Determinants and Impacts of Technological Inequalities: An Examination on the Digital Divide[1]

Teknolojik Eşitsizliklerin Belirleyicileri ve Etkileri: Dijital Uçurum Üzerine Bir İnceleme

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ABSTRACT

The digital divide, one of the social-scale technological problems of the information age, is used at the conceptual level to express the differences in access and use of information and communication technologies between people and regions. This study examines the determinants, historical roots, development and effects of the digital divide. Within the framework of the concept of the digital divide, its relationship with factors such as education, socioeconomic status, geographical location and gender is emphasized; How these factors affect inequalities in technology access and use is examined. Along with its social effects, the digital divide also has many economic effetcs such as efficiency factor productivity, general and vocational education and employment, furthermore, consumption patterns. Due to its widespread effects, the digital divide is beyond being an individual-centered problem and is a phenomenon that should be carefully examined by states that take an active role in both the welfare of their citizens and the economic growth and development processes of the country. It ends by emphasizing that the digital divide is not just a technology related problem but also a matter of social justice and equality.

ÖZ

Bilgi çağının toplumsal ölçekli teknolojik sorunlarından biri olan dijital uçurum, kavramsal düzeyde kişiler ve bölgeler arasında bilgi ve iletişim teknolojilerine erişim ve kullanım farklılıklarını ifade etmek için kullanılmaktadır. Bu çalışmada dijital uçurumun belirleyicileri, tarihsel kökenleri, gelişimi ve etkileri incelenmektedir. Dijital uçurum kavramı çerçevesinde eğitim, sosyoekonomik statü, coğrafi konum ve cinsiyet gibi faktörlerle ilişkisi üzerinde durulmakta; bu faktörlerin teknoloji erişimi ve kullanımındaki eşitsizlikleri nasıl etkilediği incelenmektedir. Dijital uçurumun sosyal etkilerinin yanı sıra etkinlik faktörü verimliliği, genel ve mesleki eğitim ve istihdam, ayrıca tüketim kalıpları gibi birçok ekonomik etkisi de bulunmaktadır. Yaygın negatif etkileri nedeniyle dijital uçurum birey merkezli bir sorun olmanın ötesinde hem vatandaşlarının refahı hem de ülkenin ekonomik büyüme ve kalkınma süreçlerinde aktif rol alan devletler tarafından dikkatle incelenmesi gereken bir olgudur. Çalışma, dijital uçurumun sadece teknolojiyle ilgili bir sorun değil, aynı zamanda bir sosyal adalet ve eşitlik meselesi olduğunu vurgulamaktadır.

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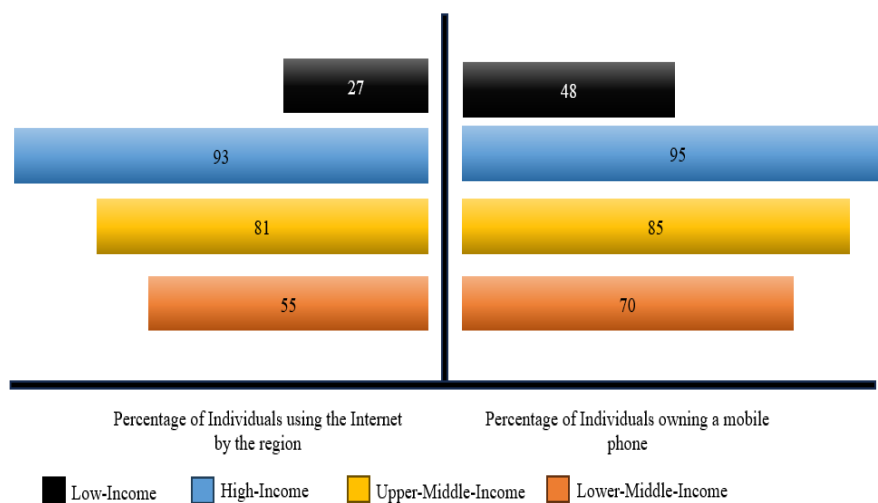
Introduction

Information and communication technologies (ICTs) are advancing quickly in the early 21st century, and their significance in our social and economic lives is growing. The widespread adoption of digital technologies and the Internet have revolutionized lifestyles, economic practices, and educational systems, permeating every part of our existence. However, the so-called "digital divide"—a significant imbalance between different societal segments—has also been brought about by this technological advancement. Larry Irving popularized the phrase "digital divide" in the mid-1990s to describe these stark disparities in technology access and use (McConnaughey et al., 1998).

Since its inception, the digital divide has encompassed social, educational, and economic aspects in addition to physical access (DiMaggio & Hargittai, 2001; Van Dijk, 2005). This expanded definition includes the ability of individuals and communities to use technology effectively and their capacity to benefit from these technologies. Moreover, nowadays it is known that even households without access to basic needs have cell phones with internet access. Supporting this, according to World Bank (2016) report, about 70% of the socioeconomically lowest 5% of the population in developing countries own a cell phone.

However, by 2023, 27% of the population in less developed economies will be using the internet, while in developed economies this rate is 93%. In this context, the fact that internet usage and mobile device ownership, which are the main indicators of ICT, are so sensitive to income level and geographical locations is the basic reality that shapes the concept of digital divide. Figure 1 shows the internet usage and mobile device ownership rates of countries according to their level of development.

