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# Conference Paper Bibliometric Analysis of European Research on Digital Divide: An Exploration of the Corporate Landscape

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# Bibliometric Analysis of European Research on Digital Divide: An Exploration of the Corporate Landscape

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#### Abstract:

This research provides an exhaustive analysis of the European digital divide literature's evolution and current state, particularly emphasizing the often-underexplored corporate sector. The digital divide, denoting disparities in digital access, literacy, and fluency, has become a critical concern in the era of rapid digital transformation. Despite its significance, research on the corporate digital divide is limited. This study aims to address this gap to advance in different research avenues on digital disparities in the business realm. Using a dataset of 1609 documents published from 2000 to 2022, extracted from Web of Science, Scopus, and Dimensions, the study employs three bibliometric techniques—performance analysis, science mapping, and network analysis—to examine the research landscape, including scientific output, impact, and intellectual structure within the field. The research uncovers key trends and shifts in European digital divide research access inequalities to a nuanced understanding of skills and usage disparities, reflecting the multifaceted nature of the digital divide. The study reveals a significant gap in the literature regarding the corporate digital divide, with only 30 out of the 1609 documents directly addressing this area. It further identifies leading institutions, publications, and thematic clusters in digital divide research, emphasizing the role of intellectual interactions and thematic connections in shaping the field.

Keywords: Digital Divide, Bibliometric Analysis, European Research, Corporate Digital Divide, Digital Divide Evolution.

### 1. Introduction

The rapid advancement of digital technologies has transformed different aspects of our daily life. As a result, the digital divide - the disparity among actors in society and the economy who lack access, literacy, and fluency in digital technologies - has emerged as a significant concern for policymakers and researchers. The digital divide is a term used interchangeably with the digital gap, digital inequality, and digital disparity, which began to gain more attention among researchers and policymakers in the mid-1990s. At that time, the scientific community began the first attempts to conceptualize factors, effects, and causes of the digital divide compelled by the new technological paradigm.

Following Regneda (2017) and van Deursen and Helsper (2015) the extensive body of research on the digital divide has distinguished three waves of research, each building upon the previous to expand our understanding of the concept. The first wave, which started in the mid-1990s, resulted from the computerization and commercialization of the internet and focused on the inequalities that arose from the unequal distribution of computer technology and internet access, known as the first-level digital divide. During the second wave of research, the focus shifted to examining the technology adaptability of individuals and how exposure to existing technologies could lead to exclusion and inequality for those who have or lack the skills to use digital technologies and navigate the digital world. This emphasis on skills and usage resulted in a more nuanced interpretation of what is known as the second-level digital divide. The third wave of research builds upon the inequalities identified in the first and second levels. This wave shifts the focus to analysing the disparities in the outcomes individuals receive even if they have access and adequate skills but differing levels of internet usage. Although digital technologies have gained prominence and extensive research has been conducted on the digital divide in Europe, the majority of studies have concentrated on the divide among households, individuals, and demographic groups (Elena-Bucea et al., 2021; Livingstone & Helsper, 2007; Ragnedda, 2017; van Deursen & van Dijk, 2014; van Dijk & Hacker, 2003) rather than businesses. While this focus on households and individuals offers crucial insights into the digital divide, Bach et al. (2013), Cirera et al. (2022), and Shakina et al. (2021) argue that a deeper understanding of the divide within the corporate sector is necessary. This divide is particularly relevant for European enterprises, as it can impact their competitive advantage, innovation potential, and contribution to regional economic development.

The main objective of this study is to provide a comprehensive understanding of the current state of European research on the digital divide by utilizing three bibliometric techniques, including performance analysis, science mapping, and network analysis. These analytical tools will allow a broader examination of the research landscape, including scientific output, impact, and intellectual structure within the field.

By applying a combination of techniques such as citation and co-citation analysis, bibliographic coupling, and network analysis, this study not only aims to identify leading publications, authors, themes, and collaborations within the field but also to visualize the intellectual structure and evolution of the field over time. This integrated analysis will also facilitate a more exhaustive exploration of the corporate digital divide and provide insight to answer the following research questions through a holistic lens:

- a) What have been the main trends and shifts in the focus of European research on the digital divide over time, and how the intellectual structure and the thematic relationships shape the current state of knowledge in this field?
- b) What are the key themes and subtopics related to the digital divide in European research, and how are they grouped or clustered in the literature?
- c) How is the corporate digital divide addressed in European research on the digital divide, and what areas have been largely unexplored in this field?

An analysis of 1,609 scientific publications between 2000 and 2022 collected from three different data sources (the Web of Science, Scopus, and Dimensions) is conducted in this study to answer these research questions. Furthermore, by merging bibliographical information from these data sources, this study sets itself apart by employing a broader and diverse range of bibliographical data on the digital divide. This approach enables a more comprehensive investigation of scientific output and the influence of European research in the field. Moreover, the study will assess the most impactful research across three distinct periods (2000-2007, 2008-2015, and 2016-2022) to evaluate the literature's evolution and novel findings. Prior bibliometric studies on the digital divide have concentrated on specific fields, such as health sciences or computer science. By extending the application of bibliometric analysis beyond these fields, diverse insights may emerge. Additionally, the absence of a particular focus on the digital divide within the European context underscores the need for further exploration in this region.

## 2. Literature review

### Digital divide: An evolving concept

The widespread adoption of Internet and computer technologies in the late 1990s marked a turning point in the ongoing digital and technological revolution while concurrently giving rise to a new form of inequality. This inequality, later acknowledged as the "digital divide" in US government policy reports, ignited a nationwide debate. In Europe, seminal research by Norris (2001), Castells (2002), James (2002), Dutton et al. (2004), and Selwyn (2004) initially framed the digital divide as a binary issue, commonly referred to as the first-level digital divide. This divide drew a clear distinction between those with and without access to the internet and computer technologies. Despite the evolving concept of the digital divide, recent studies such as Conrad et al. (2019) and Bychkova et al. (2020) underscore that certain socioeconomic groups and remote regions continue to face substantial barriers to access, suggesting that the matter of access remains relevant. In response to this ongoing concern, other research, including McMenemy(2022), offers policy recommendations that advocate for internet access as a fundamental right, emphasizing the interrelated nature of these various perspectives on the digital divide.

While this early definition of the digital divide as a dichotomous matter of technology access was a starting point for discussions, subsequent research by van Dijk (2005, 2006), van Deursen and van Dijk (2010), van Deursen and van Dijk (2014), and Hargittai (2002) evolved this understanding into a more nuanced and multidimensional approach, referred to as the second-level digital divide. These researchers contended that with the increasing ubiquity of technology access, disparities in internet usage and digital skills could exacerbate the divide. This body of work suggests that the divide extends beyond mere access to technology, encompassing the ability to effectively search, access, and evaluate information using digital technologies. In line with this perspective, additional research, such as studies by González et al. (2017) and Spada et al. (2022), posits that developing digital skills during higher education could be essential in mitigating the second-level digital divide.

With the rapid advancement of technologies, scholars such as van Deursen and Helsper (2015)v, Regneda (2017), and Sheerder et al. (2017) have further expanded the definition of the digital divide to encompass what is now referred to as the third-level digital divide. They argue that despite individuals having independent access and sufficient skills, disparities may still arise due to variations in the returns obtained from internet usage.

As highlighted by Regneda (2017), the third-level digital divide investigates the impact of digital technologies on individuals' lives, focusing on enhancing personal and professional aspects through the capacity to benefit from digital technologies in a data-driven market. Building on this perspective, recent research by De Marco (2022) and Merisalo and Makkonen (2022) emphasizes that fully leveraging the potential of digital technologies depends on access to the latest advancements and proper utilization that aligns with the user's goals. The third-level digital divide highlights the interconnected nature of the various dimensions of the digital divide and the need for a deeper understanding of the issue.

The digital divide, as a concept, has undergone substantial transformations as technology advances. According to Regneda (2017), to remain relevant and accurate, any definition of the digital divide must keep pace with technological advancements to provide a solid and relevant understanding of the concept. Furthermore, Van Dijk (2003) demonstrated that the digital divide is a complex and dynamic phenomenon, reflecting the rapidly changing landscape of technology and the multifaceted complexities that it brings to society.

## Complexities of the digital divide

As we delve into the evolving nature of the digital divide, it is essential to recognize the multiple complexities researchers face when examining this multifaceted phenomenon. Following van Dijk (2005), Helsper (2012), Regneda (2017), and Regneda and Kreitem (2018), the digital divide's emergence is deeply intertwined with existing social and economic disparities. For example, numerous studies have demonstrated the interplay of the digital divide with various demographic variables such as income (Elena-Bucea et al., 2021; Fuchs, 2009; Ragnedda & Muschert, 2013; van Deursen et al., 2015; van Dijk & Hacker, 2003), education (Becker, 2022; Cruz-Jesus et al., 2016; Eynon, 2009; Pieper et al., 2003; Santos et al., 2013; Selwyn et al., 2001); age (Agudo-Prado et al., 2012; Camerini et al., 2018; Livingstone & Helsper, 2007; Marimuthu et al., 2022; Niehaves & Plattfaut, 2014; Paul & Stegbauer, 2005), gender (Mariscal et al., 2019; Minguez, 2005; Picatoste et al., 2022; van Deursen et al., 2015; Winker, 2005), race and ethnicity (Bartikowski et al., 2018; D'Haenens et al., 2007; Gladkova et al., 2022; Milioni et al., 2014; Spaiser, 2011; van Dijk & Hacker, 2003).

Studies like James (2002), Andrés et al. (2010), Dutt and Kerikmäe (2014), and di Prisco and Strangio (2021) have examined the macro-dimensions of the digital divide, delving into global disparities in internet penetration, infrastructure, and connectivity within low- and high-income countries. Other works have focused on how geography determines access and connectivity (Blank et al., 2018; Ferro et al., 2005; Gómez-Barroso & Pérez-Martínez, 2007; Palop García et al., 2014; Rodríguez-Hevía et al., 2022; Taipale, 2013). Additionally, investigations by Norrris (2001); Kolsaker and Lee-Kelley (2006); Fernandez-Prados et al. (2021), and Natalia (2022) have explored the impact of the digital divide on democracy, assessing its influence on political participation and civic engagement. They have also scrutinized how digital technologies shape the interactions between individuals and governments.

