HORIZON SCANNING: THE ROLE OF INFORMATION TECHNOLOGIES IN THE FUTURE OF CIVIL SOCIETY

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THE CODE OF UNPREDICTABILITY

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Horizon Scanning: The Role of Information Technologies in the Future of Civil Society.

Herein, an interdisciplinary group of scholars analyze the possible technological impacts on civil society’s development, drawing upon the “Horizon Scanning” methodology. The overarching aim of this collection is to broaden the spectrum of the social and technical *imaginare*. One specific objective is to analyze how technological advancements may influence the development of civil society in Russia, the former Soviet Union, and Central and Eastern Europe. A second is to assist those involved in such issues to make decisions in the context of possible future development scenarios.

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Information Technologies and Civil Society: Why We Need Horizon Scanning

> We are going to speak of the future. Yet isn't discoursing about future events a rather inappropriate occupation for those who are lost in the transience of the here and now?
>
> — Stanislaw Lem[1]

> The social *imaginare* enables a society to construct its identity by expressing its expectations for the future. A society without a vision would therefore be dead.
>
> — Patrice Flichy[2]

Transformative Technologies

Digital platforms continue to change our society. We are witnessing rapid technological growth: new networking and communication mechanisms, tools for information dissemination and human resources mobilization are emerging. The list of innovations that can transform our future is growing every day. It includes artificial intelligence, new approaches to working with big data, crowdsourcing practices, the Internet of Things, new forms of access to the internet, augmented and virtual reality mechanisms, 3D printing technologies, blockchain and crypto-currencies, biological chips, chatbots, and non-standard forms of virtual community organization.

The scope of information networks extends beyond the human being as such, recalling British ecologist and futurist James Lovelock's concept of Gaia, according to which all living beings on earth are one super-organism. So, for example, Alexander Pschera writes about the potential of the "Internet of Animals" as a new technology for dialogue between humans and animals. According to Pschera, "animals in the Internet of animals are not just web content or memes created by humans," but "data generators and data carriers."[3] Scientists are also studying how to create a "bio-internet of things" by connecting bacteria to the global network.[4] Not only bacteria, but even atoms can now be actors in the global network. Researchers are working on the creation of a Quantum Internet, which may allow a qualitative leap in everything concerning the speed and safety of information transfer.[5]

New technologies make it possible to implement ideas that were previously only to be found on the pages of literary works. And this is not just about science fiction. For example, programmers Damien Riehl and Noah Rubin have implemented an idea explored by Jorge Luis Borges in his story *The Library of Babel*. The Argentinean write described a book depository containing the results of a combinatorial search for all possible combinations of 25 characters. Such a library would contain absolutely all texts, both created and not yet created by mankind. Although the library invented by Borges would exceed the size of the visible Universe, it turns out that the scale of big data may approach the realization of his vision. The programmers have created an algorithm that generates all possible combinations of eight notes and 12 beats, and uploaded an archive of billions of melodies with free access under the Creative Commons Zero License. The authors of this project thus sought to protect users from lawsuits from the music industry.[6]

The transformative potential of technologies can be seen both in everyday life and especially in times of crisis, when survival under new threats and rapidly growing uncertainty requires innovation. Digital platforms offer new formats for participation in decision-making, contribute to a greater transparency of public institutions, and form new control mechanisms for traditional government institutions. Experts Alex Berditchevskaia and Markus Droemann, from the British Innovation Foundation (NESTA), have noted that the central innovation supporting social and political transformation is the development of a “collective intelligence” that mobilizes human resources to address a wide range of issues. Among other things, new possibilities for rapid mobilization increase social resilience in a crisis.[7]

On the other hand, researchers point out that, contrary to what might be expected, information technology is not capable of resolving the problem of economic inequality. In the new digital economy, the rich are still getting richer and egalitarian forms of cooperation are becoming a front for the development of "surveillance capitalism" (Zuboff, 2019),[8] which is based on large-scale collection and analysis of personal data.

The story of Cambridge Analytica has shown new possibilities for manipulating the behavior of Facebook users that question freedom of choice. According to Lawrence Lessig of Harvard University, "if we could put up with the need to destroy democracy to stop climate change, what's happening today is the destruction of democracy to sell advertising more effectively."[9] Lessig goes on to note that the architecture of modern social networks stimulates polarization, because the greater the degree of polarization, the greater the involvement of audiences, which is key to the commercial success of these platforms. Thus, the laws of the market destroy democracy, while democratic political systems are to live by the laws of the market.

Some researchers point out that new forms of digital work have, in fact, offered new forms of exploitation of the working resources of internet users (Fish & Srinivasan 2012).[10] Internet activism often turns into so-called "slacktivism" when real offline actions are replaced by the simple click of a mouse, leaving a subjective sense of participation, but less likely to lead to significant change. New surveillance and control technologies threaten media freedom and the right to personal privacy. Social networks are being transformed from a new public space into a space of propaganda, toxicity,[11] and social polarization. Finally, a popular saying that "someone has already created a mobile application for that task," according to publicist Evgeny Morozov (2013), is an example of blind faith in the ability of technologies to find an answer to any social or political challenge and, as a result, creates a sense of indifference.[12]

The coronavirus pandemic is a vivid illustration of the contradictions related to the role of information technology. On the one hand, we have seen a wide range of innovations that have emerged to combat the crisis, from new forms of data analysis to network-based resource mobilization for the development of home-made personal protective equipment. On the other hand, information technology has significantly scaled up the processes associated with the spread of misinformation, which has led the World Health Organization to declare an "infodemic."[13]

Moreover, innovations related to viral shedding in the monitoring and observance of quarantine regulations are a significant step in the development of surveillance technologies that violate the right for privacy. Discussion of the coronavirus on social networks has been accompanied by a significant level of emotional tension and contributed to social polarization as well as to the development of digital vigilantism.[14] In Russia, internet technologies have been used to bring crisis-related volunteer mobilization under government control, while the role of independent horizontal mobilization was relatively minimized.[15]

One way or another, the dynamics of information technology development and its impact on social and political processes can hardly be reduced to a linear influence on certain aspects of our lives. With the increasing complexity of present systems, the impact of this or that technology is sometimes unpredictable and is open to an endless series of changes. Moreover, innovative processes often change the power balance between activists and state institutions. On the one hand, activists create new challenges for those in power. On the other hand, those in power mobilize their resources to neutralize independent innovations and to develop new technologies for controlling and managing society. However, despite the binary opposition of power and civil society, many innovations also create new forms of cooperation and synergy between society and state institutions.

Between Cyber-Optimism and Cyber-Pessimism

Researchers and experts increasingly differ in their appraisal of the impact of information technology on our lives. This is especially true of their assessment of the impact of technology on social and political aspects of social development. Researchers can often be divided into groups of cyber-optimists, who emphasize the positive impact and potential of technology, and cyber-pessimists, who focus on the negative aspects of social and political transformation. Between these two is a group of cyber-pragmatists trying to find a balance between the extremes.

According to Brian Loader and William Dutton (first director of the Oxford Internet Institute), internet development has always been accompanied by a mixture of utopian and anti-utopian discourses. Recently, however, "even in academia, there has been a critical turn in discussion of the Internet with a growing prominence of skepticism and concern over the social, economic and cultural underpinnings of the Internet and its consequences for society." Researchers note that "the Internet is no longer a futuristic innovation that might shape social and economic development, but clearly is a central aspect of contemporary network societies."[16]

Pessimism is expressed not only about the nature of the impact, but also about the degree/speed of this impact. David Karpf, a researcher at George Washington University, has analyzed articles from *Wired* magazine over the last 25 years and concluded that, contrary to expectations, the internet's development is gradually slowing down.[17] According to Karpf, although Facebook in 2019 is different from Facebook seven years ago, the scale of these differences and their impact on our lives is much less than we might have imagined. While the second half of the 1990s and the beginning of the 2000s were a period of revolutionary transformations that changed our way of life, the impact of innovation is now more linear. A number of prophecies, such as that wearable technologies (like Google Glass) or virtual reality would bring a new revolution, have not yet been fulfilled. Even though the Internet of Things has been incorporated into the design of our homes, it has hardly become a transformational technology that has completely changed our lives. This kind of skepticism can also be expressed about the role of blockchain technologies, etc.

Moreover, there are almost no big new players on the innovation market. Alphabet (Google), Apple, Amazon, Microsoft and Facebook remain the key IT companies. Karpf relates this to changes in market regulation capabilities: “During a period of rapid media and technological change, effective regulation is extraordinarily difficult because the regulators cannot keep up with the behaviors they are regulating. But as Internet time slows down and a few massive companies acquire quasi-monopolistic market power, it gets easier to regulate the market effectively.” In addition, the speed of transformations can also slow down because IT giants effectively control the market, acquiring their potential competitors. A powerful wave of “creative destruction” and volatility will be required in order to change the current status quo, one that can push aside monopolists and free the field for new innovators to grow. Therefore, Karpf concludes, “the Internet of 2022 will probably look a lot like the Internet of 2019.”

The solution required to explain how technologies are changing our lives was the emergence not only of abstract theories, but also of methodologies for the critical analysis of cycles of technological innovation, from invention and development to widespread application. For example, the so-called “hype cycle” developed by Gartner, a research and consulting company, describes the development of any technology as a series of phases, starting with the “innovation trigger,” through the buildup of expectations of a particular technology, and thence to disillusionment, work on its shortcomings, and finally the achievement of a state of productive stability.

However, the purpose of this book is not to predict the role that technologies will play in five or ten years' time. Today, there is a wealth of literature on upcoming trends, and some institutions, such as the Future Today Institute,[18] offer a detailed and comprehensive annual analysis of the vector of possible technological development. We do not need a Cassandra, a Nostradamus or even a Ray Kurzweil. Moreover, we would like to avoid a position of technological determinism according to which understanding the future role of technology will help us to predict the dynamics of social and political processes, and the development of civil society in particular.

First and foremost, we seek to help critically assess the range of risks and opportunities for civil society associated with the development of information technologies. Isaac Asimov, assessing threats to humanity, wrote a book titled *The Choice of Disasters* in 1979. The title contains an important element of evolutionary optimism. Even if catastrophes are inevitable, the "choice" we make is ours. The aim of the present book's authors is to support the development of conditions that will increase the role of individual actors and of civil society at the critical intersections of social and political development and to support the possibility of "choice" based on knowledge and critical thinking.

Such an understanding of the role of information technologies does not indicate that the authors share the position of technological determinism. However, the importance of information technologies is emphasized by researchers from a wide variety of disciplines. For example, Shahar Avin and his colleagues at Cambridge University Centre for the Study of Existential Risk suggest that threat assessment should be considered through three vectors: the role of critical systems in sustaining our existence; the role of global risk in spreading mechanisms; and finally, the role of mechanisms that allow us to respond to new challenges, including those of prevention and mitigation.[19]

In this system of analysis, information networks have a triple meaning: they are critical to supporting our lives, they can be used to spread different threats (as in the case of the "infodemic"), and they can be an important mechanism for responding to crises. However, the key factor in preparedness for the future, as well as in the ability to not just anticipate this but also participate in its creation, is knowledge, and also the ability to predict a wide range of possible scenarios.

From predicting trends to expanding the imagination

"At first, there was an idea of what might have been at first..." – this formula could perhaps describe the emergence of the internet. Long before the Internet's creation, various models of global information networks appeared in the works both of humanitarians, such as Teilhard de Chardin, and of those who worked to create technologies, such as Vannevar Bush. One of the important documents that shaped the development of the internet was John Barlow's Declaration of Independence of Cyberspace, written in 1996. In it, Barlow proclaims the creation of a new world where "anyone, anywhere may express his or her beliefs, no matter how singular, without fear of being coerced into silence or conformity."

At the same time, in the mid-1990s, the ideology of virtual communities was developed by Howard Rheingold. Concepts that envisage how technologies can enable new forms of social interaction, new types of economies and new political systems have played a significant role in the development of these technologies.

The key role of the imagination in the creation of the internet has been highlighted by a number of scholars, including French researcher Patrice Flichy and Professor Robin Mansell at the London School of Economics.[20] All these studies are based on the understanding that any technology is the object of social construction. Therefore, the role of technology in socio-political development and, in particular, in the development of civil society, depends above all on the richness of our imagination (the societal "*imaginare*") and on our ability to perceive different models for the future development of civil society.

According to Ramesh Srinivasan and Adam Fish, the authors of *After the Internet*, the ability to deconstruct myths related to the development of information technology, and in particular the myth of the internet, as a technology that can bring us closer to the "end of history," to global democratization, and to prosperity for all, is equally important. This kind of deconstruction is a prerequisite for creating something new. Speaking about the world "after the internet," the authors of this book write not about a world without the Internet, but about a world where the role of the internet is qualitatively different from that of its current embodiment.[21]

On the other hand, amidst the crisis of the current internet models, the demand for new imaginary models, in particular, is increasing. For example, researcher Ethan Zuckerman has called for a fairer internet. However, that would require that we imagine how such an internet could work. According to Zuckerman, Wikipedia remains almost the only platform that continues to realize the original vision of the internet, while the spirit and logic of commerce has transformed much of the global network. Zuckerman wonders if we can imagine a new type of social media design that will promote mutual understanding rather than spread misinformation, and support cooperation even when people have different opinions. "We've grown so used to the idea that social media is damaging our democracies that we've thought very little about how we might build new networks to strengthen societies. We need a wave of innovation around imagining and building tools whose goal is not to capture our attention as consumers, but to connect and inform us as citizens," Zuckerman sums up.[22]

Development of our imagination requires resources that allow us to go beyond visible solutions. Science fiction is a one example of such resources. For instance, Isaac Asimov describes a new type of electronic democracy in his story “Franchise,” in which the popular vote procedures necessary for the election of the President are replaced by the Multivac super-computer. The computer’s decision is based on an analysis of big data and on answers from one person, which allows the computer to make the final decision. Science fiction writers often become pioneers pointing the way for further technical development. For example, Stanislav Lem proposed “ariadnology” as a scientific discipline of information search. Research shows that science fiction movies like the epic Star Wars or the Star Trek series have significantly influenced the development of technical imagination and the process of invention. Cambridge researcher Shahar Avin offers a systematic analysis of various models for exploring a possible future of artificial intelligence, ranging from science fiction literature to computer games.[23]

Thinking about how technologies are changing society is often limited to the range of technological solutions that already exist. The practice of developing social and technical imagination helps to overcome these limitations. The application of these practices should enable us to suggest the role that different innovations could play in different areas of life. This kind of imagination is not only a reflection of opportunities and risks, but also a driver of innovation.

Our project has two objectives. On the one hand, we want to show the risks and opportunities for the development of civil society associated with the emergence of new information technologies and digital practices. On the other hand, we want to help readers expand their own social and technical imagination. The results of our research can support the development of social and technological innovations. Social and technical imagination is a potential resource with which it is possible to achieve change. We believe that those who are first to grasp future trends will be able not only to effectively use technological developments, but also to become leaders in social innovation.

The Development of Social and Technical Imagination and Horizon Scanning Technique

The future is not only time, but also a discipline. Future analysis practices often evoke skepticism and are associated, at worst, with mediums and, at best, with futurologists. But we must admit that today systemic thinking about the future is a necessary condition for making decisions in the present. The systemic nature of such thinking is ensured by a number of techniques that offer models of thinking about the future and the structure of this thought process. Recently, new technologies of complex system modeling, based on simulations managed by artificial intelligence, have allowed us to analyze millions of possible scenarios.[24] However, the purpose of this book is not to identify the most likely scenario vectors, but to expand our readers' range of thinking about the future. To achieve this, we have chosen the Horizon Scanning technique, used both by researchers and by government agencies.

The Horizon Scanning technique proposes that we imagine several scenarios of the future, among which the authors should indicate three: the possible, the probable and the preferable. Special attention is paid to so-called "wild cards," also known, thanks to Nassim Taleb, as Black Swans, i.e., events that are unlikely to happen, but with a potentially high impact on the scenarios of certain processes.

The purpose of Horizon Scanning is to analyze a wide range of sources and indicators in order to identify trends in change that can lead to a significant transformation in the world around us. According to one definition, the purpose of Horizon Scanning is "the systematic examination of potential (future) problems, threats, opportunities and likely future developments, including those at the margins of current thinking and planning" (Van Rij, 2010).[25] Horizon Scanning has two goals. The first is to provide a "warning." It tries to identify dangerous trends as early as possible. The second goal is "creative," allowing one to reflect on new opportunities and take first steps towards their implementation.

In addition to "unpredictable phenomena," the horizon scanning technique pays special attention to so-called "weak signals." The term stands for peripheral information that is far away from the spotlight and from topical discussions. This information is complex and difficult to access. Many "weak signals" will lead to nothing, but others have the potential to become harbingers of events and trends that, over time, will have an impact on science and society. When analyzing a weak signal, it is important to consider such factors as the credibility of the source, the degree of possible impact, the level of innovation, and the extent to which the signal can change existing practices and approaches in a given area.

Another important element of analysis is the identification of "axes of uncertainty." It enables us to identify the areas in which the dynamics of scenarios are least predictable. This analysis can focus on identifying possible bifurcation points beyond which a scenario cannot be determined within probability categories.

Modern scientific literature offers various methods for Horizon Scanning. Some authors suggest starting an analysis with the widest possible range of sources and topics. Wide scanning of weak signals makes it possible, through system analysis, to focus on those topics that are likely to influence future scenarios. Relying on categorization by level of possible significance and credibility, weak signals can be made to cluster and form topics. Other authors suggest focusing initially on analyzing specific topics that may be relevant in the future and on finding weak signals related to these, both confirming and disproving the significance of the topic. Finally, the two approaches can accommodate each other and be integrated within the same study.

Horizon Scanning is not only a form of analysis, but also a part of constructing the role of technologies and their future direction. Building alternative models of the future is an important element in critical thinking about the present. The ability to imagine the possible, the probable and the desirable, as well as to try to draw images of the unpredictable, is a necessary skill for making strategic decisions and forming long-term strategies in different spheres. Our task is to expand the window of opportunity through reflection on possible and probable future options, to achieve a desired future, and to be ready for unpredictable scenarios that await us beyond the horizon of events.

Interdisciplinarity and scanning optics

Horizon scanning offers a technique, an analysis framework and a set of guidelines for studying the future. In addition to a framework for a systemic approach, thinking about the future should be based on a concept that offers a different degree of understanding of the role of information technologies in social, cultural and political processes. Various theoretical approaches offer various "scanning optics." Below are a few examples.

Based on the principles of ecological psychology, horizon scanning can look for new forms of affordances that fundamentally change the forms of civil society development.[26] The theory of social movements suggests focusing on how information technologies are changing the way human resources are mobilized and collective action is organized.[27] Cultural-historical activity theory suggests investigating the role of technologies in the mediation of new forms of relationships between the user and the environment, as well as the development of new types of human activity systems.[28] A number of social and political theories draw attention to the role of technology in transforming institutions and relations of power between people and state.[29]

Cybernetic approaches draw attention to new feedback models and mechanisms for creating models of a desired future. Cultural approaches suggest paying attention to new mechanisms of production of meanings. Evolutionary approaches consider technologies in the context of the evolutionary process from development of new forms of mutual aid to achievement of the point of technological singularity beyond which "the future no longer needs us.[30]

This is only a partial list of concepts suggesting different types of horizon scanning optics. Such concepts can offer different interpretations of technological trends and weak signals, as well as various scenarios for possible, probable and desirable futures. The variety of the above-mentioned approaches emphasizes that, when it comes to the role of technologies in the development of civil society, horizon scanning should be an interdisciplinary project bringing together representatives of humanitarian, social and engineering disciplines and offering different systems of analysis and critical thinking apparatuses.

How We Did It

The Horizon Scanning system of this project consisted of two phases. In the first phase, about 100 experts in the field of social projects and civil society development shared their visions of the role of information technologies in the future transformation of their field. This survey of experts allowed us to feature a wide range of possible topics of analysis. The results of the survey are reflected in the chapter written by Aleksey Sidorenko, head of the Greenhouse of Social Technologies.

In the next phase, we brought together an interdisciplinary group of researchers to participate in the Horizon Scanning Workshop. What was important to us was the interdisciplinarity of this group, enabling the horizon scanning to be performed in measurements specified by different types of research optics. The invited experts, therefore, included sociologists, anthropologists, urbanists, geographers and computer science specialists. At the first stage, the group of researchers gathered for a two-day seminar, where the main topics of the book were identified and clustered with the help of a facilitator, global risk expert Dr Timofey Nestik. In addition, each seminar participant made a presentation on their field of research and the potential role of the research for horizon scanning.

The meeting also included a discussion of the general methodological framework of the project and the formation of a common research framework, which helped us find common ground and form a common semantic space despite the interdisciplinary nature of the group and the fact that participants would perhaps approach the analysis of similar topics on the basis of different systems of coordinates. Discussing horizon scanning technique also helped participants to overcome the temptation to focus on today's events and sought to push the authors of the book out of their comfort zone and to look forward.

Conclusion

The purpose of this volume is to expand the spectrum of the social and technical *imaginare*. The target audience is heads of non-profit organizations, movements, public initiatives, journalists, public figures, and representatives of grant-making organizations – in general, all those involved in the development of civil society today. Each chapter is focused not on a specific technology, but on a problem or issue related to technological development. Different chapters discuss the same technologies (e.g., artificial intelligence), but at the same time touch upon different problems related to these. Some chapters address several technologies at once. All chapters consider the role of future technologies in the context of civil society development issues.