Figure 1: Internet Usage and Mobile Devices by Level of Economic Development

Low-Income   High-Income   Upper-Middle-Income   Lower-Middle-Income
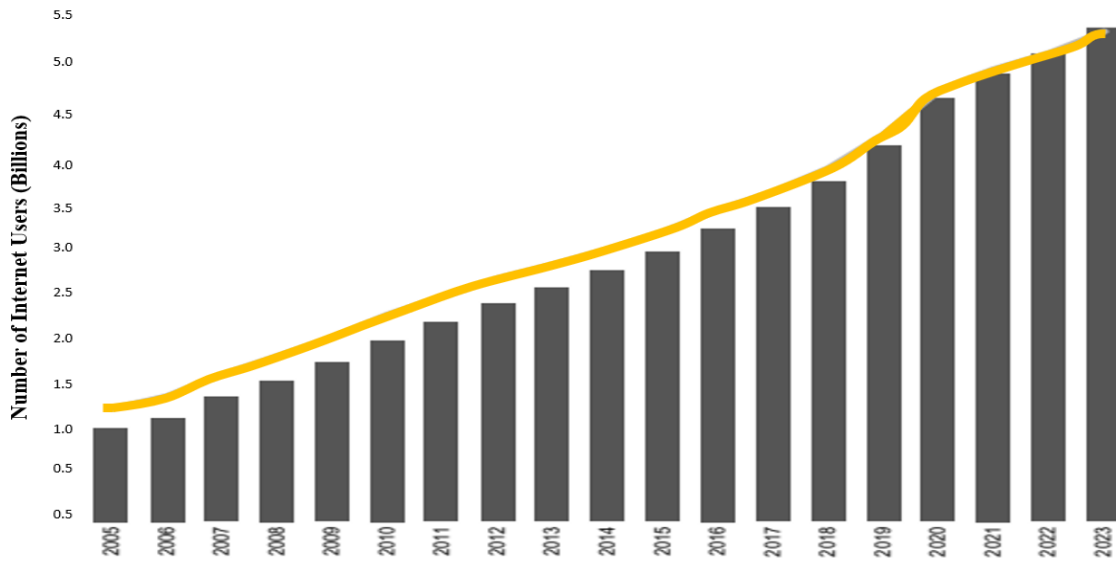
Source: (ITU, 2023).

In 2000, there were 413 million Internet users in the world, while in 2023, this number has approximately reached 5.5 billion users and more than 65% of the world's population is already an internet user (ITU, 2023). In Figure 2, data is presented to support the proposition that the population without access to the internet worldwide has rapidly decreased in the last two decades, in other words, internet usage has become more widespread day by day.

to information, but also introduced many new concepts such as digital industry, digital agriculture, digital education, digital economy, digital health and digital democracy. This evolution has further complicated the digital divide. For example, with the introduction of smartphones in 2007, new career fields such as mobile application development have emerged, requiring digitally literate labor (OECD, 2016).

This study mainly discusses the causes of the digital divide and its negative effects from different perspectives and the strategies that can be applied in the process of combating possible side effects. The digital divide can appear in various forms at different levels of economic development. The digital divide is discussed not only in terms of gaps between haves and have-nots, but also in terms of the degree of quality of access. This suggests that having technical access does not necessarily imply having the other tools, incentives, or opportunities necessary to use it effectively (Burbules & Callister Jr, 2000). Therefore, it would not be correct to limit the digital divide to a single typology; there are many different types of it including social, economic and geographical conditions. This diversity makes it necessary to address the digital divide not only as a technological problem but also as an

issue of social justice, equality and ultimately welfare. Two important conditions necessary to overcome (1) the digital divide are access to technology, (2) the internet and the development of the necessary expertise to use these technologies effectively (Anderson & Ainley, 2010; European Commission, 2022).

Figure 2: Worldwide Internet Usage: 2005-2023

The digital revolution has not only facilitated communication and access

Therefore, this study demonstrates that negative pervasive effects are not limited to Less Developed Countries but are also a significant problem in developing countries. Also, the study, aims to provide a comprehensive framework for understanding the digital divide and developing effective strategies to tackle this global problem. This framework will address the effects of the digital divide at both the individual and societal levels and will aim to propose practical solutions to reduce these inequalities.

The following sections of the study are organized as follows: The second section conceptually examines and discusses the digital divide. The next section is devoted to explaining the basic dynamics of the digital divide in the context of an extensive literature review. The fourth section attempts to develop policies to mitigate the negative pervasive effects of the digital divide. The concluding section evaluates the information presented in the study and provides insights into the future risks of the digital divide.

