

Understanding the intertwined dynamics between digitalization, homelessness and social marginalization – An integrative literature review

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Abstract

The digital age offers significant benefits such as enhanced connectivity and improved access to information, but it also presents challenges for vulnerable populations, such as people experiencing homelessness and social marginalization. This integrative literature review explores the intertwined dynamics between digitalization, homelessness, and social marginalization, with the aim to understand how digitalization of society can, both facilitate social inclusion and well-being, and simultaneously reinforce exclusion among individuals facing housing insecurity and societal marginalization. The review is based on 28 peer-reviewed articles published in English between 2014 and 2024, retrieved from four databases (Google Scholar, SAMK-Finna, PubMed, Scopus). The findings reveal that people experiencing homelessness encounter substantial digital barriers, including (1) physical and technical barriers, (2) barriers in digital service system, (3) security, trust and privacy barriers and (4) socio-economic gaps and social marginalization. Despite these challenges, digital tools also provide opportunities for (5) better access to health care and services, (6) enhance social connections and empowerment and (7) digital inclusion and access to information. While some of these main categories may appear self-evident, our nuanced synthesis of the existing research underscores their complex interconnectedness and draws attention to less-explored dimensions. These include challenges related to digital identification, the significance of service content design and representation, issues of trust and psychological barriers, as well as the potential for enhanced continuity and engagement in digital services, and various dimensions of empowerment. Despite these challenges, digital tools also provide opportunities for accessing critical services, enhancing personal agency, fostering social connectedness and supporting self-management and control over one's own life. Furthermore, digital services support managing and having control over their own lives.

Keywords: digitalization, homelessness, marginalization, digital divide, social inclusion

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Introduction

As society undergoes further digitalization, individuals experiencing homeless or social marginalization encounter substantial obstacles to inclusion [1,2]. These vulnerable populations often struggle with limited access to digital technologies and services, hindering their ability to participate fully in an increasingly digital world [3,4]. Understanding the interplay between digitalization, homelessness, and social marginalization is crucial for designing inclusive digital environments and equitable service systems.

Homelessness is a multifaceted phenomenon shaped by the interplay of structural factors - such as housing affordability, the adequacy and accessibility of social, health, and economic services and benefits, and broader housing market dynamics - as well as individual-level socio-economic disadvantages, including financial hardship, social and health vulnerabilities, and the cumulative impact of often unexpected life events [5,6]. Social marginalization, on the other hand, refers to process by which certain groups are systematically excluded from meaningful participation in economic, social, political, and cultural life. [7].

International interest in digital access and equity is growing, and research increasingly focuses on marginalized populations. A deeper examination of existing knowledge on the interplay between homelessness, digitalization and marginalization. Access to digital services requires more than devices and internet connections; it also depends on digital literacy, self-efficacy, and institutional trust [8]. Limited access can reinforce cycles of exclusion, as digital skills increasingly underpin access to employment, education, and social and health care services [9]. The rapid pace of digital innovation risks further marginalizing those lacking the

resources or knowledge to keep up, thereby deepening social inequalities.

This article examined how digitalization shaped both inclusion and exclusion among people in socially vulnerable positions, with a particular focus on those experiencing homelessness and social marginalization. Rather than solely identifying challenges, the aim was also to highlight opportunities for leveraging digital technologies to promote greater social inclusion. Our research question was: *how did the intertwined dynamics of digitalization, homelessness, and social marginalization become evident and influence each other.*

Material and methods

An integrative literature review method was chosen to allow for a comprehensive synthesis of existing literature. An integrative literature serves particularly well for new and emerging phenomenon [10]. This approach enables the inclusion of studies with diverse methodologies – both qualitative and quantitative – as well as theoretical contributions. As our topic is complex and multidimensional, a broad overview was essential for identifying common themes and knowledge gaps [11].

