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The digital dynamics of migration: Insights from the Ukrainian crisis

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Introduction

The Ukraine crisis of 2014, which saw the Russian annexation of Crimea and the subsequent internal displacement of over 1.5 million people, provides a backdrop for understanding the complexity of the ongoing crisis (Jaroszewicz, 2019; Stępniewski, 2016). Eight years later, as the Russian Federation launched a full-scale invasion of Ukraine in February 2022, the lives of Ukrainians were upended as their cities, homes and livelihoods were destroyed, and as their friends, families and compatriots were killed. The invasion has led to the mass displacement of millions of Ukrainians fleeing the dangers of war in cities across Ukraine. In just 10 days since the invasion began, approximately 2 million border crossings had been registered from Ukraine to neighbouring countries in Europe (UNHCR, 2022). Among those crossing the border were families leaving behind their husbands, brothers and fathers to serve in the war effort, under the martial law providing for men's mandatory conscription (Sotnychenko, 2022). The ensuing Ukrainian refugee crisis has been ranked among the largest in recent history, with over 6 million refugees from Ukraine recorded across Europe as of 2022 (UNHCR, 2022).

The Russian invasion of Ukraine triggered the ire and condemnation of many in the international community, including the United Nations, seeing the invasion as a violation of the territorial integrity and sovereignty of Ukraine (United Nations News, 2022). Responses from the international community have included sanctions against the Russian Federation as well as humanitarian, financial and military assistance to Ukraine (Funakoshi et al., 2022). The crisis also saw mass mobilization of civilians to join the resistance efforts against the invasion. The International Legion of Defence of Ukraine has seen over 20,000 foreigners move to Ukraine to serve in the war (CNN, 2022; Ministry of Foreign Affairs of Ukraine, n.d.). A similar effort has occurred on the digital front, with Ukraine's Minister of Digital Transformation establishing an "IT army", estimated at over 300,000 Ukrainian and international civilian specialists, to wage offensive cyberwar against the Russian Federation (Canetti, 2022).

Digital technologies have played an important role in the Ukraine crisis, including for migrants. They have provided migrants with the basic infrastructure for their information and communication needs.[1] Ukrainian migrants have continued to be active online, engaging in activism, cyberwarfare and even remote work (Elliot, 2022). However, there have been disruptions to information and communication technology (ICT) infrastructure that have negatively impacted the digital lives of Ukrainians, including cyberrisks such as disinformation, surveillance and control (Pearson and Bing, 2022). Some of the digital technologies at the centre of the Ukrainian crisis are dual-use technologies,[2] global digital public goods (GDPG), and digital platform services, such as social media. Several engagements and confrontations between States and technology companies – for example, the role played by Starlink, at the request of the Ukraine Government, to provide Internet connectivity, and the claimed attempted hacking of Starlink units by the Russian Federation – have evidenced the increasingly crucial role played by these companies in international conflicts and in migration. These trends have brought to the fore the importance of proper governance of GDPGs and digital platforms.

This chapter presents the findings of a study that explores the digital lives of migrants from Ukraine, with a focus on how digital technologies have been part of the story of the Russian invasion of Ukraine. The study employs an interpretive, qualitative approach involving a key interview with a Ukrainian informant, a study of social media activities of Ukrainians, and a review of grey literature. The key informant in this study is a Ukrainian living in Lviv, Ukraine, whose family and friends have migrated as a result of the Russian invasion. The informant, who was recruited through researchers' professional connections, was well suited to share experiences

[1] This chapter adopts and is framed around a broad definition of migrants as people who leave their country of usual residence irrespective of the reasons or legal status (IOM, 2019). The theoretical framework adopted in the chapter (see especially Table 1) accounts for different migration mobility types, including those associated with refugees and displaced persons.

[2] Dual-use technologies are defined in this paper as civilian or commercial technologies that can easily be weaponized for significant military use.

