2020; Alam & Khanam, 2022; Almenara & Cejudo, 2020; Han & Nam, 2021; Lee, 2020; Lee, 2019; Li et al., 2021; Ramírez-Correa et al., 2019; Roberts et al., 2019; Sancho-Esper et al., 2022; Syed-Abdul et al., 2019; Tsai et al.,
A	Ease of		
S	Use		

		2020; Wu & Song, 2021; Xu et al., 2022; Yang et al., 2023
Self-satisfaction	“Degree to which a product/service gives the user satisfaction with himself or herself or achievements” (Park et al., 2013, p.11).	Ahmad et al., 2020; Guner & Acarturk, 2020; Jun et al., 2021; Kwak et al., 2020; Xu et al., 2022; Zhou et al., 2019
Experience	“...a broad concept covering a physical, psychological reaction or behavior of the user before, while, and after using a product” (Jeong et al., 2016, p.1614).	Alam & Khanam, 2022; Bong et al., 2019; Lee, 2019; Pérez-Rodríguez et al., 2021; Roberts et al., 2019; Syed-Abdul et al., 2019
Perceived Enjoyment	The extent to which the activity of using a specific system is perceived to be enjoyable (Venkatesh & Bala, 2008).	Ramírez-Correa et al., 2019; Syed-Abdul et al., 2019; Wong et al., 2022; Xu et al., 2022
Facilitating Conditions	Objective factors in the environment that can facilitate the use of technology (Venkatesh et al., 2003).	Ahmad et al., 2020; Li et al., 2019; Wu & Song, 2021; Xu et al., 2022; Zin et al., 2023
Social Support	Perceived informal help from family, friends, or support networks when performing a	Han & Nam, 2021; Jun et al., 2021; Li et al., 2021; Ren & Klausen, 2023

specific activity (Kelman et al., 1994).
 Development of suitable and bespoke technological solutions for a specific audience (Merkel & Ren & Klausen, 2023; Kucharski, 2019).
 Ahmad et al., 2020; Alam & Khanam, 2022; Kwak et al., 2020; Mariano et al., 2022; Sancho-Esper et al., 2022; Song et al., 2022; Zhou et al., 2019
 Consumer perception of the cognitive trade-off between the benefits of using specific technology and the associated economic cost (Dodds et al., 2021; 1991).
 The impact of a specific social group or environment on an individual's decision-making process in response to social pressures or collective beliefs (Venkatesh & Bala, 2008).

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3		“...the extent to which
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5		consumers perceive that
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7		important others (e.g., family
8	Social	Ahmad et al., 2020; Guner &
9		
10		and friends) believe they
11	Influence	Acarturk, 2020
12		should use a particular
13		
14		technology” (Venkatesh et al.,
15		
16		2012, p.159).
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18		The ability to independently
19		decide when, how, and to what
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21		extent personal data is shared
22	Privacy	Ren & Klausen, 2023; Wang
23		et al., 2019
24		with third parties (Sinha et al.,
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26		2019).
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28		“...individual’s set of beliefs
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30		about the characteristics or
31	Stereotyp	Mariano et al., 2022
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33		e attributes of a group” (Judd &
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35		Park, 1993, p.110).
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In positive or facilitating factors, 57.6% of the studies (n=19) highlight that perceived usefulness contributes to the use of the technology evaluated, and 45.5% (n=15) highlight perceived ease of use as a significant factor. Self-satisfaction, experience, and facilitating conditions are three key factors that facilitate technology acceptance, accounting for 18.2% of the studies (n=6). Perceived enjoyment and social support account for 15.2% (n=5), and interface design for 9.1% (n=3) of the articles reviewed.