A pilot search was conducted in April 2024 by the corresponding researcher (JH) using search terms in both English and Finnish across three different databases. Based on the initial findings, the search strategy was refined in collaboration with four co-researchers (MV, VN, JR, SH) and an information specialist. The final searches were carried out between May and July 2024 in four databases; Google Scholar, PubMed, SAMK-Finna and Scopus. These databases were selected to ensure comprehensive coverage of relevant literature and to represent diverse disciplinary perspectives, particularly within health sciences, social sciences, and interdisciplinary fields. Pubmed, an established database for

healthcare journals, was complemented by Scopus, the world's largest abstract and citation database with broader social science coverage and versatile search filters. The SAMK-Finna international e-resources search provided access to numerous international scholarly databases, both subject-specific and multidisciplinary. Finally, Google Scholar complemented these databases by broadening the overall scope and identifying studies potentially overlooked in traditional databases.

Specific search terms and database-specific query strings are presented in Table 1. Specific search queries were tailored for each individual database. For example, in Google Scholar the search queries were done directly to titles and in PubMed direct to abstract using search terms and their combinations that are specifically suitable for those databases.

Table 1. Search terms and database-specific query strings.

Google Scholar

(intitle:digitalization OR intitle:digitalisation OR intitle:digitization OR intitle:digitisation OR intitle:"digital divide" OR intitle:technology OR intitle:technological)

AND *(intitle:homeless OR intitle:homelessness OR intitle:houseless OR intitle:houselessness OR intitle:roofless OR intitle:rooflessness OR intitle:"couch surfing" OR intitle:"couch surf" OR intitle:"couch surfer" OR intitle:"couch surfers" OR intitle:"sofa surfing" OR intitle:"sofa surf" OR intitle:"sofa surfer" OR intitle:"sofa surfers" OR intitle:"rough sleeping" OR intitle:"rough sleeper" OR intitle:"rough sleepers" OR intitle:"sleeping rough")*

OR *(intitle:marginalization OR intitle:marginalisation OR intitle:"social exclusion" OR intitle:"social isolation")*

FINNA

(digitalization OR digitalisation OR digitization OR digitisation OR "digital divide" OR technology OR technological)

AND *(homeless OR homelessness OR houseless OR houselessness OR roofless OR rooflessness OR "couch surfing" OR "couch surf" OR "couch surfer" OR "couch surfers" OR "sofa surfing" OR "sofa surf" OR "sofa surfer" OR "sofa surfers" OR "rough sleeping" OR "rough sleeper" OR "rough sleepers" OR "sleeping rough")*

AND *marginalization OR marginalisation OR "social exclusion" OR "social isolation")*

PubMed

(digitalization OR digitalisation OR digitization OR digitisation OR "digital divide" OR technology OR technological) AND (homeless OR homelessness OR houseless OR houselessness OR roofless OR rooflessness OR "couch surfing" OR "couch surf" OR "couch surfer" OR "couch surfers" OR "sofa surfing" OR "sofa surf" OR "sofa surfer" OR "sofa surfers" OR "rough sleeping" OR "rough sleeper" OR "rough sleepers" OR "sleeping rough")) AND (marginalization OR marginalisation OR "social exclusion" OR "social isolation")

Scopus

((digitalization OR digitalisation OR digitization OR digitisation OR "digital divide" OR technology OR technological) AND (homeless OR homelessness OR houseless OR houselessness OR roofless OR rooflessness OR "couch surfing" OR "couch surf" OR "couch surfer" OR "couch surfers" OR "sofa surfing" OR "sofa surf" OR "sofa surfer" OR "sofa surfers" OR "rough sleeping" OR "rough sleeper" OR "rough sleepers" OR "sleeping rough")) AND (marginalization OR marginalisation OR "social exclusion" OR "social isolation")

The search process followed PRISMA guidelines [12] (Figure 1), and inclusion and exclusion criteria were applied during the selection process. The inclusion criteria were: (1) peer-reviewed articles, (2) published in English, (3) within the time frame of 2014-2024 due to the emerging field of digitalization. Exclusion criteria were applied accordingly. In line with the integrative review approach, studies employing various research methods were included [11].

In the initial search phase, publications with titles containing the terms *digitalization*, *homelessness*, *marginalization*, or their synonyms were identified

(Pubmed n=59, Scopus n=7, Google Scholar n=78, SAMK-finna n=161). In the second phase, abstracts from the first phase were screened, and those referring to all three concepts—or their synonyms—were selected for full-text review. Abstracts were jointly assessed by the researchers to determine eligibility. Following this review, 43 scientific articles were selected for full-text review, conducted collaboratively by all authors. Finally, 28 articles were included in the final integrative review (Appendix 1). All stages of the selection process involved the participation of nearly all authors, and inclusion decisions were reviewed, discussed, and finalized by consensus after each phase.