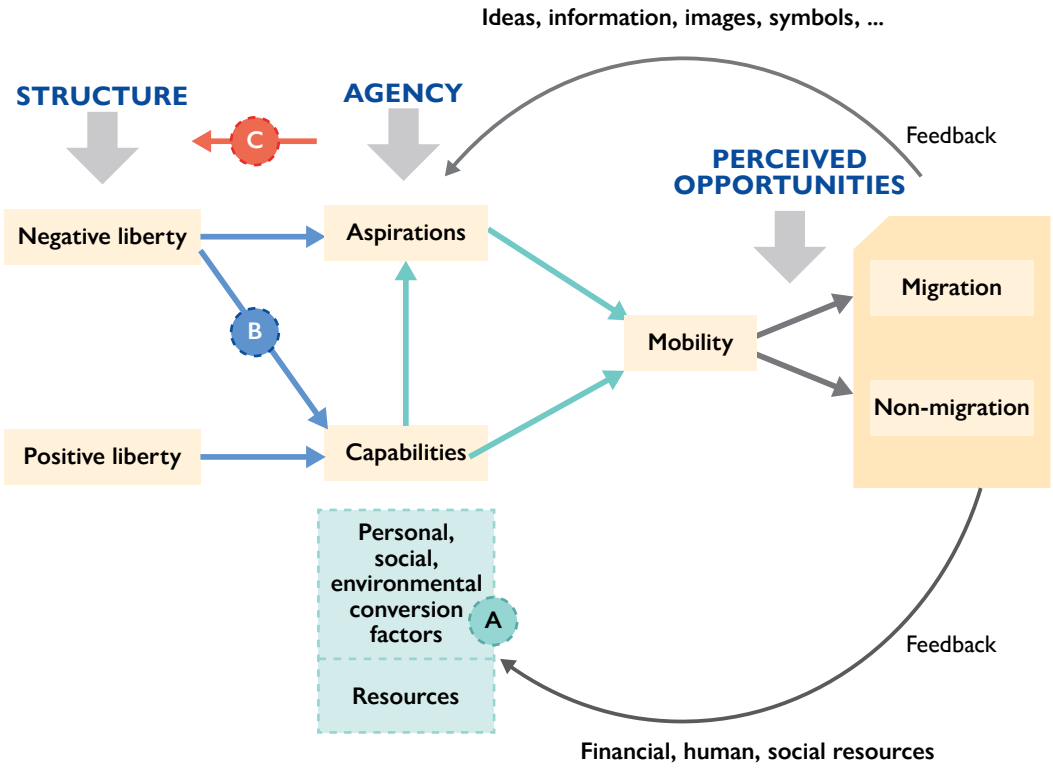
of the invasion on the ground in Ukraine and to reflect on the migration experiences of her family and friends. Additionally, a preliminary exploration of Ukrainian refugee activities on Twitter, Instagram and TikTok was conducted. Following this exploration, 10 Ukrainian refugee accounts on TikTok were selected as relevant to this study, and were further examined to derive further insights into the digital activities of Ukrainian refugees. The accounts were selected according to the following criteria: the account holders identified themselves as being a Ukrainian refugee in the account bio (for example, "Ukrainian refugee living in Belgium"); the accounts posted regularly about the war and that account holder's experience as a refugee; the accounts posted in English. All of the account holders found using this criterion were female, and they often combined beauty posts (about skin care, for example) with political posts.

In the next section, the theoretical framework that is used in this study to centre migrants' aspirations and capabilities in the migration mobility decision is presented. This is followed by a discussion of how digital technologies interact and intertwine with the migrants' aspirations and capabilities. The chapter then explores key aspects of the digital lives of Ukrainians associated with their use of digital technologies, including social media, location-based services, and dual-use civilian technologies during the conflict. The chapter concludes by discussing key observations and dynamics from the Ukraine crisis and making recommendations for supporting the digital lives of migrants.

