**Social Inequality and Digitization in Modern Societies: A Systematic Literature Review on the Role of Ethnicity, Gender, and Age**

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## 1. Introduction

The Internet and the increasing use of digital technologies have become an integral part of people's lives in the 21st century (Dijck et al., 2018; DiMaggio et al., 2001). Currently, nearly six billion people regularly use different digital platforms, apps, and services.[2] Meanwhile, it is also becoming increasingly evident that digitalization is changing existing structures of social inequality and that new structures of digital inequality are emerging. This is the starting point for our paper, which sets itself the task of systematizing international research on the relationship between digitization and social inequality within the framework of an empirically supported literature review. To this end, we focus on three key dimensions of social inequality: ethnicity, gender, and age, which in the recent inequality discussion have been (e.g., Alesina et al., 2016; Bosworth et al., 2016; Ridgeway, 2011; Walgenbach, 2017). and are also central to the digitization literature. (L. Robinson et al., 2015; Schradie, 2012; van Dijk, 2020). In our review, we ask how the inequality dimensions of ethnicity, gender, and age are examined in digitization research and what changes in social inequality dynamics through digitization can be detected in the process.

To answer this question, in our paper we analyse articles listed in journals on the Web of Science or found on Google Scholar (cf. De Vries et al., 2016; Scheerder et al., 2017). In this way, we attempt to accommodate different publication traditions in sociology. The Web of Science is one of the standard sources for SSCI-listed journal articles, while Google Scholar maps not only journal articles but also highly cited monographs, edited volume contributions, and working papers. In each case, we use the title, abstract, and keywords of these papers as our data, which we systematize using the PRISMA model for literature reviews (Moher et al., 2009).

Figure 1 shows how dynamically international research activities in the field of digitization have developed in recent years. We have used it as *an example to* illustrate the publications

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[2] The World Bank defines Internet users as: "individuals who have used the Internet (from any location) in the last 3 months via a computer, mobile phone, personal digital assistant, games machine, digital TV, etc." (Worldbank, 2019).

from sociologically oriented journals that have appeared in the Web of Science.[3] While in the early 2000s key terms related to digitization (digital, online, Internet) were listed only sporadically in this database, in 2020 they were mentioned over 800 times in articles. However, the figure also points to a specific research gap: Although the study of inequality aspects of digitization has also been on the rise since around 2010, an explicit inequality perspective on digitization is still relatively rarely adopted in social science journals on the Web of Science. For 2019 and 2020, 44 and 57 journal articles can be identified, respectively, in which key concepts of digitization and inequality issues are used with reference to the three key dimensions of ethnicity, gender and age.

**Fig. 1: Number of publications on digitization listed in social science journals between 2010 und 2020** (Source: Web of Science)
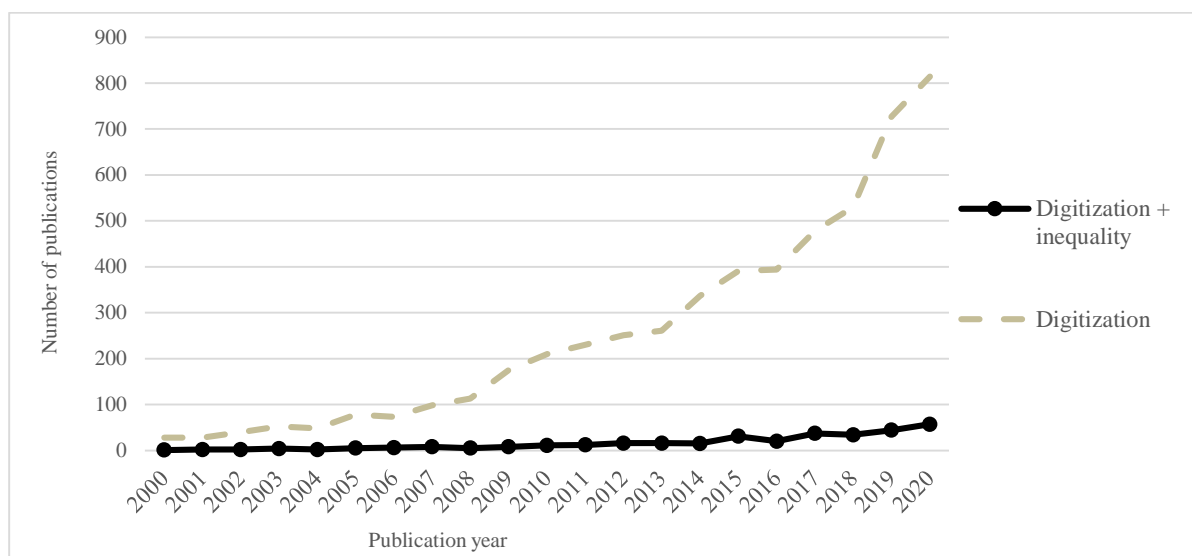


Source: Web of Science, articles in sociology; N=5,356 (digitization), N=338 (digitization + inequality + (race ∨ gender ∨ age)), own calculations.

Our paper is divided into six sections in the following: After the introduction, we discuss the methodological approach in Section 2. Our overall corpus forms a sample of N=281 texts from the Web of Science and Google Scholar. In Sections 3 and 4, we use simple statistical procedures for a description of this text corpus. A more in-depth content analysis of the relationship between social inequality and digitization, focusing on ethnicity, gender, and age, follows in

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[3] Sociological journals on the Web of Science include Social Networks, American Journal of Sociology, British Journal of Sociology, Social Indicators Research, American Sociological Review, Social Forces, European Sociological Review, Current Sociology, Sociology, the Cologne Journal of Sociology and Social Psychology, Zeitschrift für Soziologie, the Berlin Journal of Sociology.

Section 5 through a discussion of key exemplary studies. The conclusion summarizes our main findings.

## 2. Database, methods, text selection

For our literature review, we use a transparent, stepwise selection process guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Moher et al., 2009). The PRISMA model is an evidence-based approach (www.prisma-statement.org) for conducting a structured and systematic review of a research question. It has long been used in the natural sciences and is now increasingly applied in the social sciences as well (Igalla et al., 2019; Ngamaba et al., 2018; Van Laar et al., 2020, among others).