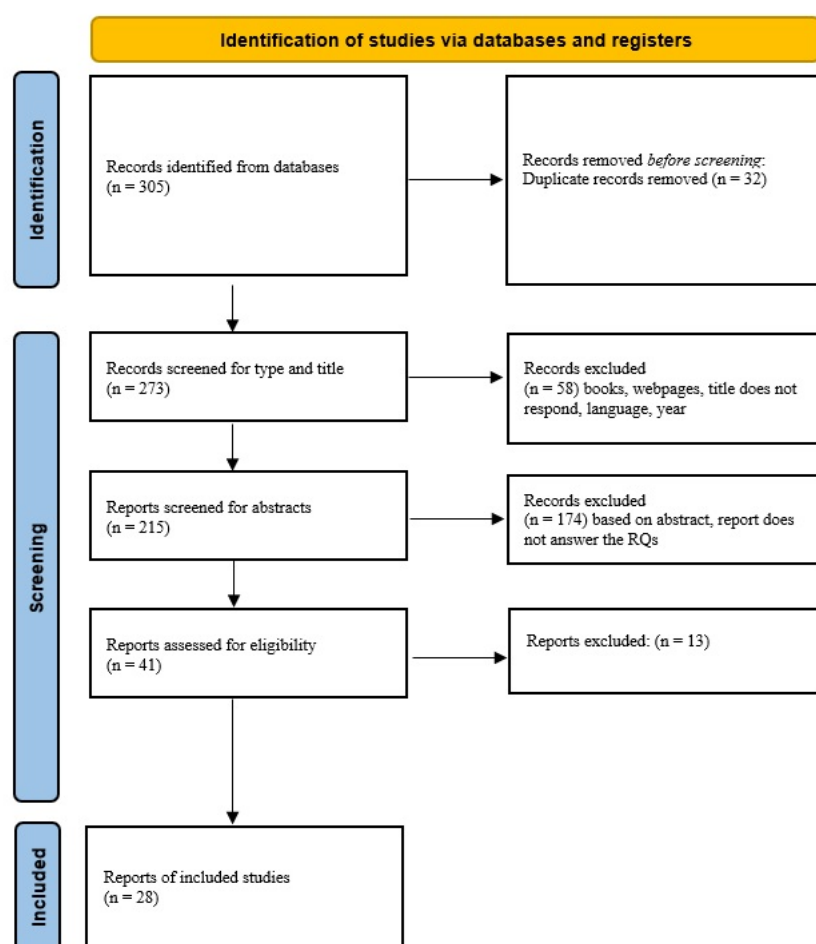


Figure 1. The PRISMA flowchart.

Description of the data

The studies included in this review were conducted across various high- and middle-income countries, with many empirical data originating from English-speaking countries, particularly the United Kingdom, Canada, the United States, and Australia. Additional studies originated from Germany, Sweden, Switzerland, Hungary, Portugal, as well as Israel, China, India, and New Zealand, and broader regions such as the European Union. Contributions from non-Western countries remained limited — highlighting a geographic imbalance in the existing literature published in English. More than half of the articles were published between 2021-2023.

Methodologically, most of the studies reflected a strong emphasis on qualitative, interpretive approaches, including reflexive, ethnographic methods and longitudinal qualitative designs. The review also included a few literature reviews as well as one small-scale corpus analysis. Lived experiences were primary focus of most studies.

Data analysis

The research articles were analyzed using data-driven content analysis guided by the research question. Each study was systematically reviewed, and key information—such as publication year, data, methods, and main findings—was tabulated to provide a structured overview. The analysis focused on identifying factors that facilitated or hindered the use of digital services among people experiencing homelessness, emphasizing perceptions of social inclusion and exclusion and the dual role of digital technologies in creating opportunities and barriers.

The data were then condensed, and subcategories were inductively developed, and organized thematically with attention to their interconnections.

Broader categories were developed to capture the shared content, culminating in the formation of main categories that encapsulated the overarching themes (Tables 2 and 3). This iterative process enabled the synthesis of findings from diverse sources and provided a nuanced understanding of how digitalization affects individuals facing homelessness and marginalization across different contexts [13,14].