Migration from the aspirations and capabilities perspective

This chapter employs the aspirations–capabilities theory of migration, which shares a similar logic to Carling's (2002) aspirations–ability model, but instead of using "ability" employs Sen's (1999) capabilities approach to frame migration in terms of the intrinsic value of the freedom to pursue the human mobility that individuals may have reason to value, that is, the notion of "migration as freedom" (de Haas, 2021). This framework also recognizes the functional dimension of migration to enhance people's capabilities, which remain valuable whether they are realized into specific activities (formally called functionings) or not (ibid.). Thus, the mobility capability, defined as the meaningful and achievable choice of where to live, is a function of individuals' capabilities, which are enabled by personal, social and environmental conversion factors (Nambiar, 2013) and of aspirations, which are related to general life aspirations and perceived opportunities (see Figure 1 on next page).

Figure 1. Aspiration–capability framework



Source: adapted from de Haas, 2021.

This framework uses the notion of negative liberty (that is, "freedom from") and positive liberty (that is, "freedom to") as the structural factors enabling and constraining an individual's choice of migration. Thus, while individuals might have the intrinsic aspiration and capabilities to migrate, there could be immigration laws in place that constrain the act of migrating. The framework also accounts for the effect of agency on structure, reflecting the ability of individuals' choices and actions to interact with, be affected by, and alter the structures that enable and limit people's capabilities (Borrelli et al., 2022; de Haas, 2021; Jonsson, 2020; Mainwaring, 2016). This framing of the dynamic between agency and structure in migration further positions immobility and individuals' choice to stay (for instance, to fight the struggles at home) as just as much a migration mobility decision as is the choice to migrate.

The interplay between migration capabilities and aspirations provides an important matrix for considering the different migration mobility types (see Table 1) and the different migration and non-migration experiences (Carling, 2002; Carling and Schewel, 2018; Jónsson, 2011; Schewel, 2015). For example, individuals with high aspirations and capabilities to migrate, such as the approximately 7 to 8 million individuals who used to emigrate from Ukraine for labour every year before the invasion (Ministry of Social Policy of Ukraine, 2018), represent the voluntary mobility type. On the one hand, since the war, many Ukrainians have been displaced and forced to move without any real choice to stay, short of putting themselves in danger; these represent the involuntary mobility type (de Haas, 2021; Vyshnytska and Skibitskaya, 2020). On the other hand, there are also Ukrainians who exercised the voluntary immobility decision and chose to stay and contribute to the war effort, as expressed in the interview: "I know lots of teenagers who went and said 'I want to support … the army'". Many Ukrainian males who wanted to leave but could not because of the martial law banning them from leaving, on the other hand, represent the involuntary immobility type. Some people, representing the acquiescent immobility

type, are in situations of low capabilities and little aspirations to move. An example given from the interview is that "lots of people don't know [the language of the country of destination] … they were afraid to go away". The reasons for the low aspirations to go, or the preference to stay, have been articulated in terms of attractive "retain" factors at home, undesired "repel" factors abroad, and internal constraints on decision-making (Schewel, 2015); the latter has also been expressed through the notions of restricted agency and adaptive preferences (Peter, 2003).

Table 1. Aspirations–capabilities individual mobility types

		Migration capabilities	
		Low	High
Migration aspirations (intrinsic or instrumental)	High	**Involuntary immobility** • "… restricting civilians from leaving"[3] • Males conscripted into the war effort[4]	**Voluntary mobility** • Labour migrants (before the Russian invasion)
	Low	**Acquiescent immobility** • "… lots of people don't know the language … they were afraid to go away" (Linked to restricted agency and adaptive preferences)	**Voluntary immobility and involuntary mobility** • "If I left, I don't know where I am going"[5] • "We've had to completely uproot, change our lives"[6] • "I know lots of teenagers who went and said 'I want to support … the army'" • Fleeing war and persecution

Source: adapted from de Haas, 2021.