# Theoretical Frameworks and Methodologies in the Study of the Digital Divide

Interdisciplinary collaboration is vital in comprehending the complex issue of the digital divide. Van Dijk (2017) illustrates that early research involved experts from multiple fields, such as communication science, sociology, psychology, economics, and education science. As digital technologies were diffusing, experts from additional fields, such as informatics, information systems, business, management, and health science, have also contributed to studying the digital divide.

Aiming to fill the conceptual and theoretical gap within digital divide research, van Dijk (2005) formulated the resource and appropriation theory. Nevertheless, as Pick and Sarkar (2016) indicated, several other theories and frameworks have been adapted to elucidate the digital divide, such as Rogers' (2003) innovation diffusion theory, the Unified Theory of Acceptance

and Use of Technology (UTAUT) by Venkatesh et al. (2003), Sen's (1999) capability approach, Regneda's (2017) stratification perspective in the digital era based on Weber's ideas, and Regneda's (2017, 2018) incorporation of Bourdieu's concept of capital to define digital capital.

In terms of methodologies, researchers have employed a diverse range of quantitative and qualitative approaches to understand the digital divide better. Quantitative methods such as surveys, statistical analyses, and econometric models (Gounopoulos et al., 2018; Lengsfeld, 2011; Ojiako et al., 2019) have been instrumental in identifying patterns and correlations between various factors affecting digital inclusion. These methods allow for large-scale data analysis and generalizable findings. However, they may not capture the subjective experiences of individuals and communities. In contrast, qualitative approaches, including case studies, interviews, and ethnographic research (Carlo & Bonifacio, 2021; Ferreira et al., 2017; Tsatsou, 2008), offer rich insights into the lived experiences of individuals and communities in the context of the digital divide. These methods provide depth and context to the understanding of digital inequality but may only sometimes be generalizable to larger populations. By combining these complementary methods, researchers have developed a more nuanced understanding of the complex interplay between socioeconomic, cultural, and technological factors contributing to digital inequality. As the digital landscape continues to evolve, future research must adapt and refine these methodologies to capture the dynamic nature of the digital divide and inform effective policy interventions.

# **Global Perspectives on the Digital Divide: Expanding the Horizon**

In addition to European research on the digital divide, it is essential to acknowledge insights from global perspectives to develop a broader understanding of the subject. Research conducted in various regions offers valuable findings and diverse approaches that can enhance our comprehension of the digital divide's dynamics and consequences in the global context.

For example, research in the United States by scholars like DiMaggio and Hargittai (2001) addressed the implications of the internet in society, Jackson et al. (2008)and Sanders and Scanlon (2021) have given evidence of the effects of digital inequalities on race and gender, and Gonzalez (2016) have revealed that patterns of technology usage among different states are linked to socioeconomic variables and cultural settings.

In Asia, studies by Wen et al. (2023), Rajam et al. (2021), and Chetty et al. (2018) have examined the digital divide from the perspective of emerging economies, highlighting the importance of government policies and institutional frameworks. These studies stress the need for suitable infrastructure, affordable access, and education programs to promote inclusive digital adoption among individuals and businesses.

Furthermore, African scholars such as Mutula (2010), Yina(2020), and Aruleba (2022) have investigated the digital divide's impact on individuals in the context of developing countries. They highlight the importance of digital literacy initiatives, community-driven endeavours, and partnerships between governments, private sectors, and international organizations to address digital inequalities effectively.

These diverse perspectives provide valuable insights into the multifaceted nature of the digital divide and can inform future research and policy recommendations in both European and global contexts.

# The Corporate Digital Divide: An Underexplored Dimension

While the extensive body of research has predominantly addressed the digital divide from an individual perspective, it is crucial to consider its implications at the firm level. The corporate digital divide refers to the disparities in the capabilities to access, use, and adopt digital technologies among businesses, which can impact their competitiveness, productivity, and innovation (Ancillai et al., 2023; Calvino et al., 2022; Cirera et al., 2022; Scuotto et al., 2021; Shakina et al., 2021), such disparities may lead to firms falling behind, ultimately affecting overall economic growth and intensifying income inequalities between businesses. Various factors can contribute to these disparities, including firm size, industry sector, geographical location, and the availability of financial and human resources (Bach et al., 2013; Torrent-Sellens et al., 2022). For instance, small and medium-sized enterprises (SMEs) in rural areas may face more significant challenges accessing high-speed internet and attracting skilled digital talent than large corporations in urban centres.

Examining the corporate digital divide is crucial. It reveals the potential consequences of digital inequalities on the larger economic landscape and market dynamics, including the potential for hindered economic growth and exacerbated income disparities. In the European context, studies by Tylor and Murphy (2004), Plinskin et al. (2006), Wielicki and Arendt (2010), and Lehner and Sundby (2018) emphasize the differences in the adoption and utilization of ICT technologies and e-commerce between SMEs and large corporations. These regional and crossnational European comparisons highlight the significance of understanding the corporate digital divide and its implications for businesses of varying sizes and industries.

In the context of European research, the literature addressing the digital divide at an industry level is relatively limited, prompting calls from scholars like Bach et al. (2013), Cirera et al. (2022), and Shakina et al. (2022) for a more comprehensive analysis. Furthermore, studies such as Souza et al. (2017) provided empirical insights into the Brazilian scenario, emphasizing the connection between access quality, digital expertise, and the extent of ICT tool usage among companies. Meanwhile, Chen et al. (2022) explore the Chinese landscape, revealing that the impact of the digital divide varies across distinct industry sectors, indicating the need for further analysis.

In order to address the corporate digital divide effectively, policy interventions should consider tailored strategies, such as targeted digital infrastructure investments, skill development programs for SMEs, and public-private partnerships to promote digital adoption across different sectors (Saka et al., 2022; Torrent-Sellens et al., 2022).

In conclusion, this literature review has provided an exhaustive overview of the digital divide, highlighting its multifaceted nature and the various dimensions contributing to digital inequalities. By examining the historical development, theoretical frameworks, methodologies, and global perspectives on the digital divide, we have identified areas where further research is necessary, particularly in the context of the corporate digital divide.

While significant progress has been made in understanding the digital divide, gaps in the literature still need to be addressed, particularly in studying the corporate digital divide and its impact on businesses and the economy. Future research should delve deeper into the determinants and consequences of the corporate digital divide, identifying effective strategies to bridge these gaps and foster a more equitable and competitive digital economy.

# Methodology

Bibliometric analysis, as discussed in the literature, is a methodology that applies quantitative techniques to bibliographic data for assessing the impact and development of scientific publications and different research constituents by analysing citation data and other publication-related metrics (Aria & Cuccurullo, 2017; Cobo et al., 2011; Donthu et al., 2021; Ellegaard, 2018). According to Nakagawa et al. (2019) and Donthu et al. (2021), bibliometrics allows researchers to uncover emerging trends, identify knowledge gaps in specific domains, and analyse large quantities of publications.

This research employs bibliometric analysis to investigate digital divide literature by evaluating the performance of research components, visualizing the intellectual structure, and describing the key themes that shape the field's evolution. This work incorporates performance analysis and integrates two science mapping techniques with network analysis. Performance analysis encloses a descriptive examination that measures the number of publications and citations of research components (Donthu et al., 2021; Nakagawa et al., 2019). Meanwhile, science mapping techniques involve citation analysis and similarity measures such as co-citation analysis and bibliographic coupling. When combined with network analysis, similarity measures enable visualization of the knowledge base through a co-citation network, representing a cluster of academic publications considered fundamental for developing and understanding the field. Additionally, the bibliographic coupling network visualizes the research front, a cluster of academic publications that address emerging active research areas and share a similar unsolved research problem (Boyack & Klavans, 2010; Kammerer et al., 2021). By integrating these methods, the study aims to thoroughly understand digital divide literature, highlighting its evolution, influential works, and potential future directions.

# Data Collection, processing, and cleaning

Caputo and Kargina (2022) and Echchakoui (2020) note that authors often rely on a single data source like Web of Science or Scopus for bibliometric analysis. When using both, they typically perform separate analyses. In contrast, Singh et al. (2021) emphasize the extensive coverage of scientific journals and publications within Web of Science, Scopus, and Dimensions databases. This study will merge data from all three databases to capitalize on these comprehensive data sources for a more thorough and robust bibliometric analysis.

The selection strategy of this study is designed to include authors with European affiliations and publications in sociology, economics, administration, computer, and technology disciplines. For this purpose, the study employs the search criteria ("digital divide\*" OR "digital inequalit\*" OR "digital gap\*") to filter publications based on their titles and author keywords. Several preprocessing and cleaning steps were undertaken to guarantee data quality and consistency, which is crucial for successfully implementing the selection strategy. First, duplicates across Web of Science, Scopus, and Dimensions were identified and eliminated, ensuring each document was unique in the final dataset. Second, data normalization and consolidation were applied to author names, affiliations, and keywords. This process involved correcting spelling, abbreviations, and capitalization variations and identifying and merging records that referred to the same author, institution, or keywords.

After thorough data processing and cleaning, an analysis of 1,609 unique documents published between 2000 and 2022 was performed. The data were categorized into three periods: P1 (2000-2007), P2 (2008-2015), and P3 (2016-2022), as well as the total period, TP (2000-2022). This categorization facilitates fair comparisons, allows monitoring of the evolution of digital divide literature, and allows pinpointing emerging trends.

The potential limitation of the data collection process lies in the possibility of overlooking relevant studies not indexed in the selected databases. Nonetheless, the dataset is considered to provide a comprehensive representation of the digital divide research landscape and its associated trends. Furthermore, to ensure replicability and reproducibility, this research includes a public GitHub repository called "dd bibliometric europe," which contains the data management plan, cleaning, and processing using the R programming language environment with bibliometrix and igraph packages.

## 3. Results

In this section, the results of the bibliometric analysis are presented, addressing the research questions and objectives outlined earlier. The findings are organized into three parts: first, a performance analysis of various research constituents (publications, authors, journals, universities, and countries); second, science mapping, which encompasses citation analysis, as well as the integration of co-citation and bibliographic coupling with network analysis; and finally, interpretation of the results.