2. Digital Divide

In the mid-1990s, Larry Irving, who was then leading the National Telecommunications Infrastructure Administration, brought the concept of the digital divide to the forefront (McConnaughey et al., 1998). This notion initially stemmed from a perspective where the possession of or access to technological tools was seen as the key factor influencing societal transformations, relegating human, and social elements to a lesser role. Early research categorized the digital divide based on whether individuals had ownership or physical access to digital technologies (Hartviksen et al., 2002; Srinuan & Bohlin, 2011). This interpretation of the digital divide has been considered inadequate by some researchers (Bertot, 2003; Vehovar et al., 2006). Other constraints encompass deficiencies in literacy and skills related to Information and Communication Technologies (ICT), along with psychological or motivational hesitance (DiMaggio & Hargittai, 2001; Van Dijk, 2005). Van Dijk (2005) highlighted that these disparities indicate restrictions not only in physical access but also in acquiring necessary skills and motivational willingness to use ICT.

The digital divide represents a complex, multi-layered issue, extending its influence across both national and international arenas (Bertot, 2003). Initial investigations into the digital divide were largely confined to its technological aspects, focusing on disparities in access to digital tools like the Internet and computers, particularly in residential and public spaces including workplaces, schools, and libraries (Dobransky & Hargittai, 2006; Kaye, 2000).

The concept of the digital divide also encompasses the ability to afford and understand technology. Historically, towards the end of the 20th century, it mainly signified the gap in telephone access. However, by the early 21st

century, this term evolved to predominantly denote the divide in internet access, especially in broadband. The term now captures contrasts not just in technology access between urban and rural areas, or educated and uneducated populations, but also across different socioeconomic groups and between countries at various stages of development worldwide (Pick & Nishida, 2015). Even in communities with some level of technology access, disparities are evident in the form of lower-quality computers, slower wireless connections, more affordable internet options like dial-up, and restricted access to subscription-based content (Antonelli, 2003).

As digital technologies have advanced, traditional interpretations of the digital divide have become inadequate, leading to the emergence of new definitions. These now incorporate aspects of economic disparity, accessibility of information, and levels of information literacy (Bertot, 2003). The divide is increasingly apparent among individuals with differing financial, educational, regional, or racial backgrounds (Hoffman & Novak, 1998; Lengsfeld, 2011; Wei & Hindman, 2011). The realization that the digital divide transcends socioeconomic status to include physical barriers has led to more expansive definitions. For instance, the divide is also evident between individuals with and without disabilities. While some researchers like Dobransky and Hargittai (2006) have termed it the disability divide, within the context of this study, the term 'digital disadvantage divide' is deemed more appropriate. Bynum and Rogerson (2003) emphasize the need for effective solutions, particularly for those at a disadvantage in the digital divide, to ensure their equitable participation in society.
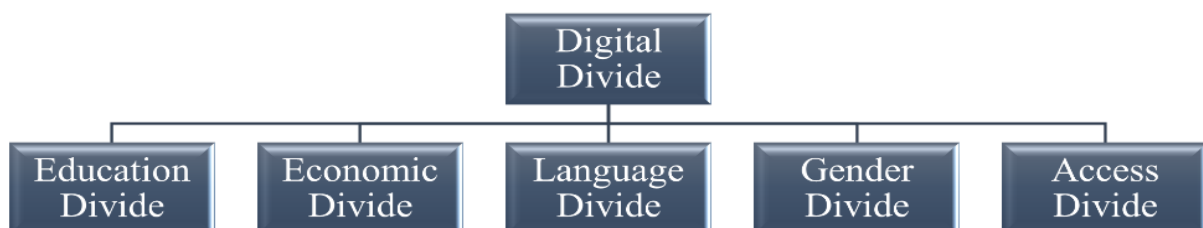
Furthermore, new interpretations of the digital divide have also been influenced by linguistic and cultural disparities (Keniston & Kumar, 2004). Globally speaking, the gap in developing nations is typified by a dearth of access to internet services and digital technology, which also extends to more recent, superior technologies like cell phones and wi-fi.

Worldwide, there is a stark inequality in telecommunications bandwidth. Countries like Venezuela, Paraguay, Egypt, Yemen, and Gabon are noted for their particularly low digital access speeds (Mubarak, 2015). Addressing the digital divide is believed to enhance aspects such as digital literacy, the democratization of digital skills, social mobility, economic equality, and overall economic growth (United Nations, 2022). In response, the United Nations has formed an ICT task force aimed at bridging the global digital gap. The rapid evolution of ICT has triggered significant transformations in the political, economic, and social landscapes globally, prompting widespread initiatives to boost ICT investment and infrastructure development. Yet, the challenge of the digital divide persists, deepening with the continual emergence of new technologies (Mubarak, 2015). To effectively tackle and comprehend the complexities of the digital divide, a more nuanced and in-depth understanding is required. The following section attempts to dissect and explore the driving factors behind the digital divide.

3. Literature Review on the Determinants of the Digital Divide

When the digital divide is used conceptually on its own, it cannot clearly reveal all the problems it encompasses. This is because the concept evokes deprivations related to technology. However, at the theoretical level, the process leading to the digital divide is the sum of many differentiations in terms of education, economic, linguistic, gender and access. Figure 3 presents the main dynamics that determine the digital divide.

Figure 3: Digital Divide and its Determining Dynamics

Source: Designed by author.