**Fig. 2: PRISMA analysis**
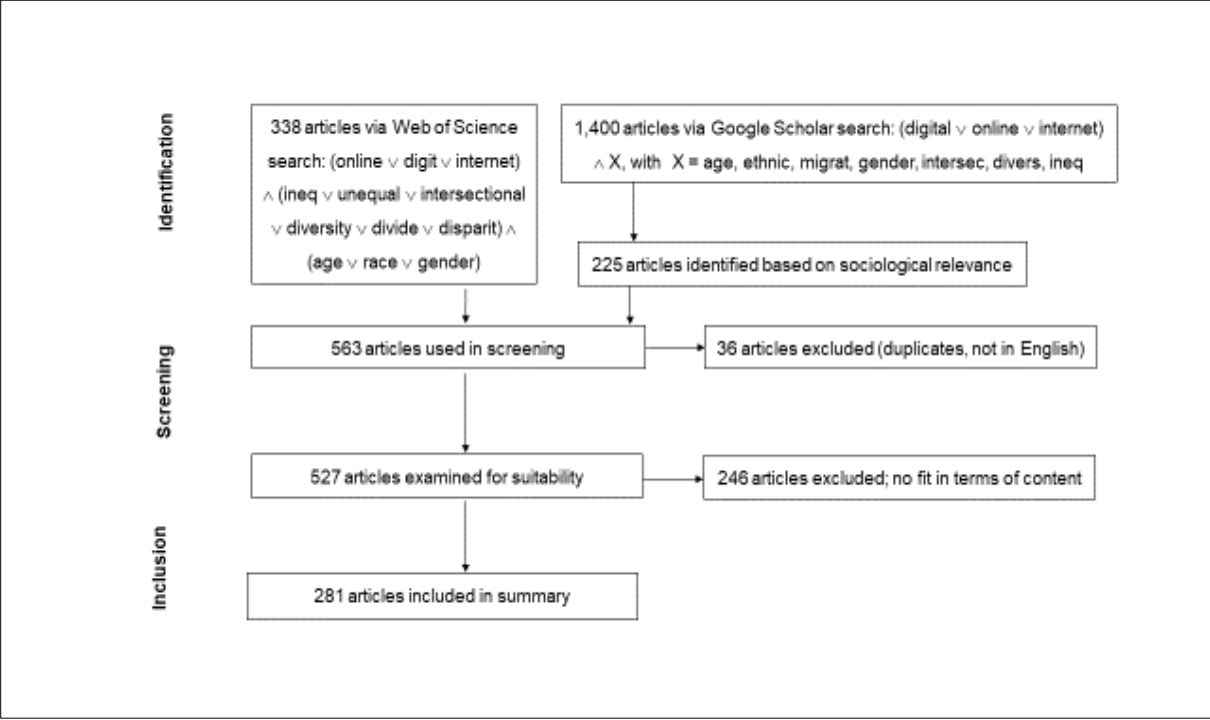


Source: own illustration.

Here, we proceed in three steps (see Fig. 2): First, we identify literature for our topic (identification). In the second step, we assess the relevance of the contributions (screening). Based on the remaining contributions in the text corpus, we systematically summarize the literature (inclusion). To create our text corpus, we use the Web of Science (WoS) and Google Scholar (GS) for the period 2000-2020. In WoS, we restrict the search to SSCI-listed journal articles in English or German that are listed there in the discipline of sociology. In the GS search, these specific

restrictions cannot be made. In our view, this disadvantage is outweighed by the advantage of a GS search, since it lists not only journal articles but also important monographs, book contributions, and working papers (cf. Liu et al., 2018).[4]

The literature search for the PRISMA model runs through a combination of keywords. Those must be present in the title or abstract of the paper for it to be considered. In the WoS search, we combine keywords on digitization with keywords on inequality and mention of ethnicity, gender or age.[5] As a result, we identified 338 texts in the Web of Science. For the GS search, which we performed using the publish&perish program (www.harzing.com), the formula had to be modified slightly because Google Scholar only allows a limited number of conditions. The search was limited to the first 200 hits in each case, giving us a total of 1,400 articles in the GS source corpus. In a next step, the non-sociological contributions were excluded, thus initially integrating 225 GS contributions into the text corpus.

**Tab. 1: Keywords for literature search**

| | Web of Science | Google Scholar |
|---|---|---|
| **Search formula** | (digital* OR online* OR Internet*) AND (ineq* OR unequal* OR intersectional* OR diversity* OR divide* OR disparit*) AND (ethnic* OR migra* OR race* OR racial* OR racism* OR gender* OR sex* OR age*) | ("digital" OR "online" OR "Internet") AND "X" |
| | | X = "ethnic" OR "migrant" OR "gender" OR "intersec" OR "divers" OR "ineq" OR "age" |

Source: own illustration.

The total corpus thus comprises 563 texts at the beginning of the screening, which was further trimmed during the screening of the material (step 2 in the PRISMA model): We removed contributions that appeared neither in English nor in German as well as duplicates from the text corpus (N=36). To determine the articles relevant to the content, we then examined the titles, abstracts, and full texts of the articles for their suitability. In doing so, we identified 281 content-matching contributions and 246 non-matching contributions for our research question. We excluded, for example, the text by Babarovic et al. (2011), which examines individual determinants of support for Croatia's NATO and EU membership. This text had initially been included in our corpus because the words "online," "age," "gender," and "divided" are mentioned in the

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[4] Databases such as Scopus or Microsoft Academics could not be additionally considered due to time and cost constraints (most PRISMA texts use only the WoS).
[5] The concretization of our approach through the search terms used has led to a specific selection of texts. The use of other search terms (e.g., future of work, precarization) would have modified the present result, but in our view offers possibilities for future analyses.

abstract. Each article in the final text corpus (N=281) was then coded in terms of the following: Identifying characteristics (gender of author, institutional affiliation of authors, year of publication, journal), the classification of the empirical subject area as well as the geographic location of the studies, the method, the research design used and the conclusion of the article with reference to recent inequality dynamics.

