

Beyond Access: Public Policies and Digital Skills as Determinants of Digital Inclusion

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ABSTRACT

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This article examines the determinants of digital inclusion, focusing on the digital divide and its socioeconomic impact. Through a literature review, key factors such as technological access, digital skills, and public policies are identified. The methodology included an exhaustive search of academic databases using specific keywords and rigorous inclusion criteria, followed by thematic analysis based on Braun and Clarke's method. The results indicate that the availability of technological infrastructure, affordability, and the development of digital competencies are essential for digital inclusion. Additionally, public policies play a crucial role in promoting digital equity. The conclusions suggest that a multidimensional strategy is necessary to promote effective digital inclusion, ensuring equitable participation in the information society and contributing to socioeconomic development. This study reaffirms the need for proactive public policies and inclusive educational programs that address both technological access and digital skills.

1. INTRODUCTION

Currently, digitalization has taken a leading role in our daily lives, transforming socio-economic dynamics worldwide. Digital inclusion, understood as equitable and effective access to information and communication technologies (ICT), has become an essential pillar for development, education, and civic participation [1, 2]. Digital inclusion goes beyond mere access to devices and the internet; it entails ensuring that all individuals, regardless of their geographic location, socio-economic status, or age, have the opportunity to actively participate in the digital economy and civic life. According to the World Bank [3], the digital sector plays a fundamental role in driving economic growth and job creation, particularly in developing economies, where it can help reduce the digital divide and foster economic inclusion.

However, the digital divide persists, delineating a profound division between those who have access to digital tools and those who are marginalized [4-6]. The digital divide is not only a matter of access to technological infrastructure but is also closely tied to individuals' ability to use these technologies effectively. Mere technological access is insufficient to ensure the development of capacities to engage harmoniously in the so-called Information and Knowledge Society. The lack of digital skills and the absence of adequate public policies exacerbate this disparity, preventing many individuals from fully leveraging the benefits of digitalization [7, 8].

This study aims to explore the determinants of digital inclusion, focusing on three fundamental aspects:

technological access, digital skills, and the framework of public policies. Various studies have highlighted the importance of technological infrastructure and affordable access as prerequisites for digital inclusion [9, 10]. However, access alone is not sufficient; the skills to effectively use ICT and the creation of relevant content are equally critical [8, 11, 12]. Additionally, public policies play a decisive role in promoting digital inclusion through the implementation of strategies that ensure access and foster the development of digital competencies across the population [13, 14].

Through an exhaustive literature review, this study identifies and analyzes the factors contributing to digital inclusion. This analysis seeks to understand how these determinants interact and which strategies are most effective in overcoming the digital divide. The literature review focused on identifying empirical and theoretical studies that address the three mentioned pillars, providing a comprehensive view of the challenges and opportunities presented by digital inclusion. The findings of this study are expected to contribute to the debate on how to ensure that the benefits of the digital era are accessible to all, providing a framework for future research and public policies aimed at promoting a more inclusive society.

The paper is structured as follows. Section 2 presents the literature review focusing on studies related to the determinants of digital inclusion. The methodology is described in Section 3. Section 4 describes the analysis of results and discussion. Finally, conclusions are presented in Section 5.

2. LITERATURE REVIEW

Digital inclusion is a multifaceted concept that entails more than mere access to devices and internet connectivity. It focuses on ensuring that all individuals, regardless of their geographic location, socio-economic status, or age, can fully participate in the digital economy and civic life [1, 2, 12]. Conversely, the digital divide refers to the disparity between those who have access to ICT and those who do not. This divide involves not only a lack of physical access to devices and connectivity but also a deficiency in the skills necessary to use these technologies effectively [1, 9, 10]. According to Van Deursen and Van Dijk [10], the digital divide has evolved from inequalities in physical access to inequalities in material access and competent use of ICT.