Education divide

One of the most frequently mentioned aspects of the digital divide is the disparities in people's educational backgrounds (Cruz-Jesus et al., 2012; Shirazi et al., 2010). As a result, the literature has long explored the connection between ICT and education. Education, according to Pick and Nishida (2015), is a major factor in determining how much technology is used. It is evident how education plays a part in the growing uptake of digital technologies. It is widely believed that increased usage of the internet and ICT for work-related, educational, and

other information needs correlates with greater education levels (DiMaggio and Hargittai, 2001). Additionally, Turney et al. (2009) attest to the strong correlation between Internet use and education. According to Pittman (2007), there is no denying ICT's contribution to the advancement of a globally varied educational system. Furthermore, Cooke and Greenwood (2008) contend that the adoption of ICT has been significantly aided by the education sector.

The emergence of new technologies often presents challenges in terms of adaptation for frequent users of these tools (Rogers, 2001). In the scholarly realm, there is a consensus that the simplicity of a technology's adoption directly correlates with its adoption speed (Katz & Rice, 2002). This correlation underscores the pivotal role of an individual's educational background in the digital divide discourse. When confronted with technical difficulties, those with higher educational attainment are generally more adept at navigating and overcoming complexities efficiently (Zha et al., 2015). Education, therefore, not only eases the integration and comprehension of new information but also exacerbates the gap in knowledge among individuals with varying educational levels.

However, ICT and Internet-related activities require many users to navigate through an endless pool of data to find the information they need. Moreover, although access is a prerequisite when it comes to ICTs, having adequate technological access is not enough to take advantage of all the benefits that these technologies can bring (Van Dijk & Hacker, 2003). As Vicente and Lopez (2010) point out, the user needs training not only to access the infrastructure but also the ability to access, search and use information.

It is also feasible to bring up some recent studies that offer conflicting conclusions about the contribution of education to ICT adoption. Demographic variables may not have a significant influence on the digital gap, according to some empirical research (Katz & Rice, 2002). Pieper et al. (2003) highlighted the reality that students utilize computers more for gaming than for finishing homework or research projects. Furthermore, Middleton and Chambers (2010) contended that adoption of the Internet is unaffected by education. This stance appears to be contentious, though. This might be because both students and lecturers actively utilize tablets and smartphones, which have entered the educational system in the previous five years as a result of the development of high-tech devices. Therefore, the validity of Middleton and Chambers' (2010) idea is questionable.

Looking at the differences between those with higher and lower levels of education: People are more likely to access and use ICT at home and at work the better educated they are. Furthermore, there is a substantial correlation between income and educational attainment (OECD, 2021). Furthermore, ICT access rates are often greater among people with higher education levels at the same income level. There are differences between higher education graduates and those with lower levels of education in terms of internet access as well as the way the internet is used. Internet usage needs change as the level of education increases and access is mostly directed towards artistic, scientific, and cultural pages (OECD, 2021).

Socioeconomic Divide

Socioeconomics is an inclusive term for the integrated role of social and economic factors in social processes. An increase in socioeconomic level implies a higher income and social welfare structure. In this manner, the higher the socioeconomic level, the higher the level of ownership and use of digital devices (Rogers, 2001). Mubarak et al. (2020) have confirmed the global connections between digitalization and socioeconomic characteristics, adding to the current discussion on the digital divide. The authors offer a historical overview of the disparities in ICT use and access that have characterized the previous 20 years. Their research investigated the long-lasting impacts of money and education on ICT diffusion by analyzing data from an incredibly large sample of 191 nations. By providing a more nuanced reading of the link between the digital divide and education, they raise the following research question: *Does ICT use in emerging and disadvantaged nations stem mostly from education?* They respond that poverty is a major contributor to the digital divide and that income and education have a favorable correlation with the spread of ICT. In support of the findings presented by the authors, Figure 1 descriptively shows that the use of key digital elements changes drastically with income level. In addition, ICT penetration on a global scale, and hence rising income and educational attainment, determines the increasing rate of ICT use. High purchasing power, according to the authors, promotes investment and education and is increasingly combined with ICT-based learning. As Levine (2020) points out, digital disparities continue to exist and have a detrimental impact on social welfare, even in the most developed nations with great purchasing power.

Additionally, several research show a significant relationship between digitization and GDP per capita. Furthermore, a new kind of digital divide is discovered by some research looking at the connection between GDPs per capita and ICT dissemination in industrialized nations (Cruz-Jesus et al., 2012; Hess & Leal, 2001; Kyriakidou et al., 2011). In high-income nations, there is a regional digital divide between urban and rural communities, as noted by Hindman (2000) and Schleife (2010). Policies aimed at creating equal research circumstances in rural and urban locations should center on the digital divide (Hess and Leal, 2001).

The main challenge of reducing the rural divide is that it is a much more costly process than the urban divide. To this extent, reducing rural fragmentation requires additional investments in infrastructure. More specifically, Levine (2020) argued that subsidies and public incentives should be provided to close the digital divide for low-income households. Research on the digital divide now suggests that high-speed internet is the right of every individual. The author argues that the public sector as well as social welfare organizations should include high-speed internet as a basic need. The author also makes the ethical and moral case that governments should work to keep low-income and rural citizens from losing their rights because they cannot use the internet. This is due to the fact that those without internet connection experience negative effects on their prospects in life, both economically and educationally.