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3 Studies conducted in the USA indicate that a high level of self-perceived health
4 and strong social support significantly correlate to higher life satisfaction and, therefore,
5 higher intention to use technology (Jun et al., 2021). A 2022 study in Germany revealed
6 a positive relationship between internet self-efficacy and perceived ease of use,
7 particularly in advanced old age (Jokisch et al., 2022).
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12 Level of education and living arrangements are significantly correlated with
13 greater acceptance of technology. Chimento-Diaz et al. (2022) found a statistically
14 significant correlation between physical activity and moderate acceptance of technology
15 when older adults remain in their place of residence, i.e., at home. Jun et al. (2021) and
16 Kwak et al. (2020) agree that participants' state of health is fundamental in relation to
17 perceived ease of use.
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22 Personal autonomy, except when limited, positively relates to perceived
23 usefulness and is associated with higher perceived intention to use (Wu & Song, 2021).
24 Other studies examine emotional reactions experienced during the acceptance process
25 (Roberts et al., 2019), the positive influence of older adults' future time perspective on
26 perceived ease of use (Alexandrakis et al., 2020), and the construct of trust as a key and
27 significantly positive factor in relation to intention to use (Song et al., 2022).
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32 Participation of potential end-users in the application design process is also
33 considered a positive factor associated with level of acceptance and use (Pérez-
34 Rodríguez et al., 2021). Moreover, when interface design includes cultural variables, it
35 positively influences perceived ease of use (Alsswey & Al-Samarraie, 2020).
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40 Negative or barrier factors include technology anxiety, highlighted in 21.2% of
41 the studies (n=7), cost in 18.2% (n=6), social norms in 15.2%, and social influence and
42 privacy in 6.1% (n=2). The only study that explores age-associated stereotypes in
43 technology use and acceptance was published by Mariano et al. (2022).
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3 The results show that technology anxiety may negatively influence perceived
4 ease of use and ubiquity of technology (Tsai et al., 2020). Alam and Khanam (2022)
5 found that most females in their study were less familiar with technology, leading to
6 greater technology anxiety compared to males.
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12 Performance expectancy, perceived effort, social impact, technology anxiety,
13 and resistance to change significantly impact older adults' intention to use. The above
14 factors have a direct, negative effect on perceived satisfaction regarding intention to use
15 (Zhou et al., 2019). Perceived risks are defined as a barrier to converting positive
16 attitudes into technology adoption and intention to use in older adults (Wong et al.,
17 2022). Stereotypes are directly linked to lower expectations regarding perceived ease of
18 use and technology acceptance (Mariano et al., 2022).
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32 *Ethical and privacy aspects*

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34 In 36.4% of the studies (n=12), there is no mention of how participant data was handled.
35 There are no details about the type of informed consent used or the external ethics
36 committee involved in reviewing the studies (Ahmad et al., 2020; Alam & Khanam,
37 2022; Alexandrakis et al., 2020; Alsswey & Al-Samarraie, 2020; Han & Nam, 2021;
38 Jokisch et al., 2022; Jun et al., 2021; Lee, 2019; Li et al., 2019; Roberts et al., 2019;
39 Wong et al., 2022; Wu & Song, 2021). A total of 15.2% of the studies (n=5) mention
40 that participants signed prior consent, but do not indicate whether an external institution
41 upheld and guaranteed the participants' rights (Almenara & Cejudo, 2020; Guner &
42 Acarturk, 2020; Lee, 2020; Song et al., 2022; Zin et al., 2023).
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55 A total of 48.5% of the studies (n=16) were supported by a research ethics
56 committee that reviewed and approved the research. Moreover, the authors refer to all
57 participants receiving both oral and written information about the purpose of the study.
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3 **Figure 6.** Word cloud on perception of technology use in older adults.
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7 **Discussion**

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10 The studies reviewed provide information on the current scenario and gaps in existing
11 literature. They also provide constructive criteria to inspire future research from the
12 perspective of social work. Previous literature reviews on technology use, acceptance,
13 and behavior using the TAM model have typically focused on specific tasks and/or
14 groups. For example, in the healthcare field, studies have focused on technological
15 acceptance among patients (Chimento-Diaz et al., 2022; Wang et al., 2019; Xu et al.,
16 2022), doctors, and other healthcare professionals (Jokisch et al., 2022; Kwak et al.,
17 2020). In education, they have focused on the teaching-learning process using new
18 methodologies such as e-Learning (Alexandrakis et al., 2020; Li et al., 2019; Ramírez-
19 Correa et al., 2019). And in higher education, the COVID-19 pandemic led to reviews
20 directed at adopting learning management systems (Wong et al., 2022), and the
21 relationship between students and learning outcomes (Han & Nam, 2021). These studies
22 demonstrate that TAM is an effective tool for predicting user behavior in relation to
23 technology use (Alsswey & Al-Samarraie, 2020).
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42 As regards the factors analyzed, it seems apparent that the two essential
43 elements to consider when accepting and using specific technology are perceived
44 usefulness and perceived ease of use, as indicated by the original TAM model.
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46 Technology anxiety or the lack of previous user experience with devices are barriers
47 that limit the creation, use, and acceptance of new technology tools in older adults. We
48 agree with Alsswey and Al-Samarraie (2020) and Pérez-Rodríguez et al. (2021) that
49 active involvement of potential users throughout the design, development, and
50 implementation process can transform initial barriers into facilitators.
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3 Age, as an analytical category, presents significant difficulties regarding
4 participants' behavior towards specific technology (Alam & Khanam, 2022; Jun et al.,
5 2021; Lee, 2019; Ramírez-Correa et al., 2019; Roberts et al., 2019; Wong et al., 2022;
6 Sancho-Esper et al., 2022). Other categories that should be incorporated as research
7 variables include gender, marital status, education, personal autonomy, illness, health,
8 third-party support needs, socioeconomic status, place of residence, type of residence,
9 and any other significant aspect that helps to understand and comprehend potential users
10 (Ahmad et al., 2020; Alam & Khanam, 2022; Alsswey & Al-Samarraie, 2020;
11 Chimento-Diaz et al., 2022; Lee, 2019; Li et al., 2019; Ramírez-Correa et al., 2019).