In this context, digital inclusion aims to bridge this gap by ensuring that all individuals, regardless of their context, can fully participate in the digital economy and civic life [15]. Existing literature addresses several critical aspects of digital inclusion, emphasizing the importance of technological access, the development of digital skills, and the role of public policies [9, 13, 16]. This section reviews these key components in detail, integrating theoretical and empirical perspectives to provide a comprehensive understanding of the topic.

Access to technological infrastructure is essential for digital inclusion, but by itself does not guarantee that everyone can benefit from ICT. Rural areas and low-income communities face significant barriers due to insufficient infrastructure and the high costs associated with internet access and technological devices [17, 18]. The digital divide manifests not only in the physical availability of these technologies but also in people's ability to use them effectively. Studies have shown that inequalities in material access have displaced physical access inequalities as the primary focus of the digital divide [10].

Digital skills are another crucial factor for digital inclusion. These skills range from basic digital literacy to advanced competencies necessary for employability and civic participation [19, 20]. The lack of these skills can be a significant barrier to full participation in the digital society. Hargittai [11] and Van Dijk [12] found that differences in internet use among young adults are strongly influenced by their digital competencies, highlighting the need for continuous educational programs that develop these essential skills [16]. Digital skills not only enable individuals to use technology effectively but also foster the creation of relevant content and the productive use of ICT [8, 16].

Public policies play a vital role in promoting digital inclusion. These policies must address both economic and educational barriers, providing subsidies for internet access and technological devices, as well as promoting educational programs that enhance the digital competencies of the population [4-6]. Rivoir et al. [14] emphasize that government interventions can facilitate both the expansion of infrastructure and the development of digital skills through specific programs. The OECD (Organisation for Economic Co-operation and Development) also underscores the importance of proactive public policies to ensure that the benefits of digitalization are distributed equitably across all sectors of society [5, 6].

Although significant progress has been made in expanding access to technological infrastructure, barriers persist that prevent complete digital inclusion. Public policies that integrate infrastructure provision with educational programs

for developing digital skills have proven to be the most effective in closing the digital divide. The literature review underscores the need for a multidimensional approach to addressing digital inclusion. The interaction between technological access, digital skills, and public policies is crucial for fostering equitable participation in the information society. This holistic perspective provides a solid conceptual framework to guide future research and the formulation of public policies aimed at promoting a more inclusive society, ensuring that the benefits of the digital era are accessible to all.

2.1 Thematic analysis

Thematic analysis, based on the method by Braun and Clarke [21], is a qualitative technique used to identify, analyze, and report patterns within data. This approach allows for the detailed organization and description of data, and subsequently, the interpretation of various aspects of the research topic. Characterized by its flexibility, thematic analysis is particularly suitable for exploratory studies where the data may be complex and varied.

This study employs thematic analysis to delve into the determinants of digital inclusion, enabling a detailed understanding of how factors such as technological access, digital skills, and public policies interact. This method facilitates the identification of recurring and emerging themes in the literature, providing a solid foundation for the development of effective strategies to overcome the digital divide.

3. METHODOLOGY

This study is based on a qualitative approach through a systematic literature review, allowing for the identification, analysis, and synthesis of existing evidence on the determinants of digital inclusion. This approach specifically focuses on technological access, digital skills, and public policies.

The systematic literature review (see Figure 1) is a rigorous technique that follows a clearly defined sequence of steps to ensure the objectivity and reproducibility of the results. The process began with the definition of research questions, which in this case sought to identify the factors influencing digital inclusion and to evaluate how these factors interact.

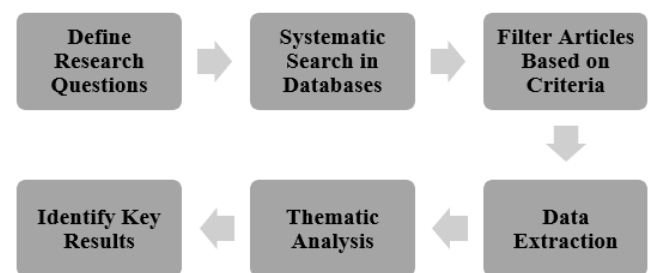


Figure 1. Systematic literature review

Subsequently, a review protocol was defined, establishing the inclusion and exclusion criteria, data sources, and search strategies. The inclusion criteria encompassed peer-reviewed articles, reports, and case studies published in English and Spanish from 2010 to 2023, addressing digital inclusion. The data sources included academic databases such as JSTOR, Web of Science, Google Scholar, and Scopus.

