

Technology and Forced Migration

Ukrainian Migrants in Central
and Eastern Europe

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Chapter 1

Migration and technology dilemmas

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1 Migration and technology dilemmas

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1.1 Introduction

Migrants and forced migrants, just like all other members of society, use modern digital technologies to varying degrees and see them as important channels for knowledge and technology transmission (Burns & Mohapatra, 2008), as well as communication, information and experience sharing. Seven out of ten individuals worldwide use mobile phones and a variety of applications and tools to access the Internet (Digital 2024). In 2023, the global number of Internet users reached 67% of the world's population, nearly doubling from a decade ago (ITU, 2023). Hence, the user population is estimated at 5.45 billion, while the unconnected population is estimated at 2.67 billion, representing 67.1% and 32.9%, respectively (DataReportal, 2024). The quality of Internet access matters because the majority of the world's Internet users (95.9%) use a mobile phone to access the Internet at least occasionally. Mobile phones account for 56.9% of Internet activity and up to 60% of global web traffic (DataReportal, 2024). Although geographic gaps persist, by far the largest gap in ICT use is between the least developed countries and the rest of the world (ITU, 2023). However, current discrepancies in ICT use also indicate that men are slightly more likely than women to use digital technologies and own mobile phones more often. Rural areas have lower mobile network coverage, and young people aged 14 to 24 are the most likely to use the Internet and digital technologies. All these discrepancies are the lowest in Europe, where the aforementioned differences are relatively small (ITU, 2023). Furthermore, the bulk of that traffic is generated by migrants, who, like others, utilise social media and contribute to a total of 5.17 billion active social media user “identities”, which is equivalent to 63.7% of the global population.¹ The number of identities worldwide increased by 282 million over the last 12 months (mid-2023–2024). This is critical given that globally, social media users spend an average of 2 hours and 20 minutes each day (DataReportal, 2024).

The ICTs access and use are linked to digital literacy, that is, having the basic technical, cognitive, social and cultural skills to use ICTs in any society (Eshet, 2004). UNESCO (2018) defines digital literacy as the confident and critical use of a wide range of digital technologies for information, communication and basic problem-solving in all aspects of life. This definition emphasises the value of

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ICT skills, such as the ability to use computers to collect, assess, save, produce, present and exchange information, as well as interact and engage in collaborative networks via the Internet. As a result, various groups of migrants will access and use ICTs in different ways, with some literate migrants using them for journey planning and information verification being equally or even more proficient than the receiving population, while others will improve their skills to avoid social exclusion in the destination.

The intersection of ICTs and migration can be addressed by viewing migrants as either those in transit, or those in sedentarisation into a society other than their own (i.e. becoming immigrants) (Collin, 2012). Certainly, the lines between those two groups blur when looking at big populations of migrants, whether voluntary or forced, who will eventually become migrants, or to be more precise, in some cases immigrants.

The origin society plays an essential role, given the fact that some countries such as Ukraine have commenced its journey into digitalisation of both the state with its services and the citizens, who use them. This is why the chapter examines the situation of Ukraine and how it influences the attitude and approach of their migrant citizens. With that in mind, ICTs help migrants in a variety of ways, which are examined using the existing literature. These migrants protrude to form relationships with others to varying degrees (weak and strong); on one hand, they bridge to maintain contact with the origin society while also attempting to bridge and bond with the receiving society (see Preface and Chapter 5).

The Ukrainian forced migrants profiled in this book are fundamentally different from refugees and forced migrants who have sought refuge in Europe in the past. This is the largest forced migration within Europe since the Yugoslav wars of the mid-1990s. The experience of Ukrainian forced migrants differs not only in terms of the conditions offered to them by most European countries (e.g. temporary protection status and the rights it confers), but also due to their geographical, cultural and in many cases linguistic proximity (Jelínková et al., 2023), as well as shared ancestry.

To summarise, using the example of Ukrainian forced migration, this chapter investigates how modern digital technologies and migration interact, that is, how migration impacts ICTs and how ICTs influence migration in the CEE context, as demonstrated by the Ukrainian forced migration.

To analyse this, the chapter first examines modern technologies and their transformative and innovative role over time, setting them in a historical context of industrial revolutions (IR). That allows to capture the ongoing and growing interconnectedness stemming from previous revolutions leading to a change in the quality of life portrayed by an ontological shift – from life where technologies were on the sidewalk, where their access and use was an opportunity or a sign of luxury and prestige, to the epi-digital and polymedia reality where lives are embedded in the context dominated by ICTs as a main driving force – being necessity, with an exclusionary capacity and digital divide. Migrants share this change of environment, and they are no longer uprooted; instead, they are “connected” and utilise technology to disseminate information within migration populations, settle in more privileged positions than others and organise new positions of power in societies. Migrants’ presence and

engagement is characterised by circularity due to not just open borders and blurred boundaries, but also interconnectivity (Borkert et al., 2009).