## 3. Descriptive analysis of the text corpus

The total of 281 articles considered in our review were published by 595 researchers; this means that the average text has 2.1 authors.[6] Among them, there are more women (n=309) than men (n=280),[7] working at different institutes or departments (see Fig. 3).

**Fig. 3: Authors' affiliation**
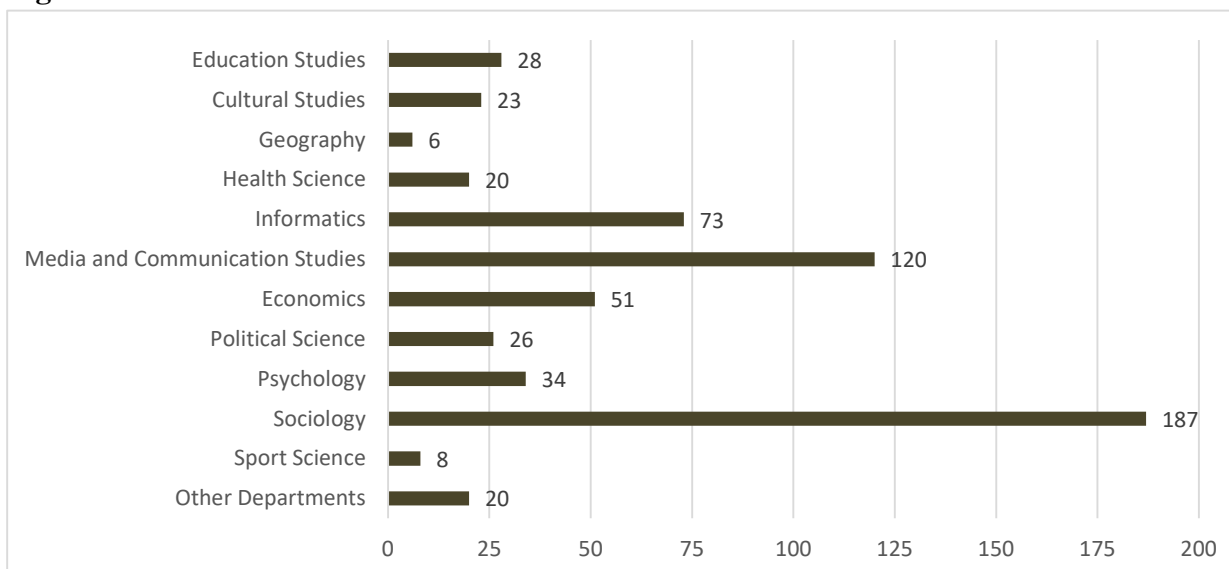


Note: absolute frequencies, N = 595 authors.

Authors work particularly frequently, in addition to an institutional affiliation in sociology[8] (including DiMaggio et al., 2004; Dodel & Mesch, 2018; J. P. Robinson & Martin, 2009), in media and communication studies/public relations. (Duffy & Pruchniewska, 2017; Nguyen et al., 2020; van Deursen & van Dijk, 2015), in computer science (Brock et al., 2010; Groggel et al., 2019) and in economics (AbuJarour & Krasnova, 2017; Dengler & Tisch, 2020). Other

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[6] The articles in our text corpus were published in 128 journals (not tabulated), which shows how broad the debate is. Among the sociological A-journals, Social Forces publishes more texts on digitization and inequality than other journals. Otherwise, interdisciplinary (sociological) journals are strongly represented (e.g. Poetics; Media, Culture & Society; Information, Communication & Society).

[7] Gender was coded using first names and the authors' websites. In six cases, no gender could be attributed.

[8] Our WoS search examines journals listed in the discipline of sociology. The discipline is thus strongly represented, but collectively almost 70% of the authors are employed at other departments.

authors of articles in our text corpus come from departments of psychology (34 authors), for example (Cleland et al., 2019) or the political sciences (26 authors). (e.g., Grenfell et al., 2021).

The authors researching digitization in the context of the inequality dimensions of ethnicity, gender, and age work to a large extent in the U.S. (47% of the authors), where sociologically oriented digitization research started about 20 years ago (Bimber, 2000; DiMaggio et al., 2004; Fairlie, 2004; Hess & Leal, 2001).

**Fig. 4: Authors' place of work**
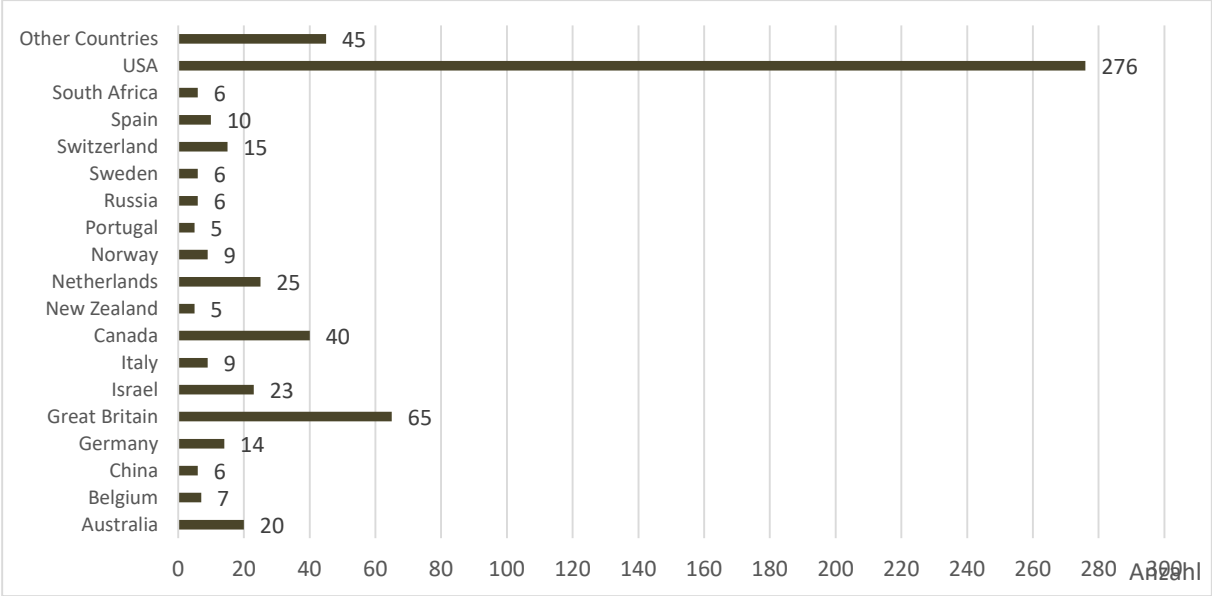


Note: The category "Other countries" subsumes countries with fewer than 5 authors , absolute frequencies, N = 292 university/research facilities.