Specific keywords like “digital divide,” “access to ICT,” “digital skills,” and “digital public policies” were used. The initial search identified many potentially relevant studies, which were filtered according to the inclusion criteria, resulting in a selection of studies that provided empirical evidence on the impact of the determinants of digital inclusion (see Figure 2).

Data extraction was conducted systematically, collecting relevant information from each selected study, including the methodology, study population, determinants of digital inclusion examined, and main findings. These data were organized into a synthesis matrix (see Table 1), which facilitated the systematic comparison of studies and the identification of common patterns and themes

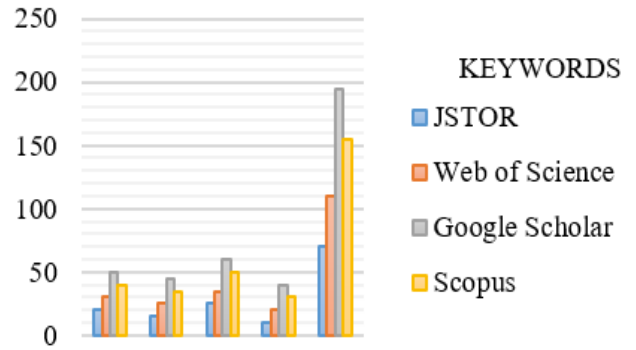


Figure 2. Articles found according to criteria

Table 1. Summary of key studies on the determinants of digital inclusion

Autor(s)	Year	Methodology	Study Population	Digital Inclusion Determinants Examined	Main Findings
Hargittai [1]	2010	Survey and statistical analysis	Young adults	Digital skills, access to ICT.	Digital skills are critical for reducing the digital divide.
Van Deursen and Van Dijk [10]	2019	Quantitative analysis	Internet users	Material access, digital skills.	The digital divide has evolved into inequalities in material access.
Gómez Navarro et al. [4]	2018	Conceptual review	Case studies in Mexico	Public policies, access to ICT.	Public policies are essential for digital inclusion.
Sieck et al. [17]	2021	Case study and qualitative analysis	Vulnerable communities	Access to ICE, digital skills.	Digital inclusion significantly impacts public health.
Smith and Storrs [22]	2023	Quantitative research	Digital content creators	Digital skills, content creation.	Digital content creation is key for digital inclusion.
Rivoir et al. [14]	2021	Policy analysis	Latin American countries	Public policies, access to ICT.	Proactive public policies are crucial for digital equity.
Selwyn [13]	2010	Quantitative study	University students	Digital skills, access to ICT.	Digital skills are determinants in higher education.
Cepal [5]	2020	Policy report	Latin American countries	Public policies, access to ICT.	Digital transformation is essential for economic recovery.
Pérez-Escoda et al. [23]	2017	Quantitative study	ICT users	Digital skills, media literacy.	Digital skills enhance critical thinking.
Vosloo [20]	2023	Policy guidelines	Developing countries	Public policies, access to ICT.	Accessibility and digital literacy are vital for inclusion.

For the analysis of the collected data, thematic analysis was used to identify, analyze, and report patterns within the data, providing a detailed description and interpretation of various aspects of the research topic [21]. Thematic analysis is especially useful in exploratory studies where data can be complex and varied, as it allows for great flexibility in organizing and presenting the results.

The thematic analysis was developed in several phases. First, the data were familiarized through repeated reading of the selected studies, identifying initial ideas and concepts.