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Research must guarantee certain ethical questions, especially confidentiality and
privacy. Participants' rights and wellbeing must be protected. Complying with this
process promotes trust and transparency in the scientific community and the general
public. In this review, 48.5% of the publications referred to were supported by a
research ethics committee that reviewed and approved the studies. The other studies
reviewed did not mention this aspect in their studies, although some considered that the
ethical questions relating to the research could be reduced to a consent signature.

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3 Correa et al., 2019). Moreover, there is a lack of studies that determine facilitating
4 factors, such as social factors, in the use and acceptance of technology by older adults
5 before it is implemented (Chimento-Diaz et al., 2022; Xu et al., 2022).
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10 The involvement and genuine willingness of public administrations as
11 facilitators in the process of providing the population, especially vulnerable groups,
12 with access to technology and the design and implementation of training programs to
13 reduce technology anxiety (Jun et al., 2021) is essential. The aim is to advance the
14 acceptance process, taking into account real and continuous use of technology (Song et
15 al., 2022). Quantitatively and qualitatively measuring user experiences is key to creating
16 more accurate and user-centered designs, with active involvement of potential users
17 from the project/idea's inception to its implementation (Lee, 2020). Notwithstanding,
18 the barriers must also be considered to avoid falling into the trap of age-based
19 stereotypes (Alsswey & Al-Samarraie, 2020; Mariano et al., 2022) or generating
20 rejection due to technology anxiety.
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39 **Conclusions**

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41 Social workers can establish criteria and procedures for technology use that meet the
42 needs of older adults and their families. TAM is a useful and versatile theoretical model
43 that can assist professionals in the analysis of device use among participants.
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48 This review has revealed how the over 65 population group comprises very
49 diverse digital competencies, which often leads to technology anxiety and rejection of
50 use. In this regard, this must be seen as an opportunity for social work, as a profession
51 that supports and works with people in the process of adopting and using new
52 technology. Research in this vein must recognize and value diversity.
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3 Social workers have a responsibility to be aware of reviews that analyze models
4 and theories on technology acceptance by older adults. Such studies are becoming a
5
6 fundamental pillar of gerontological and social research (Martín-García et al., 2022).
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10 This review opens up interesting future lines of research, such as incorporating
11 an intersectional approach to technology use in older adults requiring support in daily
12 activities. This approach would enable social workers to recognize and address the
13 diversity and inequalities experienced by older adults, as well as enhancing their
14 participation and empowerment in the digital society.
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21 Future studies must respond comprehensively to the needs of older adults to
22 avoid situations of vulnerability or exclusion. The originality of this research lies in
23 providing useful data on the positive and negative factors of technology use in older
24 adults and a comprehensive analysis on how research addresses ethical and privacy
25 aspects.
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34 **Disclosure statement**

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37 The authors declare that they have no conflicts of interest.
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For Peer Review Only