To offer insight on how ICTs and (forced) migration interact, their relationship is examined, beginning with technology development, its diversity and progressing to ICTs-migration nexus. The following approaches were taken in the light of existing literature on ICTs and migration. The first approach emerging from digital studies is based on the work of Candidatu et al. (2019) and Leurs and Prabhakar (2018), which explores the following paradigms: (1) migrants in cyberspace; (2) everyday digital migrant life, and (3) migrants as data. The other approach, based on the discourses, as noted by Brown et al. (2019) and Masiero and von Deden (2022) sees ICTs in the migratory context as tools to: (1) control migrants and manage migration flows; (2) acquire information and knowledge about migration; (3) provide migrants' integration and inclusion. Our approach seeks to combine both approaches, as well as the relevant discourses and paradigms (see Figure 1.1), to investigate the transformative impact of ICTs on migrants in the context of Ukrainian forced

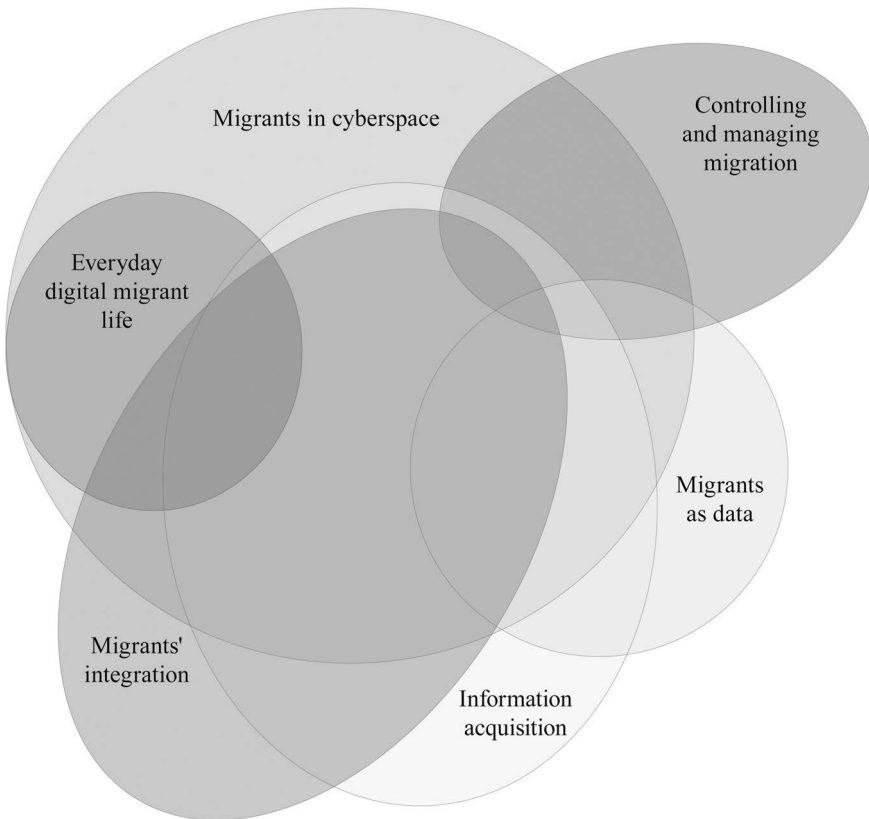


Figure 1.1 Discourses and paradigms of ICTs and migration.

Source: own work.

migrants in Central and Eastern Europe (CEE). With that in mind, Ukraine will be portrayed as a source country, sending Ukrainians out of the country to safe havens, while also supplying them with digital skills and services.

The discussion in this chapter lays the groundwork for further research on Ukrainian forced migrants' decision-making, communication and interaction practices, which are embedded in both private and public sectors and promote transnationality. Finally, integration practices as well as potential conflicts and challenges will be discussed. All of these topics emerge in subsequent chapters.

In search of this refined intersection analysis, the chapter relies on a rigorous literature review based on robust desk research that addresses the multidisciplinary and multidimensionality of the analysed phenomena of national and international literature, primarily sociological and economic theories, as well as empirical evidence from migration and technology studies. Furthermore, the authors drew on their field research findings. This interdisciplinary approach allows for an in-depth understanding of mechanisms and processes related to forced migration and situations that migrants encounter, not just in the Ukrainian-CEE context.

1.2 Modern technology development in a nutshell

Nowadays, practically everyone owns a smartphone and uses it for daily tasks. Its significance to the human species demonstrates a rapid transformation of life in the eyes of people during the last two centuries. Smartphones, for example, present a significant transition in a variety of categories, including computational capacity, power, sophistication and size (Chown & Nascimento, 2023).

However, before this could occur, several situations and pieces of technology had played a pivotal role in the world's development and progress (Agnihotri et al., 2023), more evolutionary than revolutionary and frequently unimaginable to many (Gomory, 1983, p. 576). This experience with technology use was shared by various groups and categories, including migrants and forced migrants, who, like others, use ICTs for a variety of life-related activities. Before that, it is worth noting how technologies progressed to the present phase and continue to impact people's realities.

1.2.1 Modern technologies: From simple autonomy to complicated interconnectedness

The first decades of the 21st century saw an increase in technological compilation, complexity and interconnectedness of technologies. Things and services that people use, such as cars, planes, medical devices, financial processes and power systems, have become more reliant on computer software, making them harder to control and understand (Wolff, 2021, p. 1). All of this has occurred within the background of increased worldwide international cooperation and interconnectedness.