Then, initial codes were systematically generated across the entire data set, grouping relevant data for each code. These initial codes were reviewed and refined, then grouped into broader themes (see Table 2).

The identified themes included the availability of technological infrastructure, the affordability of digital services, the development of digital skills, and the role of public policies in promoting digital inclusion.

The review of themes was conducted at two levels (see Table 3). At the first level, the coded themes were reviewed to ensure they formed a coherent pattern. At the second level, the themes were reviewed in relation to the complete data set, ensuring that the identified themes adequately represented the collected data. This review allowed for the refinement and clear definition of each theme, providing a coherent narrative

that integrates the findings of the reviewed studies.

Table 2. Initial code and description

Initial Code	Description
Technological access	Availability and affordability of technological infrastructure and internet access.
Infrastructure costs	Impact of the costs associated with internet access and devices on digital inclusion.
Basic skills	Essential digital competencies for digital literacy.
Advanced skills	Digital competencies necessary for employment and civic participation.
Public policies	Government initiatives to promote access to ICT and develop digital skills.
Socioeconomic impact	Effects of digital inclusion on economic growth and job creation.
Educational programs	Educational efforts to improve digital competencies across diverse populations.
Digital equity	Measures to ensure that all sectors of society have equitable access to ICT.
Social inclusion	Promotion of active participation in the digital society regardless of social status.
Digital empowerment	Empowerment to use ICT effectively and participate in the digital economy.

Note: The initial codes were grouped into broader themes to facilitate the analysis and interpretation of the data concerning digital inclusion and its determinants.

Table 3. Levels of review

Level	Activities Performed	Results
First level	Review coded themes to form a coherent pattern.	Identification of 10 key themes grouped into coherent and meaningful categories.
Second level	Review themes in relation to the complete data set.	Confirmation that the identified themes adequately represented the data.
Theme refinement	Refine and clearly define each theme.	Provide a coherent narrative that integrates the findings of the review studies.

Note: A two-level review process was implemented to ensure the coherence and representativeness of the identified themes in relation to the collected data.

4. RESULTS

The systematic analysis of the literature enabled the identification and synthesis of the key determinants of digital inclusion, focusing on three fundamental aspects: technological access, digital skills, and public policies. These determinants are crucial for understanding and mitigating the digital divide, which remains a significant barrier to equitable participation in the information society.

Technological access stands out as an essential factor for digital inclusion. However, the reviewed studies indicate that mere availability of technological infrastructure and internet access is not sufficient to close the digital divide. Rural areas and low-income communities face significant challenges due to inadequate infrastructure and high costs associated with internet access and technological devices [17, 18]. This finding is reflected in the studies of Prom Tep et al. [24], which indicate that the digital divide has evolved into inequalities in material access. Digital transformation requires not only the expansion of technological infrastructure but also the affordability of digital services to ensure equitable access.

Digital skills emerge as a critical component of digital inclusion. Hargittai [1, 11] emphasizes the importance of digital competencies, ranging from basic digital literacy to advanced skills necessary for employability and civic participation. Digital skills enable individuals to effectively use ICT, which is fundamental for meaningful digital inclusion [15, 16]. Digital content creation is also identified as a key factor in empowering individuals and fostering their inclusion in the digital economy [8, 22]. Evidence suggests that continuous educational programs are necessary to develop these skills and reduce inequalities in ICT usage.

Public policies play a vital role in promoting digital inclusion [24]. The reviewed studies, such as those by Gómez Navarro et al. [4] and Rivoir et al. [14], highlight that governmental interventions are essential to reduce economic barriers and provide subsidies for internet access and technological devices. Additionally, policies must promote educational programs that enhance the digital competencies of the population. The OECD emphasizes that proactive policies are crucial to ensure that the benefits of digitalization are distributed equitably across all sectors of society [5]. Effective and well-designed governmental interventions can play a crucial role in mitigating digital disparities [6].

