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ICTs: WHOSE INVISIBLE HERO?

Bridging the Digital Divide for Sustainable Development

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RESUMO

A conectividade nunca foi tão crucial, porém estar conectado ainda é um privilégio. Aproximadamente metade da população mundial continua off-line. Mesmo entre os mais conectados do mundo, existem ainda grandes grupos que não possuem os dispositivos, a velocidade e os meios para acessar serviços digitais e, o mais importante, as habilidades que tornam a conectividade significativa. A pandemia do COVID-19 colocou um estresse nunca antes visto nas redes de Tecnologia da Informação e Comunicação (TIC), pois a tecnologia se tornou a "heroína invisível" da crise. No entanto, essa heroína ainda tem muitas pessoas para salvar. Este artigo tem como objetivo explorar a divisão digital e a definição por trás do acesso significativo. Com foco no papel das Nações Unidas na promoção das TICs para o desenvolvimento sustentável, discutimos a urgência de reverter as tendências de desigualdade digital para a governança global. Por fim, o artigo propõe um olhar mais próximo para a cooperação digital e os telefones móveis como um possível caminho a seguir em direção à inclusão digital e o desenvolvimento global.

Palavras-chave: Relações Internacionais. Tecnologia. ODS. Divisão Digital. TICs.

ABSTRACT

Connectivity has never been so crucial, but to be connected is still a privilege. Approximately half of the world's population remains offline. Even among the world's most connected, there are still large groups that lack the devices, the speed and the means to access digital services and, most importantly, the skills that make connectivity meaningful. The COVID-19 pandemic put a never-before-seen stress on Information and Communication Technology (ICT) networks as this technology became the "invisible hero" of the crisis. However, this hero still has many people left to rescue. This article aims at exploring the digital divide and the definition behind meaningful access. With a focus on the role of the United Nations in promoting ICTs for sustainable development, we discuss the urgency of reverting the trends of digital inequality for global governance. Finally, the article proposes a closer look at digital cooperation and mobile phones as a possible path forward toward digital inclusion and global development.

Keywords: International Relations. Technology. SDG. Digital Divide. ICTs.

Introduction

In 2020, a global health crisis caused by the outbreak of the Coronavirus (COVID-19) transformed the routines of individuals across nations. The great threat represented by this pandemic inspired fear and uncertainty as it affected the lives of *all* people, independently of social position, education, income level and gender.

Information and Communication Technologies (ICTs) emerged as a beam of hope or as an “invisible hero” amid this crisis. These technologies took on the important role of connecting the people of the world when physical connection was no longer safe. ICTs connected us to prevention, detection and diagnostic information vital to keep us healthy. They connected us to our workplaces and our colleagues, virtually, so that we could continue to contribute to society. From our smartphones, ICT applications connected us to a variety of products and services, bringing a feeling of normalcy to our daily lives as physical shops and marketplaces closed to avoid contagion. Finally, ICTs connected us to our family and friends, close and far, so that we could still be together, and connected us as human beings as we stood united, regardless of physical isolation.

Yet, being rescued by this invisible hero did depend on social position, education, income level and gender. When one is online, in the virtual world, one tends to forget who is offline. The COVID-19 pandemic showed us that the unconnected will not be forgotten.

This has sparked some questions about how the world is tackling digital inequality, as we enter the Decade for Action of the United Nations Sustainable Development Goals¹. How does the United Nations, particularly through the International Telecommunication Union (ITU), contribute to the global governance of Sustainable Development through leveraging ICTs for development? What does meaningful digital access entail? How does the UN contribute to the ICT4SDG regime? To what extent is closing the digital gap central to maintaining the ICT4SDG regime? What are the dangers of digital inequality and how can digital inclusion be a path towards global equality? Is technology neutral or can it reflect bias?

The fact that technology is the future may no longer be under discussion, but *how* technology will mold our future still is. Global decision-makers at the political level are responsible for reversing the current trends in digital inequality so that no one is left behind. The most vulnerable are our priority, we must make sure they get online and stay online, and learn to listen to their contexts and their special needs as they find their own path to inclusion.

¹ <https://www.un.org/sustainabledevelopment/decade-of-action/>

The Networking Logic in International Relations

If we look at the etymology of the word ‘technology’², we understand why Castells (1996) describes technology’s power to penetrate all human life and activity by explaining that it is “the fabric in which such activity is woven”. From within, technology alters our reality, how we perceive our reality and how we interact with our reality. Feeling as if it had always existed, naturally, we forget what life was like before technology sneaked into every corner of our existence.

The Industrial Revolutions³ were brought about by discoveries of new sources of energy, the steam engine in the first revolution and electricity in the second, with the irreversible incorporation of machines to industry and, later on, to everyday life. The social changes and economic consequences were truly revolutionary for the history of the world, but limited in space. They initiated locally, taking place in few societies and with a selective expansion to other areas of the world.

The 20th century saw its own revolution, which became more global and even more pervasive than the ones that preceded it: the Information Technology Revolution. The Second World War and the years that followed saw its first technological breakthroughs, but the decade of 1970 was when its developments gained pace and expanded into a synergistic process of exchange and innovation. In just 20 years, information technologies advanced in an unprecedented pace as it reached more users, its rate of diffusion contributing to its evolution. From the 1970s until the 1990s, these technologies developed to accumulate more power, while at the same time dramatically decreasing in cost. The fields of micro-electronics, computer science and telecommunications merged to create the personal computer, which not only revolutionized the technological systems used until then but has also had social and cultural implications until this day. According to Castells (1996), unlike the previous industrial revolutions that applied knowledge and science to new products and processes, this movement revolutionized information and knowledge itself. Creating a “cumulative feedback loop”, where new technology was introduced, used and appropriated by its users, the same users which then interacted with and creatively modified the technology in real-time, generating new knowledge and so on in an endless circle of innovation.

² The etymology of the word ‘technology’ points to two roots, one from the Greek *tekhne* meaning “art, skill, craft in work” and the Proto-Indo-European root **teks-*, which means “to weave, to fabricate” (<https://www.etymonline.com/word/technology>)

³ The First Industrial Revolution was a process sparked by the Renaissance that unraveled towards the end of the 18th century in Britain, and the Second Industrial Revolution, originating in Germany and the United States 100 years later. They both represented a clear rupture in the economy, culture and society. (Castells, 1996)

The development of the Internet throughout the 1990s is the best demonstration of the unprecedented spirit of this new technological revolution, as it clearly exemplifies the ‘networking logic’ behind it. Resulting from “a unique blending of military strategy, big science cooperation, technological entrepreneurship, and counter cultural innovation”, the Internet was mainstreamed into society with the technological leap of the *world wide web*, an application which organized website’s content by its information rather than by its network location.

As part of what Castells (1996) characterizes as the ‘Information Technology Paradigm’, the networking logic refers to communication and connections in a network, shortening distances and approximating contexts, establishing relationships through the power of interactive creativity through the exchange of knowledge. Information, and all the power it holds, was at the same time the means and the end of the Information Technology Revolution, which combined complex integrated systems and structures with a collective and flexible environment.

Complex Systems

This ‘networking logic’ approach is also useful in the study of International Relations (IR). Understanding Complex Interdependence is a good starting point for how a non-linear approach to IR research is more useful in the current global scenario. Due to how world events have increasing reciprocal effects among states and non-state actors, effects that incur interaction costs for the actors involved, the international system has become increasingly interdependent. The complexity in this arises from the multiple channels of societal connections sustained by informal links, which blur the territorial borders between nations. Moreover, the linkage of non-hierarchical issues in the global agenda together with the decentralization and diffusion of power allow for non-state actors to also influence international affairs on various levels in a very dynamic and unpredictable way. States are sovereign and still represent the main actors in the international system. However, it is very challenging to attribute causality or control the consequences of these transnational interactions due to the complexity of the relationships between actors and the many influencing factors.

Despite this apparently anarchic context, there is order in chaos⁴. Order is possible through the concept of global governance, which in contrast to the idea of a formal governing authority to police nations into compliance, is a system of rule “backed by shared goals that

⁴ “In all chaos there is a cosmos, in all disorder a secret order” is a famous quote from Carl Jung from his book *Archetypes of the Collective Unconscious* (1969).

may or may not derive from legal and formally prescribed responsibilities”. Governance depends on intersubjective meaning, agreed concepts and principles, and only works if it is willingly accepted and acknowledged by the majority – it is “order plus intentionality” (Rosenau, 1992).

When looking at the global agenda, each specific global issue also follows ordered arrangements called regimes. The international regime of a specific issue-area is the “networks of rules, norms, and procedures that regularize behavior and control its effects” (Keohane; Nye, 2012). A regime creates a framework of common assumptions and the foundations for cooperation based on shared interests for the management of any particular topic.

If we apply Castell’s information technology paradigm ‘networking logic’ to global governance and international regimes, the different actors of the international system are the users of the network, and also the creators of the same network, which has a reciprocative nature. The users are constantly connected and interact following rules and procedures within specific subnetwork, but at the same time, in sharing information and knowledge as a group, they are able to alter and recreate the dynamics of the subnetwork, or regime. When we expand our view to a more comprehensive level of analysis, which includes all the different subnetworks or regimes in the system, and we consider the arrangements between them - how they overlap, articulate and confront each other - we find ourselves looking at a large interactive web of actors across topics, in the *world wide web* of global governance.