Examining the global spread of Information and Communication Technologies (ICT), a clear disparity is evident: certain countries showcase high levels of ICT integration, whereas others exhibit minimal or no utilization (Dong & Zhang, 2022; Yu et al., 2016). Developed nations consistently benefit from ICT, leveraging it for social and economic shifts, while developing countries often miss out on these advantages due to limited access to digital tools (Antonelli, 2003; Drori & Jang, 2003). This scenario mirrors the uneven distribution of economic resources and capital, suggesting a parallel between ICT accessibility and economic potential. Consequently, several studies have posited that disparities in income levels are a primary factor driving the digital divide, with the divide itself mirroring the disparities in wealth (Olaniran & Agnello, 2008; Tipton, 2002). A country's GDP per capita and computer usage are significantly correlated, according to research by Quibria et al. (2003). On the other hand, Tavani (2003) argues that a variety of factors other than income account for the disparity in ICT access and utilization. Similar to this, Brooks et al. (2005) observe that the cost of internet connectivity in developing nations is significantly higher than in developed nations, supporting Norris's (2001) argument that wealthier countries are better positioned than poorer nations to take advantage of the benefits of ICT.

Access Divide

Access delineates the comprehensive capability of individuals to utilize Information and Communication Technologies (ICT) in varied scenarios, thus representing a microcosm of the digital divide (De Haan, 2003). This concept, as a nuanced determinant, encompasses the usage of ICT and is characterized by the ease with which technologies can be employed in specific situations (De Haan, 2003; Thompson & Garbacz, 2008). Four distinct types of access are identified:

Material Access: This relates to the possession or accessibility of hardware, software, internet connections, computer devices, and/or the right to use these resources within certain parameters (Belanger & Carter, 2009; Bruno et al., 2011). It is strongly correlated with the rate of technology progress and may need subscriptions to different internet services and software. Physical access (as it relates to hardware utilization) and conditional access (as it relates to supplementary software and online material) are distinguished by Van Dijk (2005, p. 25). One can obtain material access through public service providers, social networks, workplaces, or personal ownership.

Cognitive Access: This is often referred to as intellectual access, is the capacity to use digital technologies for work, study, or personal needs in an efficient and effective manner. Digital literacy abilities are strongly related to this kind of access. Critical competencies for digital literacy include computer operation, email and internet use, word processing, document generation, and elementary search capabilities (Goldhammer et al., 2013; Tesch et al., 2006). Basic programming, security awareness, and system/network diagnostics are examples of advanced literacy that are becoming more and more important (Arachchilage & Love, 2014; Turner et al., 2011).

Motivational Access: This is defined as the aspiration to adopt, buy, use, or learn technology in specific scenarios (Jackson et al., 2001; Van Dijk, 2005). It's a more subjective form of access, distinguished by the individual's desire or lack thereof.

Social Access: This specifies the conditions necessary for technology use, particularly within an organizational or business context (Yu et al., 2016). ICT usage not only demands time and space but also a level of social privilege or access. Participation in spaces providing digital devices, instructions, or services often necessitates membership, which can be restricted in certain environments like university libraries, limited to faculty and students.

Financial resources have a significant impact on the link between household income and device availability, making them essential for ICT use. Better access to computers, home broadband, and general internet use, as well as diffusion rates, are positively correlated with higher family income. (Fuchs, 2009; Rainie, 2017). Conversely, households with lower income are less likely to embrace internet usage. Smartphone, tablet, gaming console, wearable, and health technology ownership is also closely related to household income. Low-income adults often prioritize owning basic cell phones over other technological gadgets (Anderson & Ainley, 2010; Nielsen, 2014),
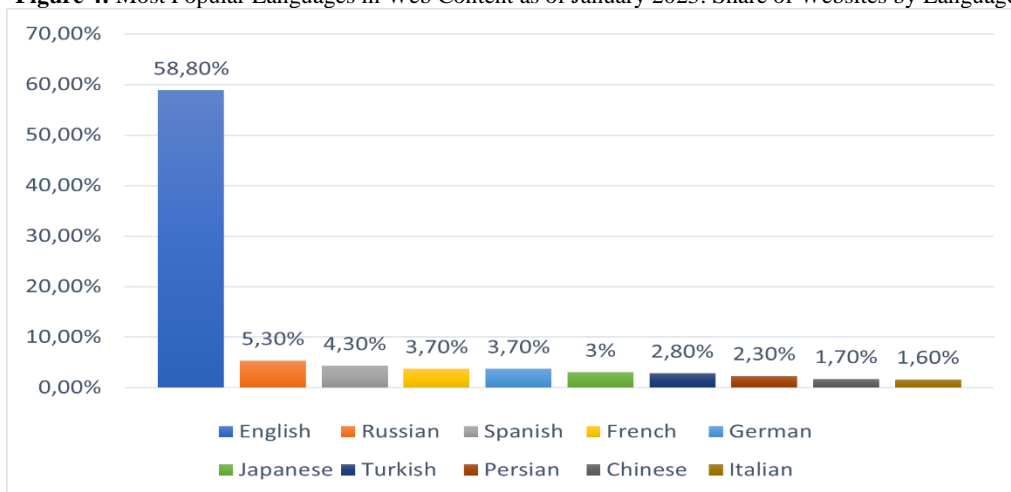
while higher-income families tend to spend more on digital content and software (Aguiar & Martens, 2016; Cheng et al., 1997). The younger generation within the same income bracket is more inclined to allocate financial resources for technology (Chakraborty & Bosman, 2005).