Our book has several goals. The first is to analyze how technological development can influence the development of civil society in Russia, the former Soviet Union, Central and Eastern Europe. The second is to help those involved in these issues to make decisions in the context of possible future development scenarios. We hope that analysis of the future will help to improve the effectiveness of long-term civil society development solutions, increase the range of opportunities associated with building strong horizontal communities, and enable readers to become leaders in social innovation. Moreover, this project will help to anticipate the risks associated with restrictions on civil liberties and threats of human rights violations resulting from technological development.

Science-fiction writer Isaac Asimov once wrote: “We cannot prevent the collapse of the empire, but we can still shorten the period of Barbarism.”[31] To paraphrase Asimov, we cannot predict the future, but we can try to systematically comprehend its possible scenarios and the probability of certain events in order to minimize the risks and maximize the opportunities for constructive development. In this book we try to help each reader to formulate their own unique portrait of a desired future in order to make this desired future more likely to happen.

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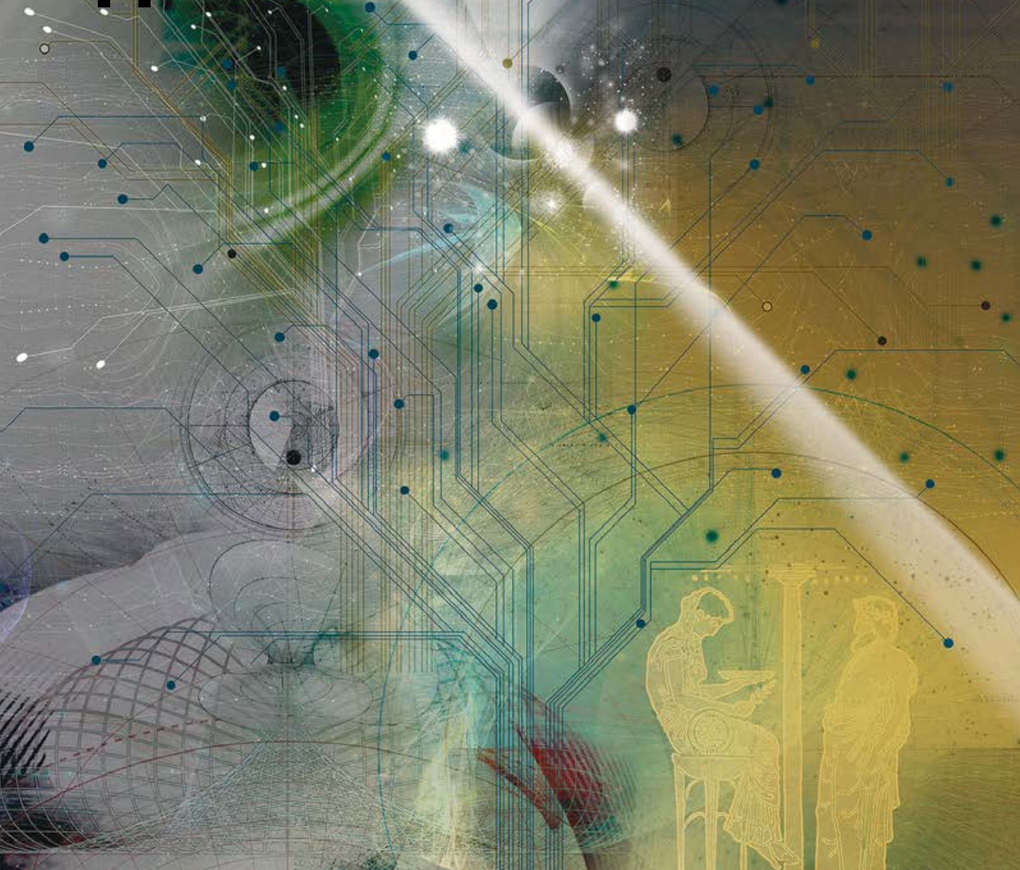
Civil Society Looks into the Future of Technology: A Survey of Civil Society Experts' and Activists' Opinions on Technological Opportunities and Risks



> The only thing we know about the future is that everything will be different. Trying to predict the future is like trying to drive down a country road at night with no lights while looking out the back window. The best way to predict the future is to create it yourself.
>
> — Peter Drucker (1909–2005)

Preface From Another Era

At first glance, working with the future is a thankless task. In 1933, the British physicist Ernest Rutherford declared the impossibility of harnessing nuclear power: "Anyone who expects a source of power from the transformation of these atoms is talking moonshine." A Hungarian counterpart of Rutherford's, the physicist Leo Szilard, a former student of Einstein's, within days after having read about this in the newspaper, came up with the principle of a nuclear chain reaction initiated by neutrons.[1] One might say that it was Rutherford's shortsighted statement that created the known reality. We all know what happened next – the invention of the atomic bomb, the hundreds of thousands of dead in Hiroshima and Nagasaki, the construction of nuclear power plants around the world (and periodic accidents at them). The Cold War never become "Hot" because of the dramatically increased destructive power of new nuclear weapons. The resulting principle of Mutually Assured Destruction in global politics led to the global regime of nuclear non-proliferation that formed the basis of the modern geopolitical order, etc. In sum, the future that Rutherford had envisioned in 1933 came to an end just days after he posited it.

Did nuclear physicists, writers and journalists expect to face such a destructive potential of the new discoveries? In 1913, the British writer H.G. Wells seems to have been the first to describe an atomic bomb in his novel *The World Set Free*: "His companion, a less imaginative type, sat with his legs spread wide over the long, coffin-shaped box which contained in its compartments the three atomic bombs, the new bombs that would continue to explode indefinitely and which no one so far had ever seen in action. Hitherto Carolinum, their essential substance, had been tested only in almost infinitesimal quantities within steel chambers embedded in lead."[2]

Did politicians and activists have any idea of the destructive potential of scientific discoveries? Yes, they did, though it came rather late. Not in 1914, not in 1933, and not even in 1938, when Hitler inferred that nuclear energy could be used for the purpose of attaining a decisive military advantage. Only in 1939, six years after his discovery, did Szilard together with two other physicists initiate "Einstein's letter to Roosevelt,"[3] calling for accelerated work on developing a version of the nuclear weapon before the same could be achieved by the Nazi scientists. The resulting Manhattan Project began in 1942, three years after the scientists' letter, and ended in 1947. Trying to catch up with the Americans, the Soviet Union created the first working nuclear reactor a year later. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was signed in 1968, 7 years after the Cuban missile crisis which called into question the future of intelligent life on Earth. It took thirty-four years (1914–1948) for mankind to reap the peaceful fruits of nuclear energy and fifty-four years (1914–1968) – from Wells' book to the NPT – to establish rules for the use of destructive applications of scientific discoveries.

Looking Beyond the Horizon

Can we, by applying analytical methods, imagine similar situations in our future? Is it possible to anticipate unforeseen destructive consequences of a particular technology? Is it possible to predict vectors of the development of technologies and social systems, using available data, with the aim of identifying in a timely way the possibilities not only for saving lives, but also for building a more equitable society?

Scholars who have applied predictive techniques for the past few decades offer mostly affirmative answers to these questions. Aside from correctly predicting an atomic bomb, H.G. Wells was also the first to propose the term "foresight," urging academics to become "professors of foresight."[4] The foresight method is nowadays actively used in commercial companies and at the state level. It does not, however, exhaust the entire academic field of called "future studies" – an interdisciplinary field of science devoted to the study of possible variants of the future, including extrapolation of the existing technological, economic, and social trends and prediction of future trends. The "Horizon Scanning" methodology (first mentioned at the beginning of 21 century and applied in this book) belongs to the family of such future-studies methods.

The "Horizon Scanning" approach does not have a globally recognized, "canonical" methodology. In various studies, the fundamental elements (to name a few: glimpsing into the future as a method, paying attention to weak signals and wildcards, examining a number of varying scenarios) have been interpreted quite freely. Gregory Asmolov's opening chapter of this volume describes the elements of the "Horizon Scanning" methodology in great detail. The authors of other chapters in this book follow the general guidelines of the methodology, but do so quite freely in order to create a certain research space for work on a poorly studied topic. We can confidently assert that the existing degree of study of the main subject of this volume (the impact of the development of digital technologies on the development of civil society) remains quite low.

Given that many civil society processes take quite a long time (take, for example, the six-month or even one-year cycle of software development or the three-year cycle of a major grant program), decision-makers of today need to be able to evaluate whether ideas that have yet to turn into something tangible will make sense and have practical application in the future.

Narrow Topic, and Even Narrower Application

The project that gave rise to this volume had the following goal: "To look into the future with critical analysis of how information technologies can impact the development of civil society in the post-Soviet space (with a primary focus on Russia)."

The authors were offered the following definition of civil society: "Civil society is a set of registered and non-registered non-profit voluntary organizations and initiatives that function for the sake of the pursuit of the public interests, but without the end goal of securing political or commercial profit." As I knew of no canonical definition of civil society that would fit the modern situation in the region of study, I took the liberty of drafting this definition myself, based on my own work experience. Here are a few points I wish to draw attention to:

1. Civil society is a very heterogeneous environment which consists of various entities. There are definitions of civil society that define it exclusively as registered organizations. Such an approach fails to consider a great number of communities and individual initiatives that exist without any organizational form. The term "initiative" encompasses not only unregistered groups, but also ideas that may be expressed by only one person (e. g., a blogger, an activist, or a group of friends), ideas that are further developed and perceived by society.

2. The voluntariness of civil society is an important feature that allows us to distinguish "astroturfing"[5] – organizations or initiatives created so as to simulate citizens' interests. The criterion of voluntariness (although I have to admit that in real life it is likely impossible to be sure of sincere motives of absolutely all actors of civil society – we can talk only about "visible" voluntariness, i.e., about the correlation of the declared goals and real actions) allows us at least theoretically to distinguish between "mercenaries," i.e., actors driven by goals other than those proclaimed (for example, by money or ideology), and

conventionally "true," voluntary actors who are driven by their proclaimed goals.

3. The "pursuit of public interests" is the key phrase in this definition, because it is namely the *goal of improving* what is perceived by civil society actors as *the reality* around them, that is the most powerful uniting feature for completely different groups that can be labeled as 'civil society.' It may be argued that some environmental activists set the goal of preserving biodiversity and animal rights and do not perceive society as the ultimate value. But, based on my own experience, I can say that, even if not at the level of goals, but at the level of their activities, environmental organizations stand up for the long-term interests of the society in which they live and, therefore, fall under the definition.

4. The lack of dominant commercial or political profit implies that the activities undertaken are not a means (example, a politician investing in charitable organizations to gain more votes at the next election), but a goal in itself. In most cases, an outside observer will not know the true motives of most civil society actors. But most probably, she will be able to infer whether a civil society actor is sincere in achieving the declared goals or is interested only in his/her own well-being and prestige.

As any definition, the proposed definition of civil society is an imperfect one. But, unlike others, it does clearly outline the research object in the modern context and in the particular region.

The reader will notice that the perception of civil society greatly varies from author to author in this volume. This, in my opinion, is a merit of the book. The fact that the researchers differ in their understanding of civil society means that they are more likely to perceive something interesting on the horizon. Gregory Asmolov and I purposefully invited, to cooperate on the project, scholars who represent not only different disciplines but also different academic cultures – both from Russia and from universities of the broadly understood West.

The choice of civil society as the subject of research increases the level of complexity of the task of our "Horizon Scanning": the authors were tasked with imagining how technologies will develop in the future, applying this knowledge to a rather narrow and unpredictable group of actors – not simply to society, but to a rather small, but most active group: a diverse group which can be identified externally (the global civil society has almost no common identity, and the activities of civil society are very different) and is described according to its functions rather than to its qualities. The next indicator of complexity is that the analysis cannot be reduced to a single country: not only is technology itself global, but civil society is also becoming more global.

But it is the functions of civil society that are important in understanding technology. In 2020, three major corporations involved in development of face recognition technology – IBM, Amazon, Microsoft – decided to freeze for a year or even to halt using the technology.[6] That was done against the backdrop of the protests of 2020, but was preceded by human rights activities of civil activists, with the beginning of the process traceable back to at least 2018. Technology is created by humans (at least, for the time being). Humans impact the development of technology. Civil society has impacted both technology companies and individual developers. In the course of their work, they are involved in making various decisions. It can be concluded that projection into the future for such a small group makes sense, because the power of decisions made at the human level is still quite high.

In addition to the importance of such analysis, it is worth noting the scarcity of this subject (the impact of technological development on civil society) in the Russian-language scientific and popular scientific publications. It is relevant to mention some forecasting and scenario-like studies in Russia, though their focus is on a stand-alone country and they consider a number of factors that are not so important for the authors of this book. Computer technology remains subject to rapid disruptive transformation – as opposed to, for example, energy systems and political structures. Therefore, this book should be considered not only in terms of understanding the situation and impacting the development of certain technologies, but also in terms of harnessing these technologies for the pursuit of our own objectives.

How much can we predict? In 2010, I participated in a scenario session of the "Russia 2020" project that was held by the Carnegie Moscow Center. In October 2010, some of the top researchers on Russia issues gathered at a beautiful villa in the north of Italy. The result of the intensive work was the book *Russia in 2020: Scenarios for the Future* edited by Maria Lipman and Nikolay Petrov.[7]

In my short article therein,[8] in which I described the role of the internet in political scenarios of the country, I described the main trends of state's presence on the internet: "1) parallel processes of concern [for on-line activity] and involvement in the virtual environment; 2) growing internet regulation; 3) development of e-government services." All three trends manifested themselves in full over the next decade. Speaking of society, I wrote about the importance of bloggers and moderators of communities in political life, citing Alexey Navalny as an example. In 2010, according to the Levada Center survey, the Navalny's name was recognized only by 6 percent of the Russians. Ten years later, "network public policy" has become much more powerful, despite the restrictions, and far more people today recognize the prominent politician and blogger.

Looking back, rather critically, at the predictions made in my 2010 article, I can admit that some of them quite accurately coincide with the events that actually took place. For example, I wrote about street protests in 2012, rigged elections within the period from 2016 to 2018 and, as the result, a "risky status quo" after 2018 as the most probable scenario. With all the criticism of the regime established in Russia, it is easy to see "predictability" as one of its key features: even the slide into dictatorship is a rather predictable trajectory.

Technological development, at least for the next few years (in my estimation, 3-5 years, before the full-scale implementation of quantum computing[9] in everyday life), will also show some signs of moderate predictability.

Given that the social sector, the political situation, and technology are all developing in a predictive enough way, I conclude that the analysis of the future can bear tangible results. The next question to address is: why is it me and my project that is organizing a study like this?

The mission of the project "Greenhouse of Social Technologies," which I co-founded in 2012 and have been managing ever since, is to make the non-profit sector[10] strong and independent with the help of information technology. Our project helps various non-profit organizations and initiatives in various fields and at different levels – from video tutorials to hackathons. I often have to deal with short-sightedness, lack of systemic vision and lack of such strategic planning that would consider changes in the environment which civil society actors exist in. People often are not even able to realize that technology has changed. My observation is partially borne out by the expert survey that we conducted before the workshop that resulted in this book (see below).

I can identify at least two reasons why dramatic changes in technology happen unnoticeably. The first reason is great duration of the process: technological development is like a dripper decanting novelties to us drop by drop, rather than by a waterfall of changes which may fall at us instantly. However, the events of March–June 2020 caused by the global coronavirus pandemic significantly contributed to the increased interest in technology due to the immediate need for rapid change.

The second reason is related to the fact that innovations depend on local infrastructure, and technological innovations do not occur simultaneously on the entire territory of the planet, or in our case – in Russia. This tendency allows skeptics to say, "Well, things are that way at your end in Moscow. Things are the same old way here" (can be replaced with "at your end in San Francisco" or "at your end in London"). Therefore, when technology finally reaches the hinterland, "the depths of Russia," large cities – the centers of diffusion of innovations – will initiate a new process of changes that will, again, be hidden from a not very scrupulous observer.

In order to understand emerging technology-related problems, to fight for accountability of technology and to change technological tools for the better, it is necessary to study future risks beforehand, strategically plan development and capacity building with consideration of technological trends and think of educational programs for developing skills that we may not need now but that will be of great value in the future.

Preliminary Research: Methodology

The project "Horizon Scanning – 2019" was the first such work carried out by a group of primarily Russian-speaking scientists from different universities. The outcome is the present volume, consisting of two review articles (including this one) plus eight specialized articles. The topics of the latter eight articles were formulated at a two-day workshop that took place in April 2019. The workshop was

Fig 1. Scenarios for "Horizon Scanning" collected in the finale of the workshop. Photo: Stanislav Ronzhin.

preceded by a survey of Russian-speaking (although not always Russian) representatives of civil society.

The objective of the survey was to serve as a starting point for the "Horizon Scanning" conducted by the authors of the articles gathered in this volume. The main results of the survey were presented to the experts at the workshop and defined the main directions of scanning that are represented in this book.

The survey was conducted in April 2019. I drew up a list of 156 experts, representatives of non-profit organizations, donor organizations, computer security trainers, sociologists, etc. The survey was conducted in Russian. There were 52 respondents. The survey was sent out only to selected recipients and was not available to everyone.

This survey is not necessarily representative (due to the peculiarities of selection and limited number of responses), but it does paint a certain picture, in broad strokes, of how a limited number of experts and members of civil society perceived technology at the beginning of 2019. More than half of the selected respondents are individuals working for different NGOs (fig. 2).

The other half of the respondents are civil society affiliated experts who work at commercial companies,

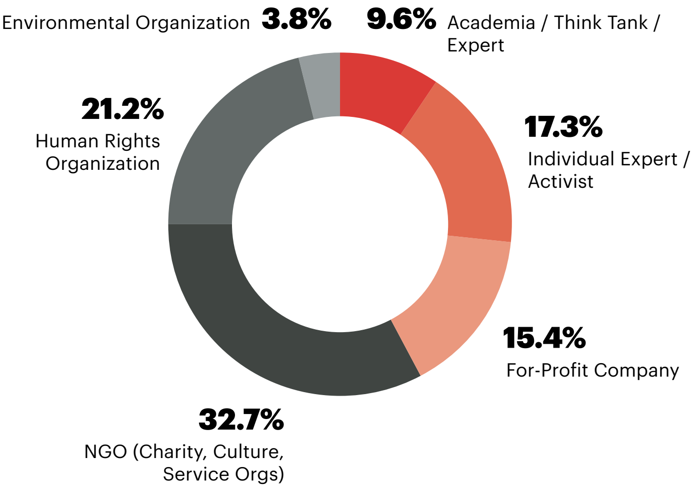


Fig. 2. Organizations represented by the respondents.

universities or are self-employed as independent experts and activists. In terms of management level, 44 percent of respondents are heads of organizations (Fig. 3.), while another 25 percent are leaders of projects or programs. (Note that the group of "individual activists" slightly grew compared to Fig. 2, due to the outflow from the "Other" category.) In both cases, the responses were grouped to roughly reflect positions of the respondents. The questions were answered by individuals able to influence and make decisions in civil society organizations.

Open Questions

The first question was open-ended and did not offer any suggestions to the respondents: "Let us set our imagination free... What information technology seems to you to be promising for the development of civil society in the future? How do you see the future of technology in this respect? Do not restrain your imagination and share your most unexpected ideas!"

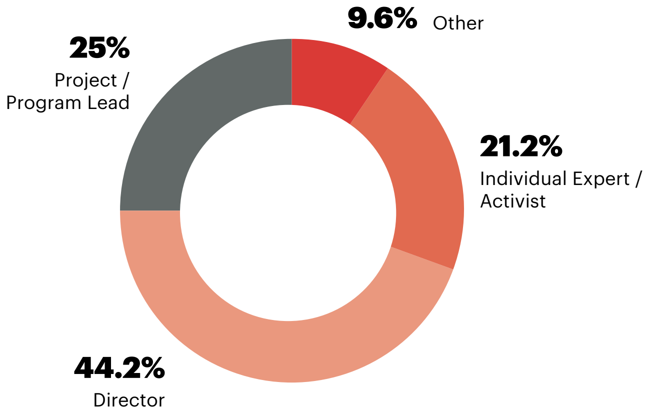


Fig. 3. Management Level of Respondents

Respondents were encouraged to write any and all ideas. Then, we arranged the responses into groups that seemed similar thematically. The respondents were allowed to choose more than one type of technology. The responses received were grouped into 16 categories,[11] some of them named after the appropriate technologies (e.g., artificial intelligence), others after the topics raised in the responses (for example, the future of communication). For the purpose of simplification, Fig. 4 shows only the most popular technologies and topics among the respondents.

The category entitled "Future Communications" was mentioned in most of the responses, outstripping even what would seem to be the obvious leader – "Artificial Intelligence." Speaking about the future of communication, the respondents paid attention both to the issue of eliminating boundaries (hereinafter there are examples of the answers "Free Communication in any Language of the World" in brackets), and to formats of communication ("Instant Non-Censored Communications among People, Building of Horizontal Effective Systems" or "Decentralized Communication Technology," local networks (MESH-networks), alternative protocols that can provide local communities with connectivity even in the absence of "Big Internet").