The United Kingdom (65 authors), Canada (40 authors), and the Netherlands (25 authors) also focus on such issues, for example, with regard to the digital divide by age or ethnicity (Haight et al., 2014; Schradie, 2013; van Deursen & van Dijk, 2015; Yates et al., 2015). Germany is represented by 14 authors and Switzerland with 15 authors in our text corpus, again with a focus on the digital divide but also with analyses of the digital substitution of gendered segregated labor or with research on the digitization of pro-migrant protest movements (including Dengler & Tisch, 2020; Friemel, 2014; Haight et al., 2014; Zajak et al., 2021). The category "other countries" includes for example Qatar, the Czech Republic, France, South Africa, and Peru.

The chosen empirical perspective of the studies in our text corpus also differs, with 62% of the articles (n=174) examining phenomena within a nation-state setting in a classical sociological

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manner (see Tab. 2, further details in Fig. 5); either drawing on secondary data (Blank et al., 2018; Friemel, 2014) or using data from their own surveys (Costello et al., 2019; Grenfell et al., 2021; Scheerder et al., 2019). 9% of studies (n=25) take a comparative research perspective. These include international comparative studies on social media relevance for older people or on the gender and age gap in Internet use (Gaia et al., 2021; N. Li & Kirkup, 2007; Ono & Zavodny, 2007; P. Silva et al.). 17% of studies (n=48) analyze inequality and, among others, discrimination aspects of ethnicity, gender, and age on digital platforms that have a global reach, such as Youtube, Facebook, Twitter, Google, or AirBnB (Bivens & Haimson, 2016; Brown et al., 2017; Cheng & Foley, 2018; Edelman & Luca, 2014). In another group of texts, arguments are primarily conceptual (12%, n=34), for example, with a somewhat broader, social theory focus (L. Robinson et al., 2015; van Dijk, 2018) or with a focus on more concrete problems such as the ethnic bias of algorithms (S. Silva & Kenney, 2018).

**Tab. 2: Empirical focus**

| International comparisons | Theoretical designs and conceptually oriented studies | Studies of digital platforms (global scope) | Focus on one country |
|---|---|---|---|
| 25 | 34 | 48 | 174 |
| 9% | 12% | 17% | 62% |

Note: N=281 texts.

If we look at the part of the studies that focus exclusively on one country (Fig. 5), we see that digitization phenomena are very often researched for the USA (78 of a total of 174 studies). Among the remaining texts, 18 studies relate to the UK and 10 to Israel. For all other countries, the number of studies remains well below 10. A total of six studies deal specifically with Germany. The geographical location in Fig. 5 ultimately reveals a strong imbalance in the research on the regions. Continents such as South America and Africa, as well as the regions of the Middle East and Southeast Asia, are studied very little compared to North America and Europe, for example.

**Fig. 5: Geographical location of digitalization studies with country-specific focus**
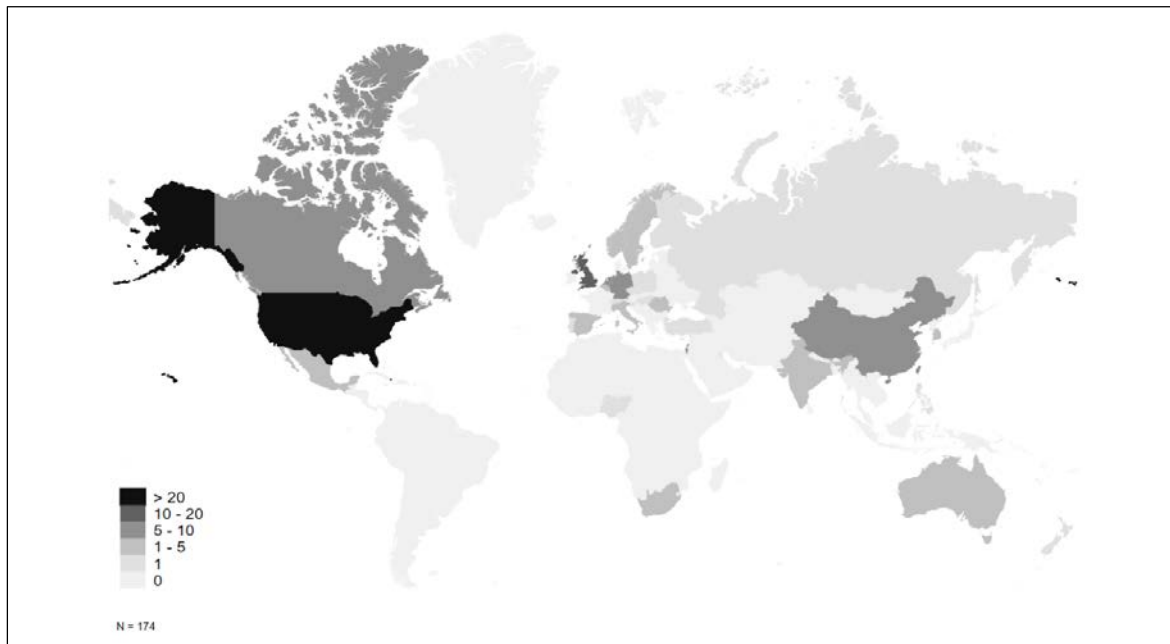