Mathieson (1991) and Venkatesh & Davis (2000) describe those who voluntarily reject digital use, regardless of economic means, as resisters and refusers, often applying to individuals who initially engaged with the internet or computers but later opted out. Technophobia is used to characterize those overwhelmed or intimidated by technology or reluctant to use ICT. It manifests as anxiety or fear towards technological activities, internal self-criticism during device usage, and negative anticipations regarding future technology interactions and its social implications (Rosen & Weil, 1995). Other psychological factors influencing motivational access and ICT usage include self-efficacy, perceived overload, locus of control, attitudes, trust, and normative beliefs about ICT (Bawden, 2008; Broos & Roe, 2006).

Language Divide

Another factor affecting the digital divide is the language barrier (Kiiski & Pohjola, 2002). Language is the most important tool for communication between people. Today, more than 7,000 languages are spoken worldwide. Today, a social media tool is available in dozens of different languages and even dialects. The relationship between language and the internet is a growing field of academic research. By 2022, English, Chinese and Spanish are the top three most common languages using the internet in the world (Statista, 2022). A search in a regional language may yield very few results, while a search in a global language may yield much more comprehensive results. In order to increase the degree of social integration negatively affected by language barriers, many efforts are being made to support more local languages on mobile devices.

Figure 4: Most Popular Languages in Web Content as of January 2023: Share of Websites by Language

Source: (Statista, 2023).

This can lead to a digital divide in developing countries for several reasons. Web content or the information needed may not be available in local languages. This is a barrier to accessing information that exists. On the other hand, a well-educated foreign-language digital literate person will be able to access the information they need. The difference between the existing language of the population and the ICT language not only negatively affects ICT use at the individual level, but also creates a gap in the perception of the benefits of ICT (Kiiski and Pohjola, 2002).

People all throughout the world, particularly in developing nations, are unable to connect and take part in the information economy because of language barriers. How can we assist everyone in bridging the language gap? It is not practical or reasonable to argue that English should be learned by all. The best course of action for IT firms, makers of mobile devices, and service providers is to develop a long-term strategy to enable their products to be accessed in all currently spoken languages. It is necessary to find technical solutions that support all language scripts and fonts and offer input ways on mobile devices. As many pertinent languages as possible should be pre-installed by device manufacturers. Language variety should be supported by service providers (Lu, 2010). In order to make sure that speakers of minority and underrepresented languages are not left behind, some language communities should also participate in translation crowdsourcing. Every language community should match their language with online material since having access to relevant content in each language is essential for success.

The internet can only communicate in a language that is available online, allowing the community to engage in the information economy.
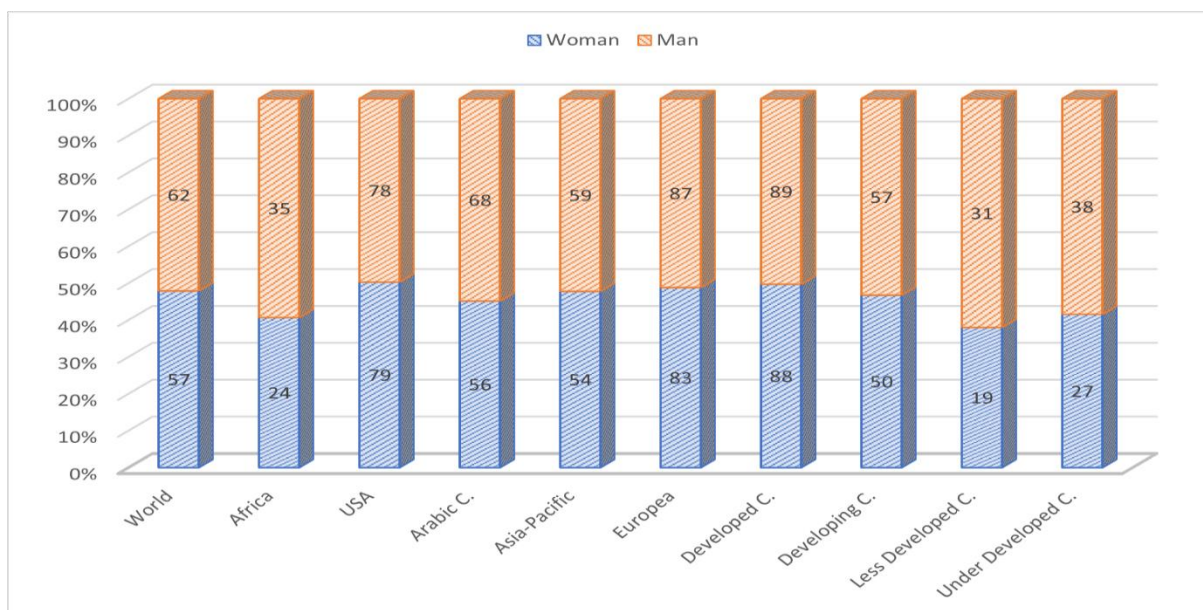
Gender Divide