The role of digital technologies within aspirations–capabilities framework

Digital technologies are deeply intertwined with migration; fundamentally, they are part of the resource pool that migrants tap into before, during, and after their migration journey (Moneke, 2017). However, digital technologies have a dual impact, both empowering (for example, maintaining social capital) and disempowering (for example, through exposure to surveillance, extortion, and scams) migrants (Alencar et al., 2019; Fletcher, 2021; Nedelcu and Soysüren, 2022). Ullrich (2017) discusses how this duality of impact influences the exercise of migrants' visible agency, their ability to access relevant information, know about their rights and demand redress in cases of violations, and maintain social networks, on one hand, and invisible agency, their ability to avoid surveillance and extortion and to stay invisible, on the other hand.

The aspirations–capabilities framework helps to locate the role of digital technologies in migration in a much more nuanced way that accounts for the complex experiences involved in migration and for the influence of structural factors on the digital lives of migrants. Of particular interest in this study of the digital lives of Ukrainian migrants are the following elements (indicated in Figure 1 with the labels A, B and C):

[3] As detailed in the petition by Sotnychenko (2022), signed by 60,000 people, asking that Ukrainian men be allowed to leave the country.
[4] As exemplified by the #ukraineletmenout hashtag on Twitter.
[5] As reported by Barnard (2022).
[6] Direct quote from Ukrainian refugee documenting her journey on TikTok.

A. The ways that digital technologies can amplify migrants' capabilities, such as providing them with greater mobility and fundamental agency over their life, bodies and environment (Nussbaum, 2013), and allowing them to choose their daily activities as they navigate their migration journey.

B. The structural effects of digital technologies on migrants, recognizing the possibility of both positive and negative structural effects with impacts on the liberties of the migrants.

C. The use of digital technologies to support the assertion of individuals' political agency with regard to structures. In particular, how individuals use digital technologies to subvert, confront, and challenge the structural elements that impinge on their migration capabilities. For the purposes of this study, the focus is on social media activism, civilian participation in cyberwarfare, and the weaponization of everyday technologies to support active physical warfare.

This study is also interested in the role of GDPGs and of digital platforms across the three lines of inquiry mentioned above. The governance of GDPGs and digital platforms has major implications on migration because of the impact these technological resources have on the capabilities and aspirations of migrants. Global governance of these digital technologies is also important because cyberspace is increasingly a site of contestation and confrontation in international politics and the locus of "weaponized interdependence"[7] between States, and this has spillover effects on international stability, peace and migration.

Use of digital technologies by Ukraine migrants

Migrants rely on digital technologies to enhance their capabilities before, during, and after their migration journey (Kindler and Wójcikowska-Baniak, 2019; Moneke, 2017). Digital technologies provide access to relevant information and enable communication with friends and relatives. They also facilitate interaction between migrants and governments, such as for receiving government services from their countries. Since the Russian invasion, the ICT infrastructure in Ukraine has suffered damage that has led to the disruption of digital services. This triggered the much-publicized Twitter interaction between Mykhailo Fedorov, the Ukraine Minister of Digital Transformation, and Elon Musk, CoE of Starlink, about assistance with satellite Internet connectivity,[8] thus highlighting the role of social media and private technology companies and the importance of Internet connectivity.

Despite the positive impacts of digital technologies on migrants, digital technologies also expose migrants to many cyberrisks. Examples of these risks include breaches and leakages of migrants' personal data, disinformation (such as the campaign that urged Africans in Ukraine to wear armbands used by combatants; Le Roux, 2022), discrimination from the misuse of biometric data and predictive analytics, and exposure of vulnerable migrants to online abuse and exploitation.

This paper focuses on the use of social media, geospatial services, and dual-use technologies by Ukrainians to explore how these technologies impacted their digital lives across the three dynamics of amplifying migrants' capabilities, being a conduit of structural effects on migrants' aspirations and capabilities, and supporting migrants' assertion of political agency on structures.