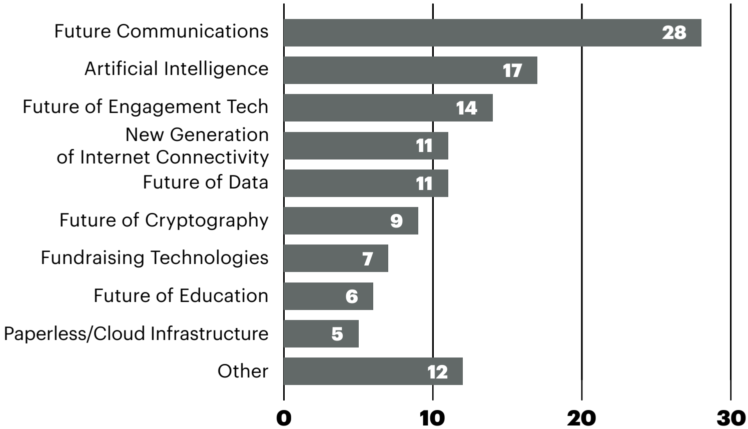


Fig 4. Technologies and/or topics raised in open responses from experts.

Such high repeatability of the responses referring to communication shows that, for civil society, the sharing of meanings, involvement and coordination with other activists, their target audience and the rest of the world are critically important. We can assume that it is communication that civil society leaders associate their future activities with.

The second most frequently mentioned category embraces the family of different technologies related to artificial intelligence (AI). These opinions can be explained both by the attributes (real or imaginary) of this technology and by the number of references to AI in the mass media, at recent conferences, etc. Five years ago, AI was being referred to only at highly specialized technological events, whereas in 2019 AI became a rather much more commonly discussed topic.

All of the next most popular categories ("Future of Involvement," "New Generation of the Internet," "Future of Data Management") reflect the ongoing work of civil society. A high degree of reference to these topics among the respondents' answers can be explained by the fact that technological breakthroughs today may give them and their fields of activity a necessary competitive advantage or may solve old problems. A certain by-sector division of civil society is evident here: whereas experts and human rights protectors are more interested in the future of internet connectivity ("New Generation of the Internet"), communication and data management, charitable NGOs see opportunities more in the development of fundraising technologies and paperless document circulation / cloud infrastructure, i.e., the topics they deal with on a daily basis.

Closed Questions

The second part of the questions consisted of a closed list of technology types taken from the last research work at the time, the Gartner Hype Cycle.[12] The experts were asked to rate each technology type from 1 to 5 according to the following indicators:

1. the impact on civil society (CS),
2. the likelihood of effective introduction by CS,
3. the likelihood of effective introduction by CS opponents for confronting CS,
4. if this technology, in your opinion, is one of the nine technologies that we should analyze in detail (answers to this question are not described here, since they are of no value in the context of the article).

The obtained quantitative estimates were summarized. The summarized indicators "effect for civil society" and "likelihood of effective introduction by civil society" were multiplied and normalized.[13] The indicator "likelihood of effective introduction by civil society opponents for confronting CS" was also normalized. The result of the calculation is presented in Fig. 5.

The results of the evaluation of the closed list of technologies confirms, once again, the importance of communication and connectivity for civil society. "Affordable Satellite Internet" and "5G network" can be perceived as the most useful in the opinion of civil society leaders. In 2020, a certain campaign aimed at discrediting 5G

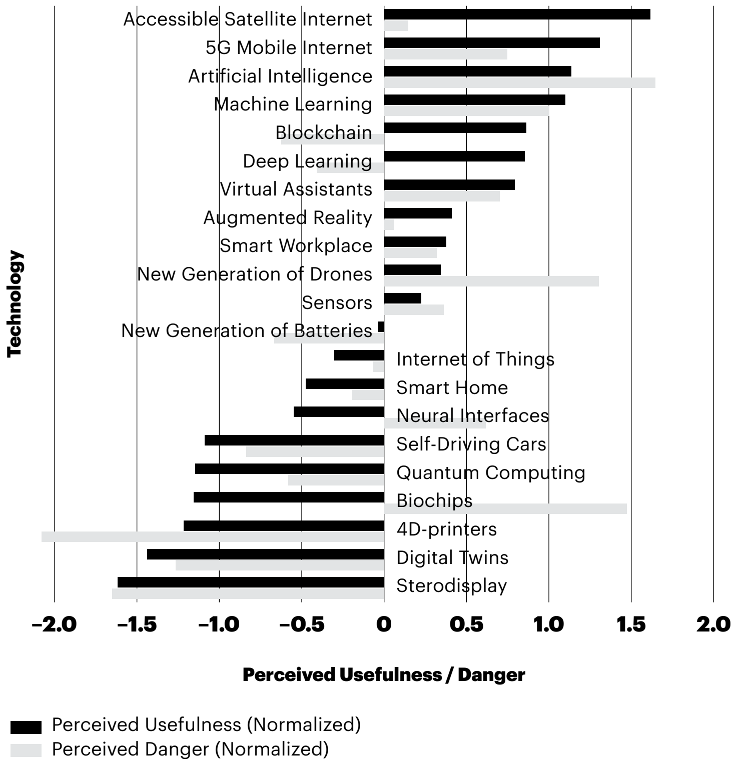


Fig. 5. Normalized Indicators of Perceived Usefulness and Perceived Danger of Technologies on the Gartner Hype Cycle list (with "Perceived Usefulness" = Likelihood of Use x Perceived Usefulness for CS)

communication was notable. It reached its quite comical apogee in May of 2020, when one of the cell towers was burned in the village of Nogir (outskirts of Vladikavkaz, the Republic of North Ossetia), as this technology was allegedly intended "to force people to live [...] in reservations, then put up 5G antennas and expose them to radiation, to make them faint and afterwards to implant chips in them."[14]

We can only guess whether the campaign was a planned action of civil society opposition, but it is obvious that the perception of the same technologies is and will be quite different depending both on time and reference groups. Returning to the respondents' answers, it is possible to note, once again, the perceived usefulness of connectivity, as well as an increasing role for artificial intelligence as being obvious to the experts.

Artificial intelligence, perceived as a useful technology, also occupies the top place as a source of the perceived danger. Along with the new generation of drones and AI biochips, it is of the greatest concern among the respondents.

The use of the Gartner Hype Cycle closed list of technologies made it possible to prioritize what, in the experts' opinion, is the most interesting and what is the most potentially dangerous. It should be pointed out that the most "science fiction" like technologies, i.e., ones whose perception is shaped mainly by popular science-fiction works (science fiction books, movies, TV shows) rather than by practical experience, raised the most fears. In addition, mere enumeration of the technologies from the Gartner list proved to be of only limited value – some experts were not familiar with a number of technologies presented in the questionnaire (as became clear in the personal interviews). For future research, a scenario- or problem-based approach seems to be recommendable. One of the workshop findings was that analysis of such scenarios as "the future of meanings," "future of urban space," "the future of privacy," "the future of protests," etc. yields more meaningful and sensible results.

Mapping of perceived dangers

Lastly, after a series of closed questions, respondents were asked to answer the following open-ended questions: 1) What technologies seem, in your opinion, potentially hazardous to civil society? 2) What technologies will have the greatest impact on civil society's ability to solve problems effectively? Why? 3) Imagine that you have 10 million dollars that should be invested in something useful. Which technology would you invest in above all? (This question was necessary to assess the practical applicability of imaginary technologies in the respondent's opinion).

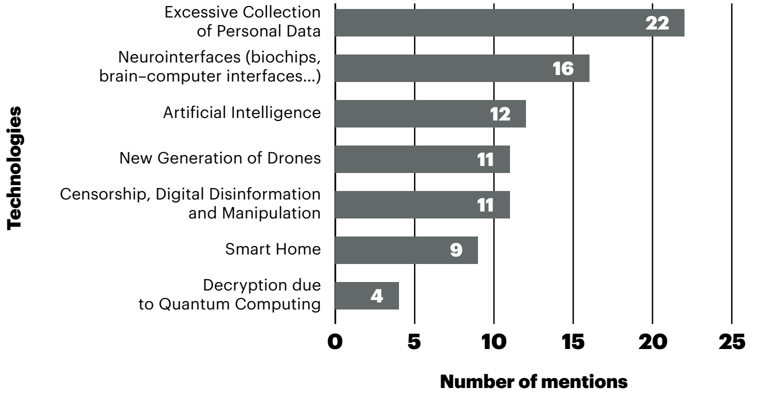


Fig. 6. Rating of the most dangerous technologies, as perceived by survey respondents

Among the potential threats to civil society, excessive collection of personal data is perceived as the leader. As all objects are going through a digital transformation – including objects about which it had only recently been difficult to imagine that they might transfer data anywhere (with taxis, refrigerators, headphones, scales, etc., having become connected over the past few years) – the ability for such data to be used (perhaps not separately, but aggregated together from all the connected sources) to control the person increases dramatically. Fear of the acquisition/control of data is observed in other categories of answers, such as "Neurointerfaces" ("all that allows collection and analysis of data that the person does not provide consciously – the Internet of Things, Virtual Assistants, Biochips, etc."), the "New Generation of Drones" and "Censorship/digital disinformation/manipulation of consciousness." If general artificial intelligence is created someday, civil society already now treats it as an enemy.

Technologies as the Object for Investment

Responses to the question of which technologies people would opt to invest 10 million dollars in did not always refer to information technology. Moreover, the first thing that meets the eye here is the high diversity of responses, even within a fairly small group, hampering efforts to extrapolate the future on this basis.

The most frequently mentioned technology was, as in the other answers, artificial intelligence (every fifth response). It is the technology to which the majority of respondents attributed the maximum impact. “AI in the field of sociology, it is important to know the real needs of society in order to properly work with them”; “On the one hand, I would invest it in the development of artificial intelligence, since it is the most complex technology and it opens up great opportunities for the development of the humanitarian sphere; on the other hand, in parallel, I would invest in the development of the ‘man – machine’ code of relations and global education, improvement of technological literacy and discussion of issues related to equal opportunities in the new reality.”

The second most popular group of response (7 responses) dealt with monitoring and services of different kind that increase the amount of data about society and the planet that allow a higher degree of control and, if necessary, intervention (“I would invest in sensor networks (partly in IoT), a platform for data collection, and the community around them. A quality environment is an environment where anyone can participate, it is technologically replicable and allows for the authorities to be shoved aside on various fronts in a relatively easy way”).

But control and the possibility of intervention is not the only motive. Sometimes the opportunity to collect data is valuable just in order to share it with others – “processing of data arrays related to cultural objects and making this information available to all, satellite imagery and image recognition.”

Finally, the third most popular group (6 responses) dealt with new systems of civil society coordination: “a comprehensive system of interaction between members of civil society, including decision-making and financing of their implementation"; "cultural and social technologies (as any information technology is derivative of this or depends on it), I would invest funds in public technologies of reflection on the Soviet period and the development of technologies for social self-organization."

One response, worth noting separately, related to meta-aspects of technologies (the development of gender inclusion in the technologies and, as a consequence, the creation of technologies that would be created within the framework of a more inclusive logic).

In general, one can note a lack of interest in specific technologies – respondents were rather interested in solving applied tasks. However, one response generally questioned the development of technologies: "It makes no sense to invest in the technology per se. It is necessary to invest in the solution of practical problems of innovative NGOs, leaving them the freedom to choose the technologies. This is the way technologies are created, IMHO." In the same group is another interesting answer: "Specifics are only possible when decisions are made by professionals in the field of technologies, to whom I do not belong." It seems that it is this waiver of any responsibility for thinking about technologies that is a perfect illustration of the very problem this volume seeks to address.

Conclusion

Future studies urges us to deeply analyze the current situation and build explanatory models, which then serve as a basis for distinguishing those aspects of the future that may both harm and help. The "Horizon Scanning" method, adopted in this project, offers sufficient flexibility by paying attention only to certain elements of the future: "trends," "final scenarios," "wildcards" and "weak signals." Taking into account the long cycles of technology development, if a curious observer looking forward, rather than back, has the proper information, he or she could potentially alter the development of a negative trend, having noticed emerging threats at an early stage.

Technologies can carry the potential for destruction and are hardly ever completely neutral. Even in the presence of positive effects, similar to nuclear power, we as a society should continually listen to the most pessimistic forecasts and constantly check the facts that we perceive against the end-points of the forecasts put forward by scientists. The splitting of the atom has brought nuclear energy and a new world order, but it has also taken a toll of hundreds of thousands of lives. Can we foresee disastrous consequences before they happen?

Overall, the representatives of civil society we surveyed indicated in their responses to our survey: yes, a whole range of technologies could cost us the loss of personal freedom, clarity of thought and generally redefine mankind. At the same time, they also pointed out things that are so important for civil society: global connectivity, sharing of meanings, involvement and coordination with other activists, their target audience and the rest of the world. Artificial Intelligence is perceived both as an assistance and a threat, both of its own accord and in the hands of the state (or technology corporations), the logic of which is perceived as a constant thirst for more and more new data and control over the human being, while the abundance of digital connections to what used to be only analog objects of our life only makes this thirst stronger. The study represents a unique slice of the way the civil society leaders and experts we surveyed imagine technology. How these technologies will be used in the development of civil society, as well as how civil society will control the development of certain technologies, will depend largely on the way they see and understand technologies.

Needless to say, the intermingling of the relationship of technologies and civil society cannot be reduced to a conflict of “connectivity and communication against data collection and control.” The chapters of this volume show the diversity of contact points between technology and civil society. On behalf of the group of authors, I would like to invite readers on a fascinating journey to explore the very edge of the visible horizon.

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Endnotes

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10 The non-profit sector is understood as a subset within the broader concept of civil society, as described above.

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The Technology of Constructing Meanings in Digital Ecosystems: Agents, Platforms and Ethics

The digital environment cannot really be described as a unified space; rather it is an archipelago, a complex of digital ecosystems "inhabited" by devices, software, users, services, algorithms, databases. This archipelago is based on constructing meanings, that is, systems that are shared by communities of meanings that are "voiced" and tested by opinion leaders. This is why it is crucial to determine which strategies and agents of constructing meanings, barely visible on the innovation horizon now, could soon become leaders of the computing industry. The text below attempts to map out the future agents and platforms of these ecosystems and the ethical decisions beneath them. An important part of this analysis is devoted to considering of the potential of civil activists' participation in new practices of disseminating socially significant agendas.

In lieu of a foreword: questions

Digital technologies have multiplied communication possibilities, and communication services have become one of the most commonly used types of tools.[1] They have become the entry point into the digital space for many users as social networks, matching services, blogging and microblogging platforms, and messengers. This can be illustrated relatively simply by listing the most popular social networks, messengers, and streaming services for 2019. This includes old-timers such as Facebook, YouTube and Twitter, newer networks designed for relatively younger audiences such as Instagram, Snapchat, TikTok and LIKEE, and networks of greater interest for various "local internets" such Tumblr, LinkedIn and the Twitch streaming service.

No wonder that in such a situation, much of the software and devices are focused on meeting users' social needs, for instance finding someone helpful/interesting to talk to or exchange content with. To a certain extent, these tools, with their interfaces, affordance systems and "dark patterns"[2] act as a guarantee of a state of "connectivity"[3] state – a sense of belonging to an online global community of individuals. Potentially, this can be seen as a very positive phenomenon, as experiencing it makes users feel confident that they will discover "their own" communities and find solutions to problems relevant to these groups. Meanwhile, communication is impossible without the generation of messages (opinions, judgments[4]) and, therefore, private generation, mass production and broadcasting of potentially influential meanings.

This brings us to the following questions: in the digital space today, who can be considered a producer of at least relevant and local content and, therefore, an influencer?[5] And, in the coming years, which platforms will produce the most influential messages? Perhaps answers to these questions are obvious. Let's say that it is simple to trace the trends of YouTube development as a new educational medium,[6] or to see ultramodern social networks[7] and streaming services as having the potential for constructing participatory communities[8] which together produce relatively consolidated judgments about the ethics of joint action and therefore about the norms of social behavior. These cases already present many challenges for civil society which require the inclusion of cyber-activists of various stripes. For example, is it necessary to develop specific network spaces for services to involve an ever-increasing audience in various projects? Or can this lead to a waste of resources, dispersal, and minimal visible effects for the active community's growth? Who exactly can become opinion leaders and influencers in these systems?

The last question is particularly important if it is transformed into a discussion on whether there will be new influential authors of messages in the digital ecosystem. Further, are they more likely to be machine agents (algorithms, virtual influencers) or more familiar human figures? And how can civil society (represented by NGOs and perhaps other more or less institutionalized agents) contribute to the formation of new ethical norms, preventing these technologies from evolving into a source of alarmism and chaos of judgment overproduction?

Context and problems

The linguists and philosophers George Lakoff and Mark Johnson argued back in the 1980s that everyday life, thinking and activity are riddled with metaphors. Following the Sapir-Whorf hypothesis of linguistic relativity (according to which the structure of a language impacts its native speakers' perceptions of the world), the authors of *Metaphors We Live By* developed the "Whorfian" traditions. They claimed: "the ordinary conceptual system within which we think and act is metaphorical in its essence." Therefore, our linguistic conceptual system determines the realities of the everyday world around us and creates linguistic facts that facilitate the structuring of human experience.[9]

Since the internet has become a mass product, there have been several changes of trends in metaphorical and abstract concepts, which help describe the effect of constituting a special social – or at least interpersonal – space created by technologies. The term "cyberspace," coined by William Gibson in his 1982 science fiction story "Burning Chrome," has been in common use ever since, including within power systems. In 2018, US President Donald Trump signed the National Cyber Strategy, which begins with the words: "Protecting America's national security and promoting the prosperity of the American people are my top priorities. Ensuring the security of cyberspace is fundamental to both endeavors." The concept of "virtual reality" has a similar history. Proposed in the late 1980s by inventor and futurologist Jaron Lanier, today this term no longer exists as an abstract idea; rather, it represents specific popular technologies that make up the continuum of "virtuality-reality" states .[10] The difficult fate of the term "internet" itself and the meanings within it are described in another chapter of this book.[11]

In general, it is vital to pay attention to approaches of defining key concepts for clear discussions about network influencers as agents, and about civic intentions of platforms: "spatiality" and "virtuality." Without them, for network spaces the appeal of development and distribution of meanings will be solely based on an everyday, empirical view of the subject. Meanwhile, the conceptualization of "spatiality" and "virtuality" balances between technocentric and biological metaphors. It seems that theorists and practitioners are reaching for such verbal gymnastics to finally eliminate stalemate discussions about the proportion of "cultural-natural" which had been conducted since the time of ancient philosophers.

So, we can say that there is an "online space" which combines tools, services and agents that are technically involved in interaction by being connected to the network, computer, etc.[12] There are also "digital ecosystems" which are created, among other things, by platform activities and united in the "habitat" of modern agents.[13] This is the environment in which individuals (at least those connected to the global internet) live in today.[14] They do not always have the opportunity to inform others about their "online" (meaning "in touch, connected" and "I am in a special, "virtual place") or "offline" status. To assess the relevance of such a generalization, we need to introspectively analyze individual interactions between users and their mobile device. Although the device may reveal a relatively low amount of screen time, the user's subjective experience can relate more to the feeling of constant connection to "the network." Simultaneously, many everyday activities are conducted using software and apps on mobile and other devices, and literally digitized. In some cases, it is not entirely clear whether it's even possible to carry out simple everyday activities such as ordering a taxi, making a money transfer, paying a bill, cooking a meal or even reading or writing text without living in multi-platform digital ecosystems, largely monopolized by tech giants such as Google, Amazon, Facebook, Apple and Yandex.

It should be noted that ecosystems produced by such monopolies are fundamentally multiple. They are similar in this respect to various physical spaces of community existence. Of course these communities conduct many activities using digital tools and make certain collective decisions. Rather than creating a unified "digital environment," ecosystems shape an archipelago of "locations," whose "inhabitants" have certain anthropological, social, economic, cultural and other habits. These habits are reflected in the construction of meanings, public agendas, and, eventually, in the development of competing regulatory perceptions. Therefore, the application of metaphorical physical interactions to describe this space is something of a winning move: instead of worrying about "technologies" it is possible to think about "people." To some extent, this even correlates with today's widespread concerns about the climate and environment. The discourse of personal "awareness" and collective "responsibility," which generally speaking is rather detrimental to the eco-friendly agenda, is also a good topic for discussions about how technologies of constructing meanings work and who is their subject.

Such disputes can be considered in the context of research and pragmatic problems that interest us. They also can be presented as questions. Who can be seen as creators of meanings in today's internet and its popular services? How and to what extent do the platforms used by these "creators" (whether human or artificial) generate a desirable or undesirable future? What trends and tendencies remain unnoticed, and why? All these problems are of current importance for specific user communities and civil activists.

Weak signals – New agents of meanings: from robots/AI to the deceased

When discussing digital ecosystems, it is necessary to consider the specifics of the agents who inhabit them. An interesting of network agents includes influencers and opinion leaders who produce interesting and useful content for others. First of all, it is important to take a step back from normative anthropocentrism. It assumes that only people (users, representatives of business and power structures) – those who create content and make decisions – can be inhabitants of these ecosystems, excluding agents of other kinds, such as machine environments. The following example may not seem obvious at first. According to statistics published by the International Federation of Robotics, the number of service robots sold is surging year over year.[15] This shows that modern social robots (machines capable of interacting with humans in an autonomous or semi-autonomous mode) are increasingly perceived as deserving the status of objects of a moral relationship.[16] And where there is a social robot, there is software which allows machines to communicate with people in various contexts and formats. It means that a new attitude is being formed towards machines as *inanimate agents* with which, nevertheless, *interpersonal relations* are possible.