Note: N=174 texts with country specific focus


## 4. Methodological approaches of the text corpus

Methodologically, the publications in our text corpus vary considerably and the range of research designs used is wide (see Tab. 3). A number of texts are based on qualitative interviews or focus group discussions (Alam & Imran, 2015; Correa & Jeong, 2011; Scarcelli, 2015). Quite a few individual case studies or (videographic) observational methods can also be identified in digitization research related to the inequality dimensions of ethnicity, gender, and age (Anderson et al., 2017). Survey-based research and online quantitative methods are even more prevalent in the current literature. About 40% of all texts in our sample use such method designs: online surveys, studies that use webscraping, and "classic" survey methods are commonly used here (Cleland et al., 2019; Maxwell, 2015; Paceley et al., 2020; Rozado, 2019). It is interesting to note that well over 20% of studies on digitization and inequality are based on a mixed-method design. Particularly common among these are publications that combine different qualitative methods (Kaufmann, 2018; Shield, 2018), a combination of qualitative and quantitative methods, on the other hand, occurs less frequently (Neves et al., 2013; Woodman & Cook, 2019). About 6% of papers use text analytic methods; either qualitative or quantitative. 17% of the papers in our text corpus follow a theoretical design, are framed as a literature review or essay (Das & Farber, 2020; Ezell, 2021; Ollier-Malaterre et al., 2019).

**Tab.3: Research designs**

| | in % | N |
|---|---|---|
| Qualitative interviews, focus group discussions | 7.5 | 21 |
| Case studies, (non-)participant observation | 4.6 | 13 |
| Survey-based research / quantitative methods | 42.7 | 120 |
|     thereof web scraping | *31.7* | *38* |
|     thereof online survey | *32.5* | *39* |
| Mixed method designs / triangulation | 21.7 | 61 |
|     thereof mixed method: qualitative | *55.7* | *34* |
|     thereof mixed method: quantitative | *29.5* | *18* |
|     thereof mixed method: qualitative + quantitative | *14.8* | *9* |
| Qualitative or quantitative textanalysis | 6.4 | 18 |
| Other: Essays, literature review, theoretical designs etc. | 17.1 | 48 |
| | 100 | 281 |

Note: N=281 Texts. Numbers in italics are shares of the main category.

The methodological orientation of the texts we studied also differs according to the inequality dimension at the center of the analysis (see Tab. 4). Qualitative methods of data collection are relatively often used, when gender issues are addressed (Conner, 2019; Kang, 2012). Quantitative methods, in contrast, are used more often in sociological studies of age in relation to digitization and in studies that look at more than one dimension of inequality (Cotten et al., 2011; J. P. Robinson & Martin, 2009; Thomas, 2020). In the more theoretically oriented analyses, the emphasis is comparatively often on ethnicity or gender. This category also includes many texts that, in the context of the intersectionality debate among others, consider different dimensions of inequality in the context of digitization processes (Ezell, 2021; Halford & Savage, 2010; Hamilton, 2020; S. Silva & Kenney, 2018).

**Tab.4: Research designs by inequality dimension**

| Dimension | qualitative | | quantitative | | qualitative + quantitative | | Theory / others | | All | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in % | N | in % | N | in % | N | in % | N | in % | N |
| Race | 30.8 | 16 | 50.0 | 26 | 3.8 | 2 | 15.4 | 8 | 100 | 52 |
| Gender | 28.9 | 24 | 49.4 | 41 | 3.6 | 3 | 18.1 | 15 | 100 | 83 |
| All | 12.1 | 4 | 72.7 | 24 | 6.1 | 2 | 9.1 | 3 | 100 | 33 |
| Multiple inequality dimensions | 21.2 | 24 | 57.5 | 65 | 1.8 | 2 | 19.5 | 22 | 100 | 113 |
| | 24.2 | 68 | 55.5 | 156 | 3.2 | 9 | 17.1 | 48 | 100 | 281 |

Note: N=281 texts.

In Tab. 5, we additionally consider the conclusions drawn in the individual contributions with regard to the question of whether digitization leads to an increase, a reduction or a reproduction of social inequality. This key question is currently difficult to answer and a larger proportion of the texts (46%) do not come to a clear conclusion in this regard (Fichman & Sanfilippo, 2015; Friemel, 2014; Mossberger et al., 2008), which in our view can be understood as an indication of existing research needs. Within the remaining corpus, there is a great number of texts, that observe reproduction of inequality structures in the context of digitization (37%) (Dodel & Mesch, 2018; Lewis et al., 2008; Ruvalcaba et al., 2018; Vochocova, 2018) or reduction (12%) of inequality (Gaia et al., 2021; Hamilton, 2020; Nguyen et al., 2020). Only in about 4% of our text corpus did we find evidence of an increase in social inequality due to digitization (Bacher-Hicks et al., 2021; Conner, 2019; Hargittai, 2007; Milkman, 2017; Ortiz, 2019). Although the question of the inequality consequences of digitization cannot be answered conclusively at present, these trends are remarkable in our view.

**Tab. 5: Inequality dynamics**

| Dimension | Increase (in %) | N | Reproduction (in %) | N | Decrease (in %) | N | Unclear (in %) | N | All (in %) | N |
|---|---|---|---|---|---|---|---|---|---|---|
| Race | 3.8 | 2 | 40.4 | 21 | 9.6 | 5 | 46.2 | 24 | 100 | 52 |
| Gender | 1.2 | 1 | 44.6 | 37 | 4.8 | 4 | 49.4 | 41 | 100 | 83 |
| Age | - | 0 | 33.3 | 11 | 21.2 | 7 | 45.5 | 15 | 100 | 33 |
| Multiple inequality dimensions | 8.0 | 9 | 31.0 | 35 | 16.8 | 19 | 44.2 | 50 | 100 | 113 |
| | 4.3 | 12 | 37.0 | 104 | 12.5 | 35 | 46.3 | 130 | 100 | 281 |

Note: N=281 texts.