[7] "Weaponized interdependence" is the situation where States leverage their asymmetric interdependence and power in networks (such as financial or telecommunication) to coerce or gain an advantage over other States (Drezner et al., 2021).

[8] Mykhailo Fedorov on Twitter: "@elonmusk, while you try to colonize Mars – Russia try to occupy Ukraine! While your rockets successfully land from space – Russian rockets attack Ukrainian civil people! We ask you to provide Ukraine with Starlink stations and to address sane Russians to stand". Elon Musk's response on Twitter: "Starlink service is now active in Ukraine. More terminals en route".

Social media

Social media has enabled Ukrainians and the Ukraine Government to publicize their plight, advocate for their cause, share updates and information, and garner support and responses from the international community. On Telegram, the city channels have been a crucial trusted source of information that has cut through the noise and the disinformation, as noted in the interview: "in our city, we have own [sic] channel … where we can know everything."[9] Social media also played a role in supporting Ukrainians' activism and resistance against the Ukraine Government and institutions. For example, the #UkraineLetMenOut Twitter campaign protested the conscription into war and the banning of males from leaving Ukraine.

Just like Syrians and the people of Myanmar before them, Ukrainians in situations of migration have turned to social media to document their journeys. While Rohingya refugees from Myanmar continue to post extensively on Twitter,[10] many Ukrainians have turned to TikTok. In collecting data for this study, we observed several Ukrainian refugees describing their stays in Germany, Belgium, and other parts of Europe. All of these refugees are women, and they have accumulated hundreds of thousands of followers since the beginning of the war.[11] While this platform provides the well-documented affordances of entertainment and social networking, the researchers have noted the following further ways through which social media has amplified the capabilities of migrants.

Migrant influencers

Influencers on social media have been defined as "key individual[s] with an extensive network of contacts, who play an extensive role in shaping the opinions of others within some topic area" (Chandler and Munday, 2016). Often, this term is related to brand influencers, that is, those who advertise products to their followers in exchange for remuneration (ibid.). However, this term also refers to those posting for non-commercial purposes, who may have social and political influence, rather than advertising influence.

While there is no threshold number of followers to be called an influencer on social media, many so-called influencers have less than 15,000 followers, while an increasing number have millions (Haenlein et al., 2020). Several of the migrant social media accounts we have been observing have from 12,000 to over 1 million followers, putting them squarely in the influencer range. It is difficult to measure their real political impact; nonetheless, they certainly reach many people across Europe who could, through their votes, affect refugee policy in the continent. One post, for example, entitled "My typical day as a refugee in Germany", garnered over 1.6 million likes.[12] In the 24-second video, the poster had included footage of her breakfast in a refugee camp, being driven through the German countryside, and going to a grocery store that offered free food to refugees. The video ended with footage of the poster skipping through a field in Germany. The objective of the video seemed to be to document the kindness of Germans supporting arriving Ukrainians – a reprieve, perhaps, from the negativity that dominated the news cycle. As testament to and recognition of the power of social media to shape the narrative on issues, for the first time, the United States Government invited 30 TikTok influencers for a security briefing, led by National Security Council staff and the White House press secretary, on the ongoing war in Ukraine (Lorenz, 2022).

A 2017 study by the marketing platform IndaHash stated that 68 per cent of social media influencers globally were female. This is not only the case for brand influencers; many policy influencers on social media are also women (IndaHash Labs, 2017). In traditional media, however,

[9] Direct quote from interview conducted by research team.
[10] Fournier-Tombs, forthcoming.
[11] See, for example, the accounts by @valerisssh and @markchrs, which clearly illustrate this phenomenon.
[12] As of 6 December 2022. The video remains available on TikTok.

women and girls have much less say. Of course, before the rise of social media, it was very rare for a person in a situation of displacement to have any say in refugee policy, much less reach hundreds of thousands of people with each broadcast of a message. For some of the women whose accounts we analysed, posting on social media has also allowed them access to wider audiences, with one woman being invited to speak at a film festival in the United Kingdom about her work documenting the war and situation for refugees in Ukraine. It should also be noted that social media has proven to be a very unique tool at the intersection of gender and migration because the majority of refugees coming from Ukraine are women and girls.[13]

Some Ukrainian refugees online have chosen to go another route with social media by becoming brand influencers, forgoing political commentary to focus on monetizing their social media presence. There are some practical challenges to doing this as a refugee, such as the need for online banking capability, the capacity to receive physical objects (such as fashion or beauty products) in order to showcase them, and the ability to reliably access the Internet.