Access to and use of ICTs is one of the most significant gender concerns facing society today. The term "gender digital divide" describes how differently the sexes utilize and have access to ICT. The gender-based digital divide is seen by the UN High Commissioner for Human Rights as both a result and a source of human rights abuses (United Nations, 2022). Global socioeconomic difficulties include gender discrimination and other gender-related concerns. Goal 3 of the UN Millennium Development Goals and Goal 5 of the Sustainable Development Goals list gender equality. In the framework of fundamental human rights, gender equality is a prerequisite for a future that is peaceful, prosperous, and sustainable (United Nations, 2022). ICTs are becoming more and more necessary for both academic and economic success; as a result, gender-based disparities in interest or skill sets are problematic for society (Cooper, 2006). ICTs have the potential to alleviate persistent gender disparities in developing nations, particularly in the areas of work, income, education, and health care access (Hilbert, 2011).

In the digital age, a growing number of services and information in the political, social, cultural, health, and economic domains are accessible online. As a result, the internet has developed into a vital tool for society. Given the importance of the Internet nowadays, everyone is expected to use online services (Van Deursen & Van Dijk, 2011). According to Olphert and Damodaran (2013), "digital inclusion" is the ability for every member of society to access and use the Internet and other relevant digital technologies. This has a significant positive externality that benefits people on an individual, economic, and even societal level.

Globally, access to and usage of digital technologies have increased significantly, but there are still major obstacles in the way of ensuring that women are included in the digital society (Mariscal et al., 2019). In underdeveloped nations, women tend to use fewer digital services and have lower rates of access to and usage of ICTs. Also, it has been noted that women use ICTs with less confidence (Alozie & Akpan-Obong, 2017; Hilbert, 2011). Women typically find themselves on the losing end of the digital gap, particularly in underdeveloped nations. International Telecommunication Union (ITU) data estimates that in 2020, 62% of men and 57% of women will access the internet globally. The percentages of men and women who use the internet in wealthy countries are 88% and 89%, respectively, but in underdeveloped nations the figures are 50% and 57%. There is a significant gender disparity in internet use and a relatively low number of internet users in developing countries (ITU, 2020). Furthermore, in emerging and less developed nations, the gender disparity in internet usage has grown over time (OECD, 2018). The issue of the gender digital gap extends beyond underdeveloped nations. In industrialized nations as well, there are gender disparities in ICT use and access. Studies reveal that, on average, males use digital technologies more frequently and have greater familiarity with them than women (Codoban, 2005).

Figure 5: Internet Usage Rate of Men and Women 2020

Source: (ITU, 2020).

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Gender-centered ICT policies that can offer simple accessibility, extended access hours, and ICT use are necessary, according to Bala and Singhal (2018), in order to close the gender digital divide. The author suggests that by emphasizing women-centered ICT training centers, these policies could improve women's technology literacy and skills. The availability and usage of the internet by rural women should also be considered. In order to guarantee sustained gender equality in access to and use of information technologies, policies and initiatives should enable girls and women to participate equally in an information society (Hilbert, 2011). Arroyo (2020) makes the point that in order to provide women with better opportunities for participation in the digital realm, digital inclusion policies must be combined with other social policies. Since women's engagement in the digital society is a sociocultural issue, socially inclusive projects should be implemented to secure women's participation (Abu-Shanab & Al-Jamal, 2015).

The bar chart illustrates the gender disparity in internet access across various global regions and country classifications in 2020. It reveals that men consistently have higher internet usage rates than women in all the categories presented. For instance, in Africa, 57% of men use the internet compared to 24% of women, indicating a significant gender gap. This trend is consistent but varies in magnitude across other regions, such as the USA, where the gap is smaller, with 79% of men and 68% of women using the internet. Interestingly, the gap is widest in the less developed and underdeveloped countries, where economic and social factors may exacerbate the digital divide. The chart underscores the persistent global challenge of ensuring equitable internet access across genders, with a clear indication that efforts are needed to address this imbalance, particularly in regions where the disparity is most pronounced.

4. Strategies for Overcoming the Digital Divide and Enhancing E-Inclusion

Hosman and Pérez Comisso (2020) have written extensively about the issues of the digital divide and the strategies that aim to address them. To offer a fresh viewpoint, the authors examine how the terms "digital divide," "digital literacy," and "digital inclusion" have been framed, developed, and transformed over the past three decades. They place a strong emphasis on the idea of sociotechnical awareness in their analysis. The sociotechnical awareness framework has been examined by Hosman and Pérez Comisso (2020) in relation to the extent to which people and communities can use ICT and the internet to make meaningful (or empowered) uses of it. They contend that to attain meaningful internet use, people must first have access, then acquire the requisite skills, and lastly have self- and technology awareness. They do this by examining the notions of the digital divide, internet-ready skills, and effective use.

Several academics have framed the digital divide issue as one of unequal participation in a digital society (Clement & Shade, 2000; Helsper & Smahel, 2020). To expound on this notion, Warschauer (2004) introduced the concepts of social inclusion and e-inclusion as means to understand the disparity in digital participation. He defines social inclusion as the state where individuals, families, and communities are fully engaged in society and can shape their own futures as much as possible. This concept encompasses a range of factors including economic resources, employment opportunities, health care, education, housing, recreational activities, cultural engagement, and civic participation. On the other hand, e-inclusion is characterized as the active engagement of individuals and communities in all dimensions of a knowledge-based society and economy, facilitated by their access to ICT. This definition underscores the importance of ICT in enabling comprehensive societal participation and shaping the contours of modern societal engagement.