In this context, uncertainty and obscurity characterize policy formulation of global players. As the international system has shifted from being complicated to being complex⁵, a linear analytical approach to global challenges is no longer enough to provide effective solutions. This is why IR theorists, since the 1990s, have started looking at complex systems as an alternative framework for studying global affairs. A view of the world as multiscalar, comprising of various heterogeneous elements at different levels that are interconnected and constantly exchanging information with its environment, complements a networked understanding of IR.

“Complexity can be understood as DEEEP: difficult to explain, evolve, engineer, or predict”, nonetheless, three properties can help us identify complex systems. The first is self-organization: the multidirectional interactions between the elements of the system and between the elements *and* the system generate and regulate their own order. Secondly, the property of

⁵ “Something “complicated,” such as a jet engine, can be approached by cutting it down into manageable parts. Complex problems, on the other hand, cannot be reduced or simplified without being strongly altered or mutilated,” and their behavior is not predictable from the study of their parts.” (Orsini et al, 2019)

emergence indicates the system as a whole is not only greater than the sum of its parts, but also essentially different from the sum or any combination of its parts. The third property is adaptation, meaning that the system not only organizes itself but also has the capacity to “learn from and coevolve with its environment”, adapting to changing circumstances in a way that is functional and practical to the system, even if that means fundamentally changing its parts or causing the disappearance of failed units. Within this framework, the key to understand behavior is relationship, not only within regimes but beyond and across them, which in the context of cooperation for solving common challenges, adds new dimensions to the mapping of global governance. International actors are not the only elements that are interdependent; the current international context is characterized by interdependent and interacting issue-areas also, making effective global governance contingent of mastering this complexity (Orsini et al, 2019).

The sustainability of governance relies on three levels of action: ideational, behavioral and political (Rosenau, 1992). The focus of this article will be on the political level, as we explore the role of the United Nations, particularly the ITU, an established actor in the Telecommunication⁶ and Global Information Infrastructure (GII)⁷ regimes, in the governance of sustainable development. In understanding that to solve common global challenges, even if only within their mandate, it is not sufficient to focus on infrastructure in an isolated manner, the ITU is actively participating in the governance of the sustainable development regime with the objective to correct the increasingly alarming issue of the widening digital divide. Having become ever so apparent with the COVID-19 crisis, the stress digital inequality is putting on the global order is evident. In leveraging ICTs for development, particularly through digital inclusion and digital cooperation, it is mainstreaming a normative ideal intended at breaking the habits of a global order addicted to inequality – positioning ICTs as a potential solution to inequality, rather than yet another one of its perpetrators.

International Organizations and Inequality

As we mentioned before, International Organizations’ (IOs) role in international politics

⁶ Telecommunications is the technology of sending signals and messages over long distances using electronic equipment, for example by radio and telephone. (<https://www.collinsdictionary.com>)

⁷ “The GII is the core socio-technical foundation on which the Information Society is being built [...] Bringing the Information Society into existence requires four interrelated foci, which are (1) information infrastructure development; (2) building a legal and regulatory infrastructure; (3) content creation, and (4) human capacity development. Each of these areas requires substantial international cooperation, financing, and the development of consensus on the principles, values, norms, rules, and decision-making procedures for the Information Society across public, private, and civil society sectors.” (Cogburn, 2017)

is key for global governance. The institutionalize regimes and representing a stage for multilateralism, facilitating consensus by encouraging participation from all members in the decision-making processes. They help guarantee global governance of key global issue-areas by providing a platform for the establishment and monitoring of agreements and alliances, as by acting first hand in the management and administration of regimes. Moreover, IOs are actors in themselves, securing a certain level of autonomy from their Member States, with authority and legitimacy to act and influence the international system (Herz; Hoffman, 2004).

Some International Relations theories were central to the development of the studies of IOs towards the end of the 20th century. In this article we will focus on the neofunctionalist contributions to the study of IOs, following from the functionalist premise that technical cooperation in specific sectors between actors can ‘spill-over’ to generate intersectoral linkages and extend cooperation to other areas.⁸ Building on a constructivist view of international affairs, States’ interests and their perceptions of their interests may be influenced to change. Goals and beliefs of actors within the international system may transform over time and the amount of information available to each actor is key in the formulation of policy for cooperation and beneficial exchange. According to this theory, the role of international institutions is central to the States’ dynamic process of defining its national interest since disseminating and sharing information among its members is one of IOs’ main tasks; “increased transactions and multiple levels of contact influence States’ definitions of self-interest” (Rosenau; Czempiel, 1992). Continued interactions between States and other actors in the international stage systematically leads them to re-examine and reformulate their interests and this opens an opportunity for spill-over, as the more integrated are ideas and expectations among international actors and the more they engage in exchange and discussion, the more their interests are modified towards further integration. As Rosenau & Czempiel put it: “Integration becomes self-perpetuating to the extent that it modifies the interests, expectations, and ideas of domestic actors in ways that precondition further integration.”

However, we must keep in mind that the interstate system is characterized by a distribution of capabilities. In other words, political power is distributed unevenly among the nations and this distribution may change over time, affecting the functioning of both governing

⁸ Neoliberal institutionalism brought forward the resilience of international cooperation, stating that conflict and cooperation did not need to be studied separately, since cooperation is indeed possible where there is conflict and lack of converging interest between States, confirming the consequences of the ‘Prisoner’s Dilemma’. The resurgence of the English School also builds on the idea that eventually cooperation will prevail, looking at the world as a Society of States that establishes relationships which, through diffuse reciprocity, allows them to follow common rules of international behavior and coexist peacefully (Brown, 1997).

dynamics and international regimes, and vice versa⁹.

Even though some mechanisms and structures within IOs bring into question whether inequality might be entrenched in these institutions, “ideas about equality have long been central to the creation, functioning and influence of international organizations” (Reinalda, 2013). Even with their limitations, IOs have acted as “norm entrepreneurs” in promoting international equality and still provide platforms for marginalized actors to have their voices heard before the international community. According to Reinalda (2013), maybe one of IOs’ most notable contributions towards more equal opportunities at the global stage is in organizing networks that permit actors invested in pioneering new egalitarian norms to exchange ideas and join force.

In the last few decades, there has been a general shift in the conversation around inequality among IOs from international inequality between nations to global inequality between individuals. This can be explained by the “two tales of world poverty” told by the Bretton Woods institutions and UN specialized agencies. Focusing on an economic approach to inequality, the first institutions drew the debate towards poverty reduction through integration into the world economy through macroeconomic stability and growth, whereas the UN agencies focused on people-centered development, making sure that every person in the world were having their basic needs met. Both views set aside matters of international redistribution, focusing rather on equality between individuals, even within the same nation – as domestic inequality grew in almost every nation of the world. Therefore, with the 1990 UNDP Human Development Report as a benchmark, IOs have since focused on global inequality rather than international inequality in their efforts towards development (Reinalda, 2013).

As previously, stated, digital inequality will be a center issue in this article. When looking back to the initial developments of information technologies, Castell (1996) observed that “differential timing in access to the power of technology for people, countries, and regions is a critical source of inequality in our society”. He also affirmed that the technological superiority of the nations that hosted the two industrial revolutions in the 18th and 19th centuries, which, as we mentioned, had very restricted reach, are responsible for their historical ascent now dividing developed from developing nations. While recognizing the importance of the historical context of technology diffusion and its implications today, this article will contemplate a human-centered approach to inequality and inclusion. The reason for this can be drawn from what has been detailed throughout this chapter: the complexity and interdependence of the

⁹ “the structure of the system (the distribution of power resources among states) profoundly affects the nature of the regime [...] The regime, in turn, affects and to some extent governs the political bargaining and daily decision-making that occurs within the system.” (Keohane; Nye, 2012)

current international scenario calls for a united, coordinated and cooperative approach to global problems. Complex systems cannot be explained by oversimplified dichotomies, such as developed vs developing or North vs South, rather require a holistic and truly universal approach. Moreover, in the last years it has become more apparent how world problems deriving from inequality no longer only affect poorer societies. Of course, there are differences in scale and one must prioritize policy accordingly. However, inequality *within* societies, in addition to inequality between societies, and its negative impacts are affecting everyone (Wilkinson; Pickett, 2010).

Finally, we must be careful not to fall into technological determinism and assume that technology, in any single format, is always good, or even that when it is good, it is good for everyone. The root of digital inequality is precisely in that assumption.

Technology: Good or Evil?

Opinions diverge greatly in the judgement of technology, but few disagree that it is now an essential part of human life and that there is no turning back from our confluent state of man and machine. While some see technology as the salvation of humanity, others accept it as a necessary evil and dodge it whenever they are given the opportunity. Still, there is a group that takes an apparently less subjective approach and assure us that it is neither good nor bad, that it cannot be either, and affirm that it is a *neutral* tool; powerless on its own.