Results

In the following, we present the results of our analysis, organized into two main themes: challenging and facilitating factors. Nevertheless, this categorization does not delimit the scope of the analysis, but rather serves as a heuristic, recognizing that the intertwined dynamics of digitalization, homelessness, and marginalization can also extend beyond this division.

Challenging factors

Physical and technical barriers caused challenges in accessing digital services. Due to unstable housing and financial hardship homeless people lacked consistent access to digital devices and internet connection. Instead, they had to rely on occasional wifi-networks and opportunities to charge their mobile phones. Furthermore, public devices were seldom available.

Digitalized service systems caused challenges due to both technical constraints as well as content-related issues. Identification and registration to services require digital user IDs and address information, which homeless people often lack. Furthermore, content for services sometimes failed to consider the realities of homelessness and sometimes assumed access to facilities (e.g., a refrigerator, a toilet) or equipment that people experiencing homelessness might not have had.

Security, trust and privacy issues. Due to homelessness, individuals experienced insecurity and risk of having their digital devices stolen and the challenge of finding a space where digital transactions were safe and private. Borrowing mobile phones from others posed risks, such as the possibility of being linked to crimes committed by previous users, or the exposure of confidential information, like doctors' messages, to outsiders. On the other hand, information privacy threats and a general distrust towards digital services were a barrier to their use and caused anxiety.

General barriers related to socio-economic inequalities and social marginalization include poor digital literacy and technical skills gaps. In addition, homeless people experienced similar challenges as many other disadvantaged people: complex structure of the service system and the potential of digital services led to inaccessible services. Similarly, language challenges also hindered their understanding of digital services.

Table 2. Challenging factors (The numbering used in the table refers to the sources listed in Appendix 1.)

Data simplification e.g.	Sub-category	Category
<ul style="list-style-type: none"> Not enough free Wi-Fi hotspots [21] Difficulty accessing the internet while living on the street [11, 8] 	Limited access to internet	Physical and technical barriers
<ul style="list-style-type: none"> No (free) places to charge the phone [26, 16, 14] No possibilities to maintain the phone, no electricity [14, 12] 	Limited charging possibilities	
<ul style="list-style-type: none"> Phone without a data contract or pay-as-you-go facility [21] Phones being often changed, lost, broken and damaged [12, 2] 	Financial constraints on access to technology	
<ul style="list-style-type: none"> Lack of a mailing address creating barriers to receiving benefits [26] The system and health surveillance do not reach the homeless without an ID card, phone, or number [28, 3] 	Limited possibilities for digital ID	Barriers in digital service system
<ul style="list-style-type: none"> Not enough digital material targeted particularly to the homeless [24] Content does not consider the facilities of homeless people [24, 14] 	Service content design barriers	
<ul style="list-style-type: none"> Fear of phones being robbed or harassment [12, 14, 4] Lacking a private space for remote healthcare services [27] 	Security and trust issues	Security, trust and privacy barriers
<ul style="list-style-type: none"> Fear and anxiety towards using digital services [14] Technological incompetence also causes stress [13] 	Psychological barriers	
<ul style="list-style-type: none"> No help and support available for using technologies [20] Internet access, but no knowledge of how to use the internet [21] 	Weak technical skills	Socio-economic inequalities and social marginalization
<ul style="list-style-type: none"> Digital literacy or general language skills are weak [27, 21, 15] Information acquisition skills can be deficient [23, 21] 	Weak digital literacy skills	
<ul style="list-style-type: none"> Homelessness, diagnosis of psychosis, older age, and low education predicting little use of digital services [17] Not being understood during remote connections due to language barriers [27] The complexity of the healthcare system despite digital access [23, 27] 	General barriers related to socio-economic disadvantage	

Facilitating factors

Digital services contributed to access to healthcare and social services. Remote meetings reduced traveling and scheduling stress. Furthermore, remote meeting reduced the fear of stigmatization. For professionals, digital services enabled close monitoring of patients' well-being during the care process — something that would have been difficult without technology.

Digital services also had significant effect on people's self-efficacy. Digital tools provided a sense of empowerment for homeless individuals within the service system. A mobile phone with unlimited text, calling, and data, as well as access to public transportation, enhanced the ability to navigate the challenges of homelessness.