### **3.1.** Performance analysis

Table 1. Comparative Summary of Document types and Measures.						
Details	P1	P2	P3	TP		
Timespan	2000 - 2007	2008 - 2015	2016 - 2022	2000 - 2022		
Journals	123	284	530	832		
Annual growth rate	71,14	3,74	15,67	26,69		
Average citations per doc	42,87	24,27	10,36	18,74		
Articles	159	348	743	1250		
Book chapters	4	34	17	55		
Proc & Conf papers	39	115	150	304		
Total published documents	202	497	910	1609		

Table 1 Ca nations Community of Do 1.1.0

Source: Author's elaboration.

Following Abramo and D'Angelo (2014) and Wang and Barabási (2021), performance analysis measures productivity (number of publications) and impact (number of citations). Examining Table 1, in conjunction with Figure 1, allows for a deeper insight into the dynamics and trends within the digital divide research landscape during the timeframes of P1, P2, P3, and TP. During the total period TP, the annual growth rate of publications is 26.69%, with an average of 18.74 citations per document. The analysis included 1,609 documents published in 832 journals by 3,506 authors, totaling 38,932 cited references. Despite the fluctuations in citation patterns, the topic of the digital divide has gained significant attention within the scientific community,

showcasing its growing relevance in today's increasingly digital world. In P1, 202 unique documents were written by 370 authors and published in 123 scientific journals. Despite the annual growth rate of publications and the average number of citations per document in P1 being 71.14% and 42.87, respectively, a significant decline occurred in P2, with these values dropping to 3.74% and 24.27, respectively. In P2, the total number of publications reached 497, involving 1009 authors and published across 284 journals. However, During P3, the number of publications rebounded to 910, involving 2285 authors and appearing across 530 scientific journals. In this last period, P3, the annual growth rate recovered to 15.67%, while the average citations per document decreased to 10.36. It is crucial to consider various factors that may contribute to reducing average citations per document in Figure 1(B). Firstly, recent publications, citations may be dispersed across more documents, resulting in a decline in average citations per document. Finally, the digital divide is a multidisciplinary topic, and research in this field may have become more specialized, prompting researchers to concentrate on narrower aspects of the digital divide.



Figure 1. (A) Total publications per year. (B) Relative change in the average citation per year. Source: Author's elaboration.

In summary, the productivity and impact figures unveil significant trends and variations. Table 1 and Figure 1(A) show that researchers' interest in the digital divide has steadily increased, highlighting its growing importance in today's rapidly advancing digital society. Acknowledging the decline in average citations per document during P3 in Figure 1(B) is important. However, the general trend across the periods highlights that the field of digital divide research remains highly relevant and constantly developing. Therefore, it is crucial to emphasize the need for ongoing investigation and examination in this domain as new digital technologies continue to evolve and expand.

#### Authors

In this section, the performance of the authors is presented. Figure 2 displays the top 15 most productive authors over time. The legend shows that the dot size represents the number of publications, while the color intensity indicates the times cited per year. Figure 2 reveals that James J. is the most productive author, with 25 publications, followed by van Deursen A. with 24, and van Dijk J. with 18 publications. However, regarding influence measured by citation

counts, van Dijk J. leads with 3644 citations, van Deursen J. follows with 2515 citations, and Hargittai E. has 775 citations. Additionally, although other authors in this plot possess fewer citations and publications, these emerging scholars can potentially introduce innovative perspectives, methodologies, and research questions to the field.



Figure 2. Authors' publication patterns over time. TC: Times Cited. Source: Author's elaboration.

#### **Publications**

Table 2 illustrates a ranking of the most influential articles based on the highest number of citations for P1, P2, and P3. For P1, the article The Digital Divide As A Complex And Dynamic Phenomenon (van Dijk & Hacker, 2003) was cited 664 times. The second most cited article was Digital Divide Research, Achievements, And Shortcomings (van Dijk, 2006). These two articles contend that digital inequalities encompass more than just physical access, providing a comparative analysis of various access types, including physical, skill-based, and usage access, among diverse demographic groups in the United States and the Netherlands. Furthermore, the authors highlighted the gaps in digital divide research, emphasizing the need for theoretical development, interdisciplinary collaboration, and conceptual refinement.

Table 2.	Тор	5 Most	Cited	Articles	per Period.
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Rank	Article	тс				
	P1: 2000 - 2007					
1	Van Dijk J; Hacker K (2003) -The Digital Divide As A Complex And Dynamic Phenomenon	664				
2	Van Dijk J (2006) - Digital Divide Research, Achievements And Shortcomings	660				
3	Livingstone S; Helsper E (2007) -Gradations In Digital Inclusion: Children, Young People And The Digital Divide	587				
4	Selwyn N (2004) -Reconsidering Political And Popular Understandings Of The Digital Divide	560				
4	Introna L; Nissenbaum H (2000) -Shaping The Web: Why The Politics Of Search Engines Matters	463				
	P2: 2008 - 2015					
1	Van Deursen A; Van Dijk J (2014) -The Digital Divide Shifts To Differences In Usage	555				
1	2 Van Deursen A; Van Dijk J (2011) -Internet Skills And The Digital Divide	402				
3	Becker S; Miron-Shatz T; Schumacher N; Krocza J; Diamantidis C; Albrecht U (2014) - Mhealth 2.0: Experiences, Possibilities, And Perspectives	289				
4	Helbig N; Gil-García J; Ferro E (2009) - Understanding The Complexity Of Electronic Government: Implications From The Digital Divide Literature	268				
5	Carter L; Weerakkody V (2008) -E-Government Adoption: A Cultural Comparison	208				
	P3: 2016 - 2022					
1	Iivari N; Sharma S; Ventä-Olkkonen L (2020) - Digital Transformation Of Everyday Life – How Covid-19 Pandemic Transformed The Basic Education Of The Young Generation And Why Information Management Research Should Care?	386				
2	Priemel T (2016) - The Digital Divide Has Grown Old: Determinants Of A Digital Divide Among Seniors	347				
3	Scheerder A; Van Deursen A; Van Dijk J (2017) - Determinants Of Internet Skills, Uses And Outcomes. A Systematic Review Of The Second- And Third-Level Digital Divide	307				
4	Hunsaker A; Hargittai E (2018) - A Review Of Internet Use Among Older Adults	223				
4	Van Deursen A; Van Dijk J (2019) - The First-Level Digital Divide Shifts From Inequalities In Physical Access To Inequalities In Material Access	198				

TC: Times Cited. Source: Author's elaboration

In P2, the most influential article is titled The Digital Divide Shifts To Differences In Usage (van Deursen & van Dijk, 2014), with 555 citations, followed by Internet Skills And The Digital Divide (van Deursen & van Dijk, 2011), which garnered 402 citations. These articles emphasize the shift in focus from access disparities to the differences in how individuals use the internet. They delve into the various aspects of internet skills and how they contribute to the widening digital divide. By examining the usage patterns and skill sets of different demographic groups, the authors shed light on the evolving nature of the digital divide and the need for targeted interventions to bridge these gaps.

During P3, the article Digital Transformation Of Everyday Life – How Covid-19 Pandemic Transformed The Basic Education Of The Young Generation And Why Information Management Research Should Care? by Livari et al. (2020) garnered 386 citations, while The Digital Divide Has Grown Old: Determinants Of A Digital Divide Among Seniors by Friemel (Friemel, 2016) received 347 citations. The former article by Livari et al. (2020) highlights the extensive digital transformation in society and primary education for children due to the COVID-19 pandemic, revealing digital divides and stressing the need for information management research to address challenges students, teachers, and families face in adapting to the new normalcy. While Friemel (2016), on the other hand, explores the "grey divide" in Internet use among seniors aged 65+ years, revealing a partial exclusion of older seniors (70+) and highlighting the importance of education, income, technical interest, pre-retirement computer use, and social context in predicting Internet use among this age group.

#### Journals

Top-tier journals with high impact factors play a significant role in the digital divide domain. Figure 3 shows that The New Media & Society journal is the most influential scientific journal, accumulating 4427 citations and 42 publications. Following closely as the second most influential journal is the Information Society, with 2066 citations and 26 publications. It is essential to note that although Poetics and the European Journal of Communication have fewer publications than other journals, they have published works that significantly contribute to the field. Most of these journals hold a Q1 ranking, except for Universal Access In The Information Society, which ranked Q2.



Figure 3. Top 10 Journals' Performance 2000-2022. Source: Author's elaboration.

### Universities

Figure 4(A) highlights the significant contributions made by various institutions in the field of the digital divide. The University of Twente in the Netherlands is the leading institution, amassing 4085 citations across 31 publications. The London School of Economics is closely behind, with 2195 citations and 24 publications. Although this research mainly focuses on authors with European affiliations, it is essential to note that research activities often include collaborations with scholars from other affiliations, giving rise to unique collaboration patterns. As a result, New Mexico State University appears among the top ten most influential institutions, claiming one publication with 664 citations. Notably, this highly-cited publication is the article by van Dijk & Hacker (2003), demonstrating the significance of collaborative research efforts.



Figure 4. (A) Top 10 universities' performance 2000-2022. (B) Top 10 countries' performance 2000-2022. Source: Authors' elaboration.

### Countries

This section discusses the top ten most productive and influential countries in digital divide research, as illustrated in Figure 4(B). The United Kingdom (UK) leads the field with 10,689 citations and 384 publications, followed by the Netherlands in second place, having accumulated 5,415 citations across 109 publications. The United States (US) occupies the third position regarding influence. Although this analysis focuses mainly on European countries, it is essential to note that several European nations (see Figure 5) have not only collaborated with the US but with other countries on various research initiatives. This observation underlines the significance of international partnerships in driving research endeavours within the domain of digital divide studies.