This article will challenge this interpretation of technology. While at first it may seem like a passive instrument, we are just now beginning to understand the proportions of its power and comprehend how its reach can extend much farther than initially intended. We hope to demonstrate how technology is *not* neutral and must not be set to default or automatic, because contrary to being nothing, it is *everything*. It is both good *and* evil, paradoxically both at the same time, and not just that: it is good and evil at its extremes, due its enormous power of diffusion.

Using the Internet as an example¹⁰, we will site briefly a few current controversies around Internet governance to expose the bipolarity of this technology. In being both non-territorial and anonymous, the Internet is a unique terrain that simultaneously generates innovative

¹⁰ Despite having been initially government operated, on April 1995 the Internet was fully privatized. With this, it became a no-man's land since it had no one designated authority to oversee, manage or regulate it. However, after the technology 'time lag' explained by Castell (1996) surpassed, it began showing its claws and the need for effective global Internet governance arose together with the urgency of reducing its quickly diffused negative impacts. This is highly complex, due to the diverse number of technical institutions, mechanisms, organizations and authorities involved in supervising different aspects of the Internet and the difficulty in coordination of the many overlapping and conflicting interests and elements.

opportunities and original challenges.

Firstly, cyber-attacks require a brand new security approach. The difficulty in measuring and anticipating the damages they cause, for example, to infrastructure, causes widespread terror and uncertainty. An individual of no political significance with a computer, an Internet connection and enough expertise may be able to cause more damage to a country's infrastructure than a military offensive by a nation's armed forces. Also, in addition to the easy access and availability of the tools needed to act in cyberspace, the actors involved in cyberattacks, as well as the motives behind their actions, are extremely diversified. Cyber activism, cybercrime (which range from transnational crime to international espionage) and cyberterrorism are examples of threats to security through the Internet (Medeiros et al, 2009).

However, the Internet also has the potential to significantly improve infrastructure. In order to comply with sustainable development models, Smart Cities have emerged as a solution in the short, medium and long term towards more sustainable societies (Lopes, 2020).

Concerning its political implications, the Internet is becoming a central platform for diverse political activities. The data left behind online and its use raises a debate on privacy and ethics, while it may also provide powerful opportunities for political research (Farrell, 2012). The impact of digital media on democratic processes, on political participation and inclusion and on political polarization is being widely discussed, as are the challenges and benefits of e-government (Van Dijk; Hacker, 2018). From collective action on social media (Bennett; Segerberg, 2013) to intolerance online (Lu; Yu, 2018), the societal impacts of technology are numerous and technology justice becomes a central issue (Daño; Prato, 2019). Finally, considering most societies dependence on telecommunication infrastructure, "network disruptions and large-scale network shutdowns have become a widespread tool of information control" which has important consequences for human rights¹¹.

Rescuing the data privacy issue, it has been a hot topic in both technical spaces and the mass media. At the international level, "the right to be forgotten"¹² demonstrates the limits of national data privacy systems in a world of transnational data flows" (Newman, 2015). At the government level, the Big Data debate contrasts the benefits for cost-effective improved decision making with the ethical concerns of privacy, highlighting the benefits it could have for

¹¹ Global Network Initiative. **Disconnected: a Humans Rights-Based Approach to Network Disruptions.** Global Network Initiative, 2017.

¹² The EU General Data Protection Regulation (GDPR) governs how personal data must be collected, processed, and erased. The "right to be forgotten," set the precedent for the right of erasure provision contained in the GDPR. Of course, given competing interests and the hyper-connected nature of the Internet, the right to be forgotten is much more complicated than an individual simply requesting that an organization erase their personal data. (<https://gdpr.eu/right-to-be-forgotten/>)

development but also pointing out the human resource scarcity and the unequal diffusion process of the use of this tool around the globe (Hilbert, 2016). On the individual level, “users want to engage with the ends of digital production, without being inhibited by an education or a discussion about the means” and give away information and consent without even knowing they did (Obar; Oeldorf-Hirsch, 2018), which raises the question of trust (Uslaner, 2010).

Finally, and maybe the most tangible example, especially with the COVID-19 coronavirus pandemic, the issue of fake-news is in high vogue for discussions surrounding the Internet¹³. Studies show that false information and false news is diffused significantly farther, faster, wider and deeper than the truth in all categories of information, with more pronounced effects for false political news (Vosoughi et al, 2020). It seems that we have entered an era of ‘post-truth’ (Braun, 2019), where information goes viral before being verified. Solutions entailing the restriction of information adds to discussions about the limitations of the right to information and of freedom of communication (Veneroso, 2006).

We stand before a unique opportunity to dominate technology and exploit it as a revolutionary and innovative solution to complex global challenges. The more we study and understand ICTs and its impact on the complex international system and on cultures, societies and individuals, the more we can learn to mitigate its negative impacts and deploy its great potential for good. However, ICTs are not self-regulating and we must maintain the underlying assumption that if we leave these technologies unattended, on automatic, they will most probably take a wrong turn. Technology is a powerful impulse and one that we can harness. If we are adamant in mastering its every aspect, relentless in taming it and persistent in employing it for the common good, we can use it to change the world on humanity’s terms. The COVID-19 crisis demonstrated exactly that, how technology can go as far as saving the lives of the connected, but what about the unconnected? For that, the first step is simple, technology should, before anything else, be a means for inclusion.

¹³ During the coronavirus COVID-19 pandemic, the ITU and the office of the UN Under Secretary-General, Mr. Fabrizio Hochschild, have co-organized a series of Webinars on “Digital Cooperation during COVID-19 and beyond”. On 29 April 2020 the third episode of the series: “The ‘Infodemic’ – misinformation and disinformation during COVID-19” took place with broad international multistakeholder participation.

The Digital Divide: concepts and conceptions

“When countries prioritize inclusion, identify populations to target, and take the necessary actions to ensure truly equal opportunities to develop digital skills, it can help narrow socio-economic gaps and build more inclusive societies. If this is not done, existing digital divides can continue to widen, further exacerbating existing socio-economic inequities, such as lower incomes and higher unemployment for already marginalized groups.”¹⁴

The digital divide or digital gap¹⁵ exists and persists even though, as a rule, ICTs are becoming increasingly more accessible in terms of cost¹⁶. The first observation to be made is that there exists two different discussions concerning the digital divide, the discussion for the developed and technologically advanced nations and the discussion for developing nations. This is important to keep in mind because most of the research that has been developed in this area, which will be analyzed in this chapter, addresses the digital divide within developed nations. We have found limited literature that studies the context and the consequences of the digital divide within developing countries. Therefore, we believe there is great potential for future research in this area, exploring the causes and characteristics of the digital divide looks like in developing nations, as also in least developed nations, which has less than 20% of its population using the Internet¹⁷.

Despite the context surrounding digital inequality in developing states naturally being very different from that within developed states, the considerations made in the literature available is still very valuable for this article. The mistakes made and lessons learned by developed countries in their attempts to close the digital gap may prove very useful for developing nations’ undertakings to tackle these issues, as an opportunity to avoid ineffective interventions and develop a more comprehensive approach to digital inclusion. By remembering that one-size-fits-nobody and that digital policy must be culturally contextualized for the community it serves, we can take the best practices that worked in the developed nations and adapt it to developing nations’ context, needs and realities, avoiding top-down methods that

¹⁴ ITU. **Digital Skills Toolkit**. ITU, 2018.

¹⁵ The concept of ‘digital divide’ appeared in the second half of the 1990s and was first used in a publication by the US Department of Commerce’s National Telecommunications and Information Administration (NTIA). The term may be semantically misleading in suggesting a clear, absolute and static division between the included and excluded, which may oversimplify the complex nature of this concept. However, the rise of the term was positive in that it raised awareness about the issue, causing it to become a priority in the agenda of many scientific and policy conferences into the first years of the 21st century. Attention began to decline in 2005 due to a recurring misconception, which we will challenge in this chapter: that the solution to the digital divide is resumed in physical or material access to computers, infrastructure and the Internet. (Van Dijk, 2006).

¹⁶ ITU. **Measuring digital development: Facts and figures**. ITU Publications, 2019.

¹⁷ Idem.

could delay the path towards meaningful digital equality¹⁸.

Information is power, and being part of the Information Society is no longer optional. According to D. Veit and J. Huntgeburth (2014), access to ICTs enables participation in the Information Society, “where the creation, the distribution, and the use of information is a significant economic, political, and cultural activity”. They go on to emphasize the importance of ICTs for political engagement that allows for the improvement of an individual’s physical and social environment by being civically involved. Sora Park (2017) goes beyond and talks about the importance of ICTs for one’s well-being and quality of life through its ability to foster participation in society and to contribute to their sense of belonging and to their personal empowerment. Furthermore, digital skills are fundamental for the fast-evolving digital economy, and being digitally included means being “more employable, productive, creative, and successful” in the 21st century”¹⁹. For all that, what does digital access encompass?

Meaningful Access

Digital access is not only about having a computer and a Wi-Fi connection. Van Dijk (2006) points to several types of inequalities in digital divide research: immaterial, material, social and educational [Figure 1]. Sora Park (2017) proposes a three-dimensional framework to examine digital inclusion closely linking preconditions, digital engagement and outcomes [Figure 2]. Close attention must be paid to the whole process, from when the first contact with the technology is made to the users’ digital ecosystem and context. Through these contributions, we can begin to understand the complexity of the digital divide.