Digital services enhanced social connections. Mobile phones provided the ability to stay connected with family and friends, thus helping to maintain

social relationships and access social support. Technology also provided a sense of control over one's life by enabling individuals to decide whom to keep in contact with.

Helpful functionalities in apps promoted commitment to digital health services and life balance. Reminders and various wellness monitoring tools helped homeless people stay connected with social and health professionals, reminded them about medication and appointments, gave advice and tips and supported continuity of care.

The articles discussed *digital inclusion and access to information* primarily in terms of conditionality - focusing on *if* and under what circumstances access is provided. They emphasized how offering technology and information *could* or *might* support and promote digital service use among vulnerable groups.

Table 3. Facilitating factors (The numbering used in the table refers to the sources listed in Appendix 1.)

Data simplification e.g.	Sub-category	Category
<ul style="list-style-type: none"> • Telemedicine reduces the need to travel to the doctor and thus improves access to healthcare. [9, 25] • The use of remote connections, such as video calls and telephone calls, enabled the accessibility of services. [3, 27] 	No need to travel	Access to healthcare and services
<ul style="list-style-type: none"> • Remote opportunities can increase comfort for those who find traditional receptions challenging. [27, 1] • Remote receptions can offer more privacy, which may encourage to seek treatment without fear of stigmatization. [27] 	Less emotional stress in remote meetings	
<ul style="list-style-type: none"> • Remote services offered flexibility in terms of schedules, which enabled better adaptation of services to individual needs. [27], • Remote receptions made it possible to extend service hours, which offered patients more options for finding suitable times. [23] 	Flexible scheduling	
<ul style="list-style-type: none"> • Possibility to maintain the continuity of treatment which reduced interruptions and improved treatment results. [3, 18] • Remote connections enabled the monitoring of the patients' condition and need assessment without physical presence. [2, 16] 	Better continuity and commitment	
<ul style="list-style-type: none"> • Text reminders as part of active follow-up and provided reminders and help manage documentation. [23] • Phones enable track and share mood and events over the week. [2, 16] • Online chat services such as mental health counseling were significant for some young people accessing care in a crisis. [23 16] 	Helpful functionalities in apps promote commitment to digital health services and life balance	
<ul style="list-style-type: none"> • Technology offers the possibility to delay responding or limit contact with parents and thus avoid direct emotionally heavy encounters. [10] • Regain control over aspects of their environments and their everyday lives. [26, 6] 	Control of one's own life	Social connections and empowerment
<ul style="list-style-type: none"> • The use of the phone has affected positively the target group's social networks. [19, 26] • Phone provided the ability to stay connected with family and friends. [26, 19, 5] 	Supporting social connection	
<ul style="list-style-type: none"> • The use of the mobile phone has affected positively the target group's self-perceived well-being. [13] • A mobile phone with unlimited functions equipped participants to navigate in service system. [26] 	Feeling empowered in services system	
<ul style="list-style-type: none"> • Accessibility to smartphones would promote the use of digital health services. [21] • Accessibility to the internet would promote the use of digital health services. [21] 	Provision of technology (devices) would promote the use of digital service	
<ul style="list-style-type: none"> • More knowledge and assistance (how to use the internet) would have helped the use of digital health services. [21, 7] • Young people found technology could be a valuable way to find out about services that meet their needs. [22] 	More information would promote the use of digital service	Digital Inclusion and Access to Information

Discussion

This study contributes to research on digital inclusion by offering new insights into how digitalization intersects with homelessness and social marginalization. While earlier studies emphasized the importance of access to technology [4,15], our findings deepen this understanding by showing how digital empowerment and social inclusion are shaped not only by access but also by broader socio-economic conditions and systemic inequalities [4,8]. Beyond the challenging and facilitating factors categorization, the literature also highlights themes such as intergenerational disadvantages and the empowering potential of digital technologies, illustrating the complex intertwined dynamics between digitalization, homelessness, and marginalization.

Homelessness-related issues, including unstable access to devices and internet, create major barriers to digital participation. To address these, essential conditions—including functioning devices, stable internet connections, and safe environments—must be met. However, access to digital technology alone is insufficient for full participation in a digitalized society [4]. Structural disadvantages such as financial hardship, unemployment, and low education further entrench exclusion.