The current stage of technological development is the result of incremental processes that may be traced back to early human history. The technological transition is made up of inventions of the human mind, such as watermill, compass, gun powder, printing device or automatic clock, which eventually contributed to the rise

of industrial capitalism, which replaced handicraft and crafts with industry. Technologies, along with reproduction of human life, production modes, social relations and mental perception of the world were driving human evolution (Harvey & Szadkowski, 2017, pp. 229–237), resulting in changes that were not only industrial, but also social and intellectual (Hoppit, 1990, p. 188). The issue, originally characterised by Karl Marx as industrial revolution (IR), remained in the centre of intellectual debate, but also illuminated critical comments and countless variations (de Vries, 1994). Interestingly, the industrial revolution discourse conjures up images of infinite and diverse machines used in manufacturing processes, dating back to the First Industrial Revolution (1IR) which mechanised production in Britain in the mid-18th century, when James Watt realised the enormous power of steam after observing a kettle in his mother's kitchen. After repeated tries, Thomas Savery (in 1698) created the first full-scale working steam engine, which was then refined by Thomas Newcomen into a semi-operational model, before James Watt added the invention of two cylinders (Gomory, 1983, p. 576). The Second Industrial Revolution (2IR) took off in the second half of the 19th century with the introduction of electric power, and it also saw the conception of the first programmable computer by Charles Babbage (though it was not realised until the 20th century) (Gomory, 1983, p. 577). The Third Industrial Revolution (3IR) emerged at the end of the millennium with the arrival of digital technologies and the Internet, which are so common today but were originally utilised on computers (Tan & Shang-su, 2017, pp. 5–6). Finally, the contemporary Fourth Industrial Revolution (4IR), viewed as extension of 3IR, presents a transformative vision of development based on both well-established and emerging technologies, such as computer hardware and software, sensors, machine learning, AI, the Internet of Things, robotics and big data (Pollitzer, 2018, pp. 77–76).

According to Philbeck and Davis (2018, p. 18), the coming waves of industrial revolutions “remained in a strategic dialogue”, relying on past inventions and allowing for further transformations. To put it another way, the 4IR is based on the information exchange enabled by the solid foundations of the 3IR digital technologies, and it represents a succession of significant shifts in the creation, exchange and distribution of new economic, political and social value. The shifts are linked with the advent of new technologies spanning the technical, biological and physical worlds. It is said that all of these technologies, with digital technologies at their core, will eventually converge and merge, integrate with physical, digital and biological spheres to form a new cyber-physical system or hybrid media systems that will spread throughout the world and radically alter people's lives (Chen, 2013, p. 3; Pollitzer, 2018). Perhaps it is appropriately referred to as an “epi-digital” revolution, in which innovations based on digital foundations are primarily driven by technologies (Philbeck & Davis, 2018, pp. 17–18). But in addition to transforming the entire economy, digital technologies also gave rise to policies that are now crucial for nations (like the US and the EU) in terms of national security, economic prosperity and even value preservation (Burwell, 2020).

The concept of connectivity or interconnectivity, which is rooted in the language of globalisation, is infused with the “epi-digital” 4IR shift that migrants are experiencing. The 20th century ended with the impression that the world was the

most (inter)connected in its history, thanks to the development of modern technologies, as well as trans-border trade, investments and information flows and human mobility. In the discussion on globalisation, digital technologies are mentioned in a number of ways, including early prophecies by McLuhan (1964) suggesting the emergence of a global village anchored on media and ICTs, Robertson's (2000) compression of the world and shift in perceptions of time and space and Giddens's disembodied and re-organising social life, time and space and lifting them out of local frames to global ones. In addition to driving the expansion of transnational production and structural changes in the global economy (Strange, 1996) or economic integration (Bhagwati, 2007), the increasing scope, intensity and speed of communication and transportation also meant that the poorest places were reached and that communication flows spread there radically (Borkert et al., 2009). This interconnectedness as well as access to information motivated many to make migration decisions, either voluntarily or under duress, in search of safety.

1.2.2 Technologies and transformation of human lives

The Fourth Industrial Revolution (4IR) is projected to dominate technological debates, introducing new methods for communication, social interaction and task management (Jones, 2015; Pollitzer, 2018). The world, including that of migrants, is inundated with devices such as smartphones, which have become an integral part of human life and represent global economic and social trends. These devices allow for contact through conversation, emails, text messages, social media and digital memories (Chown & Nascimento, 2023). These interactions call into question human nature and point to ICTs' domination over human activities (Braidotti, 2019). The Internet has become crucial because it attracts people to digital services, which they rely on, pay for and supply data into the system that employs it (Zygmuntowski, 2020).

ICTs are omnipresent in transforming human lives, forming individuals and their lives' structures (Carrington, 2015) and are embedded in "algorithmic devils" based on 4IR.² The convergence of powerful 4IR technologies blurs boundaries, fostering intimacy with devices and resulting in a post-human state that calls into question the binary divide between human and non-human. This convergence emphasises the ongoing aspect of becoming, as users experience interconnectedness between humans and non-humans (Braidotti, 2019).

People form emotional and relational bonds with ICTs, experiencing both virtual and physical locations, and intertwining their bodies with these environments (Andersson, 2019; Longhurst, 2013). The relationship between society and technology is changing, with human bodies being "incorporated" into machines. Many people develop emotional attachments to their devices, resulting in virtual ecosystems with shared meanings (Carrington, 2015; Haraway, 2006; Latour, 1993). Technologies not only reflect human meanings, but also impact user behaviour through their design (Merchant, 2015). This relationship is further investigated in the context of polymedia, in which communication technologies merge persons with technology both physically and metaphysically, treating technologies as an extension of the

self (Baldassar, 2016). The selection of communication media becomes an “idiom of expressive intent” (Madianou & Miller, 2012 in Carrington, 2015).

Smartphones, with their various applications, are technological artefacts (Carrington, 2015). They serve as “servomechanisms”, delivering ongoing input on well-being. Applications collect data, track routines and compare persons to one another, reflecting social positions. This establishes a cybernetic relationship between humans and machines, monitoring behaviour and interactions, transforming people into “natural-born cyborgs” (Jones, 2015).