## 5. In-depth discussion of the text corpus

### 5.1 Focus on ethnicity

Digital inequalities can arise due to differences in access to and use of digital information and communication technologies (ICT). Ethnicity is a key category in this regard (Campos-Castillo, 2015; Graham & Smith, 2010; Mabweazara, 2021), which plays a significant role in determining the material, social, and cultural resources of ICT use (van Dijk, 2020). Ethnic differences in ICT access and use have existed for a very long time and have been well researched in numerous countries (e.g., Fairlie, 2004; Gladkova et al., 2020; Lissitsa & Lev-On, 2014; Stiller & Trkulja, 2018). Exemplary for our text corpus is an early, large-scale study by Hess and Leal (2001), that demonstrates massive disadvantages in digital equipment for schools with a high

proportion of African American students for 72 urban school districts in the United States, regardless of the average educational attainment and income structure in these school districts. In general, the extent of digital inequality by ethnicity in the U.S. appears to have decreased over the past two decades (Fairlie, 2004). However, ethnicity remains an important explanatory factor for unequal resource endowments: for example, various recent studies conclude that *recent immigrants in* the U.S., but also in other countries such as Canada or Spain, have *significant disadvantages in access to digital technologies compared to* natives (Haight et al., 2014; Jimenez et al., 2019; Ono & Zavodny, 2008; Tripp, 2011). This fact is addressed in yet other studies as a cause of ethnic segregation patterns in ICT use behavior (e.g., Mossberger et al., 2017; Stiller & Trkulja, 2018) and referred to linked formations of ethnic digital identities. For example, Pinckney et al. (2018: 267) argues that in digital spheres there is no such thing as "racial neutrality". "Our racialized identities are imported into these spaces, as are the ideologies of our respective societies." Recent studies on the situation of Syrian *refugees in Germany and* Austria have taken a different approach (AbuJarour & Krasnova, 2017; Kaufmann, 2018). These provide the interesting finding that the almost seamless possession of smartphones with mobile Internet access is essential for geographic orientation, information retrieval or language learning and thus *facilitates social participation in the majority society for* an *ethnic minority*. Moreover, in our text corpus, we also find studies that, in addition to the role of ethnicity, address the concurrent effect of other individual characteristics of digital inequality (van Dijk, 2020: 74) and include, for example, vertical inequality dimensions such as class, income, or occupation in their analyses. These studies show that when *multiple inequality dimensions are considered, the importance of ethnicity recedes into the background*. For example, Mesch and Talmud (2011), Cleary et al. (2006) or also Schradie (2012) highlight that ethnic differences in Internet use can be partially explained by differences in occupation or class. Correspondingly, Schradie (2012) argues in her study of blog posts in the U.S., that ethnicity loses importance, especially in the production of online content, but that a person's class affiliation and educational level are particularly relevant (Schradie, 2012: 569).

Ethnic differences in access and use of digital resources have implications for the existing inequality structure (van Dijk, 2018: 204). This is discussed in the studies of our text corpus mainly in terms of two sets of issues. First, a large number of studies deal with experiences of discrimination in the digital space and the (subjective) perception of exclusion (Gaddis, 2017; Hastie & Rimmington, 2014; Weidmann et al., 2016). Matamoros-Fernandez (2017: 1) speaks of "plat-

formed racism" in this context and argues that companies such as YouTube, Twitter, or Facebook *can not only further reproduce but also amplify discriminatory discourses*: "Platformed racism [..] as the entanglement between users' practices to disguise and amplify racist humor and abuse, and the contribution of platforms' features and algorithms in the circulation of overt and covert hate speech." Laouenan and Rathelot (2017) in turn, analyze data from Airbnb in 19 major European and North American cities and show in a widely cited paper that ethnic minority hosts are at a disadvantage in their economic activities and can charge significantly lower prices for renting accommodation (similar findings have Cheng & Foley, 2018; Edelman & Luca, 2014). Hunt (2019) also addresses discriminatory practices in the digital world, using content analysis to examine a popular comic book adaptation website (forums.superhero-hype.com). "This study shows forum participants adopted a white, racially framed perspective to rationalize the absence of women and characters of color in Marvel films. . [and] often reified the traditional 'racial order'." (Hunt, 2019: 100)

However, we can also identify a group of studies that attribute an integrative function to activities in digital space that counteract existing ethnic inequalities. For example, Carpio (2018) thematized the importance of digital pop-ups in combating "racial injustice and creating more inclusive spaces, especially among youth adults." Hastie (2014) analyzes online commentary on U.S. Supreme Court rulings on ethnic discrimination and concludes, that depictions of ethnic discrimination can spark discourses of privilege and combat inequality and racism. Laz and Berenson (2013) also address inequality-reducing digital mechanisms for the United States and show that comparatively small disparities in access to valuable health-related information exist in younger age groups. Thematically quite different studies, on the other hand, show for countries such as Australia, Canada, Switzerland, and Germany that for migrants, access to and opportunities to use digital technologies are crucial positive factors for integration into social networks and the labor market (Alam & Imran, 2015; Nedelcu, 2017; Rushworth & Hackl, 2021). Bosch (2017: 221) discusses for South Africa, that activist protests on Twitter countered institutionalized racism in the analog world. Mossberger et al. (2008) use surveys of Internet and media use in the U.S. and provide evidence that for ethnic minorities, among others, political participation and social engagement are positively influenced by the use of digital resources and digital media. Milkman (2017) provides the finding that social movements led by Millennials - and thus the first generation of digital natives - in the U.S. (including Occupy Wall Street, Black Lives Matter, Dreamers) are much more ethnically diverse than movements of earlier generations. Williams (2017) again uses an analysis of the Tumblr page "Fat People of Color"

to show that new discourses of race, gender, class, and body size are emerging that can form counter-narratives to normative notions of white ideals of beauty. Ultimately, these exemplary studies presented here show that digitalization is changing the dynamics of social and political mobilization and that new forms of representation of ethnicity can be used in the digital sphere. This can contribute to decreasing discrimination by ethnicity; however, this is by no means an automatism.