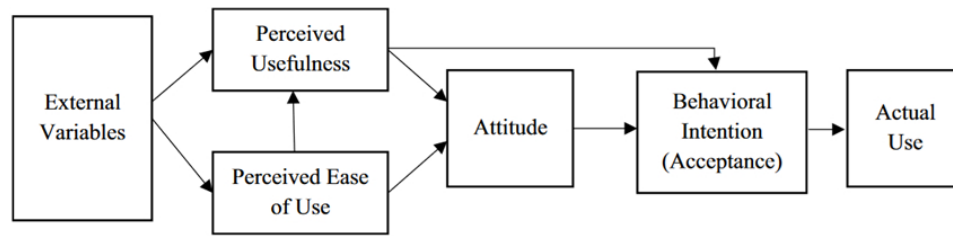


Figure 1. Final Technology Acceptance Model (TAM) (Davis et al., 1989)

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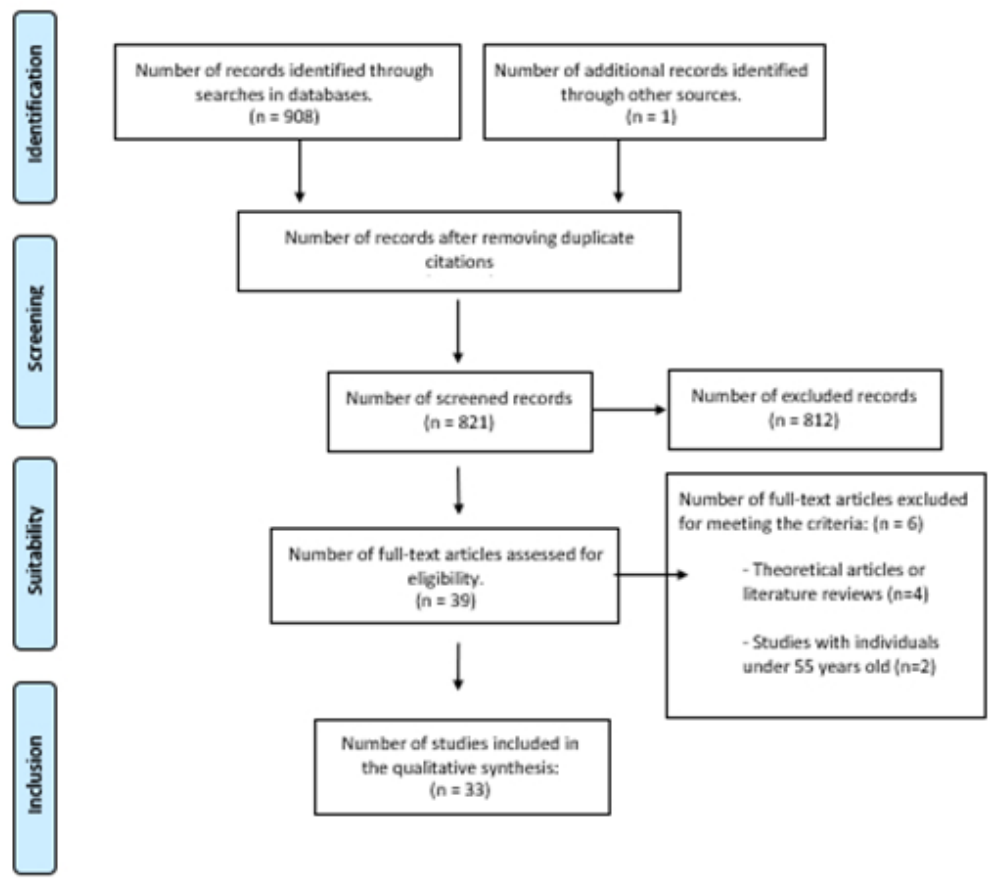


Figure 2: Data Collection and Selection Process Diagram based on the diagram provided by PRISMA 2020.

341x320mm (38 x 38 DPI)