The growing availability of portable digital devices has resulted in the replacement of previous ICTs with newer ones, with many reaching users as early as childhood. These devices have become central to human life, starting from family entertainment, with children becoming literate and digitally infused at an early age, resulting in technologically mediated literacy practices (Merchant, 2015). New media play a significant role in everyday life, impacting cosmopolitanism, identity construction and cultural reproduction among many groups, including migrants.

As mobile devices subtly integrate into daily lives (Gergen, 2003), they influence activities at both the mezzo (groups and communities) and micro (partners, friends, families) levels via applications such as Facebook, Instagram, Skype and instant messaging. Technology, literacy and everyday behaviours are continually updating and deconstructing people’s reality, reshaping their lives (Merchant, 2015). They influence the way people think, learn, act, work, study and rest. According to Deuze and colleagues (2012, p.1), human experience “perhaps should be seen as framed by, mitigated through, and made immediate by pervasive and ubiquitous media” indicating an ontological shift, in which people live “in” poly-media environments rather than “with” media, making it pervasive but invisible in social life (Carrington, 2015).

1.2.3 Transformation of migrants’ lives by the ICTs

The influence of technologies is especially important because ICTs and migration are viewed as two critical axes of the globalisation processes. ICTs changed the lives of people, including migrants, because connectivity and interconnectedness enabled access to information about destination countries, as well as tracking of migrants’ movements (Borkert et al., 2009, pp. 7–9) (for more, see Chapters 3, 4 and 5). Migrants, on the other hand, can actively participate in socio-economic processes, bridging and bonding societies from which they originate and arrive at, being here and there as trans-migrants and striving to integrate into their receiving society.

Since the 1980s, numerous facets of the link between ICTs and migration have been investigated, even if the research did not address the nexus explicitly. Interconnectedness served as the primary frame of reference, and fluxes between core and periphery, that is, north and south. The key figures and metaphors used included social networks, which are essential for each migration episode, as well as nomadic travels with extensive experience. Nomads, who frequently live their lives in this manner, would wander within a territory, autonomously choosing their own path, hence being able to enter or leave as wanted (Bauman, 2011). Furthermore,

diasporas arose as a shared identity response to an imagined homeland, as well as a myth of return. Transnationalism sparked debate about the diverse interactions between countries of origin and destination, that ICTs have the potential to foster (Andersson, 2019).

Aside from the foregoing, media researchers addressed the nexus, emphasising the transformation of cultural identities as a result of ICTs, as well as the impact of ethnic minorities on media and consumption patterns. Interestingly, the experts discussed the representation of minorities in mainstream media and its relationship to the state-driven approach to migrants and their categorisation. Finally, some more recent studies suggest that generations of migrants use ICTs in a variety of ways (Borkert et al., 2009, pp. 11–14). Work on digital migration is especially important here, encompassing interdisciplinary research across areas such as media, cultural and communication studies, the Internet and information, science and technology studies, but also studies of migration, ethnicity, diaspora and race, transnationalism, gender and postcoloniality to name a few (for more, see Candidatu et al., 2019; Leurs & Prabhakar, 2018). As a result, three paradigms of “digital-media-centricness” emerged: (1) migrants in cyberspace, (2) everyday digital migrant life, and (3) migrants as data. With varying degrees of digital centrality in mind paradigms offer insights on: (1) how offline differences, primarily cultural ones, are similarly manifested online (digital-centric migrants in cyberspace); (2) how contemporary migrant experiences of communication and mediation are anchored in distinctive power contexts based on socio-cultural, historical settings (non-digital centric everyday digital migrant life); (3) how migrants generate data in distinctive digital settings (migrants as data) (see Figure 1.1).

When discussing Ukrainian forced migrants, who not only form a national diaspora but also share nomadic experiences of forced migration and the journey undertaken to escape the horrors of Russian aggression, it is critical to see them as migrants connected in cyberspace and to consider their daily digital lives. Why? Because ICTs play an important role in connecting people across physical borders, while also generating new dilemmas and concerns. In the context of migration, digital technologies are increasingly deeply intertwined, since their use and accessibility provide both empowerment, such as enhanced social capital, and disempowerment, such as risk of exclusion and increased surveillance (Thinyane et al., 2023).

1.3 The evolution of studies on ICTs and migration

When studying the forced migration of Ukrainians into Central and Eastern European countries, it is essential to consider how this phenomenon fits into the larger debate on ICTs and migration. In this geographical and geopolitical setting, the topic has not been sufficiently investigated.

In fact, in recent years, a growing number of studies and papers have investigated the relationship between ICTs and migration (Alencar, 2020; Borkert et al., 2009; Brown et al., 2022; Leurs & Smets, 2018; Masiero & von Deden, 2022). These studies look at the role of digital technologies in migration governance as well as migrants’ everyday experiences. The existing literature covers a wide

range of issues linked to this relationship, including improved communication and information availability, the use of social media, border control and migration management and the use of ICTs for social inclusion. Only recently have scholars begun to address under-researched topics such as migrants' digital literacy, policies designed to reach out to migrant populations (e-inclusion), Internet use among migrants and ethnic minorities, the impact of ICTs on sending countries and linguistic changes. It appears that the transformation of information available online and reproduced in multiple forums and chat groups has not been thoroughly investigated (Borkert et al., 2009). The authors emphasise both the positive and negative consequences of digital technologies, such as increased access to information and the establishment of digital migration infrastructures, as well as increased surveillance and potential human rights violations (Alencar, 2020; Latonero & Kift, 2018; Yang et al., 2024).