The model we will employ to decipher access will be Van Dijk’s “Four Stages of Access to Digital Technologies”. This framework explains how “technology access should be seen as a *process* with many social, mental and technological causes and not as a single event of obtaining a particular technology” and it demonstrates that obtaining or possessing the technology is not even the first step to the appropriation of digital technologies.

The first stage, motivation access, precedes material access. This is because, as Park (2017) explains, a person’s behavior and response to technology is a fundamental part of the appropriation process. A user or potential user must believe that the technology is good and

¹⁸ “There is no direct, causal relationship between ICTs and poverty reduction. The relationship is much more complex and indirect in nature, whereby the impact on people’s well-being depends to a large extent on a dynamic and iterative process between people and technology within a specific local, cultural, social, and political context [...] ICTs receive meaning only if people use and enact them for a specific purpose and if local communities can exert control over their use by interpreting and appropriating them for their own specific sociocultural realities” (Gigler, 2015)

¹⁹ ITU. **Digital Skills Toolkit**. ITU, 2018.

useful to have an open attitude to engage with it, and even today, technophobia and computer anxiety still marginalize people from digital technologies. Moreover, continuous motivation and stimulation generates a virtuous cycle necessary for developing digital skills (Van Dijk; Van Deursen, 2014).

All these layers must be considered when implementing digital inclusion projects. As a case study, we selected the Brazilian government's "One Computer Per Student Program", inspired in the One Laptop Per Child²⁰ project, to discuss the importance of context. In 2005, the Brazilian Digital Inclusion Program (PBID) was created in order to centralize and coordinate actions being taken within the framework of the new national priority assigned to digital inclusion as a facilitator for social inclusion through the exercise of citizenship and social development (Echalar; Peixoto, 2017). Digital inclusion was central during President Ignácio Lula da Silva's both terms in office, from 2002 to 2006 and 2006 to 2010. While delivering a speech in 2009 at the International Telecommunication Union in Geneva, he asserted the importance of digital access as part of the exercise of citizenship and cultural diversity: "To reduce inequalities, we must increase access to the modern communication technologies. These must reach a higher number of people, so that they may exercise their citizenship."²¹

Within this context, the "One Computer Per Student Program" was created and regulated by Law 12.249, of 10 of June 2010, which stated that the program's purpose was to "promote digital inclusion in the public school network [...] through the acquisition and the use of IT solutions". These solutions are defined as IT equipment, software and technical assistance. As we can see, the focus is put on physical access as a quick fix to digital exclusion. Government programs that assume that the needs of the lower classes will be met simply with the possession of digital equipment are flawed, because they do not commit to the specific environment and context for digital appropriation, nor do they consider the participation of its subjects. This was perceived in the fragmented teachers' training program for the "One Computer Per Child Program". It was disarticulated in that it alienated the public-school teachers in their fundamental role as facilitators of the new technology being introduced in the public schools. No attention was paid to these teachers' perceptions of modern technologies nor to their

²⁰ <http://one.laptop.org>

²¹ Discurso do Presidente da República, Luiz Inácio Lula da Silva, por ocasião de visita à União Internacional de Telecomunicações (UIT), onde foi agraciado com o Prêmio Mundial das Telecomunicações e Sociedade da Informação – Genebra, 15 de junho de 2009. **Itamaraty**. Available in: <<http://www.itamaraty.gov.br/pt-BR/discursos-artigos-e-entrevistas-categoria/presidente-da-republica-federativa-do-brasil-discursos/11056-discurso-do-presidente-da-republica-luiz-inacio-lula-da-silva-por-ocasio-de-visita-a-sede-da-uniao-internacional-de-telecomunicacoes-uit-onde-foi-agraciado-com-o-premio-mundial-das-telecomunicacoes-e-sociedade-da-informacao-genebra-15-de-junho-de-2009>>. Accessed on: 1 May 2020.

motivations towards learning about these tools, considering their often-precarious working conditions. Disregarding, therefore, the complexity of the human factor and inferring that the technologies, in themselves, “possess the power and autonomy to transform education”, what took place was a form of digital inclusion that further excluded the marginalized population: an ‘excluding inclusion’ (Echalar; Peixoto, 2017).

The next step of appropriation according to Van Dijk (2006), physical access²², “has dominated public opinion and policy perspectives in the last two decades” and is still a major issue in many developing and least developed states. Telecommunication infrastructure in many of these nations represents a great barrier for individuals to connect and remain connected and is considered as a necessary first step to inclusion. According to data from the ITU, while the number of individuals using the Internet worldwide has increased from 16.8% in 2005 to 53.6% in 2019, developed countries are reaching saturation levels with just under 87% of the population using the Internet, whereas in developing countries only 47% of individuals are online. In the Americas, 77.2% of the population is using the Internet²³. Despite this seeming like a surprisingly high number considering that most of the continent is made up of developing States, we must consider *how* almost 80% of the population of the Americas are using the Internet, and we will explore this in the following stage of digital technology appropriation according to the Van Dijk model: Skills Access.

The word ‘skill’ suggests a more interactive competency, which goes beyond literacy - a more passive way of learning that includes reading and writing. Information and communication technologies, such as the Internet, make things much easier by allowing us to search for information from different sources simultaneously in extremely high speeds. Its great potential for communication shortens distances and makes long-distance connection possible at the push of a button. However, it does not make things easier for everyone. The use and operation of the Internet requires a brand-new set of skills and if you do not possess them, using the Internet and using digital media just makes finding information and communicating much more difficult than with traditional media (Van Dijk; Van Deursen, 2014).

Many sources agree that there are different types of digital skills, which are cumulative and continuous²⁴. Van Dijk and Van Deursen (2014) propose the classification of digital skills into operational skills, formal skills, information skills, communication skills, content creation

²² ‘Physical access’ is different from ‘material access’. Material access refers to all costs related to the use of computers, connections, peripheral equipment, software, and services, and these costs differ in many ways. (Van Dijk, 2006)

²³ ITU. **Measuring digital development: Facts and figures**. ITU Publications, 2019.

²⁴ The ITU classifies digital skills into only three categories: basic, intermediate and advanced skills.

skills and strategic skills. Operational skills, also called “button knowledge” refers to basic technical skills to operate a computer. Formal skills draw special attention to the skills involved in navigating the Internet and browsing for information, which requires understanding and interacting with formal characteristics of the Internet, such as hyperlinks. Information skills allows individuals to “search, select, and evaluate information in digital media”, which is different from similar skills with traditional media because of the exponentially higher amount of information and sources ICTs provide. Communication skills account for efficient use of the numerous communication platforms on the Internet, such as e-mail, instant messaging and social media. Content creation skills are particularly important for the Web 2.0 Internet²⁵, where user-generated content is taking over with more and more non-professional users taking a much more active role in producing the information available on a variety of platforms. This is possible thanks to new applications and user-friendly, accessible software for website creation, blogs, etc. Strategic skills are any skill a person may have that allows them to use ICTs for personal or professional growth. This may include using information available on the Internet to save money when purchasing an item, or taking advantage of online trainings that could advance one’s career. Technical ICT skills, such as programming and software design, are also included in this category.

The final stage of appropriation is the usage stage. Here, usage time, usage applications and diversity, broadband or narrowband usage and more/less active or creative usage is analyzed. Usage loops back to motivation, which, as we said, depends on external social, psychological and cultural factors. Usage patterns also influence progress in digital skill acquisition, since one learns more by using the technology, through trial and error, than by learning *about* the technology in formal settings. These patterns depend also on available infrastructure and devices, which is why mobile phones should be studied as facilitators for digital skills acquisition and usage, considering their practicality and ease of use. In fact, further research on all the different aspects of the usage stage would be very beneficial for better understanding the digital divide in developing nations. For example, millions of Facebook users in South East Asia and Africa do not know they are using the Internet.²⁶

Van Dijk explains that the largest part of digital divide research is dedicated to observe the differences in physical access among obvious demographical categories such as income, education, age, sex and ethnicity. However, Van Dijk (2006) proposes a resource based and a

²⁵ Web 2.0, term devised to differentiate the post-dotcom bubble World Wide Web with its emphasis on social networking, content generated by users, and cloud computing from that which came before. (<https://www.britannica.com/topic/Web-20>)

²⁶ <https://qz.com/333313/millions-of-facebook-users-have-no-idea-theyre-using-the-internet/>

network approach, which considers the gaps in access related to “a distribution of resources (temporal, mental, material, social and cultural)”. This adds a new level of complexity to the digital gap, making it much more difficult to solve, since the resources needed to bridge this gap go beyond the merely material. All these different factors of digital inequality are interrelated and interdependent, and because they are being ignored and oversimplified, a pattern of persistent inequality is being reproduced in spite of ICTs. Beyond understanding the complex individual process of digital appropriation, particularly the indispensable role of digital skills for meaningful access, we must analyze these trends as systemic. As a global phenomenon, changes to the system deep enough to break such patterns of inequality must be led at the political level through effective policy, product of international cooperation.