Geospatial location-based services and dual-use technologies

Today, geospatial technologies and location-based services (LBS) have become ubiquitous, accessible to anyone with a smartphone and an Internet connection. Many digital services, including social media apps such as Facebook, Instagram, Twitter, and TikTok are location enabled, allowing users to include their location in posts, and to see what others have posted at a given location. This allows broadcasting one's past, present or future location to a wide array of connections, be it privately or publicly (Ciuriak, 2022). Often, users do not fully understand the privacy and safety repercussions of broadcasting their location data widely (Verma, 2022; Zeffiro et al., 2020).

The geographical affordances of these technologies have amplified the capabilities of Ukrainians and supported them during the crisis in several ways. In Ukraine, there were 54 million active mobile-cellular subscriptions in 2020, or 130 per 100 people, ranking it 28th in the world in terms of mobile-cellular connectivity (ITU, 2022). Internet connectivity was also high, with about 75 per cent of the population being connected (29th in the world) (ibid.). These tools have been used during the war by displaced Ukrainians to navigate their way to safety, find transportation routes to the border, and locate humanitarian corridors (Radio Prague International, 2022; Reichert, 2022).

Geospatial services have also been used by Ukrainians to locate their electronic devices and equipment that were looted during the war (Davies, 2022). Further, with many cases of human rights abuses being reported during the war, geospatial services have been instrumental in supporting the documentation of abuses and violations (Strick, 2022). Ukrainians have been able to participate in crowdmapping locations of such abuses, thereby contributing to holding structures and institutions (such as the army) accountable (Davies, 2022; Verma, 2022).

The biggest risk of geospatial technologies to migrants is that they can compromise their privacy and agency, as migrants constantly negotiate and manage their visibility and invisibility in their migration journey (Ullrich, 2017). Location-enabled mobile devices can reveal the whereabouts of migrants, exposing them to surveillance, control, and disclosure risks. This is one of the risks that is linked to the Starlink user terminals: that their signals could be intercepted, revealing their location. Hence the recommendation from Musk to place the antennas "as far away from people as possible" (Cheney, 2022).

The same tools can be used, to some extent, in lieu of military grade technology, in the organization of combatants and militias. There is evidence that the Russian military used location

[13] According to UNHCR, 90 per cent of refugees from Ukraine are women and children.

tools such as Google Maps or Waze to find their way to specific locations in the Ukraine and to identify targets (Buczkowski, 2022; Elliot, 2022). These tools were used also by Ukrainian civilians and soldiers to organize their defence, for example with civilian users reporting movements of invading soldiers (Olejnik, 2022). Location-based services such as these navigation apps are an example of a dual-use civilian or commercial technology that can easily also be used for significant military use. A smartphone that can be used by a civilian in everyday life can also be used by a soldier to navigate to a certain military target or location using its commercial mapping apps.

Dual-use technologies can either be software or hardware. An important dual-use hardware technology in the Ukraine war has been commercial, off-the-shelf drones. During the Ukraine war drones have featured significantly, being used by Ukrainians, including civilians, to support the resistance against the invasion. These drones, only about a kilogram in weight and enabled by on-board high-precision Global Positioning System (GPS), are civilian commercial technologies that can easily be weaponized for significant military use.