The collaboration network analysis within the digital divide literature reveals a multifaceted landscape where degree centrality, betweenness centrality, and the distinction between dominant and peripheral actors play a significant role. In the first cluster, the UK Netherlands, and the US exhibit a high degree of centrality, signifying their prominent positions as central nodes with numerous connections to other countries within and across clusters. These dominant actors display considerable betweenness centrality, implying their influence as research hubs facilitating collaborations and information flow within the network. Conversely, peripheral countries like Russia, Greece, South Africa, and Ireland hold relatively lower centrality measures, indicating fewer central positions within the network. The second and third clusters

follow similar patterns. Countries like Spain, Germany, and Italy emerge as dominant actors with higher degrees and betweenness centrality while surrounding countries maintain peripheral roles. This network structure highlights the prominent research hubs underscoring the complex interactions among multiple actors in defining the intellectual framework and diffusing knowledge within the realm of digital divide research.



#### **Country Collaboration Network**

Figure 5. Country Collaboration Network. Source: Authors' Elaboration.

### **3.2.Science Mapping and Network analysis**

### **Citation Analysis**

Table 3 presents the most cited references within the digital divide domain, signifying the most influential works and representing the knowledge base in this area. The analysis of Table 3 suggests that these seminal works have introduced groundbreaking theoretical frameworks, methodologies, and key concepts that contribute to our understanding of the digital divide. In subsequent sections, a more comprehensive visualization of the knowledge base will be provided through a co-citation network. Additionally, the research front will be examined by employing a bibliographic coupling network, further illustrating the significance of these works in the field.

Table 3.	<b>Top 1</b>	0 Most	Cited	References	2000-	2022.
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Rank	Article	TC
1	Norris P (2001) -Digital Divide Civic Engagement, Information Poverty, And The Internet Worldwide	204
2	Van Dijk J (2005) -The Deepening Divide: Inequality In The Information Society	172
3	Hargittai E (2002) -Second-Level Digital Divide: Differences In People's Online Skills	136
4	Van Dijk J (2006) -Digital Divide Research, Achievements And Shortcomings	129
5	Van Dijk J, Hacker K (2003) -The Digital Divide As A Complex And Dynamic Phenomenon	114
6	Selwyn N (2004) -Reconsidering Political And Popular Understandings Of The Digital Divide	108
7	Dimaggio P, Hargittai E, Celeste C, Shafer S (2004) - From Unequal Access To Differentiated Use: A Literature Review And Agenda For Research On Digital Inequality	105
8	Van Deursen A, Van Dijk J (2014) -The Digital Divide Shifts To Differences In Usage	103
9	Zillien N, Hargittai E (2009) -Digital Distinction: Status-Specific Types Of Internet Usage	82
10	Hargittai E, Hinnant A (2008) -Digital Inequality: Differences In Young Adults' Use Of The Internet	80
TO		

TC: Times Cited. Source: Author' Elaboration

#### **Co-citation analysis**

Figure 6 presents the co-citation network from 2000 to 2007, revealing four distinct clusters connecting publications with similar research themes. Each cluster is composed of dominant and peripheral publications. Dominant publications exhibit higher centrality measures, such as

degree of centrality, which measures the number of connections of a vertex, and betweenness centrality, which gauges the influence of these vertices within and across clusters. Dominant publications play a crucial role in shaping the field, as they establish key frameworks, methodologies, and concepts that contribute to the overall understanding of the domain. On the other hand, peripheral publications, which possess lower centrality measures, tend to gravitate around these dominant works. Peripheral publications play a specific role in the cluster, contributing to the literature by expanding on and refining the ideas established by dominant publications. They also introduce new perspectives into related areas of the digital divide.

In Figure 6, clusters 1, 2, and 3 share close connections; this implies greater collaboration and cross-citation among the publications within these clusters. Conversely, cluster 4 is more diverse and less connected to the other clusters, suggesting a unique perspective on the digital divide or a different focus within the research domain.



Co-Citation Network, 2000 - 2007

Figure 6. Co-Citation Network 2000-2007 with cluster keywords. Source: Authors' elaboration

The clusters cover various topics. Cluster 1 interconnects publications on the global digital divide, access inequalities, and civic engagement. Dominant publications in this cluster are Norris (2001), Dimaggio and Hargittai (2001), and Castells (2002). Cluster 2 links publications that focus on the second-level digital divide and online skills, and internet usage, with Hargittai (2002), Bonfadelli (2002), and van Dijk and Hacker (2003) emerging as prominent publications in this area. Cluster 3 connects publications that address the theoretical and methodological shortcomings in the field, where Compaine (2001) and Rogers (1995) assume significant roles. Finally, Cluster 4 lacks any dominant publications, suggesting that this cluster encompasses a more diverse range of research areas. For example, topics such as the emergence of the network society and the social consequences of internet use are explored, offering a broader sociological perspective on the digital divide.

Figure 7 depicts the second co-citation network spanning from 2008 to 2015, consisting of three distinct clusters. Cluster 1 interconnects publications that primarily focus on the global digital divide, digital inequalities due to lack of access to technologies, civic engagement, and the different complexities of the digital divide. Norris (2001) persists as a dominant publication in this cluster, along with van Dijk and Hacker (2003) and Selwyn (2004). Cluster 2, on the other hand, concentrates on the second-level digital divide, in which differences in skills and

internet usage may widen the digital divide. Dominant publications in this cluster include van Dijk (2005, 2006) and Hargittai (2002). The thinner edges in Cluster 3 indicate that publications in this cluster have fewer co-citations, making it challenging to identify a clear dominant author. However, the main topic of these publications primarily involves cross-country comparisons of internet access.

In conclusion, comparing Figures 6 and 7 highlights a shift from four to three distinct clusters, suggesting a consolidation or narrowing of research topics in the second period. Furthermore, the persistence of publications from the first co-citation network across both periods underscores the continuous development and interplay of ideas within the digital divide research domain.



Figure 7. Co-Citation Network 2008-2015 with cluster keywords. Source: Author's elaboration.

Figure 8 presents the third co-citation network from 2016 to 2022, comprising three welldefined clusters. Cluster 1 connects publications primarily concentrating on the second and third-level digital divides, underlining the significance of digital skills and internet usage in comprehending digital inequalities. Notable publications within this cluster consist of van Deursen and van Dijk (2015-a; 2014), van Dijk (2005-a), and Hargittai (2002). Cluster 2 emphasizes the global digital divide resulting from disparities in access, civic engagement, and varying complexities, featuring prominent publications by Norris (2001), Van Dijk (2006), and Dimaggio and Hargittai (2001).In contrast, Cluster 3 centres on differences in digital skills in different age groups, and knowledge disparities, featuring publications from Hargittai (2002), Van Deursen and van Dijk (2011), and Zillien and Hargittai (2009) as its leading contributors. Clusters 1 and 3 are highly interconnected, sharing thicker edges among publications, reflecting a close relationship between the research topics.

In conclusion, the third co-citation network presents a more refined structure than previous periods, signifying the development and specialization of research topics within the digital divide domain. Moreover, the enduring influence of publications such as Norris (2001), van Dijk and Hacker (2003), van Dijk (2005), and Hargittai (2002) illustrates not only their strong persistence across the first two periods but also their crucial role in shifting the literature's focus from internet access to disparities in skills and internet usage. The co-citation network in Figure 8 encapsulates the continuous development, interaction, and impact of ideas within this

research area. It highlights current trends, notable publications, and primary focus areas, emphasizing the research evolution from internet access to skill and usage differences and the emergence of the third-level digital divide.



Figure 8. Co-Citation Network 2016-2022 with cluster keywords. Source: Author's elaboration.

#### **Bibliographic coupling**

Figure 9 presents the bibliographic coupling network from 2000 to 2007, containing the relationships between publications that share the same or closely related unresolved research problems based on the similarity of their cited sources. This network also reveals three well-defined clusters. Cluster 1 connects publications primarily focusing on the political implications of addressing the digital divide as a policy issue and the methodological challenges faced when measuring the digital divide. Notable publications within this cluster include Vehovar et al. (2006) and Selwyn (2004). Cluster 2 emphasizes digital disparities among age groups with different socio-economic backgrounds and theoretical shortcomings in the field, featuring prominent publications by Livingstone and Helsper (2007) and van Dijk (2006). In contrast, Cluster 3 centres on digital gaps across different locations, the new economy, and multi-dimensional aspects of the digital divide, with Gil-Garcia et al. (2006) as a leading contributor.



Figure 9. Bibliographic Coupling Network 2000-2007 with cluster keywords. Source: Author's elaboration.

This bibliographic coupling network offers valuable insights into the evolution of digital divide research during the 2000-2007 period and sets the stage for understanding subsequent developments in the field.

Figure 10 displays the bibliographic coupling network for the 2008-2015 period, comprising three distinctive clusters. Cluster 1 encompasses publications primarily examining the digital divide's impact on a wide array of social and economic aspects at regional and national levels, as well as the advantages and drawbacks of using indexes for measuring the digital divide. Hanafizadeh et al. (2013) emerges as a dominant publication within this cluster, forming a tightly-knit group or clique with peripheral publications such as Vicente and Lopez (2011), Cruz-Jesus (2012), and Billon (2009).



Figure 10. Bibliographic Coupling Network 2008-2015 with cluster keywords. Source: Author's elaboration.

Cluster 2 delves into the digital divide's educational, social, and cultural dimensions, analyzing social media's role in promoting digital and social inclusion. While no single publication dominates this cluster, Weerakkody (2012) is particularly influential, as evidenced by its high betweenness centrality. Cluster 3 interconnects with Cluster 1 through thicker edges, indicating a close relationship between their research areas. Publications in Cluster 3 primarily explore the evolution of the digital divide, including various dimensions and emerging inequalities in digital skills and usage for different demographic groups in the Netherlands. The dominant publication in this cluster is van Deursen and van Dijk (2015-a), supported by other influential peripheral publications such as van Deursen and van Dijk (2014), van Deursen and van Dijk (2015-b; 2015), and van Dijk (2012).

In conclusion, the bibliographic coupling network depicted in Figure 10 demonstrates a more refined structure than the previous period. These publications addressing similar unresolved research problems are progressing towards improved methodologies for measuring the digital divide. Notably, the emergence of two influential authors, van Deursen, and van Dijk, with multiple publications in Cluster 3, highlights the growing importance of their contributions. The network also emphasizes the need to shift focus from internet access to a more elaborated understanding of the digital divide, encompassing the skills and usage gaps.