In 2018, the United Nations Secretary General appointed a High Level Panel on Digital Cooperation²⁷. The objective of this panel of experts is “to address the social, ethical, legal and economic impact of digital technologies in order to maximize their benefits and minimize their harm.” The High Level Panel on Digital Cooperation asserts the need for cooperation in times of digital interdependence, and maintains that this cooperation must be grounded on common values, not only involving governments but also a far more diverse spectrum of stakeholders such as civil society, academics, technologists and the private sector. The panel’s 2019 report²⁸ dedicates a whole chapter to ‘Leaving No One Behind’, highlighting the importance of equality in access to digital technology and outlining a path to equality through international collaboration.

The COVID-19 crisis represented a very clear and grave example of how we as societies are independent and interlaced, while at the same time blatantly exposed those being left behind from meaningful access to digital technologies. With the crisis, global actors found themselves before a unique opportunity to recognize the need to work together towards universal and enduring solutions to close the digital divide and to achieve sustainable development.

²⁷ “We believe that our aspirations and vulnerabilities are deeply interconnected and interdependent; that no one individual, institution, corporation or government alone can or should manage digital developments; and that it is essential that we work through our differences in order to shape our common digital future. We declare our commitment to building on our shared values and collaborating in new ways to realize a vision of humanity’s future in which affordable and accessible digital technologies are used to enable economic growth and social opportunity, lessen inequality, enhance peace and security, promote environmental sustainability, preserve human agency, advance human rights and meet human needs.” – Excerpts from the UN Secretary General’s High Level Panel on Digital Cooperation’s ‘Declaration of Digital Interdependence’.

²⁸ <https://www.un.org/en/pdfs/DigitalCooperation-report-for%20web.pdf>

ICTs for Sustainable Development (ICT4SDG)

We have already discussed the importance of appropriation of digital technologies for effective participation in the Information Society, but Information and Communication Technologies can be much more than just tools for survival: they can promote development.

A variety of studies demonstrate the potential of ICTs for economic development, particularly through economic growth. Kaur et al (2017) affirm that the extremely high rate of diffusion of ICTs produces a positive impact on long-term economic growth and development. This ‘death of distance’, according to the authors, and the “dynamic growth of socio-economic networks” contribute to the free flow of information and reduction of information asymmetries, facilitating, for example, mobilization of labour force, resource allocation and the better functioning of the financial market. Similarly, Niebel (2018) in studying ICT investments in a selection of developed, developing and emerging countries confirms that ICT investment is “a key driver of productivity growth” and suggests possible spillover effects.

However, economic growth does not necessary lead to overall development. In fact, according to Galperin and Viencens (2017), “a more recent development literature suggests that economic growth is not enough for poverty alleviation, particularly in the presence of high levels of inequality, as is the case in most developing countries.” This means that when one looks closer at the distribution effects of ICTs, the impact on development is modest due to threshold effects and increasing returns to adoption. The impact of ICTs for development is not linear, but rather increases with penetration rates. Moreover, Internet diffusion is associated to poverty alleviation through the accumulation of two intangible asset: social capital and ICT skills. Therefore, ICT investment does not automatically lead to positive results, rather the positive results depend on the circumstances of the social context, particularly with regards to conditions for meaningful appropriation of the technological resources being invested.

In a parallel discussion, Martin Hilbert (2010) created scenarios in Mexico, Uruguay, Brazil, and Costa Rica for potential cuts in access prices and/or required subsidies for household spending in ICTs in order to calculate “how cheap is cheap enough to bridge the digital divide” in these Latin American countries. His findings show that personalized access was not feasible for the governments and economies of the selected countries. One of the analyzed scenario would require the reduction of ICT prices to as low as 4% of the 2010 price levels, or alternatively, a subsidy as high as 6.2% of GDP (a figure comparable to public spending on education plus health). The author raises an interesting discussion, for which it is important to

distinguish ‘universal access’ and ‘universal service’²⁹, about whether the latter would be more feasible than the former. It is important to note that Hilbert’s calculations took into account merely the physical access aspect of digital inclusion, which we know is insufficient for meaningful access. Hence, it becomes very clear that developing governments cannot tackle this complex task on their own.

ICT4SDG

The International Telecommunication Union has a leadership role in the global ICT4SDG agenda, particularly through its Development Sector³⁰. Every four years, the ITU holds the World Telecommunication Development Conference (WTDC). The last edition in 2017, which took place in Buenos Aires, had precisely the theme: "ICT for Sustainable Development Goals". Similarly, the theme for the World Telecommunication and Information Society Day 2020 is “Connect 2030: ICTs for the Sustainable Development Goals (SDGs)”.

The Sustainable Development Goals (SDGs), which were adopted in 2015 to replace the Millennium Goals, strived for a more coherent and transformative global Sustainable Development Agenda [Figure 3]. As a product of intense negotiation and extensive consultation, it is an ambitious effort towards achieving goals that effectively integrate the economic, social and environmental aspects of development through sustained impact. For our purposes, the innovative characteristic that most stands out about the SDGs is its objective “to capture the interconnections between issues; that is, they encourage integrative and systemic approaches to global problems”. In embracing the complexity of international development, this new agenda’s efforts towards integration and inclusion, together with a results-oriented understanding of international development, brings the discussion of the potential of ICTs for development to a completely new level (Kanie; Biermann, 2017).

The ICT4SDG framework has been guiding the priorities of the ITU Telecommunication Development Sector’s activities and projects.. The ITU is constantly

²⁹ “United Nations International Telecommunications Union (ITU) define that universal access implies that everyone in a population has access to publicly available communication network facilities and services, typically provided through such means as pay telephones, community telecenters, and community Internet access terminals; while universal service focuses on promoting or maintaining universal connectivity of all households to public network facilities and services, and at affordable prices” (ITU, 2007).

³⁰ The International Telecommunication Union is organized in a General Secretariat and three Sectors. The Radiocommunication Sector plays a vital role in the global management of the radio-frequency spectrum and satellite orbits, which are limited natural resources in increasing demand. The Standardization Sector develops international standards known as ‘ITU-T Recommendations’ that act as defining elements in the global infrastructure of information and communication technologies (ICTs). The Development Sector fosters international cooperation in the delivery of technical assistance and in the creation, development and improvement of telecommunication and ICT equipment and networks in developing countries.

addressing the issue of sustainability and affirms that without paying adequate attention to the context and to the process, development efforts may actually “cause more harm than good”. Nevertheless, the potential for ICTs to overcome many development challenges is enormous, such as its “potential to address challenges on an increasingly local level [...] but also increasing the potential for interactions at a distance”³¹. Cooperation with diverse stakeholders in the digital ecosystem is key for development, which is why multisector partnerships are key to the ITU’s development strategy.

Coordination within the UN system, among its specialized agencies, is a great governance strategy adopted by ITU, as it reaches across issue-areas and regimes. It takes advantage of its sister agencies expertise for a multidisciplinary approach to global challenges, in an environment of familiar administrative processes and procedures inside the UN family. In this respect, we highlight the report³² published by the ITU in collaboration with 29 UN programmes, specialized agencies and international organizations, which detail the specific contributions of ICTs in reaching each one of the Sustainable Development Goals³³. This document outlines the numerous projects, activities and mechanisms in place engaging the UN and multiple other actors in the ICT4SDG regime, demonstrating the UN’s efforts in creating linkages across topics for better coordination and governance of the sustainable development regime. This year also marks the 10 year anniversary of the Broadband Commission for Sustainable Development, established jointly by the ITU and UNESCO, which embraces diverse perspectives in a multi-stakeholder approach to promoting the power of ICTs and broadband-based technologies, as well as providing a fresh approach to UN and business engagement³⁴.

Another governance strategy adopted by the ITU is extensive and wide-ranging collaboration with the ICT sector, not restricted to corporate players but including also civil society and academia. This strategy is well received and the numerous reports published by these actors in collaboration with the ITU that promote ICT solutions for the SDGs attest to the success of these partnerships. To name two examples, GeSi³⁵ and Accenture, sponsored by T-

³¹ ITU. **ICT-centric economic growth, innovation and job creation**. ITU, 2017.

³² ITU. **Fast-forward progress: Leveraging Tech to Achieve the Global Goals**. ITU, 2017.

³³ In light of the COVID-19 global crisis, the chapter “Leveraging ICTs and digital innovations to achieve SDG 4 and ensure inclusive and quality education for all and promote lifelong learning”, written by Director-General of UNESCO, which highlights the potential of e-learning solutions for inclusive education is particularly pertinent. In 2020, as a response to the crisis given the over 1.5 billion students out of school, UNESCO launched the Global Education Coalition “to facilitate inclusive learning opportunities for children and youth during this period of sudden and unprecedented educational disruption”. The ITU joined the coalition in March 2020. (<https://en.unesco.org/covid19/educationresponse/globalcoalition>)

³⁴ <https://broadbandcommission.org/>

³⁵ The Global e-Sustainability Initiative (GeSI) is a strategic partnership of the ICT sector and organizations

Mobile, Microsoft and Verizon, published the “System Transformation” report on digital solutions towards the SDGs. The Earth Institute - Columbia University and Eriksson, with contributions from GSMA, published the “ICT & SDG: How Information and Communications Technology can Accelerate Action on the Sustainable Development Goals” report. The Internet Society, using data and statistics provided by the ITU, also launched the 2015 “The Internet and Sustainable Development” report³⁶.