Such commercial drones are not only capable of general reconnaissance, but also, importantly, for military target acquisition, in which they can pinpoint the location of enemy assets in order for them to be engaged with higher success (BBC, 2022; Beaubien, 2022; Trofimov, 2022). They can also carry small payloads such as a grenade and drop it, using customized payload-dropping devices, or they can be used as projectiles themselves, and flown into the target (NYT, 2022). The weaponization of these commercial grade tools opens a new frontier, as they can provide previously inaccessible air support and weapons for militias and armies.

Furthermore, the Internet networks that allow and facilitate the use of these dual-use technologies can now increasingly be provided without the control of any government, such as the broadband offered by the Starlink constellation of communications satellites (Brown, 2022; Haugstvedt and Jacobsen, 2020; Singh, 2022; Walkowitz, 2020).

Discussion

Much research on the impact of technology on migrants presupposes a migration mobility decision (to go) and therefore explores the role of technology before, during, and after the migration journey (Gelb and Krishnan, 2018). In this section we consider the interactions between digital technology and migrants' aspirations and capabilities, which consequently inform the migration mobility decision – to go or to stay. In this regard, the paper notes varied interactions between migrants and technologies beyond simply supporting the migration journey. First, digital technologies catalyse specific personal, social and environmental factors, and can enhance or restrict migrants' capabilities and aspirations. For example, consistent with the gendered influence dynamics on social media, TikTok has enabled some Ukrainian women refugees to publicly speak their mind and earn an income doing so. However, social media can also present greater risks for women, namely in terms of privacy and security.

Second, digital technologies are used in structural systems that either support or constrain migrants' capabilities. For example, they can facilitate control and surveillance of migrants by State-level actors and, as noted during the Ukraine crisis, can be used in influence campaigns against migrants to perpetuate disinformation (Hancock, 2022; Karasapan, 2022).

Third, digital technologies support the exercise of migrants' political agency to resist, challenge and alter the structures that impinge on individuals' liberties. This is mostly enacted across voluntary immobility, involuntary immobility, and involuntary mobility decisions such as, for example, Ukrainians who were observed to use social media to challenge the male travel

ban and to use geo-mapping technologies and drones to document human rights abuses and support the resistance against the invasion.

Table 2 summarizes these different elements and the dynamic effects of digital technologies on the lives of Ukrainians as observed during the ongoing Russian invasion crisis.

Table 2. Impact of digital technologies on migrants' lives

Digital technologies		
(a) Impact on capabilities and aspirations	(b) Conduit of structural effects	(c) Enable engagement with structures
Positives • Information and communication services • Teleworking **Negatives** • Cybersecurity risks **Conversion factors** • Digital literacy in Ukraine • Ukraine as tech hub • Prior ICT outsourcing to Ukraine • Government digitalization strategy • Digital penetration in Ukraine	• ICT service disruptions from attacks • Weaponization of digital public goods and digital platforms	• Cyberwarfare • Crowdfunding for ICT resources • Starlink and Russian Federation confrontation, for example

Technology: Social media		
(a) Impact on capabilities and aspirations	(b) Conduit of structural effects	(c) Enable engagement with structures
Positives • Connection with the world • Maintaining social networks and capital • Trusted information sharing • Monetizing followers **Negatives** • Misinformation and disinformation, such as fake telegram group misinformation[14] • Compromises invisibility and privacy • Sociotechnical cyberthreats **Conversion factors** • Gender dynamics on TikTok: female influencers	• White House briefing of TikTok influencers	• Social media activism (for example, TikTok refugee activists) • Influencing policy • #UkraineLetMenOut Twitter campaign • Mykhailo Fedorov engagement with Big Tech

[14] DFR Lab, 2022.