This should put a stop to disputes over whether individual entities have the qualities of a moral "agent" (capable of performing actions and being responsible for them) or "subject" (capable of being harmed or benefit). It turns out that the agency of inhabitants of digital ecosystems (and therefore potential creators of local meanings) lies beyond regular binary limits, which are the basis of the symbolic system at the foundation for developing notions of the normative. Does this mean that the potential existence of active robotic agents (both devices and self-learning technologies build on their application) forms some *weak signals* that objectively exist? We could recall here chatbots which were a major presence in users' lives alongside ICQ. Do these signals suggest future strategies and tools for producing important content that develops the agenda of communities which consider themselves a part of "civil society"?

There are several facts of various representative levels that speak in favor of this assumption. On the one hand, according to lawyers working with the Japanese legal system (Japan is implementing the concept of "Society 5.0," which explores issues of human/robot interactions and self-learning intellectual systems),[17] the growing number of robots and related software requires a transformation of how we think about machines. At the very least, it is crucial to update legislation regulating the relationship between people and what used to be seen as their soulless technological environment. It is likely that discussions about what "robotic identity" means and what steps should be taken to recognize "robotic agents" will be needed in the context of legal decisions made by international organizations.[18] How will OECD recommendations regarding guidelines for protection of privacy and cross-border transfer of personal data[19] affect the protection of rights of robots and humans simultaneously?

On the other hand, lawyers and advocates of robot ethics have a long road ahead towards developing new legal conventions and social pacts which will fit in with the previous anthropocentric practices. The very environment of extensive and active distribution of content, such as social networks and business conducted in their spaces, is living proof of existing active agents of a robotic nature. They often act as prominent opinion leaders and influencers, i.e., producers of content/systems of messages meaningful to a certain community.

Perhaps the most relevant example is the virtual model known as Lil Miquela, which has amassed around 3 million Instagram subscribers since April.[20] Since her "machine" status was established,[21] Lil Miquela has been able to demonstrate conventional normality to the world of Eurocentric microcelebrities. This was primarily because she shows standard public behavior conventional to Western "stars." Lil Miquela follows common norms of consumption and production of cultural objects such as recording music and starring in commercials, and serves as ambassador of the liberal value model.[22] She is depicted as a 19 year old girl with Brazilian and Spanish heritage who lives in Los Angeles and works as a model. When combined with principles she advocates (rights of LGBTIQ+ communities, refugees and other minorities), it serves as a starting point for public discussion of injustice, protection of the rights of "others" and about the damage done by perpetuating the binary metaphoric of "us" and "them."[23]

It's worth noting that this position, as well Lil Miquela's ontological status, makes her a near-perfect inhabitant of digital ecosystems described above, the very existence of which demonstrates the value of multiplicity, including the multiplicity of agency. This virtual model acts as an influencer in ethical and business fields. Thus, in April 2019 she launched a fashion label and, given that *Time* magazine included Lil Miquela in its list of top 25 online influencers,[24] the future of this yet niche brand is looking bright.

The second case, which demonstrates the power of weak signals to a greater degree, is chatbots and 3D models based on digital traces of deceased people. There are several commercial projects working with such transhumanist ideas.[25] There are also examples of non-commercial digital projects such as Dadbot, which promote lifting taboos on discussing death and aim to ease the traumatic experience of the death of loved ones.[26] Let's consider the development of these technologies from the point of social sciences. It is easy to see how their implementation works for the purpose of the death awareness movement[27] whose aim to shift the perspective of death from a hushed-up practice removed from everyday life and almost hidden away at hospitals to a fact that requires critical comprehension. However, these technologies give another *weak signal* about disruptive technologies, noted by today's scientists and futurologists.[28] By recreating habits of people who have passed away, developers are advancing the development of autonomous "machine" companions – robotic systems able to distinguish and reproduce emotions and artificial consciousness (at least in the version of "strong artificial intelligence").

We have now encountered virtual influencers and seen an emerging market waging digital war against death, which in the long term could lead to "digitizing" the consciousness of the deceased. But can we say these technologies truly have an impact on the construction of meanings? Yes, they do. First, the examples of "artificial" agents which naturally inhabit digital ecosystems produce original content and statements. Frequently, as in the case of Lil Miquela, such statements are elements of the popular agenda and become an additional driver for its implementation. It is notable that these agents demonstrate an ability to participate in moral relationships by declaring an active personal identity. They literally introduce themselves as "I" or "we." The philosopher Jean-Luc Nancy has written extensively on community theory. He assures his readers that meaning is established by the desire of the agent. Where there is an agent, there is a meaning, it is existential.[29] In other words, if we see and recognize the capabilities of inanimate entities, we may have to acknowledge their claim to be sources of meaning contained in various messages.

It is reasonable to ask the following question: what is the role of civil activists in this system? So far, as shown by the most prominent virtual influencers, it is civil cyber-activists and other communities, sensitive to issues of protecting people from any form of discrimination, who counteract emerging ethical violations, often claimed to be due to "oversight."[30] By uniting into active communities (with varying degrees of success[31]), cyber-activists organize social campaigns such as flash-mobs, which may send a powerful message. What is likely to change?

NGOs and other institutional agents of civil society should be able to create their own virtual characters acting as ambassadors of various agendas. Lil Miquela already acts as a conduit of human rights messages, in particular speaking out against racism, sexism, and homophobia. So why not invest resources in virtual characters who will be fully engaged in educating society on protecting human dignity or the values of humanism? Chatbots and 3D-models based on the digital footprints of people who have passed away can also actively promote ideas of the progressive agenda. It is already possible to "reanimate" famous people for the sake of entertainment (for example, Tupac Shakur appearing during 2012 Coachella). This shows it is perfectly possible to use similar technologies for more meaningful purposes.

So far, the community of content creators is being expanded at the expense of automated, frequently largely autonomous agents, and remains of low interest to major markets. At the present time, civil activists could become the first to form a new community of inhabitants of digital ecosystems, built on the foundations of loyal and equal partnership with machine actors. This would make it possible to overcome alarmist pushback, which is rooted in the division between the “digital world” and “living agents,” AKA people.

Probable, desirable, and undesirable futures for technologies of constructing meanings. Platforms, formats, technologies

Agents that construct meanings operate in particular digital ecosystems. As already pointed out, digital ecosystems are organized by consolidating the experience of using certain multiplatform services.[32] These services, often related to communication tasks, are the most visible part of digital infrastructures that every consumer is aware of. Therefore, based on their development, it is relatively easy to imagine the digital presence of civil society and to look for probable, desirable, and undesirable images in an inevitably approaching future.

1. Thus far, the most prominent and probable development of these platforms, whose users are engaged in communication and therefore the production of meanings (including socially significant), can be created by observing the story of YouTube. Today, we usually see YouTube as a space for the distribution of visual content. However, it is impossible to deny the significance of communication produced around such visual objects and within the audiences of makers, consumers, and curious bystanders.

This video hosting site, which will soon turn 15 years old, has become a full value blogging platform in recent years due to the activity of its users. Despite the emergence of native video formats in more modern services (Facebook

Watch, Google IGTV),[33] as well as experimental applications such as Vine from Twitter and the relatively stable Snapchat, TikTok and LIKEE, and despite the periodic blocking of the service (owned by Google)[34] in China, YouTube has not lost its position as one of the most influential platforms for vlogging. This means that it continues to be a location, an element of the Google ecosystem, in which people are accustomed to sharing experience, knowledge, and emotions.

It is very true that over time YouTube has become popular, but perhaps not quite in the scenario envisaged by its creators in 2005. For example, it has become something bigger than just a video hosting site. Today, in 2019, it is a powerful and facilitating platform from the marketing perspective, which unites producers and consumers of meanings and potentially turns them into prosumers.[35] In fact, anyone who uses YouTube in any capacity has already overcome the division into producers of messages and the objects of their influence. This person has become an essential participant in the permanent production of meanings in the form of UGC-content.

Simultaneously, YouTube has often, and for a relatively long period, been called a platform that has affected professional markets disruptively.[36] The goal of producing content could not but result in the emergence of such professionals as videographers (not to be confused with producers and operators). Almost everyone who creates messages, and therefore acts as a content-manager, develops skills as designers, producers, or SMM specialists.[37] Imagine that every member of the YouTube community could bear in mind that any content might turn out to be an element in the development of the platform. Then there might be the hope of approval of the norms of less discriminatory online communication.

Interest in blogging as a technology for documenting private daily life, and the possible promotion of "best" practices (as viewed by a producer of meaning), has to some extent been dictated by the rapid development and long market presence of services such as YouTube. This currently represents a kind of status quo. If the presence of weak signals is enhanced in this context, it is possible to build *a probabilistic future*. For example, the market of VTubers – virtual vloggers, appeared in Japan in 2018.[38] The development of this market will potentially contribute to a growth in user awareness regarding the new non-anthropocentric situation of digital ecosystems, and lead to increased investment in other industries and technologies, such as video games and VR. These industries, often undervalued by traditional social institutions and cultural industries, may be of interest to civil activists and NGOs. Through so-called recreational spaces, relevant production practices, and broadcasting of meanings (e.g., video games[39]) it is possible to organize mutual assistance networks and other peer-to-peer projects which support interaction between equals. To develop this future, where recreational ecosystems support safe spaces, it is necessary to work on the ethics of recreational behavior of producers of meanings (both real and virtual) in those environments that are most accessible to a wide audience. Only in this case can popular and familiar technologies, formats, and platforms gain greater importance in approving an agenda that is socially fundamental and responsible in a progressive way.

2. *The desired version of the future of digital presences in civil society* can easily be constructed on the basis of the probable future. This desired version can be associated with the multiplication of content distribution platforms customized to the needs of particular users.

There are probably at least two variants of the development events (although there may be many more). It is important to notice that each of them can turn the future into a particular digital dystopia.

The first entails multifunctional platforms that will offer content publishing in an increasing number of native platform formats, and grow as industry monopolies dominate in the future. The strongest “live” or virtual influencers will appear in these spaces. Facebook in the U.S. and VKontakte in Russia can be considered such monopolies, and Yandex is seeking the same status. The downside of this scenario is the formation of a kind of "co-dependent relationship" between the service customers and the platform itself. This kind of relationship often results in increased interest in platforms from various governmental agents and the state, which believes in the possibility of censorship legislation covering network interactions in general and their specific representations in particular social networks.[40] This legislation could serve the idea of protecting user rights (for example, the right to protect personal data or honor and dignity). In this case, the platforms themselves will become more attentive to the communication microclimates in which their communities live. Transforming this microclimate from "toxic" to "safe," the monopolies that are already popular among users gain even greater power. When this happens, the desirable future of civil society digital presence will mirror the *probabilistic future*. If large top-rated services can become a platform for discussion and implementation of the ethics of humane online behavior, then responsible self-presentation and dialogue of free citizens/communities will become the norm. Virtual producers of meanings (returning to the question of the agency in digital spaces) as significant participants in the communication process can guarantee the quality of this dialogue.

The other variant looks like a libertarian's dream: a more competitive situation will develop, leading to growth in the platforms' market, which in turn will provide communication and, consequently, the exchange of meanings. Thus, consumers of communication services will be able to choose a platform (as well as an interface, system of functions, and affordances) without fear of ostracism, stigmatization, or censorship. This case presupposes the gradual refusal of users to belong exclusively to the digital ecosystem of the company that owns the relevant service. The technical problem to be solved under such a scenario is the limited ability to broadcast and perceive any messages and meanings provoked algorithmically by the filter bubbles and echo-cameras.[41] Even now, with multiplying platforms, there is a remarkable "segregation" of the inhabitants of the digital ecosystems (look at how "progressive" users of VKontakte treat "Odnoklassniki" users[42]). This fragmentation of users into communities often points to the success of marketing efforts of those monopoly companies, who want to own particular platforms and particular users, and at their expense develop particular ecosystems. Also, this situation is more likely to indicate the convenience of specific, socially irresponsible programming solutions that work well in terms of their implementation in business tasks.

The most notable example is TikTok, which originally operated as the Chinese Douyin social network. The interface of this application has 38 language options. However, China continues to promote its own rather authoritarian approach to the digital domain in the post-colonial but still Eurocentric world. In 2018, TikTok had more than 500 million users in 150 countries (for comparison, this number is much larger than the number of users of popular platforms like Twitter, Tumblr, LinkedIn, Snapchat, Pinterest or the Twitch streaming service in the same year[43]). At the same time, a significant percentage of the non-target audience, i.e., "adults" (over 16-17 years old), may not know about it at all.[44] TikTok offers its users a relatively safe microclimate (in this app it is easier to earn positive reactions from other users) and content production tools that are user-friendly but complex in their effects. TikTok is not often recognized as having a large and significant community and ecosystem, primarily due to its young user base. So, constructing an image of the desired digital future of civil society, especially one based on the libertarian model, requires moving away from simple business decisions and various schemes that deprive the users of agency.

Whichever variant development of multiplatform production of meanings and ecosystems wins, it will require careful attention from civil activists. In the multiplatform situation, the ability to create representative content on platforms that is important to users, and the potential to build a community centered on content are critically significant competitive advantages. The chance to be heard will increase if the voices of NGOs or other communities interested in concurrent sociocultural problems and faults can be heard on different platforms. And if these voices are able to use the advantages of these platforms (e.g., all the tools for creating native content or virtual characters), are aware of their differences, and differentiate between "native" public groups, there will be an opportunity for these voices to be heard and noticed. Perhaps there will be an opportunity to unite these audiences in a single community, not limited by the framework of any given platform.

3. Finally, there is the variant I have called the *undesirable future*, which is not as difficult to define if we pay heed to the possibilities of the *dangerous trends* mentioned above.

The growing number of communication services and the transmediation of content seem to be the most obvious trends. Information overload arises at the individual level.[45] However, at the level of social interactions this can lead either to the formation of a relatively powerful lobby of neo-luddites,[46] or, on the contrary, to the development of slack activism[47] ("sofa activism," the habit of "expert" online activity with minimum results).

The latter practice means reification and commodification,[48] and is transforming activism from a fight for justice into a commodity, a traded good. Many conservatively-oriented critics already believe that behind cyberactivism there is often a desire to restrict freedom of expression and impose new censorship restrictions.[49] If the intention to introduce "public control" turns into a situation where we have a new type of public court, the policing of "likes,"[50] and other repressive practices based on the demonstration of the microphysics of power, any attempts to get rid of the potentially stigmatizing binary metaphor of "digital domain" will become its complete opposite. Thus, instead of setting up a relatively safe space for the production of multiple meanings, which is the right of any agent in a moral relationship, we will get a new type of segregation which will be based on an appeal to ethical norms which do not yet even have clear frameworks and representations.

In lieu of a conclusion: Known Unknowns or New Digital Ethics and Civil Activism?

As philosophers believe, the true future is not what will happen to us, but what will happen without us.[51] Therefore, any futurological assumptions are formed through our current perceptions of what is normal and normative. Our known unknowns are those shadows of the possible tomorrow that we see today. We have not developed regulations yet (but due to the old habit of institutionalization we already assume that they will be helpful).

The future of the construction of meanings and the coming tomorrow itself are inseparable from today's struggles for the ethics of joint actions and the moral and ethical (self-)limitations of co-existence. It is evident that even now civil activists are fully involved in relevant activities as agents. Obviously, to achieve better results in establishing their agendas, they need to pay attention to those weak signals, as well as the potentially robust constructive and creative solutions that the digital environment throws up as developing ecosystems, their agents, and platforms. However, it is not entirely clear how we define the boundaries of ethical decisions. How ready are we to bring together the ethical and other assessments of public activities? To what extent can we protect any agent of production of meanings (those which are habitual or those which are new – born in the "machine" environment)? And can we concentrate our civic efforts not just on solving familiar problems, but also discussing issues that are only just becoming relevant, and distinguishing which we need to engage a habit of scanning the horizon for?

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Endnotes

1 A statistics digest on communication service usage. URL: https://www.brandwatch.com/blog/amazing-social-media-statistics-and-facts/#section-2 (retrieval date 31.07.2019).

2 *Affordance* – an object or environment property which allows it to manipulated. Affordances are widely used in web design and inscribed in interfaces. The most familiar affordances are virtual buttons.
Dark pattern are types of user interfaces (sets of means and methods of interaction between the user and the device) which exist for special management of human interests and activities. The simplest example of a dark pattern is manipulation of newsletter subscriptions, frequently issued by default to users of a service.
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7 They include Snapchat, TikTok and LIKEE, designed for creating short music videos and live broadcasts and sending messages.

8 Participatory (or in this case active) communities allow for joint participation in certain activities, direct creation or participation in product creation. For more on participatory culture (or culture of complicity) see: Jenkins H. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century*. Cambridge: MIT Press.

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Rethinking Digital Inevitability: How Digital Futures Might Shape Information Sovereignty, Memory and the Environment

Prologue: an automated new world

The year is 2022. Almost everyone has an "Auto" – a super-app, a digital personal cloud-based assistant, helping organise the user's everyday life. Work meetings, celebrations and holidays are arranged automatically, based on the analysis of past events and preferences. Once finished, their record moves into an online archive. All the incoming social media traffic is automatically sorted; likes, RSVPs and comments are made by the Auto on the user's behalf, leaving only the really urgent or important information for the user's attention. Dating and personal relations are based on a compatibility index, run by the Auto and based on deep analytics of existing data and future predictions; successful weddings are planned by the two people's Autos together; and sometimes, the relationships end if an Auto predicts a high likelihood of one partner's deviant or dangerous behaviour. Life is connected, everywhere and at all times – connected to the web, sensors, cameras, screens and personal gadgets. All information about everything is located on the Internet, and the only way to tap into is it is by using an Auto. Each person can only have one Auto – a legitimate, verified, and unique digital identity, which is supposed to be immune to fraud or replication. All life is entirely transparent, except for the small group of "noninternets" – unconnected citizens who leave no digital trails, do not have Autos and, therefore, do not have access to the Internet. Interpersonal privacy, of course, still exists (privacy settings are active and widely used), allowing navigation of specific interactions, conversations or spaces. Digital invisibility, on the other hand, is impossible – there are no secrets from one's Auto. Instead, there is immortality: after death, the deceased person's Auto changes status to "unloving" and continues to exist, post, and communicate with both its living and unliving digital friends, using compilations of phrases and behavioural scenarios from the deceased's life, analysed and shuffled by the Auto's artificial intelligence. Family and friends visit their departed ones, by calling their voice-activated Autos, or by coming to the cemetery, where *tombstones come to life when "looked" at by the living through special augmented reality glasses.*

Digital Inevitability

This is life as it is described in the sci-fi novel, *Auto*, published in 2013 by the British author David Wailing,[2] telling us the story of a very near future to come. Despite its exaggerated nature, common to the genre of sci-fi dystopia, this life resembles the kind of future, often described in policy and popular science, where futurity and the digital are metonymically intertwined, impossible to imagine without one another. The internet, personalised gadgets, and Big Data, we are told, are going to be incorporated into, support and govern all aspects of civilian, economic, political and private life. Creators of digital technologies and policy makers of digital transformation offer us scenarios of a near future, where cities are smart; cars drive themselves; banking and production processes are fully digitised; nature is saved form degradation thanks to smart planning of resources; and citizens are moving effortlessly from one augmented reality screen to another, while remaining connected to each other. All digital services are carried out through personalised devices (bracelets, smart watches, phones or other Wi-Fi-operated gadgets that are positioned on or close to one's body). Every service is adjusted based on individual preferences and geolocation; every move is calculated and registered.

Not everything is flawless in such public futuristic imaginaries. Sceptics remind us that in order to move to a fully digital future, we must consider the need for digital literacy: that without understanding the work of algorithms, netiquette and on-line safety protocols, digital automation is neither feasible nor effective.[3] We are also reminded that it is crucial to remember the high costs of digital gadgets; the affordability of digital connection and other issues of digital inequalities – what is known as the "digital divide," which includes individual differences in wealth and education, as well as larger geo-political disparities in access to communication infrastructure, without which a digital future is not possible.[4]

Those concerned with social justice emphasise that a successful digital future is contingent on democratised affordability of digital technologies – whether with regards to money or skills and literacy – in other words, that digital education needs to be widespread; and that all devices must be universally affordable.[5] However, despite the critiques and the caution, no one disagrees with the advantages of digital technologies themselves; no one challenges the overall attractiveness of digital futurity. I call this a paradigm of "digital inevitability": when the fact of the future being digital is predetermined, fully accepted and rarely challenged, and so the only matters debatable are strategies of achieving justice in distributing digital resources and access.

For most protagonists of Wailing's novel, just as for many of us today, the comfort and convenience offered by this digital inevitability conceal just how problematic it already is (and will become even more so), for personal life and for civil society alike. And this is not only because the automated life of the near future is seamless and appealing, but also because our notions of transparency, in/dependency, memory, freedom and even life and death are changing. For example, Wailing describes a growing threat to freedoms and the disappearance of anonymity: online communication, everyday activities and even information search cannot be anonymous and traceless. Similarly, in his book there is no anonymity of the body. Temperature, breathing, heart rate etc. are routinely recorded and monitored by a range of sensors; and this information can be used for a range of purposes, both in the immediate moment – for example, when heart rate or blood pressure indicate an emotional change – as well as in the future, as evidence. Travel, physical movements and activities in one's home or in public spaces are noted and documented by various gadgets; analysed by algorithms; and used in future planning.