Figure 11 showcases the bibliographic coupling network spanning the years 2016 to 2022. This network incorporates three distinct clusters, each delving into different facets of the digital divide. Cluster 1 is characterized by publications focusing on empirical investigations. These publications explore the dimensions of digital capital, technology accessibility, digital skills, and internet use, featuring dominant works such as Ragneda et al. (2020), Mingo and Bracciale (2018), and Calderón-Gómez et al. (2022). Within this cluster, we observe larger node sizes indicating a higher degree of centrality. Suggesting that the publications within the cluster share numerous connections, signifying a rich interconnection of themes and ideas. Cluster 2, on the other hand, links publications that tackle the third-level digital divide, underscoring the impacts of variables like internet skills, usage, and socio-economic determinants at a country level. Key works in this cluster include Scheerder et al. (2017), Tirado-Morueta et al. (2017), and Lythreatis et al. (2022), contributing significantly to the discourse on the digital divide's broader socio-economic implications.



Bibliographic Coupling Network, 2016–2022

Figure 11. Bibliographic Coupling Network 2016-2022 with cluster keywords. Source: Author's elaboration.

Finally, publications in Cluster 3 center on works that rigorously test the theoretical framework proposed by van Dijk (2005), the resources, and the appropriation theory. This cluster evaluates the different types of access, namely motivational, material, skills, and usage. Influential contributions in this cluster are from Lamberti et al. (2021), van Deursen and Helsper (2018), and van Deursen et al. (2021).

To conclude, the bibliographic coupling network in Figure 11 presents a sophisticated and interconnected research landscape, transcending the boundaries of previous periods. This evolution signifies the various technological influences stimulating the ongoing refinement and diversification within the digital divide literature. Moreover, this network captures the growing focus on how emergent technologies like artificial intelligence may further contribute to digital disparities (Lutz, 2019). Indeed, Figure 11 serves as a representative snapshot of the current state of research in the digital divide. The array of research themes across the three clusters underscores the digital divide research's evolving and complex nature. Each cluster offers unique insights, enriching our comprehension of digital inequalities and the influences that shape them.

# 4. Conclusions

The evolution of leading trends, focus shifts, and key themes in European research on the digital divide can be traced through a systematic examination of the literature and network analysis over time. The early phase of research, from 2000 to 2007, concentrated primarily on inequalities in access to digital technologies, recognizing these disparities as a significant barrier to the digital divide. Seminal works during this period, such as Norris (2001), Dimaggio (2001), and Castells (2001), offered foundational perspectives, often focusing on the global digital divide and access inequalities.

However, as technology became pervasive, the focus of the research shifted. From 2008 to 2015, studies began to delve into the complexities of the digital divide, acknowledging that differences in skills and internet usage were equally significant in widening the digital divide. Here, the works of van Dijk (2005; 2006) and Hargittai (2002) became prominent, emphasizing the so-called second-level digital divide.

In the most recent period, from 2016 to 2022, the research focus has been further refined, with a noticeable emphasis on the third-level digital divide. This period explored how different age groups and socioeconomic backgrounds influence digital skills and knowledge disparities. The works of van Deursen and van Dijk (2015a; 2014), Van Dijk (2005), and Hargittai (2002) are particularly influential in this regard.

The shift from a focus on access to a more nuanced understanding of skills and usage disparities mirrors the current state of knowledge in the field, acknowledging that the digital divide is a complex and multifaceted issue requiring ongoing investigation as digital technologies continue to advance and permeate various aspects of society and the economy.

The intellectual interactions and thematic connections within European digital divide research have substantially aided in pinpointing key subtopics and literature groupings. Initial analysis of the co-citation and bibliographic coupling networks unveiled shifts in the literature's focus, with clusters demonstrating an increasingly interconnected nature, especially in recent periods. These clusters represent a broad intellectual interaction among varied research themes, from the global digital divide and internet usage to theoretical and methodological approaches.

A broad perspective of the intellectual interactions' emergence, as depicted in Figure 5, highlights three country clusters actively collaborating in research. Certain countries, like the Netherlands and the United Kingdom, stand out for their influential role in shaping digital divide discussions. Their strong representation across clusters signifies their substantial intellectual contributions to central themes in the field.

The University of Twente and the London School of Economics have emerged as leading institutions in the academic sphere. The prevalence of their publications across clusters underlines their pivotal role in advancing toward a robust digital divide research agenda, particularly in examining its second and third-level aspects. Notably, high-impact journals such as 'New Media & Society' and 'The Information Society' have consistently been channels for sharing these influential works, emphasizing their vital role in circulating innovative digital divide research. Thus, these complex networks of intellectual exchanges and thematic

connections uncover the interplay between various actors and institutions in the European digital divide research landscape.

The examination of the corporate digital divide, within the larger context of European digital divide research, appears to be a relatively under-researched area. A focused search within the sample of 1609 documents reveals only 30 articles that directly tackle this subject, signaling an evident gap in the literature. This lack of extensive research on the corporate digital divide is surprising, considering the profound implications of digital disparities at the firm level, particularly in an increasingly digital global economy.

One potential reason for this research gap could be the shift of relevant discussions into other literature streams, such as digital transformation and technology adoption. These fields inherently tackle disparities in corporate settings concerning access, skills, and technology usage - elements that essentially form the corporate digital divide. Consequently, these intertwined fields might have diffused and somewhat absorbed the discussion surrounding the corporate digital divide.

Such a scenario reflects a dynamic interplay of ideas across distinct research areas. However, it also underscores the urgent need for a more robust and exhaustive examination of the corporate digital divide as a critical phenomenon. This situation heralds the need for future research in this domain, which has the potential to shed invaluable light on digital inequalities within the corporate world. By filling this literature gap, scholars can make significant advancements in deepening our understanding of digital disparities, thereby shaping the creation of more equitable digital policies and practices in the corporate realm.

In light of the current findings, there are several promising directions for future research in the field of digital divide. Firstly, given the few studies addressing the corporate digital divide, this domain warrants more in-depth investigation to better understand the nuances of digital inequality at the organizational level. Secondly, the impact of emerging technologies, such as artificial intelligence and blockchain, on the digital divide is another area that requires further exploration. Understanding how these technologies contribute to or mitigate digital disparities could inform future policy and intervention strategies. Lastly, future research could also benefit from a more granular exploration of the digital divide within specific populations or geographical regions, considering socio-cultural dynamics that may influence digital technologies' access, use, and impact.

### References

- Abramo, G., & D'Angelo, C. A. (2014). How do you define and measure research productivity? *Scientometrics*, *101*(2), 1129–1144. https://doi.org/10.1007/s11192-014-1269-8
- Agudo-Prado, S., Pascual-Sevillano, M.-Á., & Fombona, J. (2012). Usos de las herramientas digitales entre las personas mayores. *Comunicar: Revista Científica de Comunicación y Educación*, 20(39), 193–201. https://doi.org/10.3916/C39-2012-03-10
- Ancillai, C., Sabatini, A., Gatti, M., & Perna, A. (2023). Digital technology and business model innovation: A systematic literature review and future research agenda. *Technological Forecasting and Social Change*, 188, 122307. https://doi.org/10.1016/j.techfore.2022.122307

- Andrés, L., Cuberes, D., Diouf, M., & Serebrisky, T. (2010). The diffusion of the Internet: A crosscountry analysis. *Telecommunications Policy*, 34(5), 323–340. https://doi.org/10.1016/j.telpol.2010.01.003
- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007
- Aruleba, K., & Jere, N. (2022). Exploring digital transforming challenges in rural areas of South Africa through a systematic review of empirical studies. *Scientific African*, 16, e01190. https://doi.org/10.1016/j.sciaf.2022.e01190
- Bach, M. P., Zoroja, J., & Vukšić, V. B. (2013). Determinants of Firms' Digital Divide: A Review of Recent Research. *Procedia Technology*, 9, 120–128. https://doi.org/10.1016/j.protcy.2013.12.013
- Bartikowski, B., Laroche, M., Jamal, A., & Yang, Z. (2018). The type-of-internet-access digital divide and the well-being of ethnic minority and majority consumers: A multi-country investigation. *Journal of Business Research*, *82*, 373–380. https://doi.org/10.1016/j.jbusres.2017.05.033
- Becker, B. (2022). Educational ICT use outside school in the European Union: Disparities by social origin, immigrant background, and gender. *Journal of Children and Media*, *16*(1), 1–20. https://doi.org/10.1080/17482798.2021.1902359
- Billon, M., Marco, R., & Lera-Lopez, F. (2009). Disparities in ICT adoption: A multidimensional approach to study the cross-country digital divide. *Telecommunications Policy*, 33(10), 596– 610. https://doi.org/10.1016/j.telpol.2009.08.006
- Blank, G., Graham, M., & Calvino, C. (2018). Local Geographies of Digital Inequality. Social Science Computer Review, 36(1), 82–102. https://doi.org/10.1177/0894439317693332
- Bonfadelli, H. (2002). The Internet and Knowledge Gaps: A Theoretical and Empirical Investigation. *European Journal of Communication*, *17*(1), 65–84. https://doi.org/10.1177/0267323102017001607
- Boyack, K., & Klavans, R. (2010). Co-Citation Analysis, Bibliographic Coupling, and Direct Citation: Which Citation Approach Represents the Research Front Most Accurately? *Journal of the American Society for Information Science and Technology*, 61, 2389–2404. https://doi.org/10.1002/asi.21419
- Bychkova, S. G., Parshintseva, L. S., & Gerasimova, E. B. (2020). The Assessment of Territorial Differences in Access and Use of Information and Communication Technologies in the Russian Federation. In A. V. Bogoviz (Ed.), *Complex Systems: Innovation and Sustainability in the Digital Age: Volume 1* (pp. 197–206). Springer International Publishing. https://doi.org/10.1007/978-3-030-44703-8 22
- Calderón Gómez, D., Ragnedda, M., & Laura Ruiu, M. (2022). Digital practices across the UK population: The influence of socio-economic and techno-social variables in the use of the Internet. *European Journal of Communication*, *37*(3), 284–311. https://doi.org/10.1177/02673231211046785
- Calvino, F., DeSantis, S., Desnoyers-James, I., Formai, S., Goretti, I., Lombardi, S., Manaresi, F., & Perani, G. (2022). *Closing the Italian digital gap: The role of skills, intangibles and policies*. OECD. https://doi.org/10.1787/e33c281e-en
- Camerini, A.-L., Schulz, P. J., & Jeannet, A.-M. (2018). The social inequalities of Internet access, its use, and the impact on children's academic performance: Evidence from a longitudinal study in Switzerland. *New Media & Society*, 20(7), 2489–2508. https://doi.org/10.1177/1461444817725918
- Caputo, A., & Kargina, M. (2022). A user-friendly method to merge Scopus and Web of Science data during bibliometric analysis. *Journal of Marketing Analytics*, 10, 1–7. https://doi.org/10.1057/s41270-021-00142-7