Furthermore, the digital divide remains a significant concern in the realm of digital inclusion. The literature review shows that this divide manifests not only in physical access to technology but also in the capacity to use these technologies

effectively. According to Selwyn [13], digital skills are crucial determinants in higher education and contribute to reducing this divide [20, 22]. The OECD and ITU (International Telecommunication Union) emphasize that digital transformation is essential for economic recovery, especially in disadvantaged regions [5, 6]. In essence, the digital divide is not only a matter of access to devices and internet connectivity but also of skill development and institutional support.

5. DISCUSSIONS

The findings of this study underscore the need for an integrated and multidimensional approach to addressing digital inclusion [24, 25]. The interaction between technological access, digital skills, and public policies is fundamental to promoting effective and equitable digital inclusion. Access to technology must be accompanied by initiatives that develop digital skills and public policies that mitigate economic and educational barriers. The studies by Hargittai [11] and Van Dijk [12] and Van Deursen and Van Dijk [10] provide evidence that digital competencies are essential to reducing the digital divide and promoting active participation in the digital society. Additionally, the review of public policies by Gómez Navarro et al. [4] and Rivoir et al. [14] highlights the importance of effective and well-designed governmental interventions.

The digital divide is not only a matter of access to devices and internet connectivity but also of skill development and institutional support. Efforts to close this divide must be broad and holistic, integrating both the provision of infrastructure and the training in digital skills. The evidence suggests that public policies must be inclusive and designed to provide equitable access to ICT, as well as to foster the creation and use of relevant digital content. Only through a cohesive approach that addresses all these dimensions will it be possible to achieve true and sustained digital inclusion.

6. CONCLUSIONS

The systematic review of the literature on digital inclusion and its determinants highlights the importance of an integrated approach to addressing the digital divide. This study confirms that technological access, digital skills, and public policies are interdependent and critical factors in achieving effective digital inclusion. The evidence indicates that the absence of any of these elements can significantly hinder access to and productive use of ICT, thereby perpetuating socio-economic inequalities.

Firstly, the availability of technological infrastructure remains a significant barrier, particularly in rural areas and low-income communities. Although efforts have been made to expand access to the internet and technological devices, persistent inequalities continue to limit the ability of certain groups to fully participate in the digital economy. Affordability and quality of access remain key aspects that require the implementation of effective public policies and sustained investment in technological infrastructure.

Secondly, digital skills demonstrate that providing access to ICT alone is insufficient; individuals must also possess the necessary competencies to use them effectively. While basic digital literacy enables initial access, the development of advanced competencies is essential for improving

employment opportunities and enhancing civic participation. The ability to create digital content and critically navigate online resources should be fostered through continuous educational programs, as the absence of these skills significantly limits the benefits of digitalization.

Finally, public policies play a crucial role in promoting digital inclusion. Government interventions must focus on reducing economic barriers, facilitating access to the internet and technological devices, and promoting educational strategies that strengthen the population's digital competencies. The design and implementation of inclusive policies will ensure that digitalization generates equitable benefits and contributes to narrowing the digital divide, thereby fostering greater socio-economic equity.

The findings of this study emphasize that digital inclusion requires a continuous commitment to developing comprehensive strategies that address the multiple dimensions of the digital divide. The combination of adequate technological infrastructure, the enhancement of digital skills, and the implementation of effective public policies are essential elements in achieving sustainable and equitable digital inclusion. Digital transformation should not be perceived solely as a technological process but as a means to promote socio-economic development and active civic participation.

In conclusion, digital inclusion extends beyond mere access to ICT. It is a multidimensional phenomenon that involves technological, educational, and political factors that, when properly integrated, can help close the digital divide and ensure equitable participation in the information society. This study aims to provide a solid foundation for future research and public policy design aimed at fostering a more inclusive and equitable society, where all individuals can fully benefit from technological advancements and digitalization.

As part of future research directions, it would be valuable to explore the impact of emerging technologies on digital inclusion, examine the role of digital literacy programs across various socio-economic contexts, and assess the long-term effects of public policies in reducing the digital divide.

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