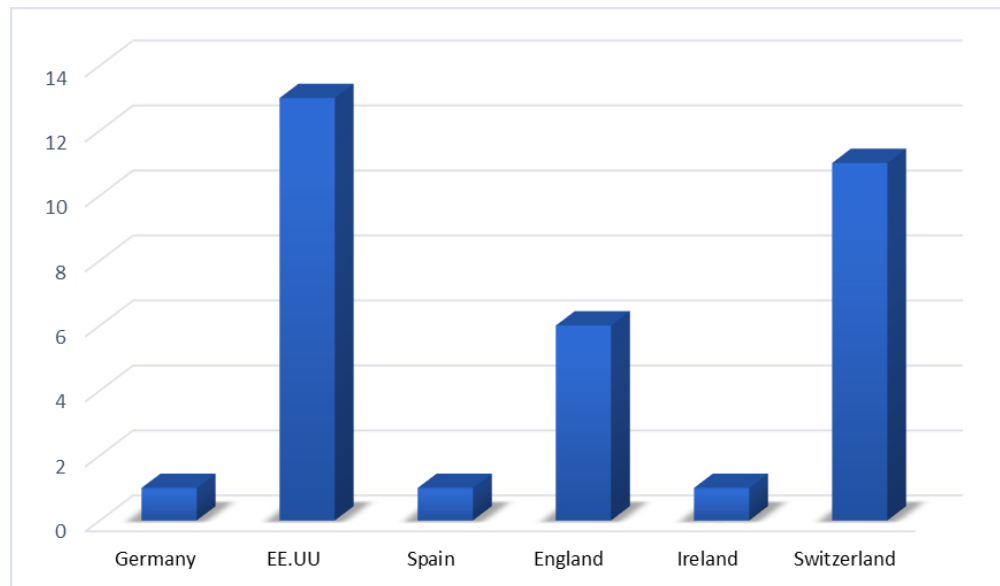


Figure 3. Articles published by country.

374x219mm (59 x 59 DPI)

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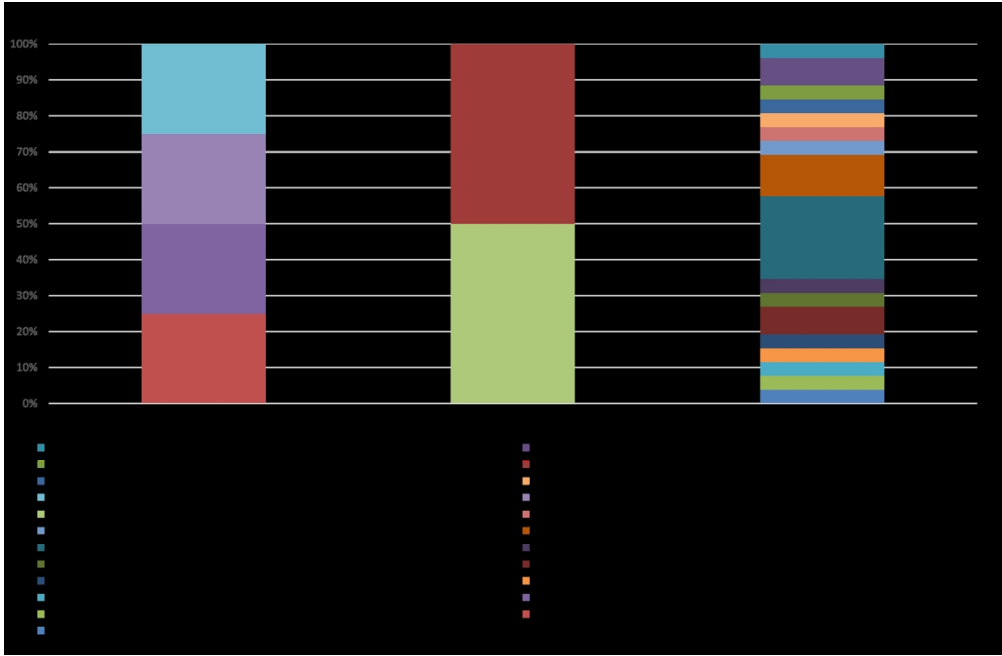


Figure 4. Distribution of analyzed publications by database.

380x248mm (130 x 130 DPI)

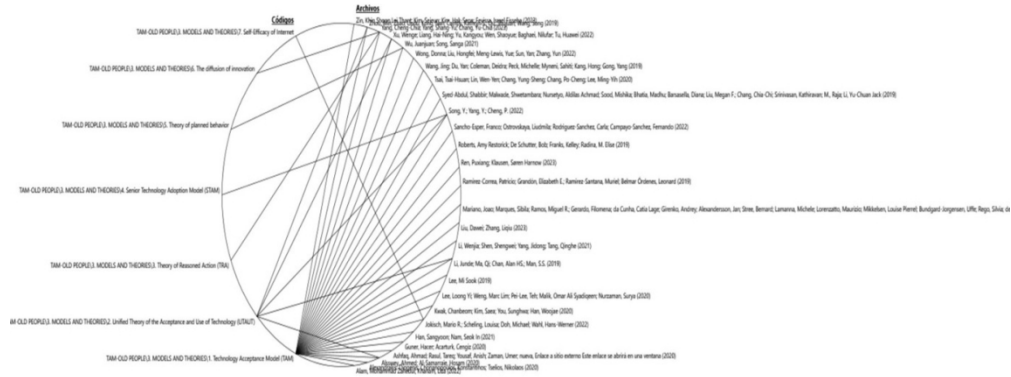


Figure 5. Grouping chart showing the connections between the studies reviewed and the theoretical models analyzed.