- Carlo, S., & Bonifacio, F. (2021). Elderly, ICTs and Qualitative Research: Some Methodological Reflections. In Q. Gao & J. Zhou (Eds.), *Human Aspects of IT for the Aged Population*. *Technology Design and Acceptance* (pp. 3–20). Springer International Publishing. https://doi.org/10.1007/978-3-030-78108-8 1
- Castells, M. (2002). The Internet Galaxy: Reflections on the Internet, Business, and Society.
- Chen, N., Sun, D., & Chen, J. (2022). Digital transformation, labour share, and industrial heterogeneity. *Journal of Innovation & Knowledge*, 7(2), 100173. https://doi.org/10.1016/j.jik.2022.100173
- Chetty, K., Qigui, L., Gcora, N., Josie, J., Wenwei, L., & Fang, C. (2018). Bridging the digital divide: Measuring digital literacy. *Economics*, 12(1). https://doi.org/10.5018/economicsejournal.ja.2018-23
- Cirera, X., Comin, D., & Cruz, M. (2022). *Bridging the Technological Divide*. Washington, DC: World Bank. https://doi.org/10.1596/978-1-4648-1826-4
- Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the Fuzzy Sets Theory field. *Journal of Informetrics*, 5(1), 146–166. https://doi.org/10.1016/j.joi.2010.10.002
- Compaine, B. (2001). The Digital Divide Facing a Crisis or Creating a Myth? In *Library & Information Science Research—LIBR INFORM SCI RES* (Vol. 24). https://doi.org/10.1016/S0740-8188(02)00114-7
- Conrad, A., Neuberger, D., Peters, F., & Rösch, F. (2019). The Impact of Socio-Economic and Demographic Factors on the Use of Digital Access to Financial Services. *Credit and Capital Markets – Kredit Und Kapital*, 3, 295–321. https://doi.org/10.3790/ccm.52.3.295
- Cruz-Jesus, F., Oliveira, T., & Bacao, F. (2012). Digital divide across the European Union. Information & Management, 49(6), 278–291. https://doi.org/10.1016/j.im.2012.09.003
- Cruz-Jesus, F., Vicente, M. R., Bacao, F., & Oliveira, T. (2016). The education-related digital divide: An analysis for the EU-28. *Computers in Human Behavior*, *56*, 72–82. https://doi.org/10.1016/j.chb.2015.11.027
- De Marco, S. (2022). El comercio electrónico en España (2019): Un ejemplo de tercera brecha digital. *Revista Internacional de Sociología*, 80(2), Article 2. https://doi.org/10.3989/ris.2022.80.2.20.98
- Deursen, A. J. A. M., Zeeuw, A., Rocks-de Boer, P., Jansen, G., & Van Rompay, T. (2021). Digital inequalities in the Internet of Things: Differences in attitudes, material access, skills, and usage. *Information Communication and Society*, 24, 258–276. https://doi.org/10.1080/1369118X.2019.1646777
- Deursen, A. J. A. M. van, & van Dijk, J. A. G. M. (2010). Measuring Internet Skills. International Journal of Human–Computer Interaction, 26(10), 891–916. https://doi.org/10.1080/10447318.2010.496338
- D'Haenens, L., Koeman, J., & Saeys, F. (2007). Digital citizenship among ethnic minority youths in the Netherlands and Flanders. *New Media & Society*, 9(2), 278–299. https://doi.org/10.1177/1461444807075013
- di Prisco, D., & Strangio, D. (2021). Technology and financial inclusion: A case study to evaluate potential and limitations of Blockchain in emerging countries. *Technology Analysis & Strategic Management*, 0(0), 1–14. https://doi.org/10.1080/09537325.2021.1944617
- DiMaggio, P., & Hargittai, E. (2001). From the "Digital Divide" to "Digital Inequality": Studying Internet Use as Penetration Increases. *Princeton University, Woodrow Wilson School of Public and International Affairs, Center for Arts and Cultural Policy Studies., Working Papers.*

- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285– 296. https://doi.org/10.1016/j.jbusres.2021.04.070
- Dutt, P. K., & Kerikmäe, T. (2014). Concepts and Problems Associated with eDemocracy. In T. Kerikmäe (Ed.), *Regulating eTechnologies in the European Union: Normative Realities and Trends* (pp. 285–324). Springer International Publishing. https://doi.org/10.1007/978-3-319-08117-5 13
- Dutton, W. H., Gillett, S. E., McKnight, L. W., & Peltu, M. (2004). Bridging Broadband Internet Divides: Reconfiguring access to Enhance Communicative Power. *Journal of Information Technology*, 19(1), 28–38. https://doi.org/10.1057/palgrave.jit.2000007
- Echchakoui, S. (2020). Why and how to merge Scopus and Web of Science during bibliometric analysis: The case of sales force literature from 1912 to 2019. *Journal of Marketing Analytics*, 8(3), 165–184. https://doi.org/10.1057/s41270-020-00081-9
- Elena-Bucea, A., Cruz-Jesus, F., Oliveira, T., & Coelho, P. S. (2021). Assessing the Role of Age,
  Education, Gender and Income on the Digital Divide: Evidence for the European Union.
  *Information Systems Frontiers*, 23(4), 1007–1021. https://doi.org/10.1007/s10796-020-10012-9
- Ellegaard, O. (2018). The application of bibliometric analysis: Disciplinary and user aspects. *Scientometrics*, *116*(1), 181–202. https://doi.org/10.1007/s11192-018-2765-z
- Eynon, R. (2009). Mapping the digital divide in Britain: Implications for learning and education. *Learning, Media and Technology, 34*(4), 277–290. https://doi.org/10.1080/17439880903345874
- Fernández-Prados, J. S., Lozano-Díaz, A., Ainz-Galende, A., & Rodríguez-Puertas, R. (2021). Intergenerational Digital and Democratic Divide: Comparative Analysis of Unconventional and Digital Activism around the World. 2021 9th International Conference on Information and Education Technology (ICIET), 466–470. https://doi.org/10.1109/ICIET51873.2021.9419635
- Ferreira, S. M., Sayago, S., & Blat, J. (2017). Older people's production and appropriation of digital videos: An ethnographic study. *Behaviour & Information Technology*, 36(6), 557–574. https://doi.org/10.1080/0144929X.2016.1265150
- Ferro, E., Cantamessa, M., & Paolucci, E. (2005). "Urban Versus Regional Divide: Comparing and Classifying Digital Divide." In M. Böhlen, J. Gamper, W. Polasek, & M. A. Wimmer (Eds.), *E-Government: Towards Electronic Democracy* (pp. 81–90). Springer. https://doi.org/10.1007/978-3-540-32257-3 8
- Friemel, T. N. (2016). The digital divide has grown old: Determinants of a digital divide among seniors. *New Media & Society*, *18*(2), 313–331. https://doi.org/10.1177/1461444814538648
- Fuchs, C. (2009). The Role of Income Inequality in a Multivariate Cross-National Analysis of the Digital Divide. Social Science Computer Review, 27(1), 41–58. https://doi.org/10.1177/0894439308321628
- Gil-Garcia, J. R., Helbig, N. C., & Ferro, E. (2006). Is It Only About Internet Access? An Empirical Test of a Multi-dimensional Digital Divide. In M. A. Wimmer, H. J. Scholl, Å. Grönlund, & K. V. Andersen (Eds.), *Electronic Government* (pp. 139–149). Springer. https://doi.org/10.1007/11823100 13
- Gladkova, A., Argylov, N., & Shkurnikov, M. (2022). The interplay between digital and social inclusion in multiethnic Russian society: An empirical investigation. *European Journal of Communication*, 37(6), 606–628. https://doi.org/10.1177/02673231221093185