The literature highlighted three primary macro topics on the relationship between migrants and ICTs (Brown et al., 2019; Masiero & von Deden, 2022) that link to the three paradigms of digital migration studies, that is, migrants in cyberspace; everyday digital migrant life; migrants as data):

- 1 Use of ICTs to control migrants and manage migration flows;
- 2 Use of ICTs by migrants to get information and knowledge about migration;
- 3 Use of ICTs for migrants' integration and inclusion.

1.3.1 Use of ICTs to control migrants and manage migration flows

One of the emerging topics in the literature on the relationship between ICTs and migration is the use of these technologies to control migrants and manage migration flows. Border control and migration management are being implemented using digital technologies to create control over refugee movement and identity (Latonero & Kift, 2018; Leurs & Smets, 2018; Yang et al., 2024). These technologies are mostly used in predictive analytics for migration flows, deterrence campaigns and algorithmic decision-making based on biometric data.

Yang and colleagues (2024) investigated the use of ICTs as a policy instrument across European borders, with an emphasis on automated decision-making (ADM). They highlighted three primary ways in which ADM is now used at EU borders:

- Identification. ADM systems, such as e-gates, automatically process travellers' biometric information, such as fingerprints or facial images, to identify and verify them. These systems use matching algorithms, and confirm the authenticity of documents such as e-passports, validate travellers' identities and check the validity of travellers' authorisations (such as visas).
- Risk assessment. Another type of ADM system conducts automated risk assessments of travellers. To determine if a traveller is authorised to cross the border, the system examines their data for potential risks, such as identity fraud, criminal activity or terrorism. Airlines in Europe provide Passenger Name Record (PNR) data for analysis by ADM systems.

- Border monitoring. A third category of ADM systems is used for border surveillance. In Europe, video surveillance from planes and drones, as well as other vision-based technologies such as multi-sensor fusion and tracking systems, are deployed to automatically detect irregular border crossings. For example, Frontex supports EU Member States and Schengen-associated countries through its Maritime Aerial Surveillance (MAS) program, which uses surveillance air-planes and drones to send video and other data.

The employment of these technologies and systems poses issues of bias, transparency and accountability (Dijstelbloem & Broeders, 2015; Vohra, 2023). Automation of these processes may result in biased decisions and exacerbate existing disparities within migration systems. As stated by several authors (Latonero & Kift, 2018; Yang et al., 2024), the use of digital technologies in border management and migration control might have negative consequences such as increased surveillance, which can lead to punitive measures like incarceration and deportation. They might also lead to potential human rights violations and discrimination. For example, some facial recognition systems perform poorly for specific ethnicities, and the methods used to train AI may lead to racial profiling. Monroy (2021) provides another example, reporting that European border guards have resorted to breaking migrants' mobile phones and confiscating these devices to obtain information on the networks and routes used for irregular migration.

1.3.2 Use of ICTs by migrants to acquire information and knowledge of migration

While digital technologies can assist authorities in gathering information on migrants and migration flows, they are equally essential for migrants in obtaining migration-related information (Masiero & von Deden, 2022). This applies to migrants seeking information prior to departure, migrants in transition, such as those crossing the European borders, and migrants upon arrival in the new society (Komito, 2011; Newell et al., 2016). Migrants, for example, are looking for information about the safest migratory routes, how to apply for asylum, and where to go. According to Latonero and Kift (2018), migrants rely on both physical and digital infrastructures for mobility. This infrastructure comprises social media (which frequently replaces or plays a comparable role to social capital), mobile devices and other digitally networked technologies, forming socio-technical spaces. This infrastructure has a profound influence on migrants' decision-making (such as where to migrate).

The literature has repeatedly emphasised the importance of social media (Dekker & Engbersen, 2014; Dekker et al., 2016, 2018; Gillespie et al., 2018; Latonero & Kift, 2018). For example, Dekker and colleagues studied Brazilian, Ukrainian and Moroccan migrants in the Netherlands as well as Norway, Portugal and the United Kingdom (Dekker et al., 2016; Dekker & Engbersen, 2014). They demonstrate that social media is used to engage with existing contacts and activate latent social contacts in destination countries. Online communication in migration networks promotes migration aspirations and decision-making. Furthermore, social media

provides open and informal sources of information, giving migrants practical, experience-based knowledge that is frequently more relevant and valuable than what they may get from official or governmental sources. Dekker and Engbersen conclude that “social media not only provide new communication channels in migration networks, but also that the virtual infrastructure of media-rich, synchronous and relatively open contacts actively transforms the nature of these networks and thus facilitates migration.” (Dekker & Engbersen, p. 414).

Despite the benefits of digital technologies, they can also pose considerable risks (Gillespie et al., 2018; Masiero & von Deden, 2022). Migrants may receive inaccurate or misleading information, or they may trust untrustworthy individuals or criminals. This can have catastrophic implications, such as police violence, deportation or even death.

1.3.3 Use of ICTs for migrants’ integration and inclusion

Digital technologies have been described as fundamental for migrants’ social inclusion in the new society (Alencar, 2020; Brown et al., 2019; Masiero & von Deden, 2022). These technologies, which include social media, smartphones and various digital platforms, are vital in helping migrants to stay in touch with their families and communities, access important information and navigate new cultural and social environments. They are also instrumental in promoting cultural integration, language acquisition and local community participation, leading to a deeper sense of belonging and inclusion (Díaz Andrade & Doolin, 2019).