Technology: Geospatial/location-based services		
(a) Impact on capabilities and aspirations	(b) Conduit of structural effects	(c) Enable engagement with structures
Positives • Navigation and route planning and sharing • Humanitarian corridors • Helping Ukrainians locate their stolen equipment **Negatives** • Compromise invisibility agency and privacy	• Surveillance and control	• Centre for Information Resilience crowdmapping of human rights abuses • Supporting kinetic warfare

Technology: Civilian digital technologies (such as drones)		
(a) Impact on capabilities and aspirations	(b) Conduit of structural effects	(c) Enable engagement with structures
Positives • Trickle-down paradigm: "the more the better" • Civilian use of drones **Negatives** • Privacy concerns on user data	• Militarization of drones (for example, by the Russian army) • Ethical concerns (such as government backing of private companies) • Unregulated use of weapons-grade technology	• Supporting kinetic warfare • Intervention from governments indirectly; for example, Chinese commercial drone company DJI[15]

The Ukrainian crisis has also brought to light new uses and challenges associated with social media, geospatial technologies, and dual-use technologies. In particular, social media platforms remain poorly regulated and in the hands of private enterprises. TikTok is the first Chinese-owned platform to have a global reach (Weibo and WeChat are extremely popular in China, but not widely used outside of the country). Other platforms with global adoption include Facebook, Instagram, Twitter and YouTube, all of which are based in the United States. Neither China nor the United States have very strong data protection laws, which means that the influencers' private data could be stored and kept indefinitely, potentially used for surveillance, harassment, identity theft or trafficking (Tangerman, 2019; Withers, 2019).

As far as LBS and geospatial technology are concerned, many institutional and commercial actors in the sector believe that there is no such thing as "too much" data. This attitude in LBS of "the more, the merrier" has a vastly different impact depending on the laws and regulations that limit the reach of State and non-State actors that could use this private data. This belief that the benefits of more data will always outweigh the costs has permeated the tech industry and influenced modern use of location data and satellite imagery. In fact, there are a number of negative impacts that these can have, in terms of privacy, personal-level security and community-level security, especially in the context of an armed conflict (Foroohar, 2022; Greenland, 2022; Harris, 2013; Snowden, 2022).

On top of the many positive impacts that LBS and geospatial technologies can have on the lives of migrants, an additional one deserving separate consideration is that they enable more accurate and impactful journalism (Ikonen et al., 2022; Schmitz Weiss, 2015 and 2019). The war in Ukraine has also highlighted how important interactive map-based information is for fighting fake news and propaganda, fact checking and building evidence of war crimes (Hasian, 2016; Koenig et al., 2021). In a way that is different from previous conflicts, the convergence of digitally savvy citizens and the opening of geospatial technology to the masses has allowed for this fact

[15] Cadell, 2022; Clark, 2021.

checking and evidence building to be led by Ukrainian citizens (Davies, 2022).

Last, dual-use technologies such as commercial drones and high-bandwidth consumer-oriented satellite Internet have made a tangible impact on the Ukrainian resistance. Among other things, they give the companies that produce these technologies the responsibility to study, warn and engage with society on the ethical issues and possible regulation needed to ensure that non-State actors cannot overplay, and undermine, the safety of people on the ground.

Conclusion

Migrants' use of digital technologies is not only to support their migration journey to the destination countries. Digital technologies come into play long before that, shaping their migration capabilities and aspirations and facilitating their interaction with the structural elements (such as institutions, governments and legalities) in their context. The Ukrainian crisis has demonstrated this varied and nuanced use of digital technologies in support of the different mobility types across voluntary or involuntary, and staying or going, decisions.

The lessons from the Ukraine crisis are that digital technologies are deeply intertwined with migration, not only at the individual level, but also in terms of the relations between migrants, State actors and non-State actors, both within the country and at international levels. These technologies can have transformational effects on migrants' lives, in some cases enhancing their capabilities and empowering them in ways not observed in the past. Supporting the development of these capabilities while also limiting the negative impacts of these technologies will involve a concerted effort on the part of the international community in terms of the governance of digital public goods, platform services and dual-use technologies. The digital lives of migrants in Ukraine are complex and nuanced, but they demonstrate opportunities and risks that will likely only be more present in upcoming crises, as the boundaries between the physical and the digital become even more blurred.

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