- Gómez-Barroso, J. L., & Pérez-Martínez, J. (2007). ADSL deployment in the Community of Madrid: Investigating the geographical factors of the digital divide. *Telematics and Informatics*, 24(2), 101–114. https://doi.org/10.1016/j.tele.2006.01.003
- Gonzales, A. (2016). The contemporary US digital divide: From initial access to technology maintenance. *Information, Communication & Society*, *19*(2), 234–248. https://doi.org/10.1080/1369118X.2015.1050438
- González, A. J. G., Gómez-Millán, M. R. B., & Rubio, L. R. (2017). Competencias comunicativas mediadas en estudiantes universitarios mayores. Alfabetización tecnológica como experiencia innovadora / Mediated communication skills in Senior University Students. Technological Literacy as an innovative experience. *Revista Latinoamericana de Tecnología Educativa -RELATEC*, 16(1), Article 1. https://doi.org/10.17398/1695-288X.16.1.67
- Gounopoulos, E., Kokkonis, G., Valsamidis, S., & Kontogiannis, S. (2018). Digital Divide in Greece—A Quantitative Examination of Internet Nonuse. In A. Karasavvoglou, S. Goić, P. Polychronidou, & P. Delias (Eds.), *Economy, Finance and Business in Southeastern and Central Europe* (pp. 889–903). Springer International Publishing. https://doi.org/10.1007/978-3-319-70377-0 61
- Hanafizadeh, P., Hanafizadeh, M., & Bohlin, E. (2013). Digital Divide and e-Readiness: Trends and Gaps. *International Journal of E-Adoption*, *5*, 30–75. https://doi.org/10.4018/ijea.2013070103
- Hargittai, E. (2002). Second-Level Digital Divide: Differences in People's Online Skills. *First Monday*. https://doi.org/10.5210/fm.v7i4.942
- Helsper, E. J. (2012). A Corresponding Fields Model for the Links Between Social and Digital Exclusion. *Communication Theory*, 22(4), 403–426. https://doi.org/10.1111/j.1468-2885.2012.01416.x
- Iivari, N., Sharma, S., & Ventä-Olkkonen, L. (2020). Digital transformation of everyday life How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? *International Journal of Information Management*, 55, 102183. https://doi.org/10.1016/j.ijinfomgt.2020.102183
- Jackson, L. A., Zhao, Y., Kolenic, A., Fitzgerald, H. E., Harold, R., & Von Eye, A. (2008). Race, Gender, and Information Technology Use: The New Digital Divide. *CyberPsychology & Behavior*, 11(4), 437–442. https://doi.org/10.1089/cpb.2007.0157
- James, J. (2002). Universal access to information technology in developing countries. *Regional Studies*, *36*(9), 1093–1097. https://doi.org/10.1080/0034340022000024312
- Kammerer, K., Göster, M., Reichert, M., & Pryss, R. (2021). Ambalytics: A Scalable and Distributed System Architecture Concept for Bibliometric Network Analyses. *Future Internet*, 13(8), 1– 29.
- Kolsaker, A., & Lee-Kelley, L. (2006). 'Mind the Gap': E-Government and e-Democracy. In M. A. Wimmer, H. J. Scholl, Å. Grönlund, & K. V. Andersen (Eds.), *Electronic Government* (pp. 96–106). Springer. https://doi.org/10.1007/11823100\_9
- Lamberti, G., Lopez-Sintas, J., & Sukphan, J. (2021). The social process of internet appropriation: Living in a digitally advanced country benefits less well-educated Europeans. *Telecommunications Policy*, 45(1), 102055. https://doi.org/10.1016/j.telpol.2020.102055
- Lehner, F., & Sundby, M. W. (2018). ICT Skills and Competencies for SMEs: Results from a Structured Literature Analysis on the Individual Level. In C. Harteis (Ed.), *The Impact of Digitalization in the Workplace: An Educational View* (pp. 55–69). Springer International Publishing. https://doi.org/10.1007/978-3-319-63257-5 5
- Lengsfeld, J. H. B. (2011). An Econometric Analysis of the Sociodemographic Topology of the Digital Divide in Europe. *The Information Society*, 27(3), 141–157. https://doi.org/10.1080/01972243.2011.566745

- Livingstone, S., & Helsper, E. (2007). Gradations in digital inclusion: Children, young people and the digital divide. New Media & Society, 9(4), 671–696. https://doi.org/10.1177/1461444807080335
- Lutz, C. (2019). Digital inequalities in the age of artificial intelligence and big data. *Human Behavior* and Emerging Technologies, 1(2), 141–148.
- Lythreatis, S., Singh, S. K., & El-Kassar, A.-N. (2022). The digital divide: A review and future research agenda. *Technological Forecasting and Social Change*, *175*, 121359. https://doi.org/10.1016/j.techfore.2021.121359
- Marimuthu, R., Gupta, S., Stapleton, L., Duncan, D., & Pasik-Duncan, B. (2022). Challenging the Digital Divide: Factors Affecting the Availability, Adoption, and Acceptance of Future Technology in Elderly User Communities. *Computer*, 55(7), 56–66. https://doi.org/10.1109/MC.2022.3172026
- Mariscal, J., Mayne, G., Aneja, U., & Sorgner, A. (2019). Bridging the Gender Digital Gap. *Economics*, 13(1). https://doi.org/10.5018/economics-ejournal.ja.2019-9
- McMenemy, D. (2022). Internet access and bridging the digital divide: The crucial role of universal service obligations in telecom policy (M. Smits, Ed.; No. 13192; Issue 13192, pp. 122–134). Springer. https://eprints.gla.ac.uk/265795/
- Merisalo, M., & Makkonen, T. (2022). Bourdieusian e-capital perspective enhancing digital capital discussion in the realm of third level digital divide. *Information Technology & People*, 35(8), 231–252. https://doi.org/10.1108/ITP-08-2021-0594
- Milioni, D. L., Doudaki, V., & Demertzis, N. (2014). Youth, ethnicity, and a 'reverse digital divide': A study of Internet use in a divided country. *Convergence*, 20(3), 316–336. https://doi.org/10.1177/1354856513517366
- Mingo, I., & Bracciale, R. (2018). The Matthew Effect in the Italian Digital Context: The Progressive Marginalisation of the "Poor." Social Indicators Research, 135(2), 629–659. https://doi.org/10.1007/s11205-016-1511-2
- Minguez, A. M. (2005). New technologies as social fact: Gender and digital divide in Spain in compared perspective. *Proceedings of the International Symposium on Women and ICT: Creating Global Transformation*, 16-es. https://doi.org/10.1145/1117417.1117433
- Mutula, S. (2010). Deconstructing the 'Digital Divide' In Africa. *International Journal of Innovation in the Digital Economy (IJIDE)*, 1(3), 56–69.
- Nakagawa, S., Samarasinghe, G., Haddaway, N. R., Westgate, M. J., O'Dea, R. E., Noble, D. W. A., & Lagisz, M. (2019). Research weaving: Visualizing the future of research synthesis. *Trends in Ecology & Evolution*, 34(3), 224–238. https://doi.org/10.1016/J.TREE.2018.11.007
- Natalia, G. (2022). An inverted digital divide during Covid-19 pandemic? Evidence from a panel of EU countries. *Telematics and Informatics*, 72, 101856. https://doi.org/10.1016/j.tele.2022.101856
- Niehaves, B., & Plattfaut, R. (2014). Internet adoption by the elderly: Employing IS technology acceptance theories for understanding the age-related digital divide. *European Journal of Information Systems*, 23(6), 708–726. https://doi.org/10.1057/ejis.2013.19
- Norris, P. (2001). Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide. Cambridge University Press. https://doi.org/10.1017/CBO9781139164887
- Ojiako, U., Choudrie, J., Nwanekezie, U., & Chikelue, C.-O. (2019). Adoption and Use of Tablet Devices by Older Adults: A Quantitative Study. In I. O. Pappas, P. Mikalef, Y. K. Dwivedi, L. Jaccheri, J. Krogstie, & M. Mäntymäki (Eds.), *Digital Transformation for a Sustainable Society in the 21st Century* (pp. 545–558). Springer International Publishing. https://doi.org/10.1007/978-3-030-29374-1 44

- Palop García, P., Thapa, B., & Niehaves, B. (2014). Bridging the Digital Divide at the Regional Level? The Effect of Regional and National Policies on Broadband Access in Europe's Regions. In M. Janssen, H. J. Scholl, M. A. Wimmer, & F. Bannister (Eds.), *Electronic Government* (pp. 218–229). Springer. https://doi.org/10.1007/978-3-662-44426-9 18
- Paul, G., & Stegbauer, C. (2005). Is the digital divide between young and elderly people increasing? *First Monday*. https://doi.org/10.5210/fm.v10i10.1286
- Picatoste, X., Mesquita, A., & González-Laxe, F. (2022). Gender wage gap, quality of earnings and gender digital divide in the European context. *Empirica*. https://doi.org/10.1007/s10663-022-09555-8
- Pick, J., & Sarkar, A. (2016). *Theories of the Digital Divide: Critical Comparison*. 3888–3897. https://doi.org/10.1109/HICSS.2016.484
- Pieper, M., Morasch, H., & Piéla, G. (2003). Bridging the educational divide. *Universal Access in the Information Society*, 2(3), 243–254. https://doi.org/10.1007/s10209-003-0061-y
- Pliskin, N., Levy, M., Heart, T., O'Flaherty, B., & O'Dea, P. (2006). The Corporate Digital Divide Between Smaller and Larger Firms. In E. M. Trauth, D. Howcroft, T. Butler, B. Fitzgerald, & J. I. DeGross (Eds.), Social Inclusion: Societal and Organizational Implications for Information Systems (Vol. 208, pp. 413–417). Springer US. https://doi.org/10.1007/0-387-34588-4\_27
- Ragnedda, M. (2017). *The Third Digital Divide: A Weberian Approach to Digital Inequalities* (1st edition). Routledge.
- Ragnedda, M. (2018). Conceptualizing Digital Capital. *Telematics and Informatics*, 35. https://doi.org/10.1016/j.tele.2018.10.006
- Ragnedda, M., & Kreitem, H. (2018). The three levels of digital divide in East EU countries. *World of Media*, 1(4), 5–26. https://doi.org/10.30547/worldofmedia.4.2018.1
- Ragnedda, M., & Muschert, G. W. (Eds.). (2013). *The Digital Divide: The Internet and Social Inequality in International Perspective*. Routledge. https://doi.org/10.4324/9780203069769
- Ragnedda, M., Ruiu, M. L., & Addeo, F. (2020). Measuring Digital Capital: An empirical investigation. New Media & Society, 22(5), 793–816. https://doi.org/10.1177/1461444819869604
- Rajam, V., Reddy, A. B., & Banerjee, S. (2021). Explaining caste-based digital divide in India. *Telematics and Informatics*, 65, 101719. https://doi.org/10.1016/j.tele.2021.101719
- Rodríguez-Hevía, L. F., Rodríguez-Fernández, L., & Ruiz-Gómez, L. M. (2022). European regional inequalities in citizens' digital interaction with government. *Transforming Government: People, Process and Policy*, 16(4), 504–518. https://doi.org/10.1108/TG-03-2022-0031
- Rogers, E. M. (1995). Diffusion of Innovations: Modifications of a Model for Telecommunications. In M.-W. Stoetzer & A. Mahler (Eds.), *Die Diffusion von Innovationen in der Telekommunikation* (pp. 25–38). Springer. https://doi.org/10.1007/978-3-642-79868-9\_2
- Rogers, E. M. (2003). Diffusion of Innovations, 5th Edition (5th edition). Free Press.
- Saka, A. B., Chan, D. W. M., & Mahamadu, A.-M. (2022). Rethinking the Digital Divide of BIM Adoption in the AEC Industry. *Journal of Management in Engineering*, 38(2), 04021092. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000999
- Sanders, C. K., & Scanlon, E. (2021). The Digital Divide Is a Human Rights Issue: Advancing Social Inclusion Through Social Work Advocacy. *Journal of Human Rights and Social Work*, 6(2), 130–143. https://doi.org/10.1007/s41134-020-00147-9
- Santos, R., Azevedo, J., & Pedro, L. (2013). Digital Divide in Higher Education Students' Digital Literacy. In S. Kurbanoğlu, E. Grassian, D. Mizrachi, R. Catts, & S. Špiranec (Eds.), Worldwide Commonalities and Challenges in Information Literacy Research and Practice