First, these technologies are invaluable for maintaining social contacts, allowing migrants to stay in touch with family and friends in their home countries while also connecting with new people, such as local residents, other migrants and support networks (Alencar, 2020; Gillespie et al., 2018; Komito, 2011; Kutscher & Kreß, 2018). Migrants frequently rely on Internet forums and social media groups to share experiences and advice, resulting in a community-based knowledge exchange (Alencar, 2020). Furthermore, digital platforms allow migrants to gain access to key services, such as healthcare, education and employment opportunities, all of which are critical for their integration in destination countries (Alencar, 2020; Brown et al., 2019; Komito, 2011). Migrants, for example, may use online platforms to find housing, connect with support networks, and get involved in cultural and community activities.

Digital technologies can help governments, national and sub-national bodies, NGOs, and other actors support migrants more effectively (Díaz Andrade & Doolin, 2019; Modesti et al., 2020; Schreieck et al., 2017; Turkay & Turkay, 2019). E-government services facilitate migrants’ access to resources including visa applications, work permits and social services assistance (Borkert et al., 2009; Díaz Andrade & Doolin, 2019). Governments can also use digital platforms to disseminate important information on migration policies, public services and legal rights. Furthermore, NGOs can also benefit from supporting migrants through digital means (Schreieck et al., 2017; Turkay & Turkay, 2019). For example, Turkay and Turkay (2019) investigated the use of ICTs by NGOs that assist Syrian refugees.

The authors discovered that ICTs are used for: operational purposes (e.g. keeping track of the refugees and storing private and sensitive information); mediation between local and refugee communities (e.g. using social media to spread positive messages, images and video regarding refugees to give them a voice) and information dissemination (e.g. informing refugees about services).

However, the literature also acknowledges significant social-inclusion challenges associated with migrants' use of digital technologies. One key concern is the digital divide, which refers to disparities in access to digital technologies including the Internet. Factors such as socio-economic status, language barriers and lack of digital literacy can limit migrants' ability to benefit from digital resources (Alam & Imran, 2015). In highly digitalised societies, non-digitised migrants may struggle to access many governmental services that are primarily delivered online (Martin-Shields et al., 2022). Furthermore, recent Dutch government research (SCP, 2023) identified a shortage of digital skills as a probable explanation for vulnerable groups' labour market issues. Indeed, digital literacy efforts play an important role in increasing migrants' social inclusion. Leung (2011) emphasises the necessity of digital literacy training, which provides migrants with the skills required to efficiently navigate digital environments. Such training aims to bridge the digital divide by allowing migrants to interact more completely with digital services and opportunities, hence improving their socio-economic integration.

1.4 Ukraine, digitalisation and ICTs

The significance of ICTs in migration, and their impact on migrants' lives, is undeniably influenced by the migrants' country of origin, individual qualities, as well as the specific countries and conditions they migrate into. The following section looks at the role of digital technologies and digital literacy in Ukraine, as a sending country. Initially, it outlines the specific circumstances of Ukrainian migrants in host nations. It then dives into the recent spike in digitalisation in Ukraine, assesses the state of connectivity, and evaluates digital literacy levels of Ukrainians, many of whom are forced or choose to migrate to the CEE countries under consideration.

1.4.1 Ukrainian forced migrants

Ukrainian forced migration is heavily feminised, educated and shaped by previous patterns of labour migration (Andrews et al., 2023). Geographical and cultural proximity, historical links and the openness of the receiving countries have all contributed to Ukrainian forced migrants settling in Central and Eastern European countries, which have frequently had little experience with forced migration. However, even countries with extensive experience with forced migrants have frequently discovered that the integration of Ukrainian migrants into society differs from that of other groups of forced migrants (Mickelsson, 2024).

Not only did Ukrainian migrants arrive with different characteristics and under different conditions, but their perception differed significantly from that of

forced migrants seeking safety in Europe in previous years. After 2015, for example, Syrian refugees in particular were suspected of being bogus refugees, partly due to their depiction with “luxury” smartphones (Dekker et al., 2018). Ukrainian forced migrants have not faced such speculation; rather, mobile technologies like mobile phones, primarily smartphones, tablets and laptops, with which they are mostly equipped, have been viewed as an essential means of connection (cf. Bauloz, 2021).

Despite the warm reception, more similarities between receiving societies and Ukrainian forced migrants, and, it seems, a more extensive use of digital technologies, reception, adaptation and, in certain cases, integration of Ukrainian forced migrants is an ongoing process. Ukrainians arrived in a variety of circumstances and with various experiences, taken the fact that Ukraine, Europe’s largest country (excluding the European part of Russia), is difficult to characterise. Despite some highly beneficial basic reforms, the majority of which were initiated in response to political and social developments after the Euromaidan (2013), it remains a country with significant internal divisions. On the one hand, Ukraine has a highly educated society (e.g. the gross tertiary enrolment rate is comparable to Czechia or Germany) (WB, 2022), but it is also a developing country with the lowest nominal GDP per capita in Europe (Brychka et al., 2023). According to Lukianova and Ovcharuk (2023), Ukraine’s internal disparities also persist in the areas of digitisation, the use of digital technologies and digital literacy, resulting in further deepening of economic and socio-political cleavages and widening of the social divide. Despite the high level of digital inequality and low level of digital literacy among the population, Ukraine has seen a tremendous growth in the use of ICTs over the last decade, which has had a huge impact on the connectivity, opportunities and expectations of Ukrainian forced migrants.