As a result, in this context, e-inclusion and the digital divide are understood as complementary ideas that reflect ideal and real conditions for digital inclusion. When the digital divide is closed, e-inclusion is realized; yet, inequality will always exist as long as people are kept from participating in society on any level (political, social, or economic).

Another element of the digital divide's technology is replacement, which occurs at a similar or equivalent rate (Rogers, 2001). Incorporating social media, wearable technology, networked or smart items, or health information technology into normative ICT practices may nevertheless provide a challenge for an individual who has historically used computers and the internet (Perrin, 2015).

4.1. The Pandemic's Amplification of Digital Divide

The pandemic has exacerbated the inequality in education and training by creating a digital barrier between pupils from low-income and financially wealthy households. According to Van Lancker and Parolin (2020), governments should offer educational resources that don't require computers or the internet in order to solve digital inequality in learning. Cluver et al. (2020) also observed that the economic situation has worsened as a result of the pandemic and that parents' stress levels have grown due to their decreased ability to purchase digital equipment. Furthermore, Cao and Li (2020) discovered that the pandemic had a major effect on the psychological

well-being of students. The majority of students reported feeling concerned as a result of academic tasks being delayed, according to the authors.

Knowing the general contours of remedies to alleviate digital inequality is crucial as these disparities multiply and deepen. Rogerson (2020) made a solid case for the idea that the Covid-19 epidemic has given rise to new dimensions and significance for digital inequality. Today, considering the pandemic, digital inequalities have potential critical vital consequences. The Covid-19 pandemic (also the other natural disasters) is an extreme example of the acceleration of this divide, which in this case may have even indirectly cost the lives of some digitally disadvantaged individuals. Because in the digital dimension, information rewards those who have it and deprives those who do not.

Students from economically disadvantaged homes suffer a bigger burden when it comes to accessing e-learning, and one significant element contributing to this is the Digital Divide. If there are no government regulations that support students and guarantee the affordability and accessibility to the internet for them, students in the higher education system would suffer grave consequences because of accessibility and affordability issues.

It is impossible to discuss ideal procedures and detailed guidelines that all higher education institutions should adhere to. Following the pandemic, educational institutions might need to assess the difficulties they might encounter and get ready to make difficult choices in the near future. To guarantee that student learning objectives and standards of educational quality are not compromised, university communities will need to consider their educational vision and mission. Universities' goals of education, knowledge development, and community service are interwoven with a sophisticated balancing of financial expenses and public health, which will require them to engage and consult with all their stakeholders (Indrajit & Wibawa, 2020). In addition, post-pandemic higher education institutions need to be ready for the difficult times ahead, when their choices will have a lasting impact on their students' lives.

During the pandemic, relying on and adjusting to e-learning may cause instructors to include more online components into their lessons. Regarding the accessibility of digital technology for education, there are, nevertheless, a number of practical problems and restrictions with this. The topic of digital inequality can be discussed globally on a very big scale. Assuming that all instructors and students will have access to sophisticated gadgets and internet connectivity outside of their universities for communication is illogical (Rogerson, 2020).

Conclusion

The disparities in access to and usage of technology among different societal segments are reflected in the digital gap that is the subject of this study. In order for people and communities to reach their maximum potential in terms of economics, education, and society, these disparities must be eliminated. Because of its status as a developing nation and the differences in affluence among its regions, Türkiye is a prime illustration of the digital divide. Therefore, some policies should be devised to minimize the causes and negative impacts of the digital divide based on the theoretical and empirical investigations described in this paper. Creating a more equitable and inclusive society requires closing the digital divide. Here is a list of recommended tactics to narrow the digital divide:

- Expanding Digital Access: To enhance internet infrastructure in rural and impoverished areas, governments and the private sector should work together. One of the most important steps in closing the digital divide is to make technology and internet services more reasonably priced.
- Encourage Digital Literacy: By setting up workshops and programs for digital literacy, educational institutions and civil society organizations can assist individuals of all ages in honing their digital skills.
- Considering Socioeconomic variables: It's critical to recognize the influence of socioeconomic variables in the digital divide and create policies that will help to reduce it. To achieve digital fairness, assistance initiatives for low-income households may be quite important.
- International Cooperation and Creative Solutions: Efforts to reduce the digital gap may benefit greatly from international cooperation. Additionally, it's critical to use cutting-edge technologies and commercial strategies to make sure that more individuals have access to technology.
- Create Inclusive Policies: When tackling the digital gap, governments should create inclusive policies and implement them with a process of ongoing evaluation.

Ultimately, tackling the digital divide requires a multi-pronged approach. Increasing technological access, promoting digital literacy, taking socio-economic factors into account and international cooperation are important steps in achieving digital equality. These efforts will lay the foundations for a more equitable and inclusive society, enabling everyone to take full advantage of the opportunities offered by technology.

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