(pp. 178–183). Springer International Publishing. https://doi.org/10.1007/978-3-319-03919-0 22

- Scheerder, A., van Deursen, A., & van Dijk, J. (2017). Determinants of Internet skills, uses and outcomes. A systematic review of the second- and third-level digital divide. *Telematics and Informatics*, 34(8), 1607–1624. https://doi.org/10.1016/j.tele.2017.07.007
- Scuotto, V., Nicotra, M., Del Giudice, M., Krueger, N., & Gregori, G. L. (2021). A microfoundational perspective on SMEs' growth in the digital transformation era. *Journal of Business Research*, 129, 382–392. https://doi.org/10.1016/j.jbusres.2021.01.045
- Selwyn, N. (2004). Reconsidering Political and Popular Understandings of the Digital Divide. *New Media & Society*, 6(3), 341–362. https://doi.org/10.1177/1461444804042519
- Selwyn, N., Gorard, S., & Williams, S. (2001). Digital Divide or Digital Opportunity? The Role of Technology in Overcoming Social Exclusion in U.S. Education. *Educational Policy*, 15(2), 258–277. https://doi.org/10.1177/0895904801015002002
- Sen, A. (1999). Development as Freedom. Oxford University Press.
- Shakina, E., Parshakov, P., & Alsufiev, A. (2021). Rethinking the corporate digital divide: The complementarity of technologies and the demand for digital skills. *Technological Forecasting* and Social Change, 162, 120405. https://doi.org/10.1016/j.techfore.2020.120405
- Singh, V. K., Singh, P., Karmakar, M., Leta, J., & Mayr, P. (2021). The journal coverage of Web of Science, Scopus and Dimensions: A comparative analysis. *Scientometrics*, 126(6), 5113– 5142. https://doi.org/10.1007/s11192-021-03948-5
- Souza, C. A. D., Reinhard, N., & Siqueira, É. S. (2017). Digital Divide of Small and Medium-Sized Enterprises: An Analysis of Influencing Factors Using the Toe Theory. *RAM. Revista de Administração Mackenzie*, 18(2), 15–48.
- Spada, I., Chiarello, F., Barandoni, S., Ruggi, G., Martini, A., & Fantoni, G. (2022). Are universities ready to deliver digital skills and competences? A text mining-based case study of marketing courses in Italy. *Technological Forecasting and Social Change*, 182, 121869. https://doi.org/10.1016/j.techfore.2022.121869
- Spaiser, V. (2011). Young people's political participation on the internet in Germany: Empowered ethnic minority groups? Proceedings of the 12th Annual International Digital Government Research Conference: Digital Government Innovation in Challenging Times, 307–316. https://doi.org/10.1145/2037556.2037606
- Taipale, S. (2013). The use of e-government services and the Internet: The role of socio-demographic, economic and geographical predictors. *Telecommunications Policy*, *37*(4), 413–422. https://doi.org/10.1016/j.telpol.2012.05.005
- Taylor, M., & Murphy, A. (2004). SMEs and e-business. Journal of Small Business and Enterprise Development, 11(3), 280–289. https://doi.org/10.1108/14626000410551546
- Tirado-Morueta, R., Mendoza-Zambrano, D. M., Aguaded-Gómez, J. I., & Marín-Gutiérrez, I. (2017). Empirical study of a sequence of access to Internet use in Ecuador. *Telematics and Informatics*, 34(4), 171–183. https://doi.org/10.1016/j.tele.2016.12.012
- Torrent-Sellens, J., Díaz-Chao, Á., Miró-Pérez, A.-P., & Sainz, J. (2022). Towards the Tyrell corporation? Digitisation, firm-size and productivity divergence in Spain. *Journal of Innovation & Knowledge*, 7(2), 100185. https://doi.org/10.1016/j.jik.2022.100185
- Tsatsou, P. (2008). Digital divides and the role of policy and regulation: A qualitative study. In C. Avgerou, M. L. Smith, & P. van der Besselaar (Eds.), *Social Dimensions Of Information And Communication Technology Policy* (pp. 141–160). Springer US. https://doi.org/10.1007/978-0-387-84822-8\_10

- van Deursen, A. J. A. M., & Helsper, E. J. (2015). The Third-Level Digital Divide: Who Benefits Most from Being Online? In *Communication and Information Technologies Annual* (Vol. 10, pp. 29–52). Emerald Group Publishing Limited. https://doi.org/10.1108/S2050-206020150000010002
- van Deursen, A. J. A. M., & van Dijk, J. A. G. M. (2015a). Internet skill levels increase, but gaps widen: A longitudinal cross-sectional analysis (2010–2013) among the Dutch population. *Information, Communication & Society*, 18(7), 782–797. https://doi.org/10.1080/1369118X.2014.994544
- van Deursen, A. J. A. M., & van Dijk, J. A. G. M. (2015b). Toward a Multifaceted Model of Internet Access for Understanding Digital Divides: An Empirical Investigation. *The Information Society*, *31*(5), 379–391. https://doi.org/10.1080/01972243.2015.1069770
- van Deursen, A. J. A. M., van Dijk, J. A. G. M., & ten Klooster, P. M. (2015). Increasing inequalities in what we do online: A longitudinal cross sectional analysis of Internet activities among the Dutch population (2010 to 2013) over gender, age, education, and income. *Telematics and Informatics*, *32*(2), 259–272. https://doi.org/10.1016/j.tele.2014.09.003
- Van Deursen, A. J., & Helsper, E. J. (2018). Collateral benefits of Internet use: Explaining the diverse outcomes of engaging with the Internet. *New Media & Society*, 20(7), 2333–2351. https://doi.org/10.1177/1461444817715282
- van Deursen, A. J., & van Dijk, J. A. (2014). The digital divide shifts to differences in usage. New Media & Society, 16(3), 507–526. https://doi.org/10.1177/1461444813487959
- van Deursen, A., & van Dijk, J. (2011). Internet skills and the digital divide. *New Media and Society*, *13*(6), 893–911. https://doi.org/10.1177/1461444810386774
- van Deursen, A., & van Dijk, J. (2015). New Media and the Digital Divide. In J. D. Wright (Ed.), International Encyclopedia of the Social & Behavioral Sciences (Second Edition) (pp. 787– 792). Elsevier. https://doi.org/10.1016/B978-0-08-097086-8.95086-4
- van Dijk, J. (2005). *The Deepening Divide: Inequality in the Information Society*. https://doi.org/10.4135/9781452229812
- Van Dijk, J. A. G. M. (2012). The evolution of the digital divide: The digital divide turns to inequality of skills and usage. *Digital Enlightenment Yearbook 2012*, 57–75. https://doi.org/10.3233/978-1-61499-057-4-57
- Van Dijk, J. A. G. M. (2017). Digital Divide: Impact of Access. In *The International Encyclopedia of Media Effects* (pp. 1–11). John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118783764.wbieme0043
- van Dijk, Jan. (2006). Digital divide research, achievements and shortcomings. *Poetics*, *34*(4), 221–235. https://doi.org/10.1016/j.poetic.2006.05.004
- van Dijk, Jan., & Hacker, Kenneth. (2003). The Digital Divide as a Complex and Dynamic Phenomenon. *The Information Society*, *19*(4), 315–326. https://doi.org/10.1080/01972240309487
- Vehovar, V., Sicherl, P., Hüsing, T., & Dolnicar, V. (2006). Methodological Challenges of Digital Divide Measurements. *Inf. Soc.*, *22*, 279–290. https://doi.org/10.1080/01972240600904076
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), 425–478. https://doi.org/10.2307/30036540
- Vicente, M. R., & López, A. J. (2011). Assessing the regional digital divide across the European Union-27. *Telecommunications Policy*, 35(3), 220–237. https://doi.org/10.1016/j.telpol.2010.12.013
- Wang, D., & Barabási, A.-L. (2021). The Science of Science. Cambridge University Press.

- Weerakkody, V., Dwivedi, Y. K., El-Haddadeh, R., Almuwil, A., & Ghoneim, A. (2012). Conceptualizing E-Inclusion in Europe: An Explanatory Study. *Information Systems Management*, 29(4), 305–320. https://doi.org/10.1080/10580530.2012.716992
- Wen, J., Hussain, H., Jiang, R., & Waheed, J. (2023). Overcoming the Digital Divide With ICT Diffusion: Multivariate and Spatial Analysis at China's Provincial Level. SAGE Open, 13(1), 21582440231159324. https://doi.org/10.1177/21582440231159323
- Wielicki, T., & Arendt, L. (2010). A knowledge-driven shift in perception of ICT implementation barriers: Comparative study of US and European SMEs. *Journal of Information Science*, 36(2), 162–174. https://doi.org/10.1177/0165551509354417
- Winker, G. (2005). Internet research from a gender perspective Searching for differentiated use patterns. *Journal of Information, Communication and Ethics in Society*, *3*(4), 199–207. https://doi.org/10.1108/14779960580000273
- Yina, M. N. (2020). THE CHALLENGES OF DIGITAL TECHNOLOGIES FOR NIGERIA. *Journal* of Interdisciplinary Studies, 32(1–2), 81–95.
- Zillien, N., & Hargittai, E. (2009). Digital Distinction: Status-Specific Types of Internet Usage. *Social Science Quarterly*, *90*, 274–291. https://doi.org/10.1111/j.1540-6237.2009.00617.x