Yet, instead of being terrified by these developments, citizens in Wailing's near future have full and utter faith in digital data and its necessity. Data will protect their health, they believe; data will find the best travel routes; offer most efficient city planning; data will protect personal safety; combat crime and defeat death. All this sounds deeply familiar to our realities today, where the cult of data characterises both the so-called democratic and wealthy societies, and those that are more authoritarian, and/or economically struggling. Ironically, in the world of poverty, injustice, tyranny and corruption many tend to believe that the AI would be more impartial than, for instance, a corrupted judge or a policeman. And this despite the fact that research has already clearly demonstrated that algorithms and the AI are not neutral; that they recreate and enhance racial and gendered stereotypes; that they serve the powerful; that they are based on the logic of profit rather than the logic of justice; and they continuously and substantially interfere in the process of information access.[6]

Digital and networked memory is vulnerable

In many ways, the convenient but terrifying future described by Wailing already exists in the present, even if in a somewhat experimental form. For example, digital technologies are already playing a substantial role in shaping and functionality of individual memory. In the last decade digitisation of memory has dramatically increased, and the process is ongoing.[7] Our phones are remembering phone numbers and contact details of other people for us; diaries, calendars and reminder apps keep track of our exercise, eating, sleep and menstrual cycle. Our photographs live on various "clouds"; and everyday moments – what might be called *the archive of the everyday* – are spread across social networks, sites and communication platforms.

Beyond the individual, digital technologies are central to reorganising collective memories, too – whether organisational, community-based, or even in broader socio-cultural contexts. Businesses and governmental services (taxes, voting, paying bills) are going paperless, creating logs and archives that are simultaneously individual and institutional. Today, most organisations hold substantial digital repositories: emails, reports, data etc. Libraries, museums and collections are actively joining (or planning to join) the process of digitisation, knows as Digital Humanities, where heritage, past histories and current cultural production are formatted, catalogued and accessed via digital tools.

Digitisation of cultural artefacts is not only about a more convenient way of curating or providing a better access, that transcends physical distance, for example, when one can virtually "visit" museums and libraries across the word without leaving one's own room. Furthermore, it is also about reconsidering the very idea of an archive. Digitisation allows us to seek, find, retrieve and analyse information on a completely different level: we can code, describe patterns and tendencies across large corpora of data; and "slice" data in various ways, that was not previously impossible. At the same time, our approach to cultural heritage is changing, too, especially when it comes to the threat of disappearance. Today, to *preserve* often equates to *digitise*; and digitisation, in turn, has become a synonym of preservation. This is particularly true for groups and communities, who are denied a voice and presence in traditional historiography, often due to reasons of censorship, ongoing political contestation, or other forms of conflict, where histories are violently erased, and where physical commemoration can be an act of resistance or treason.

It seems, then, that it becomes harder and harder to imagine a future without such mnemonic possibilities. As platforms and gadgets expand their presence in our lives, and as our daily experiences of creating and accessing memories becomes more integrated with digital technologies, it could very well be true that in the near future digitisation of memory would become almost complete. However, one must consider carefully and critically, what such a future might entail. First of all, excessive reliance on digital technologies can weaken our memory, when we delegate all responsibility to memorise and hold information to computers, cloud storages and the AI. And this is not just about the decline in individual mnemonic skills – something that psychologists and educators have been warning about for a while[8] – but also about the possible destruction and disappearance of entire cultural segments.

A case in point would be the numerous efforts to preserve oral traditions, for example of small remote communities or in cases of rapidly shrinking numbers of native speakers of certain language, often in Indigenous and native communities, destroyed by settler colonialism, state expansion, and generations of forced assimilation. Preservation efforts, often led by outside experts (ethnographers, linguists, anthropologists), are carried out via digital recording and subsequent online archiving, as well as via various projects where traditions are shared and displayed in social networks and virtual museums. Here, the traditions and the disappearing heritage are indeed preserved, but *only* for those who are themselves digitally literate and have access to the internet. This, de facto, means that such digital future memories are accessible only to those in the younger generation who are in possession of digital tools and skills, or, more often, to those outside the community whose life, history and spirit are being preserved – the researchers, the "experts," and the international audience. This way, instead of nurturing and supporting communities' own ways of knowledge transmission and preservation, and placing the ownership of the process in the community's hands, digital memory creates a dispossessed heritage, once that is dependent on digital skills, which, in turn, is dependent on platform power and the digital economy as a whole.

Dependency on platforms and algorithms, in turn, can lead to the loss of control over the process of archiving and, ultimately, result in the loss of the archives themselves. This danger is particularly acute for those whose collective access to heritage and history is subordinate to state and/or expert powers; but in some respects, this same danger lingers for everyone. Consider, for example, the ways current social media platforms such as Facebook mediate and control access to one's own digital memories. Currently, Facebook allows its users to access events that took place on the same day but in previous years, via the "on that day" feature. Past posts are often added to one's feed by an algorithm; and users are actively encouraged to share their "memories." Free browsing of future posts, on the other hand, does not exist as an easy option – one can manually scroll through feeds by year, but such scrolling brings inaccurate and incomplete results, and at some point, the loading crashes when too many past posts are brought up. The archiving architecture of Facebook, in other words, is about persistent, algorithmically structured recollections and about networked and performative remembering – but in a structured, controlled and limiting way.

Furthermore, the architecture and the terms of use, on Facebook or any other platform, can and do change over time, expanding or minimising access to one's memories, without warning and consultation. What is not available today, might be offered tomorrow; and vice versa. Access to memories can be restricted; or they can force-flood our screens, catching us off guard.[9] Platforms can be bought, go bankrupt, close down or change owners, modify their terms of use or delete their archives entirely – due to their own preferences, or because of political pressure. The future of memory, in other words, is already intertwined with techno-autocracy, hostage to platform gate-keeping, and political and corporate guardianship. All this poses a major threat to information sovereignty – and I am using this term more broadly here. Traditionally, information sovereignty refers mainly to the states' ability to control information flows within their borders, without external interventions – however, here I wish to make a point by expanding the concept of information sovereignty as a tool to think about our access to our own digital heritage – be it personal, communal or ancestral.

With such a critical understanding of information and memory sovereignty, our view of digital memory is transformed; and our beliefs are re-evaluated. Digital archives carry an illusion of precision, neutrality, and timelessness: we think that Facebook does not forget; that photographs and videos do not lie; that digitised libraries do not have secret rooms and closed storage the way physical museums do; and that everything, saved on a cloud storage, will live there forever. However this is a dangerous illusion: digital memory *can* be timeless and firm; but it is neither impartial nor always precise. On one hand, today digital memory is already tied to unique personal identification (an email, a profile, an IP address, phone or computer details) and can already create an extensive and permanent digital trace: search results of all searches one has ever conducted on Google or Yandex; one's personal digital dossier, documenting social media behaviour; an archive of online shopping; taxi trips and other journeys; and much, much more. In the future, such a digital dossier might become all encompassing, just as it did for the protagonists of *Auto*. The digital dossier will record and monitor all spheres of life, coordinating and controlling *all* databases – personal, corporate and state-owned. Such dataficaiton should be a matter of concern, because of its potential totalitarian power; and also because it might lead to complete individual powerlessness and loss of rights.

On the other hand, digital memory is not always impartial, and not always precise. For example, our everyday archives on social media are ridden with silences, exaggerations, and self-censorship, which would not be visible to an archaeologist of the future, and which are sometimes forgotten by the archive subjects themselves, when they look back at their digital memories. Behind every post, selfie, or story might exist a completely different reality, one that may no longer be remembered. What becomes the digital memories we rely on are distortions, beautifying, and sometimes straightforward lies; deleted posts; removed images; not to mention political censorship and large scale blocking of whole sites and domains.

State archives, museums and libraries can have similar flaws, because their very existence begins with deliberate decisions regarding what to digitise and what to leave out (read: what is to be allowed into the digital future, and what is to be relegated to oblivion). Digital archives are not untouchable, and not ageless: their authors or owners can edit them after the fact; they can be arrested by police or state bodies. The hardware they are made of may become obsolete – How many of us remember what floppy discs are? How many of us own one and can access its content? Servers may get damaged by flooding or overheating, destroying the keys to our past forever.

This hope that digital archives are indestructible – "everything can be found – nothing is lost" as the popular Russian joke about search engines goes.[10] The seemingly endless storage of digital memory – another illusion, supported by both the expanding sizes of many free cloud services, and by the affordability of the paid ones – conceals the fact that digital archives are unreliable and fragile, and increasingly dependent on natural resources to sustain them; and these resources are finite.[11] The finite materiality of the digital world is invisible, until the moment when the rising cost of storage comes up, as it happened, for example, in Wailing's book, where some Autos of dead people continued to enjoy a luxurious afterlife, while the functionality of others was severely cut off after they were moved to cheaper servers because the families could not afford the cost of full "unloving." The finite materiality of the digital comes up when a server is hacked and precious memories are lost. Or when we consider the possibility that a server, holding the data which our precious memories are made of, may become flooded with water or run out of energy to continue its operation.

Digital toxicity

I would like to pause here and dwell on the materiality of the digital for a bit longer. At present, the topic is rarely addressed by humanities and social science researchers of digital technologies. Among media scholars we see what Sibo Chen has aptly described as a belief in the "digital sublime": as if our digital world is full of disembodied ideas, texts narratives, semiotic structures, and nothing else.[12] What is left outside of our field of vision, here, are the metal and plastic of which our computers and smartphones are made of; the infrastructure of cables and servers; as well as the graveyards for digital devices after the end of their short lives, made disposable by design.

It is no wonder, then, that digital technologies are still perceived not only as environmentally neutral, but also as specifically *good* for the environment. For example, moving to paperless services – which are saving trees and minimise paper waste – are seen as a great alternative to traditional offices. Among environmentally-oriented organisations and projects which focus on the so called "sustainable futures," digital technologies usually play a key role. Virtual modelling is seen as a green alternative to traditional ways of production, be it clothes, building environments or many other objects of everyday use. Modelling, just like paperless offices, reduces the use of raw materials and the flow of waste, since a large share of the process is done virtually. Similarly, organisations and services dedicated to environmental protection rely on digital technologies in pretty much everything: sensors collect data or warn around natural disasters; scientists rely on big data analytics – and often claim that in the future, environmental protection will be fully computerised.

This kind of digital futurity is particularly present in public and policy imaginaries of smart cities. Although the main aim of a "smart city" is management and efficiency of urban operations, rather than necessarily environmental protection, almost all smart city projects have an ecological platform. Some argue that air pollution is will be reduced when sensors monitor, and big data analyses pollution levels and CO2 emissions, directing flows of traffic accordingly and sometimes alerting citizens about dangerously high levels of pollution. The same forms of monitoring and data analytics will calculate the pollution of land and water, and devise appropriate strategies such as planting trees or redirecting water flows. Other smart cities plan smart bins and smart waste management: the bins, equipped with sensors and wireless communication, would only be emptied when necessary (thus reducing carbon emissions from unnecessary travel of waste collectors); all the while educating citizens about correct recycling. And yet others promise to give control over the city's life to the residents, by creating accessible dashboards containing all data about the city.

Material damages inflicted by the digital are rarely discussed, both by the smart city enthusiasts and by the researchers of digital society and culture, and that despite the wealth of evidence and studies in the fields of energy, geography, environmental science and human health. The mining of the rare metals needed to produce our devices is itself a process ridden with toxic leaks, poisoning the ground, rivers and seas, and destroying whole co-systems and displacing communities. Equally if not more toxic is the e-waste generated by the discarded digital devices, which do not go to die on the cloud, as it were, but literally end up buried in the ground, in e-waste disposal sites, poisoning the water and the people who work there.[13]

Digital technologies are toxic not only when they born and die; but also throughout their existence and use. Wireless communication systems, as well as every "smart" (i.e., wireless or cellular) device have electromagnetic radiation, potentially harmful to humans and animals. Underwater cables create ultrasound signals which are damaging to sea life. Server farms emit large amounts of heat.[14] And all digital data and the way it is stored and transmitted have very high energy demands. According to some scholars, the internet is already consuming 10% of the world's electricity, a figure that grew from 8% in 2012 and continues to grow.[15] The carbon emissions of digital communication are approaching (and, as some argue, have already exceeded) that of air travel.[16] The lead culprits are big data and AI training; followed by social media, cloud storage, bitcoin mining, internet search, emails.[17] And, considering the progressive growth of the digital world – its devices, platforms, archives, data – today's statistics are only bound to grow, and very, very rapidly at that.

Rethinking digital inevitability

So, is digital inevitability as attractive as it seems? What will happen to civil freedoms, to history and collective memory, if all predictive scenarios are controlled by algorithms, which, in turn, are serving governments and corporations? If archives and memories are scattered across various communication platforms, comply with their laws, are recorded and indexed, and can be either kept forever, or erased momentarily, and all without any consideration of our wishes? What will happen to our health and our environment, when the toxicity of the digital exceeds all safe levels, and when the energy demands outgrow the available resources?

Among scholars of digital technologies in social sciences and the humanities, but also in industry, business, and economics, the paradigm of digital inevitability is currently prevailing. Here, I want to specifically focus on the social sciences and humanities scholars. There are, of course, many critical voices. For example, theorists of digital surveillance and civil rights in the era of datafication warn about the dangers of high levels of biometric recognition and everyday surveillance, leading to almost total transparency and control.[18] But even they argue that surveillance and transparency can work both ways, creating "horizontal surveillance" and possibilities of "sousveillance" (recording activities by those participating in them, often by small wearable cameras).[19] This might offer citizens more control and autonomy in relation to state institutions; it can make law enforcement more accountable, and thus, make governmentality more democratic – or so goes the popular belief.

This, of course, is a matter of interpretation, and there are always more sides to the story. Digital technologies can be improved; they can be used in different ways, at times moving far away from their original design. Technologies created to support state surveillance can be used by activist groups and human rights observers. Platforms designed for corporate gain can be used to mobilise against corporate powers. Scholars of everyday digital sociality remind us that user creativity is boundless, and that the limits of platform affordances can always be pushed. However, the two- or multi-sided story will remain limited, as long as it is trapped within the paradigm of digital inevitability: assuming that technologies will always be there, the debate will remain constrained by questions of how to change or improve them. But what if we ask an entirely different question instead:

What kind of future might we have, if digital technologies are not only equally distributed and horizontally transparent, but also have an off switch or a way out?

On the level of individual users or groups, this is a matter of being able to legitimately exit the world of total connectivity, if one wishes to do so. If a digital future is indeed inevitable, it must have not only the right of equal access, but also the right of refusal – the right to not be part of the database, the right to not be connected, which would not lead to discrimination and full exclusion from comfortable life, freedom of movement, financial security, and full participation in civic life. In practice, this might look like this: services (transport, banking, welfare) should not be completely tied to owning a smartphone or accessing the net. It might also look like the right to withdraw and recall personal data, collected by the state or private companies. Or it might look like the right to move around freely without compulsory biometric registration. Or it might look like the right to have no digital memories; or to have them un-digitised at will, leaving no digital trace afterwards.

On the level of society as a whole, rethinking digital inevitability is a paradigmatic shift. First of all, digital inevitability, especially in the case of multiple and centrally controlled databases and the all-encompassing web of always-connected smart devices, means too much freedom for governments and corporations, and too little control for ordinary citizens/civilians. But above all, the progressive growth of digital technologies *in the shape and form we have them today* is leading towards a planetary environmental catastrophe.[20]

Rethinking digital inevitability does not mean living in the woods or moving back to the stone age. We do not need to reject scientific progress, or ignore the usefulness of digital media where it is due. What we do need is a fundamental change of perspective with regards to digital technologies, as a synonym of desired futurity. Each time we imagine or plan a future, instead of considering digital solutions as the default option, we should untie the metonymic connection between "futures" and "digital," and ask instead: is this digital solution the best? What are its consequences – for individuals, for society, for the environment? Where are the possible ways out of this digital plan, for those whom it may not fit? And most importantly, what are the alternatives?

Epilogue: a non-digital future?

The first person encountered by Wailing's readers is Michael Walker, a former internet guru, a hacker and information freedom fighter, who tried to bring down the internet after the introduction of "International Internet Regulations" – a fictional law, permitting only one digital identity per individual and instituting complete digital transparency and surveillance of online actions. After a few years in exile, equipped with a fake ID and a face transformed by plastic surgery, Michael returns to the UK, this time to finally destroy the entire digital infrastructure.

This is a typical scenario, boringly common in many western sci-fi films and books, where a lonely hero (usually a male hacker), fights the entire information system all by himself. In reality, however, change and transformation are a collective effort.

So what can civil society do? First and foremost, we must consider the expansion and even transformation of the very notion of civil rights in the time of total digitisation. These rights need to include control and ownership of one's personal digital data – akin to the European General Data Protection Regulation (GDPR) – and the right to withhold it from states and corporations. Furthermore, this also includes the right to refuse digitality altogether, without losing access to benefits and public services, such as transport, welfare, banking, billing, etc., without being tied to owning a smartphone or accessing the web. In other words, the possibility of living without digital technologies should not compromise the civil rights of 'noninternets', and should not lead to discarded lives, outside the safety of a convenient and safe life. Similarly, the right of refusal includes freedom of movement, not contingent on digital IDs and biometric registration, currently used by many inter-and intra-national border regimes; as well as the right of protection from facial recognition technologies in public places.

Realistically speaking, achieving such rights in the immediate future is unlikely, and civil society therefore should explore active forms of resistance such as collective deletion of social media profiles, as a protest against platform data mining and privacy policy;[21] and proactively working on alternative forms of social care and protection for those excluded from digitised civic life, such as grassroot mutual aid or non-monetary exchanges.

Secondly, civil society needs to play a leading role in rethinking digital inevitability more broadly, in ways most suitable for concrete geo-political locations and socio-cultural contexts. A one-fits-all solution would not work here. For example, for those living in the immediate proximity of data farms or e-waste disposal sites, health concerns might take priority, orienting the organising around resisting the creation of new toxic sites, and demands to remove those already in existence. At the same time, those located far away from such sites, the question of environmentally sustainable devices or clean energy might remain in the realm of abstraction. Here, the role of civic society lies in creating a sense of collective accountability, and promoting alternatives; reducing the use of digital technologies; repairing, rather than discarding, current devices; or supporting more sustainable alternatives.

Similarly, no universal solution exists for vulnerable and ephemeral digital memory. When memory is already deeply integrated into, and dependent on, existing social networks, platforms and cloud services, civil society can and should develop skills in alternative storage. The effort here, first and foremost, is empowerment away from state and corporate control – but equally, this effort needs to support environmental resilience of virtual memories. One such alternative could be the return to paper archives through a process of de-digitisation. At the same time, those individuals, organisations and communities whose oral or visual heritage exists outside the digital might benefit most from protection from digitisation, and supporting other, non-digital, forms of intergenerational cultural transmission instead.

No one can foresee the future. Perhaps, in a decade or less, everyone would come to be fully and entirely dependent on automation, AI and full transparency and surveillance, akin to that described by Wailing and other sci-fi authors. Or, perhaps, an environmental catastrophe would lead to complete destruction of digital infrastructures, with both the digital social life and the powers that control it disappearing in a blink of an eye. Civil society needs to be ready for both of these scenarios – as well as other possibilities – starting today.

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Endnotes

1 I am grateful to Esperanza Miyake, a dear colleague and long-term co-researcher and co-author of works around digital disengagement. Many of the ideas discussed in this article are discussed in our joint publications – see Kuntsman, A. & Miyake, E. (2019). The Paradox and Continuum of Digital Disengagement: Denaturalising Digital Sociality and Technological Connectivity, *Media Culture and Society*, 41 (6), 2019, pp. 901-913; Kuntsman A., Miyake E. & Sam Martin (2019). Re-thinking Digital Health: Data, Appisation and the (im)possibility of 'Opting out', *Digital Health*, https://journals.sagepub.com/doi/10.1177/2055207619880671
A special thanks goes to Nadine Chambers, whose discussion of the intimate connections between aluminium mining and the aluminium-containing pens and laptops, used to tell the story of this mining, inspired me, several years ago, to focus on the material and environmental implications of digital communication. See Chambers, N. (2020). *De Zie Contre Menti Kaba* – When Two Eyes Meet the Lie Ends, in Jack D. Webb (ed.), *Memory, Migration and Decolonization in the Caribbean and Beyond, 1804 to the Present*, SAS Academic Publishers, 2020.
Finally, I thank the editors for their feedback on an earlier draft of this chapter.

2 Wailing, D. (2013). *Auto*, self-published e-book, http://www.davidwailing.com/stories/auto/

3 The literature on the notion of digital literacy is substantial, covering both theoretical matters and practical considerations. See, for example, Katharine Reedy and Jo Parker, Digital Literacy Unpacked, American Library Association, 2018. For some, digital literacy is first and foremost about the ability to understand and navigate communication eco-systems, understand contexts and (n)etiquette, as well as being able to practice personal and data safety. Recently, a rising number of scholars discuss digital literacy also in the context of disinformation and the ability to check and verify "fake news."

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9 As, for example, happened in 2014 when Facebook added the "This is what your year looked like" highlight to its "year in review" feature. Algorithmically selected photos – usually those that received most user engagement in emoticons and comments – were selected and pushed into users' feeds, causing distress among many users, for example, when the selected photos were of their loved ones who had died.