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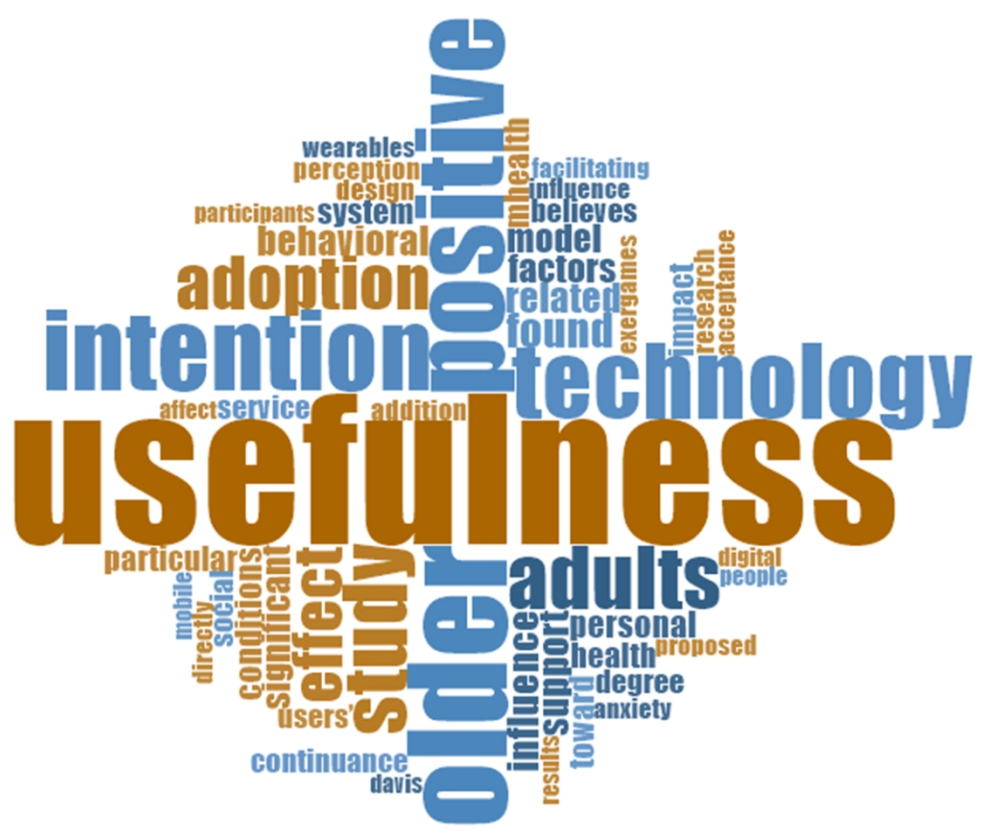


Figure 6. Word cloud on perception of technology use in older adults.

231x193mm (130 x 130 DPI)

Table 1. Summary table of the inclusion and exclusion criteria established in the systematic literature review.

Inclusion criteria	Exclusion criteria
- Studies in English or Spanish.	- Studies with a sample exclusively comprising individuals under the age of 50.
- Empirical studies with quantitative or mixed methodology.	- Studies with individuals aged over 50 that do not wholly or partially analyze TAM.
- Studies that wholly or partially analyze the population of individuals aged over 50.	- Studies using only qualitative methodology, theoretical studies, or literature reviews.
- Studies that wholly or partially analyze TAM.	- Studies that exclusively analyze individuals with cognitive impairment.
- Studies that wholly or partially analyze the use of ICT as an intervention tool.	- Studies not available in English or Spanish.

Table 2. Classification and definition of the main facilitators and barriers from the studies reviewed.