1.4.2 Ukraine and digital infrastructure

Ukraine has made an enormous progress in the digitalisation of public services. In 2019, Ukraine became the first country in the world to legalise electronic passports (e-passports), bringing them on par with paper passports. Simultaneously, it introduced digital driving licenses and business registration with digital signatures, with other services following suit. The implementation of digital services is the outcome of the “State in a Smartphone” programme, which was primarily conducted by the Ministry of Digital Transformation in collaboration with other ministries and international organisations (ITU, 2022; Storozhuk et al., 2023). The ongoing digital transformation has been effective, and the focus has recently shifted to digital services, with the goal of making all public services available online to residents and enterprises. For example, in 2024, Ukrainians are able to change their place of registration online, access tax services, register businesses remotely, submit direct appeals to the state in the form of electronic petitions, sign documents remotely using e-signatures, obtain a criminal record certificate, participate in public opinion polls and so on (ITU, 2022; Storozhuk et al., 2023).

Ukraine has also developed systems for internal communication between the various sectors of state and municipal government to facilitate the exchange of registers and data across institutions, as well as to make communication between authorities and residents easier. The Diia web portal (<https://diia.gov.ua/>) serves as a single point of entry (the user's e-office), allowing citizens to access and get information, while also ensuring quick interactions between individuals and the government. Diia (Дія) is a mobile application, a web platform and a brand for eGovernance in Ukraine. The digital portal provides access to around 120 government services (EC, 2023; Marysyuk et al., 2021). The portal's mobile application has become the most popular mobile applications in Ukraine, with over 17 million users (EC, 2023; ITU, 2022). The expansion of e-services demonstrates Ukraine's emphasis on digitalisation. This is also evident in other fields such as business and smart infrastructure development.

Following the development of e-services, Ukraine passed the law on Electronic Public Services (*Act on Electronic Public Services, 2021*), which establishes the legal basis for individuals and businesses to exercise their rights and freedoms in the field of providing electronic public services and cancels "unnecessary documents" stored in public authorities' registers of. Storozhuk and colleagues (2023) define the paperless mode as receiving unique services and information online.

The Diia (a web portal and a mobile app that allow access to Ukrainian e-government) became extremely useful following the outbreak of war, with features such as property damage reports, car sharing, entrepreneur services, e-permits for foreigners, digital pension cards and social benefits for displaced Ukrainians (ITU, 2023, p. 55).³

1.4.3 Digital literacy in Ukraine

Despite the aforementioned big developments in the state's digitisation, low digital literacy remains a serious issue in Ukraine. In 2019, the Ministry of Digital Transformation of Ukraine conducted a survey that revealed that 53% of Ukrainians aged 18 to 70 have limited or no e-skills (MDT, 2019). The second survey, conducted in 2021, showed a gradual increase in digital skill levels compared to 2019. The number of Ukrainians with digital skills below the basic level fell by 5% (or 1.42 million people), reaching 48% of the population (MDT, 2021).⁴

To address the low level of digital literacy, the Ministry of Digital Transformation of Ukraine has developed a variety of programmes (e.g. the online platform Diia. Digital Education, Digigram and e-IT Generation project) aimed at strengthening Ukrainians' digital literacy. Even with the commencement of the full-scale war, the number of participants in these programmes has steadily increased (ITU, 2023).

Despite advancements in digital literacy, Ukraine's poor digital literacy rate remains a concern. Furthermore, the aforementioned studies (MDT, 2019, 2021) found significant geographical discrepancies within Ukraine, particularly between urban and rural areas. Similarly, as in other countries, there is a significant generation gap in digital literacy in Ukraine, with young people outperforming the elderly, as well as a digital divide for those who are socio-economically disadvantaged and/or marginalised (MDT, 2019, 2021).

In terms of gender, the study cited above (MDT, 2019, 2021) found little variation in digital literacy between adolescent males and females (10–17 years). Other available data reveal a relatively small gender discrepancy in Internet use (68% of women versus 72% of men) (ITU, 2023). Other data, however, show that men utilise e-services substantially more than women, with 71% of men using e-services compared to only 58% of women (UNDP, 2024).

However, when examining Ukrainian forced migration, it should be noted that migrants are typically younger, better educated or healthier than the general population (Aydemir et al., 2022; Huang et al., 2023), and thus their higher digital literacy than presented above can be inferred from the available data (cf. Yilmaz, 2023).

1.4.4 Ukraine, connectivity and war

Despite significant advances in the digitalisation of public administration and local government, increased connectivity and the Ukrainian population’s gradually improving digital literacy, Ukraine remains among the countries with very highly developed human capital, where progress is hampered by their relatively less developed telecommunications infrastructure (UN, 2020). Table 1.1 shows major indicators of digital connectivity before the outbreak of the full-scale war, demonstrating Ukraine’s average position in worldwide comparisons but a worse position than the European average before the full-scale war began.

Prior to 2022, Ukraine made significant investments in telecommunications infrastructure development. The war had a negative impact on these quantitative advances, often reversing them. The Russian invader also (often totally) disrupted the normal operation of public and private terrestrial telecommunications and critical infrastructure in the country’s temporarily occupied and war-affected territories (ITU, 2023). Furthermore, all the state institutions experience attacks (including cyberattacks and cyber threats) on digital and critical infrastructures, access to the Internet, the trade of technologies, the digital economy and the usage of cryptocurrency and electricity sources (ITU, 2022).