10 As per a well-known, now already stale Russian internet joke: "Yandex: 'Everything can be found'. Google: 'Nothing was ever lost'."

11 Cubitt, S. (2016). *Finite Media: Environmental Implications of Digital Technologies*, Duke University Press.

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19 See for instance Mann, S. (2013). Veilance and reciprocal transparency: Surveillance versus sousveillance, AR glass, lifeglogging, and wearable computing, *2013 IEEE International Symposium on Technology and Society (ISTAS): Social Implications of Wearable Computing and Augmediated Reality in Everyday Life*, Toronto, ON, Canada, pp. 1-12, doi: 10.1109/ISTAS.2013.6613094.

20 Information technology and digitization are certainly not the only culprits of environmental destruction. However, while the role of such factors as aviation, industry, or the use of plastics is much discussed, there is insufficient discussion about the detrimental impact of information technologies on the natural environment.

21 Terro Karppi, for example, has written about an art-activist project of "Facebook Suicide," Karppi, T. (2011). Digital suicide and the biopolitics of leaving Facebook, *Transformations*, 20. URL: http://www.transformationsjournal.org/journal/issue_20/article_02.shtml

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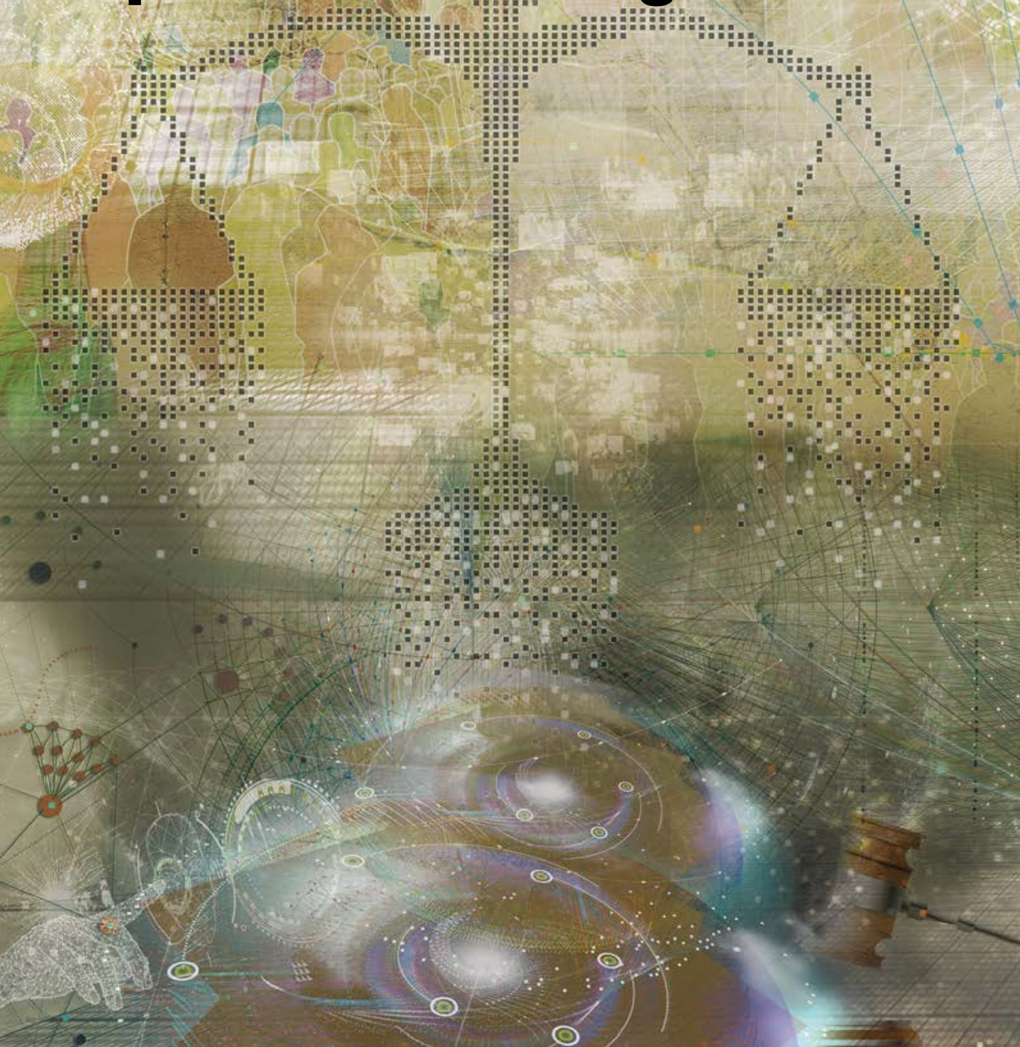
Civil Society and Monitoring the Social Impact of Technologies



Modern technologies reflect social tensions in society, enhance established structural inequalities, and reproduce cultural beliefs. Since the currently dominating technocratic approach to technological development implies a rational logic even regarding the social impact, it is limited and needs to be reconsidered; additionally, new actors must be involved at different stages of production. A change of paradigm can be brought about by improved social understanding which should become the basis for technological decision-making even before the closure of the black box that is technology which is not subject to change.

The development process requires the involvement of participants with strong fields of expertise, especially when it comes to social development: the participation of local communities, socially oriented NGOs, and other civil representatives is necessary. At the same time, joint participation of developers and public representatives sets a new range of problems and challenges. Who are these new actors? How do we control and monitor them, and make them accountable? What competencies will be required for this? What will define the borders of responsibility and serve as a guideline in estimating the actors' performance? Is it possible to achieve transparency/technology of transparency? Can technologies control technologies? This chapter is based on examples of technological trends such as privacy and ethics of technologies, AI-related development, and blockchain.

A problem area

In 2018, ethical issues of technological development and artificial intelligence in particular officially became the concern of industrial players, and IT giants started to assemble internal commissions and ethics committees. Following Microsoft's lead, Google, SAP and Facebook formed working groups on ethics. Ethics and data privacy had become critical not only for companies and product users but also for government actors. It is symptomatic that in 2019 Google dissolved its committee[1] after one of its members made disparaging remarks about LGBT people and migrants, making her membership on the ethics committee an ethical problem in itself. This was a sign of how technological development has become an arena for various political and ideological decision-making processes in which experts, ordinary employees, and the public can and want to participate.

Technologies cannot remain self-regulating systems because they affect too many areas of social life, and the social impact of their development depends on the degree to which social groups and communities are involved in technological production and distribution. This chapter focuses on the problem of civil society participation in technology development and ways in which it can be controlled. We will discuss three technological trends the development of which is critically impacted not by engineering participants: blockchain, privacy and ethics, and AI-based development. Social construction of technology (SCOT) was chosen as the theoretical and methodological background from the disciplinary field of science and technology studies (STS).

The ideas of SCOT are based on the notion that developing technology cannot be limited to engineering solutions, as the process is impacted by many other groups and participants who have no less influence on the process than the engineers themselves. In the research environment and academic literature, STS in general and SCOT in particular have evolved as an attempt to overcome the limited perspective of technological determinism, which continues to dominate in all technological directions, policies, and reports despite having been actively criticized since the 1970s.

SCOT marked a turnaround in technology and social research, allowing a critical approach to the process of development and distribution of technologies, as well as their use. The key idea was that science and technology should be considered as a process of joint participation of different social groups and their interests. In this context, civil society is becoming an active participant not only in the creation and modification of technologies but also in controlling their development. SCOT helps understand how technological decisions are made, how technological production is organized, and what actors and circumstances influence technological development. For example, the "definition of a situation"[2] was proposed in order to understand the direction of behavioral changes in the context of structures, processes, groups, and individuals. Thus, SCOT provides explanatory resources for identifying and shaping the roles of such stakeholders[3] as civil society.

Studies tend to focus on the role of production and consumption in the process of technological development, whereas the clarity of boundaries between them is called into question. The technology creation process was previously considered as formation or production, as an attempt to suggest user practices.[4] Users are given special attention because they are active agents of changes[5] in technology, its modification and reconstruction. Users add unexpected practices[6] and resist or even refuse technologies. The shift of attention towards users in the literature on social research technologies was designed to show how unpredictable and diverse they are; how they consume, modify, domesticate, project, reconfigure, and resist.[7] Technological devices are designed due to interactions, as they are seen by relevant groups. The status of relevant groups is revealed in user debates, advertising, and political messages that organize and form common views; established institutional niches are defined, and ties are routinized. In this context, civil society representatives become special users because of their active position, symbolic power, and potential political influence.

Technologies introduce changes in a range of scales, so they should always be considered in different contexts, such as infrastructure, practices, institutions, and culture. SCOT aims to avoid extremes of sociological design and technological determinism.[8] As such, it is necessary to observe the social consequences of sociotechnical changes by long-term observations of real practices including production and use. In order not to separate the social and technical elements, it is necessary to unwind the construction event as a piece of history with its own forces, interests, and socio-technical ensembles. Sociotechnical ensembles are created with early adopters who provide quick feedback and the cooperation with whom is the main form of interaction.

Background and context

State-of-the-art technologies act as an accurate mirror of what is happening in society. They emphasize tensions, highlight conflicts, reveal problem areas, increase fears, and even create new types of differences or inequalities. This is especially evident in AI and machine learning, the work of which is based on high volumes of publicly available data. If such data is associated with human behavior and interactions, the algorithms quickly capture and reproduce the most popular and common patterns.

Stigmatization, stereotypes, and profanity are what the first traits learned by algorithms which have access to data on internet user behavior or applications such as voice assistants. Racism, sexism, and other types of discrimination are readily recognized and accepted as the norm. Social researchers define patterns such as bias in data: patterns are reproduced because they quantitatively dominate and are replicated almost without question. The "State of AI" report[9] provides the following examples of such biases (for more see the chapter in this volume by Gunay Kazimzade *"Technologies of diversity vs. technologies of discrimination: the case of AI-based systems"*):

— the first page of results for a "CEO" query in an image search shows exclusively white men
— the Google image recognition app labels Black people as gorillas

— searching for names that sound African American are accompanied by ads for verifying criminal records
— the YouTube voice-to-text function does not recognize women's voices
— HP facial recognition cameras do not recognize Asian people
— Amazon classifies LGBT literature into the 18+ category and removes sales ratings

When empirical facts from a displaced "real life" turn into algorithmically confirmed facts, they change perceptions of norms and familiar beliefs. If such observations remain in the sphere of social interaction, they can be criticized, become a subject for discussion, and initiate a review of existing relationships and rules. The structural basis of such social assessments and categorizations often remains unconscious, but over time it can be brought into discourse and even reach legal levels. Algorithms play a dual role regarding such biases: on the one hand they make them visible, but on the other they reinforce them technologically, leaving their "normal" status as a matter of course. The objectives of civil society are to enhance the transparency of discussion, create a demand for social expertise, and express an active interest in access to technological changes and their monitoring or control.

Errors of data representation and imbalanced samples are the result of irresponsible algorithm development. It does not mean that developers make deliberately biased algorithms; it is rather that they rarely consider the social implications of algorithm design. It is essential that they are considered carefully, since algorithms can be something of a black box even for AI developers. It is no coincidence that growing numbers of professional associations are developing recommendations that focus on more responsible approaches to the development and "setting up" of social parameters of technologies. For example, half of the recommendations in the AI Now Institute[10] report is specifically focused on social and ethical aspects that are most often ignored by developers.

- When developing standards for database processing, it is necessary to understand the nature of biases and data errors.
- It is important to refrain from an overtly technical approach as it oversimplifies the complexity of social systems.
- A major problem is that the diversity of social groups (women, ethnic minorities, etc.) is inadequately considered, so more comprehensive research is needed.
- When involving experts from spheres other than engineering, it is necessary to make sure that their opinion and expertise are given certain power in decision-making, particularly when it comes to long-term projects.
- There is a need for constant support of technological development regarding ethical principles.

The dominant technocratic approach to technology development needs to be reconsidered. It can only be executed with the help of extensive social knowledge, which should form the basis of technological decision-making before the black box closes.

The role of civil society

Civil society is perhaps the most important potential participant in technological development for several reasons.

First, the expertise of individual active citizens or nonprofit organizations frequently brings a balanced and critical assessment of what is currently happening in society. Civil society brings together diverse views and supports the development of balanced policy decisions.

Civil society actors are groups whose experience and opinions are essential for understanding the opportunities and limitations of specific technological solutions. Feedback from civil society representatives is characterized by their interest in social responsibility, risk prevention, and thoughtful and balanced attitude towards technological development. NGOs introduce issues that necessarily complicate technological decisions and ensure they are not limited to the engineering community but are also widely discussed outside limited circles of experts.

Public discussions help technologies to become more flexible and diverse, first at the interpretive level and later at the material level. Before final decisions are made, representatives of different social groups can make suggestions on how to enhance or adapt them, which makes feedback a meaningful constructivist argument regarding technology, its type, and even function. Under market conditions, final users and representatives of expert circles can be such actors.

The communication process related to technology can be described as a mutual framework: engineers present their vision of the project, while external circumstances and specific participants transform it in accordance with their traditional practices and cultural beliefs.

Interactions between different actors and relevant groups result in the formation of technological frameworks that reflect the technological challenges faced by engineers and the social aspects introduced by relevant groups, especially NGOs.

When the main issues have been resolved and compromises made, technology stabilizes. Stabilization comes only after feedback is collected from users and groups at which this technology is directly or indirectly aimed. Since modern technologies require constant revision and, accordingly, responses to changes, users are forced to monitor these changes constantly.

As is already clear, when it comes to the development of AI, NGOs and activists contribute to its more even distribution. At the level of recommendations from global associations, the need to involve NGOs and vulnerable (socially disadvantaged) groups takes one of the most important places in AI design. The fact is that their unique expertise highlights aspects and biases that are not considered by developers at the design stage, which causes errors in the representativeness of the data underlying the models.

Discussions of ethical issues of biases and technologies in general, as well as problems of privacy and security boundaries, are not yet the priority of developers or even the state. In certain cases, users openly express their discontent regarding technologies which are of their personal concern (for example, social media). In other cases, ethical rules may be regulated at the international standard level (for example, GDPR[11]). However, concerns over ethical aspects of technology development are in fact the responsibility of individual experts within companies or representatives of expert communities. At the same time, NGOs and other civil society actors take collective initiatives that, unfortunately, do not always impact the legalization of rights and freedoms.

Technologies to aid civil society

Certain technologies are designed to make social relations more equal, transparent, and direct (not mediated by institutional, corporate, or individual players). Examples of technologies of the future which can be aimed at bolstering civil society are shown below.

1. Blockchain. Blockchain technology development is based on the ideology that implies equal access, knowledge, competence, and infrastructural opportunities. Of course blockchain itself does not change the logic or way of thinking about the nature of social relations, but rather reproduces/introduces existing problems, limitations, and inequalities despite good intentions. However, opportunities may emerge, such as the creation of independent communities (e.g., confronting corporate monopolies and verifying transactions in order to combat fraud; the development of new economies and currencies as an alternative to centralized banking and currency systems). The risks of creating closed networks, exchanging illegal resources and risks of totalitarian surveillance systems are the downside of such freedoms.

2. Artificial intelligence. In addition to the previously identified shortcomings and biases, AI is also characterized by strong points that potentially contribute to civil society development. The widespread introduction of AI technology, which will be able to process large amounts of information quickly, will provide opportunities to control certain processes such as involving policy decision-making or tracking common social patterns. AI will allow to non-systematic but potentially productive growth points to be identified and monitored.

3. Brain-computer interfaces. On the one hand, neuro interfaces can become a powerful tool for providing equal opportunities to vulnerable population groups (for example, helping people with disabilities to compensate for skills) and can be an effective tool in the medical and educational spheres, including complex skills training. On the other hand, technology has the potential to violate the right of mental privacy, can be used as an intervention in commercial and civil purposes, and can result in increased vulnerability.

4. Affordable satellite internet. The democratic nature of technology brings information resources tp remote regions, usually excluded from the main trends of civil society development. However, from a material or infrastructural point of view, the high cost and cumbersomeness of production and operation require additional resources to install and maintain such networks, and the economic burden can lie with the local population, making it even more vulnerable.

These examples are intended to demonstrate the ambiguity and complexity of individual technologies with respect to the development of civil society. Civil society representatives can show the range of these limitations and complexities in the real-life situations and cultural contexts. Full development of these technologies is impossible without the ecosystem and environment which must consider multiple barriers, as well as active participation of civil society representatives.

Weak signals

In the design process of new technology systems, people in social and cultural contexts are becoming the major focus alongside users. Human interfaces, humanitarian technologies, community management, and work with user groups reflect the general trend of development, which is the need to improve awareness of technologies through a shift towards sociotechnical interaction. Technological solutions have long ceased to be independent and requires the prefix "socio-" which puts them in the real context of daily life. The following questions occur: who will have access to control of data and technology? Who will be able to track errors and negative social effects? How can the growth of existing inequalities and social vulnerabilities be prevented?

Human relations and life situations continue to be the most marginal element in all possible scenarios of the future, albeit there is always the potential of limited social control (in the form of states or corporations) and enshrined systems of power and relations. Whether we are talking about artificial intelligence as a routine liberator, blockchain as a platform for trust or technology ethics as a major judge, none of the modern developments can solve social problems or change social structures independently; the involvement of expertise and horizontal mechanisms of control is also required.

Experts in the fields of social interactions and human relations who can bring together strict technological models and various life experiences are likely to be increasingly in demand in the future.[12] At the same time, expertise areas which involve close work with vulnerable groups, non-profit organizations, and individual civil activists are under-represented. A technological vision of the future does not suppose the involvement of potential channels of vertical communication or self-sufficient mechanisms of public discussion on decisions being taken. Therefore, there is a strong sense that society and its integration into the ideal picture in which civil society is given a special role of a stakeholder and controller is commonly ignored in the process of technology planning.

Potential models of the future

Desirable future

Civil society and its representatives must become active and equal participants of technological development and discussions of decisions before they are made. The ideology of active participation of civil society has two goals. First, it is providing in-depth information and training to citizens which focuses on how decision-making processes work and what opportunities exist for ordinary citizens, rather than on a lack of understanding about how specific technologies are designed. Secondly, citizen involvement contributes to participation in local initiatives, which supposes certain interests and responsibility for decisions under discussion. Collective discussions are always difficult to organize and control, but they are necessary at least for collecting feedback about what developers do not take into account or which social groups become vulnerable or unfairly excluded from sociotechnical relations.

There is also the third goal of participatory interaction, which is civil control that has an impact on officials and developers in terms of their responsibility level. Participation generally involves more transparent procedures with clear mechanisms of interaction between different layers and structures of the same society.

Social responsibility of businesses and civic responsibility of officials are a necessary minimum of the desirable future. Access to information, feedback mechanisms, local initiatives, transparency of procedures, and other activities in the framework of the technological decision-making process will make the shared future a common goal and aspiration. For example, corporations developing AI should create communication and feedback channels, which would help users report social effects or errors.

Blockchain-technologies should not be centralized by state actors but rather provide alternative opportunities to groups facing structural and institutional constraints. Technology ethics should become an open subject for public discussions, and their results should be considered when making subsequent technological decisions. However, the reality is rather different so far.

Undesirable future

In academic literature and media, only two scenarios of a possible future are played out – either everything will be good, or everything will be bad[13]. The first one is techno-optimistic, with a dominant belief that technologies can solve all of humankind's problems. It is imperfect because society tends towards basic needs with the same personalities, human relations, and standard predictive algorithms of daily routine; no place is left for complex situations and failures. In such an optimistic future, humankind and social relations are the most "wrong" aspects from the perspective of predictable behavior. To make the world better, it should be enough to digitize all spheres of life to the greatest possible extent, so that problems can be solved automatically, while people receive an unconditional basic income allowing them to engage in creative activities.

The second scenario is techno-pessimistic: it suggests halting technological development altogether in order to avoid all potential problems, threats, and difficulties that arise in the process. In other words, rather than understanding them, the focus is on limiting the choice to decide not to create or multiply technological developments. This scenario is rooted in concerns about the consequences of war and man-made disasters; in reality it is highly utopian because too many different actors are interested in technological development.

Both scenarios, of course, have limitations in our understanding of the real future. However, they help identify major problems and constraints in how the technological future is modeled or conceived by its creators. A major problem here is that the future is reduced to models ignoring all social relations other than the simplest, most primitive, frequently evaluative ones, such as good vs. bad, war vs. peace, progress vs. regression. These questions do not and cannot have easy answers because all social processes and relations are multiple, multidimensional, and dynamic.

Warnings

Playing out scenarios of the (un)desirable future quickly reveals their faults when they face reality and active participation of users or citizens. Arising problems are related to social inequality, ethics and morality, technophobia, incompetence of developers or officials, and a number of other reasons that are better characterized by systemic and structural conditions, and cultural beliefs.