WSIS

As explained before, the importance of international forums for generating consensus in regime formation by creating a space for multistakeholder actors to be heard and to contest for power is paramount. Of the many global conferences organized by the ITU as a governance instrument, we highlight the World Summit on the Information Society (WSIS)³⁷. WSIS is today a central activity in the ICT4SDG agenda. When it was created, it aimed to address a wider range of policy issues than previous conferences and represented a historic shift in multistakeholder participation in global governance processes (Cogburn, 2017). An important movement precursor of this conference, particularly in the discussion surrounding information flows, media and communication, is the New World Information and Communication Order³⁸.

Endorsed by the UN General Assembly in 2001, the WSIS was held in two phases: the first in 2003 in Geneva, and the second in 2005 in Tunis, which resulted in the WSIS Plan of Action. Since 2005, annual editions of the WSIS Forum have been held, providing a platform for discussions around global ICT policy issues and the implementation of the Plan of Action. Since 2015 (WSIS +10), the WSIS Action Plan was linked directly to the Sustainable Development Goals through the “WSIS Action Lines Enabling SDGs” [Figure 4]. WSIS is intended as a platform for ICT governance and innovated in explicitly including the civil society and private sector in political discussions, a space that was traditionally reserved to government

committed to creating and promoting technologies and practices that foster economic, environmental and social sustainability.

³⁶ Beside the 193 Member States, the ITU has 900 companies, universities, and international and regional organizations as part of its global membership.

³⁷ <https://www.itu.int/net/wsis/>

³⁸ This movement originated in the context of global North vs. global South confrontations at the end of 1970 and developed from discussions within the Non-Aligned Movement, which had approximately 100 members at this time, all developing nations. Imbalances in information flows and access to communication technologies were among their demands for a fairer path of development, summarized by the “4 Ds formula”: democratize, decolonize, demonopolize and development. The high point of the movement was the “Many voices, One world” UNESCO report, delivered by the International Commission for the Study of Communication Problems. However, as well as getting caught up in Cold War rivalries, the movement was not well received by the United States, which challenged its proposals as being against the free flow of information. (www.communicationencyclopedia.com)

and intergovernmental actors. The WSIS Secretariat had a special division for civil society participation in the summit and in the preparatory processes, which is where the most important work in agenda setting and negotiation takes place, hence recognizing the contributions they could bring as experts with diverse perspectives and experiences from the field. This represented a huge step forward for multistakeholder governance and a shift in power relations between state and non-state actors (Cogburn, 2017).

Open and transparent spaces for multistakeholder participation are fundamental for the decision-making processes around the ICT4SDG regime. The simple reason for this is because the ultimate goal of the months of preparation and negotiation leading up to these global conferences, and the hours and days of discussion when they take place, is a sustained improvement of the lives of *all*, especially of the most vulnerable. As we mentioned in the previous chapter, those that suffer most from the lack of meaningful access and are detached from the opportunities made available by digital technologies are the ones that are already socially marginalized. Meanwhile, the digitally advantaged are ‘leap-frogging’ even further ahead from their positions of privilege. The COVID-19 crisis made this very clear. Those that had digital tools could adapt very quickly to the new situation and avoid many of the dangers of the crisis, whereas those without access to the same tools were even more at the mercy of its negative impacts. This is why special attention must be paid to populations with specific needs, by learning about their unique obstacles in acceding to the Information Society and by providing them with the means to overcome those barriers on their singular path to inclusion.³⁹

³⁹ The WTDC 2017 Buenos Aires Declaration declares that “that an inclusive Information Society should take into account the needs of women and girls, persons with disabilities and other persons with specific needs, and the needs of children in the use of telecommunications/ICTs” (https://www.itu.int/dms_pub/itu-d/md/14/wtdc17/c/D14-WTDC17-C-0117!!PDF-E.pdf)

The Digital Gender Divide

“without an ability to control technology, people risk being controlled by it, or isolated from local, national and global communities”⁴⁰

In a contemporary analysis, Kathy E. Ferguson (2017) states that “feminist theory is not about women; it is about the world, engaged through critical intersectional perspectives”. Contextualizing current trends in feminist theory is very useful for the discussion that follows. One of these trends is the overall avoidance of dualistic thinking, which oversimplifies complex realities and inevitably leads to hierarchy and confrontation, a principle we have already mentioned in our discussions. The second is the adoption of process thinking, in contrast to static, fixed and universal essentialism that results in assumptions of one-way cause-and-effect relationships. Many of the real answers are in the dynamic processes of creation and *becoming*. Finally, there is a commitment to change: feminist theory is political and accepts the burden for social transformation. Ferguson also insists on the importance of intersectional, interactive processes, fluid and changing in social power dynamics, and in being open to connecting the dots across fields and sectors to better understand and tackle the challenges to equality. With this, we can complement our networked approach to IR with Feminist Assemblage Theory that “conceives the world as networks within networks of active, mobile, multiple practices and functionalities”. This is why we must stop looking at gender and technology from opposite sides of the spectrum and begin to map how deeply connected they really are.

Technology is not neutral

Technology must be investigated from a feminist perspective. As we affirmed in the beginning of our discussion, technology is not neutral. Technology is, in fact, constructed and political. As we have stated before, technology represents opportunity. But if technology is not applied critically, it can also reproduce negative dominant social structures. This is why gender inequalities are also reflected in the digital sphere, and why the digital gender divide is in fact increasing, rather than decreasing, with the swift evolution of technology [[Figure 5](#)].

It is important to look deeper into the asymmetries of the “process of technology” to have a positive influence in its use, design and content. The notion of assemblages can be applied in the techno-feminist perspective, adding the technological element to the articulation of identities. This notion expands the term ‘digital divide’ in that “gender and technology are

⁴⁰ EQUALS. **I’d Blush If I Could**. EQUALS, 2019.

co-constituted within a heterogeneous assemblage which, in turn, transforms the elements of the assembly itself” (Pujol; Montenegro, 2014). This means that simply giving women (as if all women were one and the same with identical needs and experiences) more access to technology without questioning if the technology is relevant to them or the way they are using it, for example, will not result in their genuine interaction and appropriation of it.

Keeping this in mind, as we look at the ICT sector, we begin to notice and question why there is a disproportionate amount of men in comparison to women in it, producing technology. This is not a matter of preference, as some argue. Studies show how in primary education, girls show as much interest as boys in science, technology, mathematics and engineering (STEM) subjects but from secondary school on to tertiary level education, girls become increasingly discouraged and their enthusiasm for these areas plummet [Figure 6]. After World War II, software programming in industrialized countries was actually considered a female job. With the arrival of the Personal Computer, as ICTs slowly began seeping into all aspects of everyday life and became tremendously influential, “women were pushed out and the field became more and more male-dominated.”⁴¹ When it comes to the professional level, worldwide women occupy less than 25% of digital sector jobs⁴², and, according to Singh et al. (2013), 38% of women Engineers leave the career within the first 7 years.

There may be many explanations for this phenomenon. Heather Greenhalgh-Spencer (2016) argues that women in the technology sector are “being disappeared” because of hostile and sexist discourses that alienates and devalues them. Building from the constructivist premise that discourse shapes reality, she explains how technology culture discourse present in a variety of social spaces (from the office to the gamer chatroom) is actively working to “construct women as sexual objects, objects of technology, and outsiders to tech fields”. Possibly following from this hypothesis, another explanation might relate to the fact that women face many challenges in rising to leadership positions in the technology sector; men are 15% more likely to be senior developers, almost twice as likely to be in management positions and nearly four times as likely to be executives⁴³. The implications of this become more worrying when we look back to our discussion about how technology is a process that depends greatly on its creators to *not* reproduce society’s biases. The widening digital gender divide might then be stuck in a vicious circle where the lack of women in technology reinforce the gendered approaches to technology design, which in itself loops back to excluding more women from

⁴¹ Idem.

⁴² Idem.

⁴³ Idem.

entering the field, and influencing it in a positive way.⁴⁴

Remembering Van Dijk's contributions, factors such as income and education level facilitate (or hinder) the process of appropriation of technology. However, in some cases, these factors do not affect men and women to the same extent. In most cases, they actually have a graver impact on women. Martha Sánchez Galvis (2010) compared data on Internet use between men and women in Chile and Mexico, and her findings suggest that the positive effect of higher income levels on the probability of use of the Internet is greater for men than for women. She argues that despite ICTs being presented as tools toward development, social inclusion and for overcoming poverty, policies toward digital inclusion in Latin America may not always prove successful for the digital gender divide. From issues rooted in lack of skills to lack of confidence in usage, to lack of time for use (due to unpaid care workloads attributed exclusively to women in many cultures), despite having access to ICTs at home, research has shown that women have less opportunities of use of such technologies. This is why gender-disaggregated data is so important, so that decision makers may recognize these gaps in how men and women use and take advantage of these technologies, and implement policies that makes no assumptions and leaves no woman behind.

Digital skills are also important for women's safety both online and offline, as they are much more vulnerable to Internet crimes and gendered online violence, and the significance of digital skills as a tool to enhance their political engagement, increasing their decision-making power in their communities and facilitating their participation in political movements.