Previous research [4,8] has shown that digital exclusion stems from cumulative and intergenerational disadvantages, including poverty, low educational attainment, poor health, limited digital literacy, and distrust toward digital services. These overlapping forms of disadvantage reinforce each other across multiple life domains, creating systemic barriers that digitalization alone cannot resolve. Addressing these challenges requires broader efforts to combat social marginalization, not merely the elimination of homelessness [5,6].

Low educational attainment and limited digital skills, common among social marginalized groups [9], continue to hinder full participation in digitalized societies. Also these challenges reflect deeper structural inequalities related to wealth distribution, educational opportunities, and institutional exclusion. As previous research highlights, the digital divide not only mirrors but also reinforces broader patterns of social inequality [8]. Addressing digital exclusion thus requires comprehensive, multi-level strategies that tackle underlying social marginalization rather than focusing solely on technology or skills provision.

However, consistent with previous research on the empowering potential of digital technologies [15], our findings also reveal positive aspects: digital services can offer new opportunities for participation, autonomy, and connectivity, benefiting both people experiencing homelessness and the general public. Furthermore, our findings indicate that digital services can significantly enhance inclusion for people experiencing homelessness and socio-economic disadvantage. According to analyzed studies, digital tools helped participants stay connected to professionals and service systems, facilitating navigation through the often fragmented landscape of support services.

Our findings indicate that digital tools can mitigate some effects of exclusion by facilitating access to professionals, services, and support networks, helping individuals navigate fragmented service systems—an observation consistent with earlier findings among the general population [15]. Beyond practical benefits, digital engagement fostered participants' autonomy, competence, and capacity for self-management. Access to mobile phones and online resources enabled greater independence in organizing daily tasks and engaging with services, while also strengthening individuals'

belief in their ability to take control over their lives—marking a significant shift from previous experiences of bureaucratic exclusion.

This research has several limitations. National policies, welfare models, and digital infrastructure can significantly shape the experiences of digital inclusion and exclusion [15]. Also, the study may underrepresent the experiences of the most marginalized individuals—those with no stable internet access, no functioning digital devices, or severe exclusion from service systems. Previous research highlights that individuals in the deepest forms of marginalization are often the least visible in digital inclusion studies [8]. Finally, while this study identifies critical themes and user needs, it does not capture longitudinal changes or the evolving nature of digital engagement over time.

A potential limitation of this review is the absence of direct searches in social science specific databases. Nevertheless, this limitation is likely attenuated by our comprehensive search strategy, which included Scopus, Google Scholar, and the SAMK-Finna, all of which offer broad multidisciplinary coverage and thereby reduce the risk of omitting relevant studies. To enhance transparency and reproducibility, all search strategies and screening procedures are documented in detail in the supplementary materials.

The results are limited by the articles included which reflect exclusively Western societies. Therefore, the results do not reflect the situation in rapidly technologically advanced developing countries.

Conclusions

This analysis underscores the intertwined dynamics relationship between digitalization, homelessness, and social marginalization. While digital services

can foster inclusion and empowerment, they may also reinforce existing structural inequalities. Meaningful digital inclusion requires more than access to technology; it demands addressing broader socio-economic barriers such as unstable housing, financial hardship, low digital literacy, and institutional distrust. Digital exclusion both reflects and reproduces social inequality, underscoring the need for holistic, structural solutions beyond technological provision.

When designing digital and social services for an increasingly digitalized society, it is essential to consider the realities of people experiencing homelessness. Services must adapt to unstable living conditions, differing levels of digital competence, and be co-created through inclusive, participatory processes that actively involve marginalized communities. Trust-building, accessibility, and flexibility are essential to ensure that digitalization promotes, rather than restricts, social inclusion.

Future research should use longitudinal and comparative approaches to examine how digital empowerment develops across time and different socio-economic contexts, with particular focus on interventions that enhance digital literacy and trust in digital services. Policy-oriented studies are needed to assess whether digitalization truly promotes inclusion for marginalized populations or inadvertently reinforces inequality.

Conflict of interest statement

The authors report no conflicts of interest in this work.

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Appendix 1.

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