The fact is that modern technologies reflect existing tensions in society in which groups maintain their dominant positions on various grounds: for example, officials on power grounds, developers on the ground of their professional status, men by gender, etc. If they are not discussed publicly and do not explicitly promote an agenda of changing the status quo, all technological solutions continue to reproduce and bolster established structural inequalities which do not have accessible channels of interaction and effective means of feedback. The current dominant technocratic approach to technology development must be reviewed and new actors need to get involved at different production stages. A shift in the development paradigm can only come about through the diversification of social knowledge, which should form the basis of technological decision-making even before the black box is closed. In a scenario of blocked participation in civil society, we would face oppression of vulnerable groups and an absence of transparent communication and discussion. The worst-case scenarios involve centralized totalitarian control of the state through technologies (for example, face identification); monopolized corporate control over data and an inability to influence social effects (for example, increase in social inequality and exclusion of certain social groups); or preferential recruitment of powerful stakeholders and lobbyists who create exclusively economic or market-driven mechanisms transforming users into exclusive consumers (for example, using personal assistants or neuro interfaces for market purposes only). Such scenarios do not involve public control, as, for example, in Russia's new national strategy for the development of artificial intelligence,[14] which mentions improving the quality of life across the population but does not consider the participation or expertise of social scientists and civil society. It is fair to say that the strategy prevents biased decisions made by algorithms, highlights the value of protecting human rights and freedoms and transparency, and emphasizes the need to develop ethical rules for human interaction with AI (first of all, in a legal way). However, civil society is not mentioned in any way.

Wild cards

In a situation where overcoming a technocratic view of production will become a shared agenda on all levels of social structure, it is not difficult to assume that jokers or wild cards will emerge, which are likely to affect the development of events. An example of a dangerous trend is digital totalitarianism under the veil of state security if boundaries between citizen control and participation become blurred.

One such situation could be a collective lobby of technocratic power structures and economic elites from technological circles, which would jointly exclude citizens from participating in the development of a common agenda. They would likely follow the "state security" path at the expense of privacy issues. The wild-card in this trend may be an information war or conditions created by public services to restrict communication, including physical and infrastructural restrictions.

Isolation and “sovereignty” could become an important warning or even threat to the development of civil society, which would have to survive under total information control and communication isolation. It is the yellow card which is defined by the use of information technologies not for the benefit of citizens but for the benefit of the state.

In these circumstances, a green card should have its own civic responses to external restrictions, which would suggest alternative, perhaps non-digital ways of interacting and fighting for the right to cross-border interaction or posing questions about greater citizen independence and participation in discussions on decisions being made. Nationwide mobilization could potentially change the situation, but it requires new standards (which do not exist yet), such as civic participation. Reactive participation of experts in the field of social and humanitarian research of technology and interactions of science, technology and society could unlock further creative potential. Reasonable monitoring and control mechanisms performed by civil society can also become jokers in the system of technology manufacturers.

Likely future

It is clear that developers, businesspeople, officials, and other interested participants in technological development will not independently build an ideal future, nor will they project working models or foresee all possible consequences. Different social groups and civil society representatives, such as activists, NGOs, minorities, and vulnerable groups add unknown elements to this picture. The more different points of view and expertise there are, the greater the likelihood of combined efforts to think through the design of a balanced and harmonious future. These are the characteristics of techno-realism – the third potential perspective for the development of the future, in which experts are not just social or humanitarian researchers, but also representatives of civil society with their unique life experience and analytical, even critical perspective. The key mechanism would be the cooperation between these participants: for example, researchers with an intellectual agenda, representatives of civil society with a social agenda, and officials and developers with the resources and standing to influence decision-making.

Remaining unknowns

A lack of transparency in policy decisions about technologies is the main barrier to understanding how technological development works in different countries. There are many conflicting reasons and interests, and the winners are those who have been able to gain more quantitatively and qualitatively convincing supporters. Once decisions are made, they are almost impossible to reverse, especially in the absence of clear feedback and communication mechanisms. Deep systemic crises in public administration only aggravate the closed nature of restrictions to even discussing technological solutions, even though they have a direct bearing on how they will impact society. Priority work with civil society could change the situation and put comprehensive solutions to social problems using new technologies on the agenda. The issue lies with policymakers at the level of individual engineers, large companies, short-sighted or incompetent officials, and even inactive citizens. Technologies are a reflection of existing complexities with unclear feedback as if they were working in a one-way technological deterministic order. However, current trends show that such an approach would quickly lead to a deadlock which would be impossible to correct simply by “rolling back the system” or “regression testing.” Flexible methodologies in the design itself should also be fully implemented through a flexible and open discussion of production and distribution.

Conclusions

How do we involve users or citizens in developing technological solutions which can be described as transparent, responsible, and humane? The concept of social technology design speaks about active participation of non-engineers at all stages of production, about open public discussions, and about rapid feedback. Companies can implement these recommendations in various ways: by involving early user groups, by involving social researchers in developing expert opinions, and organizing public demonstrations in accordance with the logic of social responsibility. However, much will remain closed under the pretext of NDAs or other formal reasons for non-disclosure. The state, in its turn, will also make the best decisions from its perspective aimed at achieving its own goals, for example tightening state security. Some countries, such as Japan and Sweden, put technological problems as a priority and make them the subject of discussion and public debates. In turn, this compels other players – companies and civil society – to participate in these discussions. These political experiments are only starting to work effectively around 15–20 years after their implementation.

There are no universal algorithms for sociotechnical development, but there are recommendations from experienced states, which have achieved changes in the most rigid structural elements by trial and error. This does not mean that they have solved all social problems as well, but they have made technology policies more socially oriented and forced companies to play by the same rules. Civil society in developed countries can become the major controller of the technological agenda.

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Endnotes

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Civil Society and the Future of Personal Data

"Technology presumes there's just one right way to do things and there never is"

— Robert M. Pirsig[1]

How we lost our data

In 2019, the World Wide Web celebrated its 30th birthday. By then, the story of how the Web came about had become almost mythological. It is thought that the foundation of the Web was laid down in a proposal[2] written by Tim Berners-Lee, addressing "the management of general information about accelerators and experiments at CERN." This novel information management system was designed to deal with the information explosion that had already started affecting data-intensive fields of research such as high energy physics. The original code and specifications defining the Web were published in 1991, and the first website explaining how to set up one's own web server and start publishing documents on the Web was up and running in 1993.

In the following 30 years, the decentralized and distributed nature of the Web has been the main driver of its unconstrained growth. People have been free to publish any documents without registering them in any centralized catalogue; and once published, documents can be immediately accessed by any user with a web browser. The main goal of the initial proposal was achieved: the Web connected people regardless of borders and hierarchies.

However, despite the success story, many people are increasingly of the opinion that the Web has failed in serving the humanity. "But for all the good we've achieved, the web has evolved into an engine of inequity and division; swayed by powerful forces who use it for their own agendas," Tim Berners-Lee reported in his anniversary speech[3] addressing the state of the Web in March 2018. This is because the original concept of the Web relied on it being managed benevolently, that is with a desire to help others and benefit people rather than to make a profit. This assumption may seem naive nowadays, but the truth is that 30 years ago CERN researchers simply could not imagine that the technology aimed at sharing data with a person next door would be used for "state-sponsored hacking and attacks, criminal behavior, and harassment."

Arguably all this existed well before the Web and it simply found its way online. What is more interesting is that the Web has created an ecosystem of technologies where novel ad-based revenue models have become possible. In such models, profit is dependent on the number of people visiting a page. This triggers a positive feedback loop: more users mean more profit. The downside is that it is all about the numbers; value for is not considered. In fact, Facebook did not originally aim at collecting our data; rather, it wanted more people to spend more time on the platform by making Facebook available on an ever-growing number of user devices. The problem is, as Tim Berners-Lee, put it: "It's amazing how clever people can be, but when you build a new system it is very, very hard to imagine the ways in which it can be attacked." This is how we inadvertently became involved in the unfolding battle for user data – a key asset in the 21st century. The outcomes of this battle will shape not only our digital lives but will directly influence our physical being (e.g., because healthcare is becoming extensively data-intensive).

The aim of this article is to discuss different ideas about how personal data is organized on the Web and to highlight those which are most promising for the development of civil society. Despite the ways the internet has been misused in the past, the future is still much greater than the past. Therefore, we will try to imagine what kind of data management regimes would benefit civil society and what steps should be taken by civil society actors to promote such a vision.

Data pyramid

Data has little value in and of itself, unless it is presented in a form which can be understood. Once the data is understood and interpreted it becomes information; in turn, information has more value than raw data because it allows us to learn what is going on. Combining several sources of information and structuring and enriching them with context creates knowledge. Knowledge answers questions about how something happened and why. Wisdom is the top tier of the pyramid representing integrated knowledge which makes it possible to determine what is best to do. Fig. 7 illustrates this hierarchy. In short, data enables the generation of new knowledge, which in turn makes it possible to reason about the future.

The model presented in Fig. 7 is something of a holy grail for what is known as data science. The reason is simple: it makes it possible to explain to businesspeople why they need to hire a data scientist. The only difference is that in business language this would be something like "data-driven insights and actionable business intelligence to drive innovation for sustainable future." This would be likely followed by a sentence including concepts "big data" and "artificial intelligence." The idea that data-driven innovations are vital for keeping up with the market is at the heart of the ongoing fourth industrial revolution and the economy it creates.

Value of personal data

Scientists were the first to experience this revolution at the end of the 1980s. For business and industry, it took another 15 years to find out that management, decision making and marketing must be data-driven just to keep afloat. When it comes to policymakers and the general public, it seems that they are yet to find their way around this new world. User data greatly benefit tech giants, while users are getting tailored advertising in return. This does not sound like a fair trade. Only recently politicians have started taking actions to improve (or, more accurately,

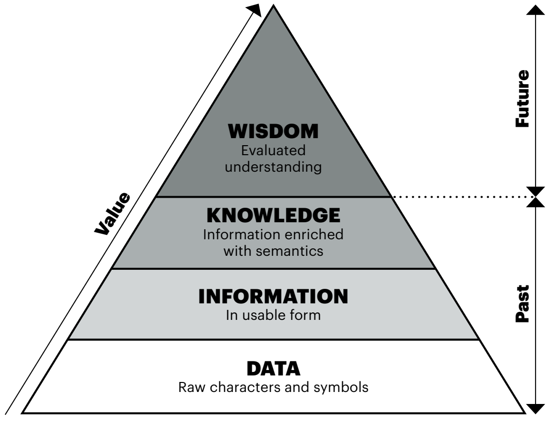

Fig. 7. The Data Information Knowledge Wisdom hierarchy pyramid (Adopted from Rowley, 2007[4])

create) data-related policies such as GDPR. However, so far, all legal efforts have mainly addressed privacy issues and misuse of information. This is undoubtedly important, since it provides grounds for sueing Facebook in court in the case of the next Cambridge Analytica scandal. Still, generals are always fighting the last war, therefore it is not realistic to expect governments to step in to harness the current technology revolution for the benefit of all. Policy-makers will always lag behind industry, and industry will always benefit from the existence of the grey zone. What makes it even worse is the fact that existing legal initiatives do not provide technical frameworks to back them up. As a result, real-life implementation is put back in the hands of app developers. We already know that being driven by the ad-based revenue model these hands will keep extending user agreements so they can get more and more data.

Data as a social divider. Data science has changed many aspects of our lives, but up until recently these changes have not touched on public health. This is rapidly changing since artificial intelligence has become sufficiently mature to be used in medical care systems. When this happens, the quality of the data used for diagnosis and treatment has a direct impact on an individual's wellbeing. Money can already provide access to better healthcare. In the future, you will need data as well.

"Unfortunately, I believe that the class divide of the future will be data. And if you are not careful those who have access to data have better health than those who don't have access to data," argues Naveen Rao[5], Vice President and General Manager of Intel's AI division. The striking part here is that this was said by a representative of a giant private company whose core business is selling technological solutions. This means that they already know how to use this social divider for their own benefit, and clearly this has little to do with making data accessible to everyone. As such, the quote could have been put this way: "Fortunately, I know that the class divider of the future will be data. And if you are careful enough you will be able to benefit from it for at least 15 years, the time needed for policymakers to understand the problem and start reacting."

Data as an economic asset. The Web became participatory in the mid-2000s. From that moment on, users have become *creators* which means that they have started creating and consuming online content at the same time. This was a breakthrough point because the ability to post, comment, share and like allowed users to become first-class citizens of the Web. The logic was simple: if a comment section on a webpage is the main reason for visiting the page, then commenters would deserve a share of the profit made from displaying ads on that page. In reality, this did not happen because online platforms were not interested in doing so for obvious reasons; additionally, the average revenue per user (ARPU) was too low for taking it seriously.

For instance, Facebook was earning just around 10$ on every user in 2011.[6] However, this number has grown 10-fold since then and there is no reason to think that Facebook couldn't double it again in the next few years. Ad budgets will keep growing as long as Facebook keeps improving targeting algorithms. Therefore, it is plausible that an average user would be able to generate revenue approaching the user's annual income in a not-so-distant future. If this happens, will it be an argument to reconsider the terms and conditions of user agreements?

The question of why we still do not have an infrastructure to monetize our own digital footprints has to do with an ambiguity of how we should treat our data. On the one hand, people should be owners of information about themselves, and, as owners of this property, should be in full control over it. Moreover, treating data as property would stimulate the development of the data market. On the other hand, it is also clear that data is an intimate part of an individual's identity or being; it needs to be treated with care. Therefore, to be on the safe side, policymakers originally preferred to focus on creating laws which would provide a tort remedy for invasion of data privacy. Ironically, the approach that was believed to serve as a rule of thumb has led to the situation where actual owners of data don't have the means to monetize it while all the parties involved in the value creation chain (see Fig. 7) are making money.

Data as a political asset. Technically speaking, there is no difference in what's promoted on social media, so we see political ads alongside all others. This comes with tracking of engagement and conversion rates. Therefore, in this sense politicians are no different from other salespeople. They also heavily rely on for steering campaigns efficiently.[7] Political parties are busy organizing internal data infrastructures and processes to be able to climb the pyramid from Fig. 7. As a result, data has become an asset that adds weight to potential candidates.

Despite all the speculation around Cambridge Analytica, there is still no clear evidence that big data collection can be used for predicting and manipulating future outcomes. However, it is certain that it gives a better understanding of the current situation. therefore politicians will be in favor of obtaining more details about people's lives, e.g., data about the location,[8] since political campaigns always have a clear geographical extent. If data centralization empowers those who are responsible for policymaking, it is very unlikely that they will easily move towards giving this power away. The situation when personal data is centralized in the hands of the few is known as data oligarchy – a rule of a tiny, privileged circle that occupies the top of the pyramid in Fig. 7.

To conclude, data ownership rights and the ability to have a fair share of the cake baked by the new data-centric economy will not simply be given away and they must be taken instead. However, there is a huge imbalance of power between individuals who want to protect their data and those who want to use it for their own gain.

It is going to be extremely difficult to centralize data ownership.

Weak signals

The inability of users to realize the value of their own data belongs to the category of *wicked* problems – those that don't have a single true-or-false solution. Instead, the potential numbers of solutions to a wicked problem is infinite and they can only be evaluated in terms of comparison. The following section overviews and discusses recent promising developments that are aimed at tackling the problem in question. These are weak signals which can help in imagining the trajectory of the problem in the future.

The Social Linked Data (Solid) project is a new endeavor led by Tim Berners-Lee, the inventor of the WWW and the Semantic Web. The project proposes a set of conventions and tools for building decentralized social apps based on Linked Data principles.

Solid implies that people store their data in personal databases called pods. In Fig. 8, these pods are shown as circles. Apps (dark blue shapes) access as many pods as needed instead of working with a single database. Users control which apps can read or write data from/in their pods.

The project aims to disrupt the ad-based revenue model by creating an infrastructure which would allow separating data from apps. Data always stays in a data pod and can be potentially reused by any other application. This will pro-

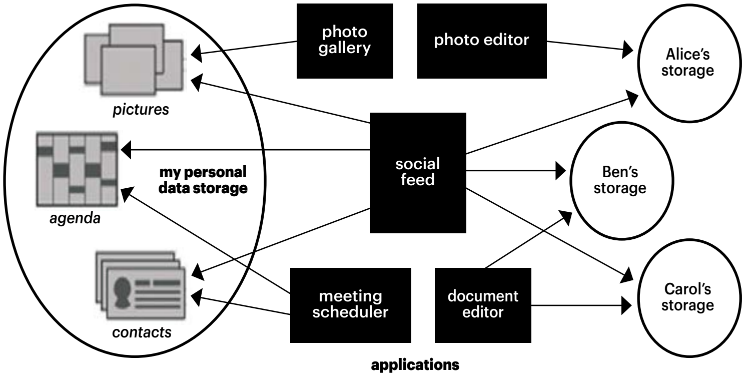

Fig. 8. Model of decentralized personal data storage and distributed applications. Source: Berners Lee & Verborgh, 2018.[9]

mote the creation of the data market and will democratize app development. Users will be able to monetize their own data and move between apps freely based on their functionality. For developers, this would open an opportunity to innovate at the app level since the user data would not be locked down by an app anymore. Moreover, decentralization of storage will return control of privacy back into users' hands. Trading of user data to third parties will not be possible since data exists only in a single place – the user's database – and is never copied. This principle is known as *data-at-the-source* in enterprise system architecture.

Adoption of legal frameworks such as GDPR will create problems not only for organizations with questionable or malicious intent, but also for everyone who deals with personal data. This is often the case for non-governmental and non-profit organizations. For example, a group of skilled volunteers wants to help a non-profit organization with a data project. This requires copying data, which is illegal without additional user consent. The solution to the problem is to provide citizens with personal data pods, so that all their public and private data remains in one place. Instead of moving data between organizations, they individually ask for permission to view relevant parts of the data only. This way data does not have to be moved around, and GDPR compliance can be assessed automatically for every single data request.

Solid is not the only development that attempts to deploy distributed social networks at a Web-scale. For instance, Diaspora and Indie Web are working examples; however, the difference is that Solid is supported by a company called Inrupt whose main mission is to foster the development of apps and communities around Solid.

Federated learning is an emerging trend in machine learning that does not require centralization of data for model training. In contrast to the traditional centralized approach, federated training takes place on a personal device using local data. The data is never sent to a central server and only model parameters are exchanged instead. This enables the development of machine learning algorithms without sharing and exchanging personal data.

What will the future look like?

This section addresses the possible trajectories of the problem in the next 20 years.

The future I would like to live in

In 2040, Web apps will not be able to copy and store user information. Instead, every time a user accesses a Web resource, the ad provider will have to request the data needed for content personalization from the user's personal storage. However, unfortunately for the ad provider, the user has already set a price (let's say 10 cents) for each of the data calls that ask about their preferences. If the ad provider agrees, then the user receive 10 cents in their bank account and the page shows personalized content. Otherwise, the user gets default ads. In a similar way, users can monetize any tracking.

However, even if the provider personalizes their content to the user's needs, they never get access to the underlying data used to calculate the preferences. The user uses another app to make it upfront and only exposes the final results for the ad personalization service. It is likely that modern social media, e.g., Facebook, would become such services, since they would not survive the competition with an avalanche of new social networks leveraging the benefits of decentralized personal data storage. Instead, Facebook would serve as an ad-broker and proxy between companies and users. Moreover, these new social apps would be ad-free because the very existence of the data market would trigger a competition between app developers and, consequently, they would be forced to seek other forms of monetization.

Potential for civil society: independent identity provider. The presence of the state in people's lives will decrease. Governments will still be responsible for the maintenance of the official national registers, but data will be stored and controlled by users. Government bodies will request access to personal data on an individual basis. In this context, government organizations will be nothing but another service to keep your precious data up to date. Personal data storage, apps and access control will be provided by different parties. Therefore, users will be free to choose independent service providers at each of these levels. This is exactly where NGOs and non-profits can step in. The deployment and maintenance of independent communal infrastructures plays an important role and provides a great opportunity to strengthen civil society. This is especially important when it comes to identity provision. Similarly to using a Facebook account to log into other services, people will be able use identity services run by the community.

Potential for civil society: data unions. Individuals will use their data as a means of democracy. If a user does not share the political agenda of a certain political party or candidate, then the user can either deny access to their data or set a price for such access. In this context, support would mean granting access to certain data to the candidate. In a similar way, the ability to donate digital footprints will boost citizen science projects. Neighborhood level traffic optimization will come together with strengthening the local community. Scaled up on spatial and conceptual levels, this may serve as a catalyst for developing global coordination.

Technical and legal aspects of personal data management are frequently far too complex to be managed by indiviudals themselves. For example, consider a scenario. Alice keeps her personal browsing data in a data pod. Bob is a researcher at a university who would like to use Alice's data. Alice is a member of a data union, a non-profit community-driven organization that helps its members to manage their data permissions. The data union agrees that Bob can be trusted with Alice's data for his research. Data unions can be of different geographical extent (local-global) and application domain.

Such a future can be possible for two reasons. First, by 2020, tech giants of the Western world had started losing competition for Asian media platforms, especially those in China. On the one hand, GDPR resulted in a number of devastating lawsuits against Facebook and Google. On the other hand, the ever growing middle-classes in Africa and Asia choose platforms using their languages. Together, these reasons have raised awareness and are considered a threat to the security of the Western world. As a result, in order to disrupt these novel platforms, tech giants have initiated deployment of decentralized data storage to protect personal data of their users, thus creating a competitive advantage. Second, such steps were backed up with social mobilization that have given rise to anew generation of non-profits such as data unions and independent identity providers.

Undesirable future

Governments will utilize the problem of personal data protection as a reason to increase state control over all personal data. The most efficient way to do this is to tightly couple hardware, software and "dataware" on our devices. In 2020, smartphones were fitted dedicated AI chips. By 2040 devices will receive another dedicated chip and come preinstalled with software as part of obligatory national certification. This chip will be permanently busy with maintaining the official digital twin of the device. The digital twin is a digital representation of everything which is happing with and on the device, including detected surroundings and data gathered from them.