More broadly, the process of developing digital skills has been found to increase women and girls' self-confidence, independence, social status and power, and give them access to new opportunities for self-expression and engagement in the public sphere. (EQUALS, 2019)

In the framework of the ICTs for the Sustainable Development Goals (ICT4SDG) regime and Goal 5 of the SDGs, the United Nations, particularly the International Telecommunication Union, in partnership with its Member States and the private sector have been heavily investing in promoting digital gender equality⁴⁵. With ITU Plenipotentiary

⁴⁴ "As more and more human activity moves online, the considerable progress societies have made towards gender equality in offline environments is at risk if women do not play a more active role in building, as well as simply using, the digital tools and applications where people spend increasing amounts of time." (EQUALS, 2019)

⁴⁵ The ITU's 2012 report "A Bright Future in ICTs: Opportunities for a new generation of women" calls attention to the fact that while the ICT sector is an increasingly growing sector for employment, women have not been filling these position in parallel proportions to men. The women that do find themselves in the sector are very rarely in higher income positions, and the report explains there is a "feminization" of low-income, low-skilled jobs and vertical gender segregation. However, there is a very solid economic argument for more women in the sector. Teams that are more balanced are linked to better business and financial performance, and even to revenue, consumer and profit increase. Keeping women from decision-making positions in the sector is simply not efficient.

Resolution 70 in 2014 and ITU Membership support, the International Girls in ICT Day⁴⁶ was born. As we have seen in the previous chapters, capacity building and skills development is key for the appropriation for technology and for acquiring the advanced skills needed for a career in the sector. Through Girls in ICT Day worldwide, the ITU aims to encourage girls that are in the process of choosing their future careers to put sexist stereotypes and lack of confidence aside and consider making the most of the employment opportunity the ICT sector has to offer.

Another very important initiative spearheaded by the ITU is the EQUALS Global Partnership for Gender Equality in the Digital Age. It is “dedicated to promoting gender balance in the technology sector by championing equality of access, skills development and career opportunities for women and men alike”⁴⁷ through the support of governments, businesses, non-profit organizations, academic institutions, NGOs and civil society worldwide. Launched in 2016 together with four more founding partners - GSMA, the International Trade Centre, the United Nations University and UN Women – this coalition works towards “promoting awareness, building political commitment, leveraging resources and knowledge, harnessing the capacities of partners, and supporting real action” through three coalitions around the focus areas: Access, Skill and Leadership.

We would like to end this chapter by highlighting the promising potential in mobile phones as a path for development. Recent trends in international mobile broadband subscription and Internet reach through mobile phones [Figure 7 & 8] have triggered an interest in looking to the basic mobile phone or smartphones as new empowering tools for development. However, there is a gender gap in mobile internet use, where in low and middle income countries 300 million fewer women than men access mobile internet, for various reasons⁴⁸. Considering that more needs to be done to make sure women have less barriers in mobile ownership and mobile internet use, extensive literature is available on the potential of mobile phones for economic and social development. Further research on mobile phones as tools for digital appropriation, not only for women but for other persons with specific needs, has great potential for the sustainable development agenda. Qualitative and quantitative gender disaggregated data on how mobile phones are being used across cultures and societies to avoid the negative impacts of the COVID-19 crisis could be valuable.

⁴⁶ International Girls in ICT Day is celebrated on the last Thursday of every April, annually.

⁴⁷ <https://www.equals.org/about-us>

⁴⁸ GSMA. **Connected Women: The Mobile Gender Gap Report 2020**. GSM Association, 2020.

CONCLUSION

The COVID-19 crisis has exposed, like never before, a digital divide that separates the world once again into have and have-nots: those that have access, those that have skills, those that have social technological roles... and those that have not. Many have said that this pandemic will change the world forever, and it must. We must change how we cooperate, how governments, industry, international organizations, NGOs, academia and other stakeholders put their differences aside to find the best common solutions for an equal global digital society.

In this article we have explored how a complex, networked approach to the study of International Relations is indispensable in understanding current trends of the international system, considering the rise of a variety of new international actors that are gaining space due to the diffusion of technology and power.

We have discussed that technology is not neutral and have discovered that access must be meaningful to bridge the digital divide. Appreciating societies' social contexts, special needs and the particularities of the unique process for digital skills appropriation is central to the implementation of activities and projects for digital inclusion.

Highlighting the central position of the United Nations in spearheading the Sustainable Development Goals, and the International Telecommunication Union's leadership role in promoting ICT4SDG, we explored how ICTs can contribute to an impactful and sustained approach to development. We also considered the importance of multidisciplinary and multilateral cooperation, through diverse collaboration mechanisms, which address global challenges in a way that embraces their different levels of complexity.

Finally, we stressed that the already vulnerable and marginalized are the ones being left behind and being excluded from new digital environments, and that the potential in ICTs lies precisely in the great difference it would make in the lives of these populations to reap the benefits of digital technologies. Women, which represent half of the world's population, are being excluded from the digital world in a variety of different ways, when they could be doing much more, not only for technology, but for the world, through technology.

In the words⁴⁹ of the Director of the ITU Telecommunication Development Sector, Doreen Bogdan-Martin, the first woman in the agency's history to hold elected office, no one will doubt the importance of connection after the COVID-19 crisis. It is a great wakeup call to the urgency of getting and keeping everyone connected and as the international community cooperates in its efforts towards digital equality, we cannot let this crisis go to waste.

⁴⁹ During the First "Digital Cooperation during COVID-19 and beyond" Webinar on 15 April 2020.

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ANNEX

Technological	Technological opportunities
Immaterial	Life chances Freedom
Material	Capital (economic, social, cultural) Resources
Social	Positions Power Participation
Educational	Capabilities Skills

Figure 1. Types of Inequalities in Digital Divide Research (Van Dijk, 2006)

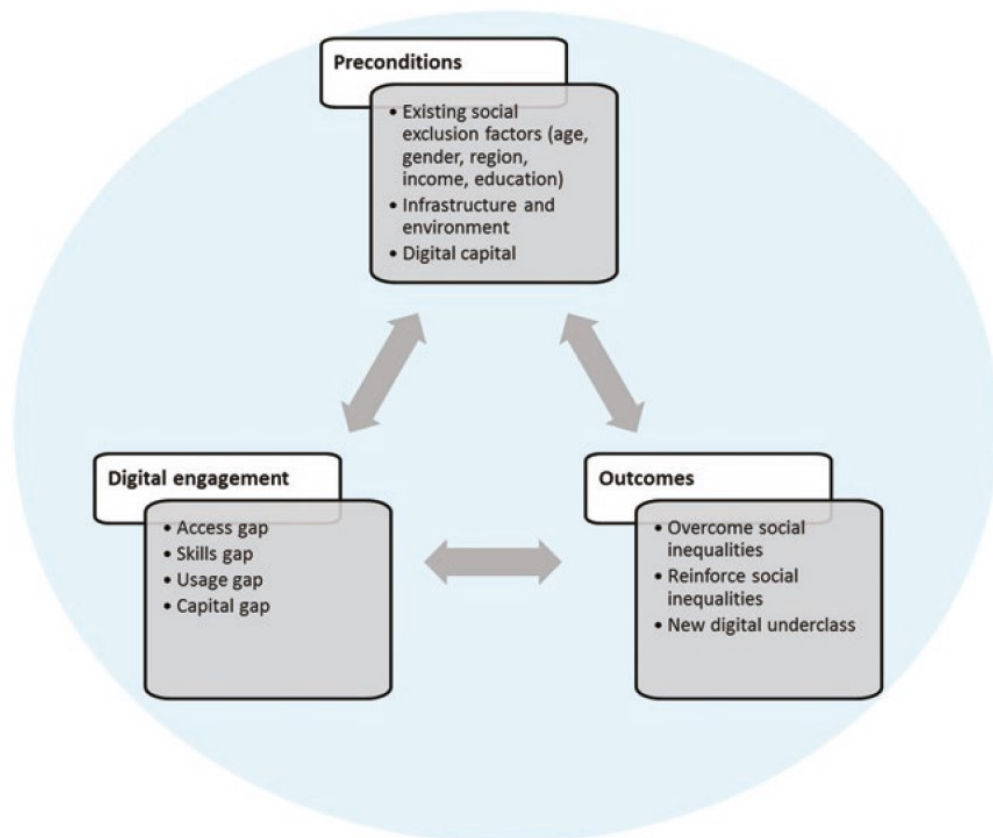


Figure 2. Framework of an individual's digital technology ecosystem (Park, 2017)

Sustainable Development Goals



Figure 3. 2030 Sustainable Development Goals.