ACTION	FACTOR	DEFINITION	STUDIES
	Perceived Usefulness	“The degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p.320).	Ahmad et al., 2020; Alam & Khanam, 2022; Almenara & Cejudo, 2020; Guner & Acarturk, 2020; Han & Nam, 2021; Jokisch et al., 2022; Kwak et al., 2020; Lee, 2019; Li et al., 2019; Li et al., 2021; Roberts et al., 2019; Song et al., 2022; Syed-Abdul et al., 2019; Tsai et al., 2020; Wong et al., 2022; Wu & Song, 2021; Xu et al., 2022; Yang et al., 2023; Zin et al., 2023)
FACILITATING CONDITIONS	Perceived Ease of Use	“The degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p.320).	Ahmad et al., 2020; Alam & Khanam, 2022; Almenara & Cejudo, 2020; Han & Nam, 2021; Lee, 2020; Lee, 2019; Li et al., 2021; Ramírez-Correa et al., 2019; Roberts et al., 2019; Sancho-Esper et al., 2022; Syed-Abdul et al., 2019; Tsai et al., 2020; Wu & Song, 2021; Xu et al., 2022; Yang et al., 2023
	Self-satisfaction	“Degree to which a product/service gives the user satisfaction with himself or herself or achievements” (Park et al., 2013, p.11).	Ahmad et al., 2020; Guner & Acarturk, 2020; Jun et al., 2021; Kwak et al., 2020; Xu et al., 2022; Zhou et al., 2019
	Experience	“...a broad concept covering a physical, psychological reaction or behavior of the user before, while, and after using a product” (Jeong et al., 2016, p.1614).	Alam & Khanam, 2022; Bong et al., 2019; Lee, 2019; Pérez-Rodríguez et al., 2021; Roberts et al., 2019; Syed-Abdul et al., 2019
	Perceived Enjoyment	The extent to which the activity of using a specific system is perceived to be enjoyable (Venkatesh & Bala, 2008).	Ramírez-Correa et al., 2019; Syed-Abdul et al., 2019; Wong et al., 2022; Xu et al., 2022
	Facilitating Conditions	Objective factors in the environment that can facilitate the use of technology (Venkatesh et al., 2003).	Ahmad et al., 2020; Li et al., 2019; Wu & Song, 2021; Xu et al., 2022; Zin et al., 2023

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3		Perceived informal help from	
4		family, friends, or support	
5	Social	networks when performing a	Han & Nam, 2021; Jun et al., 2021;
6	Support	specific activity (Kelman et al.,	Li et al., 2021; Ren & Klausen, 2023
7		1994).	
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10		Development of suitable and	
11	Interface	bespoke technological solutions	Alsswey & Al-Samarraie, 2020;
12	Design	for a specific audience (Merkel &	Pérez-Rodríguez et al., 2021; Ren &
13		Kucharski, 2019).	Klausen, 2023
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16		Negative emotional response to	Ahmad et al., 2020; Alam &
17	Technologi	fear or discomfort experienced	Khanam, 2022; Kwak et al., 2020;
18	cal Anxiety	when using IT (Chandwani et al.,	Mariano et al., 2022; Sancho-Esper
19		2018).	et al., 2022; Song et al., 2022; Zhou
20			et al., 2019
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22		Consumer perception of the	
23		cognitive trade-off between the	
24		benefits of using specific	Alam & Khanam, 2022; Han & Nam,
25	Cost	technology and the associated	2021; Liu & Zhang, 2023; Wang
26		economic cost (Dodds et al.,	et al., 2019; Wu & Song, 2021
27		1991).	
28	B		
29			
30	A	The impact of a specific social	
31		group or environment on an	
32	R	individual's decision-making	Han & Nam, 2021; Lee, 2020; Syed-
33		process in response to social	Abdul et al., 2019; Wu & Song,
34	R	pressures or collective beliefs	2021
35		(Venkatesh & Bala, 2008).	
36	I		
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38	E	"...the extent to which consumers	
39		perceive that important others	
40	R	(e.g., family and friends) believe	Ahmad et al., 2020; Guner &
41		they should use a particular	Acarturk, 2020
42	S	technology" (Venkatesh et al.,	
43		2012, p.159).	
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46		The ability to independently	
47		decide when, how, and to what	
48	Privacy	extent personal data is shared	Ren & Klausen, 2023; Wang et al.,
49		with third parties (Sinha et al.,	2019
50		2019).	
51			
52			
53		"...individual's set of beliefs	
54	Stereotype	about the characteristics or	Mariano et al., 2022
55		attributes of a group" (Judd &	
56		Park, 1993, p.110).	
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