*5.2 Focus on gender*

Studies in a number of countries show that access to digital resources is not available to women to the same extent as to men (especially in countries of the global South) and ICT use behavior and agency in digital spaces differ, sometimes significantly (Castano et al., 2011; Cooper & Weaver, 2008; Fichman & Sanfilippo, 2015; Gray et al., 2017; Haight et al., 2014; Hargittai & Shaw, 2015; Ruvalcaba et al., 2018; Sobieraj, 2018; Vochocova, 2018). An example of this work would be Bhandari (2019), which examines gender differences in access to digital resources in a large-scale, 51-country study. Other studies argue in a similar way (Fatehkia et al., 2018; Gray et al., 2017; Mariscal et al., 2019; Rashid, 2016). Gray et al. (2017) for example, provide evidence of a gendered digital divide for a total of 18 Latin American countries, which is fundamentally evident in ICT availability, but also in the use of social media platforms and political participation. Gray (2017) concludes, "[These] results have implications for the debate on the equalizing versus normalizing effects of the Internet. At the individual level, if the Internet has the potential to equalize the power disparity across gender, this potential is diminished by the lower usage among women." Other authors, in turn, show for European countries and the United States, that digital inequalities between men and women are shrinking and becoming less relevant. In these countries, especially in younger age groups, there is hardly any gender-specific digital divide anymore (Martínez-Cantos, 2017; Ono & Zavodny, 2003, 2007).[9]

From the analysis of our text corpus, it is also clear that digitization is changing the fabric of existing gender inequalities. Similar to the first focus in chapter 5.1, our text corpus contains studies that address discrimination and exclusion. This is a prevalent topic in various social

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[9] In this context, it is emphasized that, apart from biological sex, prevailing gender images also define digital inequality between men and women. The importance of subjective factors is already shown by Hargittai and Shafer (2006) as men and women hardly differ in their digital skills, but women rate their digital skills as lower themselves. In a similar vein, Siddiq and Scherer (2019) in a recent meta-study show that the digital skills of younger women exceed those of men of the same age, even after controlling for other influencing factors. At the same time, men believe themselves to be more digitally competent than women.

domains, e.g., in gaming, in the public forums of large media companies, in the labor market, or within social media platforms (Fox & Tang, 2014; Harmer & Lewis, 2021; Haslop & O'Rourke, 2021; Ruvalcaba et al., 2018). In this context, it is also worth referring to various studies that examine sexism and practices of (sexual) harassment in digital spaces (Ron & Nimrod, 2018; Sobieraj, 2018; Vartabedian, 2019). For example, evidence from Moloney and Love (2018) based on an analysis of Twitter feeds, demonstrate massive misogynistic discrimination in the digital sphere, which became visible on the occasion of the publication of hacked, private photos of prominent women. Discrimination against women is commonplace according to a study by Ruvalcaba et al. (2018) is also widespread in E-Sports. In addition to the general underrepresentation of women in the fast-growing e-sports sector, the authors point out that female players often face sexism and sexual harassment. As another example, the study by Martinez Dy et al. (2016) reveals systematic forms of disadvantage and exclusion for women who have started their own digital businesses within different branches of the economy (e.g., marketing, health, fashion industry). They write, "Our critical analysis suggests that as a socio-technical artefact, the online environment reflects, reproduces and potentially exacerbates offline social hierarchies." (Martinez Dy et al., 2016: 304) Putting a different emphasis with regard to the labor market, Brussevich et al. (2018) predict a disproportionate reduction of female jobs in the service sector and industry in the future by arguing that women, globally speaking, are more likely than men to perform simple jobs that can be replaced by digital technologies. Finally, many other studies provide evidence of different forms of exclusion and discrimination by gender and gender identities that emerge and become visible in the context of the digitization process (M. Y. Li & Luo, 2020; Rigoni, 2012; Seçkin et al., 2021; Sobieraj, 2018).

Nevertheless, digital platforms and technologies are being used to break down gendered patterns of discrimination and develop counter-narratives (Baer, 2016; Cote, 2017; Vitis & Gilmour, 2017). The study by Matos (2017) on Brazilian cyberfeminism is a case in point. Matos argues that specifically social media platforms (Twitter, Facebook, microblogs, etc.) can have an enormous, positive impact on key debates in politics and uses the case study of the blog of the NGO Think Olga (https://rightscolab.org/case_study/think-olga/), which has managed to reach a global audience after only a few years, as an explanation. Jouet (2018) discusses similar findings in her study of nine feminist collectives in France. She uses online ethnographic long-term observation to show the political opportunities associated with the use of digital media and how organizational and leadership structures change in this process. Jouet (2018) and other studies emphasize in this context for countries such as New Zealand, China, France, and Spain

(Chang et al., 2018; Jackson, 2018; Miño-Puigcercós et al., 2019; Schuster, 2013), that with digitalization comes a generational shift within feminist activism, as in many cases younger women are becoming involved with new activist forms and content. For a different focus, Bivens and Haimson (2016) analyze how social media platforms (including Facebook, YouTube, Twitter, LinkedIn, Blogspot, and Instagram) programmatically break new ground in representing gender categories, allowing for diversity of gender identities, and how relevant this is to the broader social discourse on gender justice.

*5.3 Focus on age*

Many studies in our text corpus show that *access to ICT* is *expanding for an ever-increasing proportion of older people* (Hargittai et al., 2019; Neves et al., 2013; Nguyen et al., 2020) and thus those groups of people are also using digital technologies in their everyday lives who rarely had access a few years ago (Nimrod 2017; White and Selwyn 2013). Against this background, studies are also increasingly focusing on the usage behavior of the growing group of senior citizens (Caceres & Chaparro, 2019; Neves et al., 2018). For example, Friemel (2014) shows for Switzerland that the Internet use of people aged 70+ strongly depends on the social context, family support and the attention of friends of the same age. Hargittai et al. (2019: 886) analyze the digital skills of people over 60 and emphasize the relevance of socio-economic status for the U.S.: "Especially income is an important factor in explaining who has more autonomy of [online] use (..) and higher autonomy of use is significantly tied to both higher-level general Internet skills as well as social media skills." Exploring a slightly different focus, Caceres and Chaparro (2019: 260) address cross-generational age effects in access to and use of digital technologies. The authors analyze the influence of younger individuals on the intergenerational transmission of digital skills in Latin American households and are able to show that "intergenerational transfer of knowledge within the household is a positive externality, which tends to occur among older adults when they receive support and instruction from family members who are minors, or are just exposed to new technologies." ICT access and digital usage behavior among younger groups of people is also the subject of some research in our text corpus (Smith et al., 2015). In this research, it is found that not only do access differences exist (Micheli 2016), but also differences in usage practices and, concomitantly, assessments of opportunities and risks offered by the digital space (Smith, Hewitt, and Skrbis 2015; Vickery 2015). In this regard, inequalities in digital usage practices correlate with socioeconomic status as well as ethnicity and gender (Henderson 2014; Valtchanov and Parry 2017).