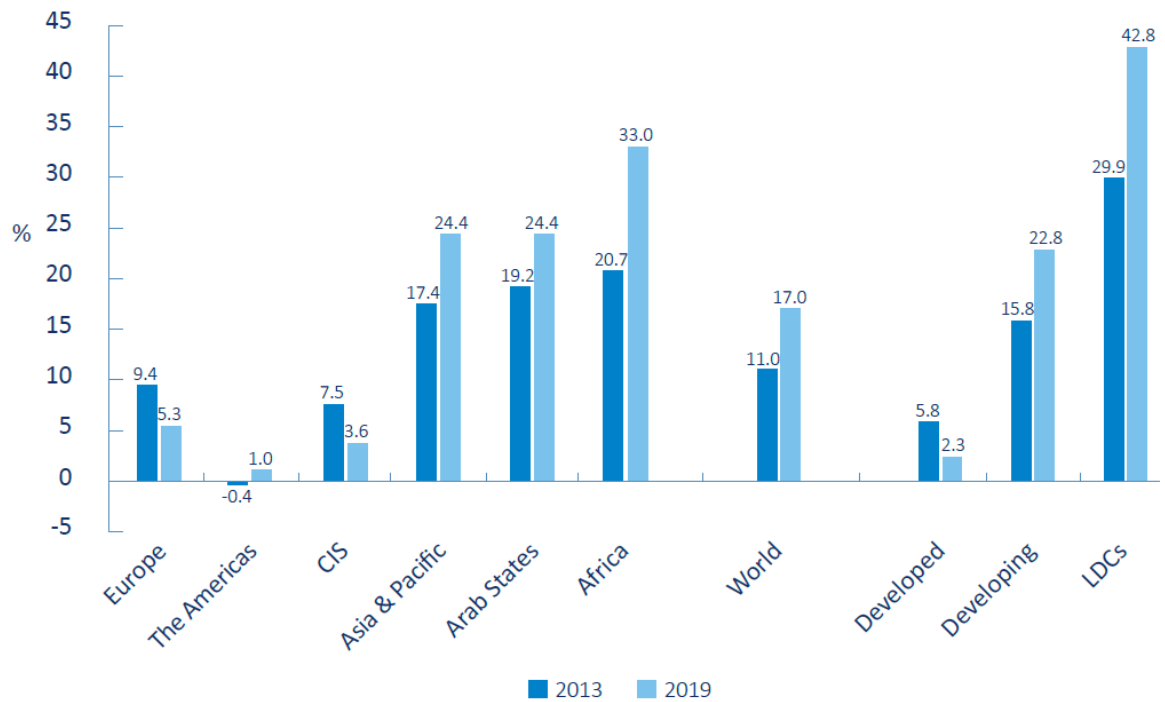
(Available in: <https://sustainabledevelopment.un.org>. Accessed on: 01 May 2020)

SUSTAINABLE DEVELOPMENT GOALS \ WSIS ACTION LINES LINKAGES																		
	C1	C2	C3	C4	C5	C6	e-gov	e-bus	e-lea	e-hea	e-emp	e-env	e-agr	e-sci	C8	C9	C10	C11
SDG 1																		
SDG 2																		
SDG 3																		
SDG 4																		
SDG 5																		
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SDG 17																		

Figure 4. WSIS-SDG Matrix.

(Available at: <https://www.itu.int/net4/wsis/sdg/>. Access: 01 May 2020)

The Internet user gender gap (%), 2013 and 2019*



Note: * ITU estimate. The gender gap represents the difference between the Internet user penetration rates for males and females relative to the Internet user penetration rate for males, expressed as a percentage.

Source: ITU.

Figure 5. The Internet user gender gap (%), 2013 and 2019 (ITU, 2019)

Gender difference in students' self-concept

Source: OECD

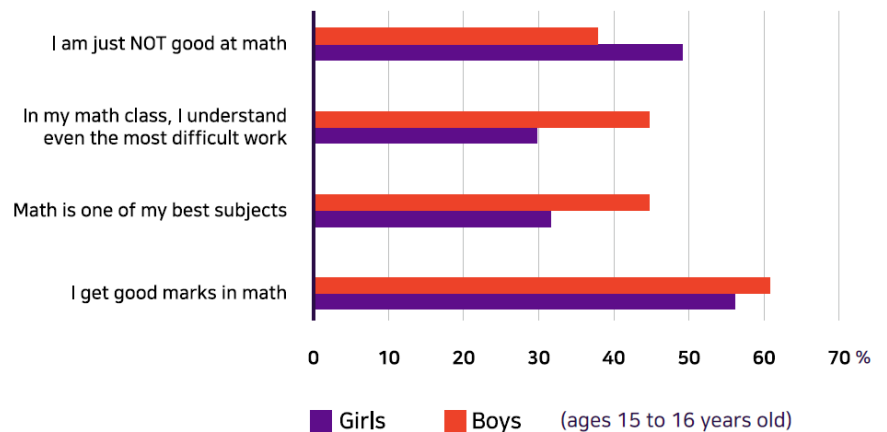


Figure 6. Gender difference in student's self-concept (EQUALS, 2019)

Mobile-broadband subscriptions continue to grow strongly

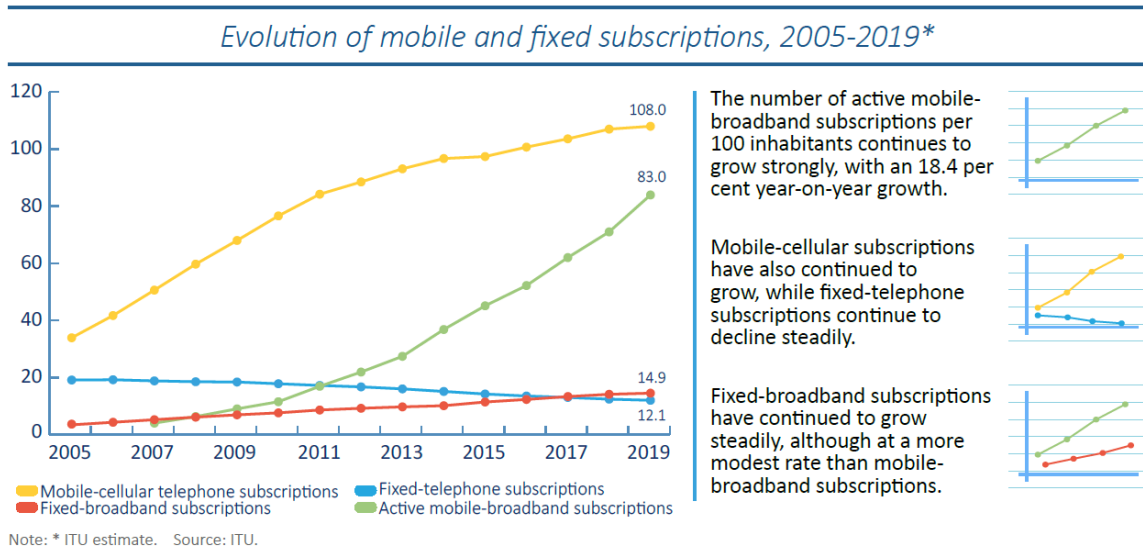


Figure 7. Mobile-broadband subscriptions continue to grow strongly (ITU, 2019)

Almost the entire world population lives within reach of a mobile network

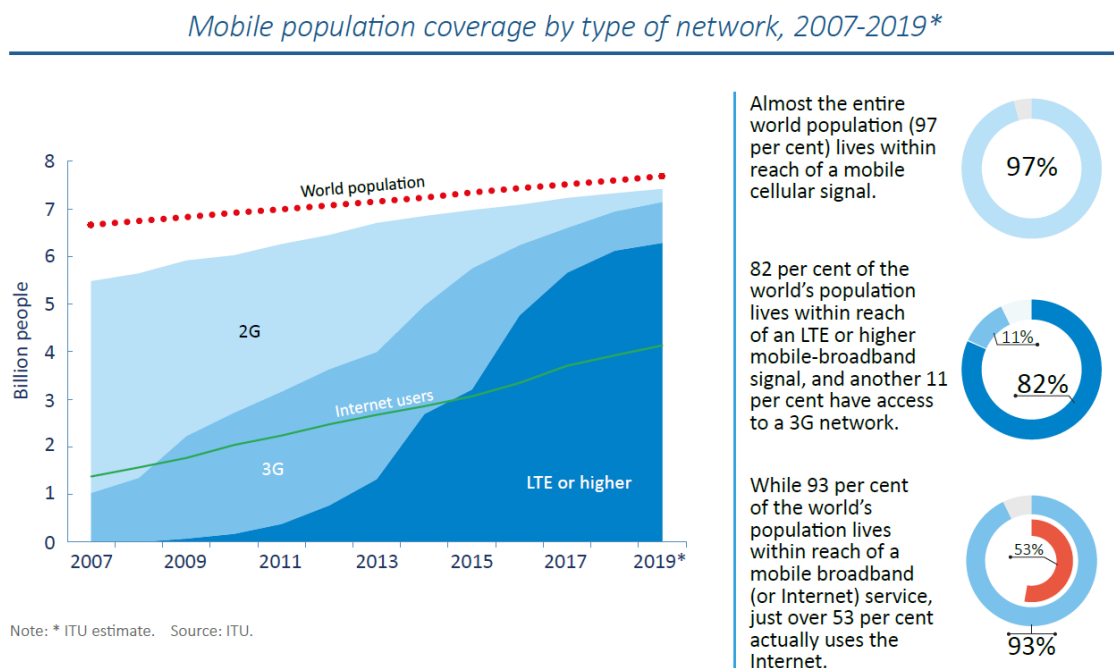


Figure 8. Almost the entire world population lives within reach of a mobile network (ITU, 2019)