Table 1.1 Key telecommunications and Internet indicators in Ukraine in comparison to the European and world averages

Key indicators (2021)	Ukraine	Europe**	World
Fixed-telephone subscribers per 100 inhabitants	5.51	31.2	11.2
Mobile-cellular subscribers per 100 inhabitants	135.03	118.2	109.9
Active mobile-broadband subscribers per 100 inhabitants	80.12	105.3	83.2
Coverage by at least 3G (% of population)	91.60	98.5	95.0
Individuals using the Internet (%)	75.04*	87.2	62.5
Households with Internet access at home (%)	79.2*	87.6*	65.7*

Source: ITU 2023 (based on: ITU, World Telecommunication/ICT Indicators Database and ITU global and regional ICT data). *Latest data available for 2019. **The Europe unit includes 46 states, which cooperate with ITU within the region.⁵

Although Ukraine faces a multitude of issues generated by the enemy, connectivity remains a source of resilience throughout wartime (EC, 2023). Telecommunications infrastructure is constantly under relentless attacks, but international cooperation provides considerable aid in ensuring Ukraine's connectivity. Data from Ukrainian government-controlled areas show that digital literacy remains low and connectivity is frequently problematic (UNDP, 2024). However, there is some good news: the number of Ukrainians who use the Internet daily went from 72% in 2021 to 80% in 2023, the number of Ukrainians who use digital services increased on average, and the number of Internet users increased marginally even among the elderly (UNDP, 2024).

The advancement of digitalisation, connectivity and digital literacy has also had a significant impact on Ukrainian migration to CEE and elsewhere. Although detailed data are lacking, preliminary studies (Yilmaz, 2023) indicate that in 2022, Ukrainian migrants arriving in CEE were at least basically digitally literate and used online information to decide where to settle (see Chapters 3 and 4) and how to integrate into host societies (see Chapter 5). As a result, the role that digital technologies played throughout their reception, adaptation and integration, had a significant impact on the forced migrants. However, as the following section indicates, the role of digital technologies in migrant reception, adaptation and integration has evolved and continues to do so.

1.5 Concerns and conclusions

The link between ICTs and migration is intricate and multidimensional. As digital technologies advance, they influence migrants, like everyone else, increasingly. Migration experiences have profoundly transformed because of modern technologies' essentiality. These tools allow migrants to exist in cyberspace, generate data and manage their everyday digital lives (Candidatu et al., 2019; Leurs & Prabhakar, 2018). Migrants utilise ICTs to acquire information and knowledge about migration, while nations use them to control migration flows and manage migration, as well as to support migrants' integration and inclusion into host societies (Brown et al., 2019; Masiero & von Deden, 2022). However, ICTs also pose obstacles and concerns, such as aggravating disparities caused by limited digital literacy or restricted access to technologies. While ICTs help with a variety of practical aspects of migration, they also introduce new forms of exclusion and raise ethical concerns by acting as tools of control and surveillance.

The argument that "the growth of migration and ICTs are unprecedented and the two increasingly affect one another" (Leurs & Prabhakar, 2018, p. 247) is still valid. The case of forced migration from Ukraine to CEEs demonstrates how swiftly societal perceptions of ICT usage have shifted. While after 2015 some migration opponents questioned whether migrants with smartphones were genuine asylum seekers (Patterson & Leurs, 2020), the importance of smartphones in the context of Ukrainian forced migration after 2022 was undeniable. On the contrary, owning a smartphone was seen as necessary; relying on it became crucial, prompting even Ukrainian migrants with limited

technological skills to learn how to use them, while those who did not were cast into the shadows as invisible.

This shift has led to a fundamental change in the paradigm, with the assumption that a migrant is a connected migrant, which may be an overgeneralisation in the case of Ukrainian forced migrants in CEE. The connectivity, digital devices and basic digital literacy have become an expected norm for Ukrainian forced migrants and refugees in the years following 2022. Although it is likely to be true for more educated and somewhat better-off migrants, who started the voyage early. Unfortunately, the available data on digital literacy in Ukraine show that a large share of forced migrants are not digitally literate. The tough economic situation of more than half of the Ukrainian migrant population in Central and Eastern European countries (PAQ, 2023) raises worries regarding their degree of connectivity, as well as their access to and use of digital devices. However, these topics received scant attention and pleaded for more.

The experiences of Ukrainian forced migrants thus demonstrate the dual nature of ICTs. Despite progress in the digitalisation of public services and increased connectivity, issues such as digital literacy, regional disparities and infrastructural weaknesses exist. As migration becomes increasingly digitised, authorities must address the digital divide and implement inclusive strategies that ensure ICTs empower migrants rather than exacerbate existing disparities.

This chapter has explored the long history of technology's role from the first industrial revolution to the present, incorporating the role of ICTs in migrants' everyday lives. Using Ukraine as an example, the lives of migrants, from before they embark on the journey to after they cross the border and begin settling, demonstrate that the key role in migration is played not only by the host society and migrants but also by the sending society. The fundamental dilemma that hangs over the discussed topics remains: how can we maximise the benefits of ICTs for migrants while reducing their risks and assuring their ethical use?

Notes

- 1 These user "identities" may not represent unique individuals.
- 2 Braidotti also refers to deep blue seas alongside the Sixth Extinction, however the chapter does not delve on that.
- 3 It is also worth mentioning that several current applications have been "adapted" to the conflict in Ukraine. For example, Kyiv Digital, a transport application used by residents to pay utility bills and parking charges, has become an important tool for warnings and alerts in the city during the war. It includes a map of the nearest bomb shelters as well as locations to get critical supplies such as insulin, food or petrol. The app also sends out alerts of impending air raids and allows users to request Internet connectivity for their bomb shelters (ITU, 2023, p. 55).
- 4 To calculate the Digital Economy and Society Index (DESI) for Ukraine, both surveys followed the methodology of the European Commission.
- 5 Albania, Andorra, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, North Macedonia, Moldova, Monaco, Montenegro, Kingdom of the Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Türkiye, Vatican, Ukraine, United Kingdom.

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