With regard to the effects of digitization on the existing structure of inequality, we can identify two central themes: First, it is striking that one focus is on the question of the extent to which digitization provides tools that can reduce the social isolation of people of different ages (Amichai-Hamburger & Ben-Artzi, 2003; Nowland et al., 2018; Sum et al., 2008). The study by Silva et al. (2020) can be cited as an example here, which uses SHARE data to analyze the online behavior of people aged 50+ in various European countries. The authors conclude that the Internet can reduce feelings of loneliness, especially among people living alone, and see this as a mode of social integration. Similar findings are reported by White and Foale (2020). They evaluate, through web scraping, 4,000 conversations of a digital neighborhood platform launched in a pilot project in Manchester, and show how this platform digitally connects (elderly) residents with each other, thereby reducing social isolation. Valtchanov (2017) argues for young immigrant women to compensate for and renegotiate constraints in their transnational familial and friendship relationships through the use of digital resources. Gross et al. (2002) on the other hand, discuss in a California school study that digital proximity can be associated with social anxiety and loneliness among students. The way ICT is used by individuals thus seems crucial to the question of whether and how its use affects perceptions of loneliness and social embeddedness.

Another group of studies explores the question of what effects digitization has on life satisfaction and well-being (Khalaila & Vitman-Schorr, 2018). For example, Gaia et al. (2021) based on a Eurobarometer data, conclude that the use of digital social networks has positive effects on the life satisfaction of people over 65 in Europe. The authors argue that the use of social networks can improve the life satisfaction of older people, but mainly for more highly educated people in this age group. This finding is consistent with a study by Nguyen et al. (2020), which shows that elders who are active online (e.g., participate in social media debates) have more social capital - both in offline and online contexts. ICT thus provides an infrastructure for communication and social exchange that can have positive effects on the life satisfaction and well-being of older people. At the same time, the digital space also reproduce notions of norms about age and discriminates on the basis of age, which has negative effects on well-being. A study by Calasanti (2007) discusses this issue by analyzing advertisements on 96 anti-aging websites that idealize the lifestyles of white, affluent, heterosexual people. Overall, digital technologies seem to offer potential opportunities to reduce the social isolation of older people and improve their life satisfaction and well-being. This is shown by quite a few studies from different countries in our text corpus. However, it is also striking that these opportunities are co-influenced

by further inequality determinants such as gender, income and education, and thus positive effects of digitization are unequally distributed within the group of the elderly.

## 6. Conclusion

In our paper, we used the PRISMA model (Moher et al., 2009) to systematize the international literature on digitization and social inequality, focusing on three key dimensions: ethnicity, gender, and age. This literature review is based on texts published between 2000 and 2020 that can be found on the Web of Science or on Google Scholar. Based on that data base, we can identify a number of key results, which we summarize here.

First, our descriptive analyses of the text corpus show that research at the intersection of digitization and inequality is strongly organized across disciplines, with contributions from sociology, media and communication studies, computer science, economics, but also political sciences, psychology and health studies. In addition, women are slightly more likely than men to be active authors. Second, nearly half of the authors are at U.S. research institutions, and a very large proportion of the empirically based studies also examine this geographic focus. The UK, Canada, and the Netherlands are also relatively well represented. In Germany or Switzerland, relatively speaking, there is less digitization research going on that addresses inequalities by ethnicity, gender and age. Third, with regard to social science methods, a broad spectrum of methods can be observed in the research on digitization and inequality that we have studied. A larger part of this research uses quantitative methods, especially original digital methods such as webscraping, online surveys, and online experiments. Studies based on qualitative methods are also strongly represented (including, in many cases, qualitative mixed-method designs). Another considerable portion of current research on digitization and inequality applies theoretical designs. Fourth, we conclude from the texts we analyzed that no definitive findings on the effects of digitization on social inequality can be crystallized at this time. Despite this open-endedness, we currently observe a tendency for a larger number of analyses that indicate a reproduction or even reduction of social inequalities in the context of digitization. Only a small proportion of the studies that examine digitization in the context of ethnicity, gender and age explicitly address an increase in social inequalities. Fifth, a number of other detailed findings can be identified. Among other things, our analysis of existing research shows, that while inequalities in access to and use of digital technologies have diminished, they remain visible. This "digital divide" (Halford & Savage, 2010; Hargittai, 2007; L. Robinson et al., 2015) exists between men and women primarily in countries of the global South, while it no longer exists in

this way in Western societies (unlike in the early 2000s). Ethnicity continues to mark an important dividing line; the digital divide by age tends to decrease. According to van Dijk (2020: 31), this variance in access to and use of digital technologies creates inequalities in social participation and is linked to already unequally distributed key resources (e.g., education, income) via feedback effects. The analysis of our text corpus also makes it clear, that massive patterns of discrimination and exclusion, especially by gender and ethnicity, operate within digital spaces in some cases. At the same time, the formation of political counter-narratives and new possibilities for activist influence on social policy can be observed here. This can make discrimination and exclusion more salient and counteract existing inequalities. Digitalization also opens up new opportunities for the integration of migrants and refugees into social networks and the labor market. Furthermore, it can improve social integration for the growing population of older people, strengthen social networks and increase life satisfaction and individual well-being.

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