Data is an asset whose management will become far too difficult for individuals to mage themselves. Therefore, governments will centralize all personal data under the flag of a national data service running digital twins and protecting individuals and their networks from criminal activity. Alternative storage solutions will be considered to be an attack on the state and will be blocked since they give alternative identities. Intelligence services will be able to access all the information at once. Endless data breaches will feed the black market of personal data. Anonymity will become impossible because patterns of online behavior will unambiguously identify an individual, similar to the way fingerprints are currently used. Access to digital fingerprints will be a question of state security, which is another reason for governments to enforce centralized personal data storage. Moreover, national data protection laws will enforce control over cross-border data transfer and access. It will accelerate the process of fragmentation of the Web into national sub-networks.

Wildcards and early warnings. The undesirable future stems from a fear of losing cyberwars in the future. This is a natural response to the overwhelming complexity of future war scenarios. The military instinctively acts overprotectively, therefore any potential threats add to this fear. This works like a pressure-cooker, and the increased pressure on security issues will fan the flames of the undesirable future. In this context, global climate change will only add to this pressure by forcing people to move away from regions with unbearable climate conditions. The sheer number of climate refugees will trigger social unrest towards newcomers, thus propagating the adoption of global surveillance.

The recent allegations that Huawei is providing the Chinese government with a backdoor to their citizens' devices is an early warning. In terms of technological and economic development the US government can afford to ban Huawei products from being sold to US telecom companies. But what happens in other, less developed parts of the world? Huawei is difficult to beat pricewise. This makes their products far more difficult to be rejected by many users in the Global South.

Recent news about the release of a smartphone from ByteDance, the Chinese company behind TikTok, is another similar warning. The company has already been accused of cooperating with the Chinese government and violating children's data use policy. The use of proprietary hardware will ensure that the company will be able to harvest user data regardless of the software they use.

The future we already have (the most likely scenario)

"The future is already here – it's just not very evenly distributed" goes the famous quote from William Gibson. Life in New York will likely look very futuristic in comparison with rural Mongolia. In other words, developed countries will be the first to start reclaiming personal data. There is already a growing number of cases of individuals applying their right to obtain their personal data from Facebook and Microsoft. European GDPR will be the model and target for many countries in the next 20 years.

Facebook makes most of its profits from its Western audiences – individuals with democratic values and the open market. Therefore, an opportunity to make money from the users' own data will likely drive the development of improved protection of data ownership rights.

China will bring technologies of state surveillance to the developing world to create the second-highest data pyramid in the world after Google. Local governments will harvest data from their citizens, while China will harvest data from all of them. The use of personal data for political activism will be strictly controlled.

What we don't currently know is the potential impact of 5G technology[10] and the Internet of Things. The latter refers to the idea that any electrical device can be augmented with a Web interface and, consequently, can be connected to other devices via the internet. Therefore, together they will increase the volume of personal data by several magnitudes. The volume of data generated by endless interconnected devices will require cutting-edge computing power, which means that the data will not be sent to data centers for storage and processing. Instead, it will be stored and processed close to the location where it is needed. This may also retransform the infrastructure into a more decentralized one.

Conclusions

The Web will celebrate its 51st anniversary in 2040. We can hope that by that time, Tim Berners-Lee will have come round to the view that the Web has not failed humanity but that it has, in fact, empowered individuals and given them the ability to leverage the power of their own data.

GDPR is a reality and there are growing numbers of cases of individuals reaching for it to request their data from apps. However, at the same time, the legislation creates difficulties for everyone working with personal data. In this context, personal data storage controlled by individual users is a way of solve the legal complexities of moving personal data around.

Once you have data, you can use it for your own or collective goals. Granting or withdrawing access to data is a new type of collective action which is not yet available. Combining personal data to build an even higher volume of data will foster and develop horizontal links within communities. Last but not the least, the monetization of personal data can create a source of basic income. All in all, once individuals are owners of their own data, civil society has the potential to become much stronger.

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The Smart City as the Future Domain for Civil Society

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Introduction

Rapid urbanization has become one of the strongest global trends, which is recognized in the United Nation's Sustainable Development Goals (SDGs) agreed upon by almost two hundred countries, as goal 11: "*Make cities and human settlements inclusive, safe, resilient and sustainable*." While connecting people to more opportunities, cities bring a number of challenges such as poor air and water quality, traffic congestion, solid waste management problems, and high energy consumption. Governments as well as civil society groups have turned to "smart" technologies and data-enabled tools to address these challenges.

The smart cities concept emerged as a strategy to mitigate the negative impacts of rapid urbanization with a key objective to *"foster more informed, educated and participatory citizens."*[1] Tackling urban grievances gave rise to forms of civil society movements known as urban activism or "citizen-led city-making."[2] However, smart city solutions mostly driven by large technology corporations and urban civil engagement practices have been developing in parallel, and in many ways conflicting with each other.

Modern cities produce, collect and process large volumes of data. City governments have discovered that the data they collect from various transactions offer important insights that can transform their operations and make them more efficient. For example, combining historic traffic data with the "real-time" movement of vehicles gathered from road tolls can help to prevent congestion. It can also enable better coordination between agencies, such as in times of crisis. In the book *The Responsive City*[3] the authors provide a number of examples when the city managers were able to better critical city services through the use of data, from more precise and coordinated crime fighting in New York

City to streamlining business licensing periods in Boston. Civil society organizations also can take advantage of open data. In New York, the Housing Data Coalition[4] uses public data to eliminate housing discrimination. In Boston, Code for America helps coordinate community effort to keep street hydrants clean in heavy snowy season through an interactive online platform Adopt-a-Hydrant.[5]

City governments and other city data producers could also provide open data relevant to people's lives, e.g., on energy, transport, housing, pollution, including 'big data' in real-time or "*massive, dynamic, varied, detailed, inter-related, low-cost datasets that can be connected and utilized in diverse ways*."[6]

Experts often connect providing data publicly and enabling open-source access, using or sharing, with the potential to empower communities to drive sustainable development in cities and "*transform the public realm and the way we live and interact in urban areas*"[7]. This would not be possible without the right technologies in place. In fact, after an extensive review of the available definitions of a smart city in various fields, Gil-Garcia et al.[8] concluded that technology is one of the common features between many of them.

Smart cities are considered critical for the engagement of citizens in a more comprehensive way, leading to a more participatory governance of the urban space. Technologies applied to cities can facilitate these new ways of participation and civil society activism. This chapter analyses technological trends in smart cities and provides some recommendations of how civil society stakeholders can take advantage of smart city technologies to address critical factors of urban citizen participation.

Smart City and Civil Society

Using smart cities as an open innovation platform where data provides new opportunities for civic engagement is considered a relatively recent concept, with only a few cities having been able to implement it.[9] This is what some authors call *"a new breed of smart cities."*[10] This type of data exchange assumes that local governments are open to collaboration and co-creation with the public and private sector of services, which have been traditionally provided by the public sector. Examples of such cities are Barcelona[11] and Tel Aviv[12], both of which made a deliberate effort to build their smart cities based on open innovation.

Indeed, more and more cities all over the world employ open data platforms, which are claimed to foster a co-creative environment in which citizens are equal participants in making their cities a better place. Such data platforms supported by open application programming interface (API) and common standards foster more inclusive and innovative cities. The 'City as a Platform Manifesto' offers a set of ten principles that cities should adopt in order to use digital data platforms to ensure that it creates *"a shared collaborative framework between residents, the public and private sector to drive the desired outcome of sustainability, inclusivity and targeted innovation that benefits cities and their residents."*[13]

Experts articulate a number of benefits of open data initiatives, the most prominent of which are: economic gains through data-driven business opportunities, transparency and accountability, increased efficiency within government through data exchange, and data-informed policy making.[14] However, the greater benefits are seen on a local level, in cities and local communities. These include improved service delivery to city dwellers, greener cities and increased efficiency by making more informed decisions about daily urban living situations. Open access to data has the potential to empower local communities to become more sustainable, making cities more people-centered and engaged.[15]

While open data is considered key to open innovation, the strategy suggesting that if you build a data portal, users will create smart city tools and applications, and benefits will follow, did not prove to be successful. Despite an increasing number of polished data portals, public engagement and participation in community action have not increased. On the contrary, existing smart city programs have been criticized for insufficient engagement of citizens, or even for whitewashing autocratic governments (like Russia), who would simulate openness by releasing data that is not useful to the user. An example of demonstrating such 'radical openness' through a large number of datasets released could be done by disassembling complex datasets into single tables and hence inflating the numbers on the portal. Cities need to look for better ways of using the new data at their disposal to bring greater benefits to their communities.

In fact, many forms of urban civil society activity arise directly from urban challenges people face due to massive urbanization. Urban sustainability challenges such as solid waste management or air pollution could prompt community groups to organize around these issues and pursue actions to address them.

I identify several critical success factors in citizen participation and engagement, especially in the urban context:

- **Awareness:** to participate, citizens need to be informed;
- **Motivation:** citizens want to participate;
- **Accessibility:** citizens have digital tools to access information and participate, and are able to use and afford them;
- **Accountability:** citizens witness improved transparency and accountability as a result of their participation;
- **Efficacy:** citizen participation leads to changes;
- **Sustainability:** citizens have convenient ways of participating and feel the need to do it.

Civil society could leverage a number of smart city technologies that offer greater opportunities for addressing the abovementioned success factors in order to self-organize and engage.

Technological Trends for Development of Civil Society in Smart Cities

Awareness: Data Visualizations and Dashboards

With a vast amount of data accumulated in a city daily, it is hard for citizens to make sense of all this information. Data-driven insights presented in a customized format via city dashboards and visualizations help people understand what is happening in the city in an open and transparent way, and to act on that data.

For example, open budget dashboards are an easy way for citizens to analyze where and how the money is spent in the city. Cities provide visualizations of real-time data on a number of city issues including transportation and environment like in Dublin,[16] for example. Dashboards driven by open data are not the same as open data portals, which provide raw data, but they relate datasets to each other and to a particular issue the citizens are inquiring about.

Geospatial data is considered the foundation for any smart city and underpins nearly all modern smart technology. Maps is just one way of using geo-data through visualization, but there are many more uses of raw geospatial data, and especially in civic activism. Combining several layers of geospatial data with different datasets can provide powerful insights about the city's infrastructure, services and many more, and even predict future patterns. Global Positioning System (GPS) data is collected by different applications from our mobile phones and wearable devices in real-time.

Civil society city initiatives are already taking advantage of that data, including crowdsourced geo-tagged data reports on various issues in their interest areas. Analysis of civic applications for smartphones in Russia demonstrated that mapping data was used to reveal the scale of the problems and as an analytical tool, tagging problems with colors and infographics.[17]

The Krasiviy Peterburg ("Beautiful Petersburg") app, for instance, categorizes problems using geotagging and marks them as blue (reported), green (solved) or red (dismissed) cases. The same principle is used in other apps.

Maps can empower citizens and help significantly in improving city services. With the emergence of 3-D maps and with adding more geo-layers to city infrastructure (for example, drone routes that will be used to deliver critical urban services in the nearest future), this potential could grow exponentially by providing accurate, comprehensive, and visual information about these services integrated with the fabric of the city and other digital tools.

Sensors penetrate city infrastructure, collect various types of data in real-time, and communicate them to each other through their own networks – Internet of Things (IoT). The simplest smartphone would have over a dozen different sensors such as accelerometer (to measure acceleration forces), barometer (for atmospheric pressure), magnetometer (for sensing magnetic fields), proximity (for detecting nearby objects without physical contact) to name a few. Data generated with these sensors and combined with geospatial layers of the city can provide full analysis of any aspect of the city. For example, projects like Sensor.Community[18] or sensors.Africa[19] offer citizens a chance to receive (and construct!) their own sensors to monitor indicators such as air, water and noise pollution in their communities. Then, these data are visualized on the map. These initiatives promote 'citizen science' and rely on people's participation, data and ability to maintain infrastructure to address urban social and environmental problems.

Dashboards connecting all city data and geo-locations in real-time will provide customized visualizations and raise awareness of critical issues and allow city dwellers to act on these data. Currently available on web and mobile phone applications this technology can embed into the city infrastructure: buildings, windows, public transportation, signage, etc.; and combine more sources of data, including those that are generated by citizens, for better analytics. On the one hand, civil society organizations should take advantage of dashboard technology to communicate such data to citizens that cover their interest area. On the other hand, it is important to note that the role of civil society will be increasing to ensure proper privacy and security of citizens' personal data when all these data are linked and analyzed.

Motivation: Gamification

Cities are more and more investing in gamification to drive citizens' behaviors. The City Points project in Cascais[20] is a rewards-based app that encourages citizens to adopt certain practices. Users receive points for activities in the areas of environment, citizenship, social responsibility, mobility, etc. Points earned in the app can be used for products and services from local partners. Through such game format, participants engage in taking an active role in transforming the community into a better place to live and have a reward mechanism to stay motivated to continue doing it.

Similarly, the Mobility Urban Values (MUV) project[21] aims at "*promoting a shift towards a more sustainable and healthy mobility choices*" through a mobile app where users can earn points for performing sustainable behaviors.

The project re:publica[22] calls gamification "*an approach for playful urban participation and meaningful civic engagement.*" The approach is very relevant for areas like urban mobility. Car-pooling online solutions like RideAmigos[23] and TravelWise Tracker[24], which serve as a search engine for car-ride companions, use gamification techniques to encourage users to choose greener options for transportation.

When built on the sense of belonging to a community and with the right incentives, these gamification tools allow civil society to drive programs that promote citizens' engagement and participation, while creating a connection with the local community as well. Cities and local businesses can provide services or products in return of behaviors making engagement even more fun and rewarding by linking the virtual gamification scheme to real benefits. Citizens' participation becomes very tangible when the online engagement score becomes exchangeable for local experiences.

Accessibility: Integrated Service Management Systems

Online city platforms allow cities to have a holistic view of all their services and provides them with a single-entry point towards connecting with citizens. City governments are investing more and more in platforms to centralize all data, and in services that are more professional, when it comes to how they communicate and react to their customers.

For example, Deloitte's CitySynergy[25] platform looks across every aspect of a city's operations and uses technology to improve outcomes. Digital infrastructure of a smart city sets the stage for a network of partnerships and connects with citizens, businesses, and civil society organizations. Similarly, the Smart Dubai Platform unifies city services, IoT, cloud services, Big Data and digital identity across all city parameters to construct the most thorough exchange point for federal government and private sector services, providing extraordinary value for the city.

Service management platforms in the future will deliver all services across various sectors in the city and allow tracking public service delivery in real time. Through these systems citizens can gain easy access and demand more control over public organizations and good quality public services. Civil society organizations could use these platforms and data to identify gaps in service provision, for better planning and providing tailored services to their target groups.

Accountability: Blockchain

The term blockchain, referring to a type of Distributed Ledger Technology (DLT) that organizes data in the exchange in 'blocks', has been thrown around a lot, particularly for financial transactions. A technology trend yet to be explored further by cities opens up many opportunities for citizen participation.

In a distributed ledger all entries in the database are decentralized to eliminate the need for a central actor to validate or authenticate transactions. The system operates on the consensus reached by all parties participating. All data points in the system have a time stamp and unique cryptographic signature. This technology allows one to verify and check all past data entries in the dataset. City programs built on top of blockchain could offer greater social accountability through transparency on reporting of city problems and how the city has addressed them.

Removing the intermediary party and central authority is what makes this technology so attractive to civil society, and it has promised various applications in the city context. Smart cities could employ this technology in various areas from water and energy management systems to business registries and urban planning. Proven useful especially for financial transactions, blockchain significantly decreases operational inefficiencies and creates greater security due to its decentralization. While cities are coming up with their own local currencies for urban gamification tools, they could also think about using cryptocurrencies to increase participation. For example, citizens can earn cryptocurrencies by taking certain actions and use them to support social programs, or choose city investments (i.e., a participatory budget).

Efficacy: Machine Learning and Artificial Intelligence

Governments are starting to invest in machine learning (ML) and artificial intelligence (AI) to be able to analyze contributions of individual citizens in participatory processes. While participation is enormous, they need help to make sense out of the data created by people. ML algorithms allow to analyze large amounts of city data effectively and feed back into the systems, improving city services.

The 311 service, a specialized phone number across the US cities where citizens can report non-emergency issues about their communities, could be improved with ML to easily make sense out of the data reported by citizens. Chatbots often used for citizen feedback provide millions of opportunities to help cities provide better services. In Dar es Salaam, a water utility company allowing citizens to report a problem through a Facebook Messenger Chatbot, accumulates all response data in a standardized dataset form that can then be analyzed to feed back into the service delivery improvement.

Civil society organizations can adopt similar practices. With AI technology anyone who has access to data can read the inputs provided by people, analyze the image, categorize problems, even aggregate similar reports that might be connected to a single incident and provide response insights for the community.

Sustainability: Data Sharing Economy

Currently we are experiencing the economy, driven by data analytics and the sharing economy, based on peer-to-peer services such as Uber and Airbnb. With better informed citizenship realizing the value of their data, we will get a data sharing economy in which citizens are stakeholders of how their data is being used. The emergence of data sharing platforms can play an essential role in future data economy. The main challenge is to identify incentives to help increase readiness to share data.[26]

Growing data storage capabilities, faster data exchange and rapidly increasing computing power will enable the data sharing economy. This will support new business models and innovative opportunities for civil society to engage citizens in data sharing based on the benefits it creates for their communities locally – while making it more sustainable. The Smart Health Community project,[27] for example, explores where personal data can be used to improve people's well-being. When citizens share these data with local community, the service offer is customized to what the community needs at each moment.

The role of civil society is vital for establishing data sharing economy that will be secure for citizens, as well as for development of data sharing networks among various stakeholders in the city in order to bring long-term benefits.

What do we want to achieve?

The increasing availability of broadband internet and mobile connections is already helping cities to become 'smarter' every day. The ubiquitous rollout of 5G can be a real game-changer for cities. Mobile 5G will make connection practically instantaneous (single millisecond per connection). Anything you can think of in a city will indeed happen in real time, connecting city services, infrastructure and individual users. Transmitting HD/3D videos and other new formats of content that previously was unthinkable will become a reality. It will dramatically enhance the speed of data transmission and opportunities to operationalize IoT and other smart city applications discussed in this chapter in real time, making response time close to nothing.

Ideally, the abovementioned technologies will bring more transparency and greater participation to cities, which will support and enhance civil society. Solutions built on open source technology will help urban civic enthusiasts to address a number of issues in a collaborative way. Catalyzed by 5G connections, these solutions will be available to anyone at their fingertips as quickly as they can think.

The University of Nottingham's Databox project[28] in collaboration with the BBC[29] and other industry partners, is already exploring the development of a platform that can provide such control and accountability of personal data. The Databox is envisioned as a personal data processing ecosystem for managing own-data security and authorizing third parties to access the data to provide authenticated services. The similar principle is described in an article by Stanislav Ronzhin (see also his chapter in this volume, *"Civil Society and the Future of Personal Data"*). This will put civil society in a position where they need to articulate the value proposition to access personal data alongside with the private sector and government actors. Cities will need to reconfigure and adapt to each person based on the amount of data they are willing to share, and so will civil society and urban activists.

What do we want to avoid?

The most common approach to 'third sector' organizations clearly separates civil society and the state, although in some cases, especially in the post-Soviet countries, the line blurs, and it is difficult to identify whether the organization belongs to the civil society or the state. For example, in the Aktivny Grazhdanin ("Active Citizen") initiative[30] and 'vertical crowdsourcing' platforms[31] public participation is facilitated by the government with the goal to support the state agenda.

As the Moscow Smart City strategy suggests, mass implementation of AR applications along with the virtual reality (VR) and mixed reality (MR) is expected in law-enforcement agencies, education, and health care sectors. It will also be used widely in Moscow schools in teaching sciences and implemented in various places of tourist attractions. The flipside of this technology is that it is run and managed by the government, so these technologies will be controlled by the parties that are outside of civil society reach.

One of the biggest concerns associated with such technologies is what happens to the data generated through these technologies and who owns them. Traffic camera feeds, city-wide sensor networks, and local government management systems to name a few are the sources of big data. When used with algorithms, data integration and analytical tools enable real-time city monitoring and surveillance.

While big data is considered useful for understanding cities, its use for urban management and governance has prompted a number of concerns expressed in literature and should be critically evaluated. The data accumulated from numerous sources automatically and streamed into a single "panoptic vantage point" could turn a city into "a Big Brother society" and create tensions between effective urban governance and citizens' right to privacy (Kitchin, 2014).

Discussions around educating a regular user about digital technologies and data, however, place responsibility on users calling for 'smart people' rather than on the developers of the systems that manipulate data. Government and businesses are collecting more and more data whereas the general public remains powerless to do anything even when it comes to using and protecting own data. Issues of data protection are not unique to any particular technology outlined above but are common to all emerging technologies that run on data.

What is likely to happen?

Highlighted data security and privacy concerns are a significant barrier on the way to creating transparent, open, and safe systems for people to participate in smart cities. Fully digitized, smart cities will be able to create an environment where anyone can switch on and off any data sharing that they are engaged in their urban living. Anyone can be as digitally visible and invisible as they wish, without putting their own experience of cities at a disadvantage. The role and possibilities of civil society activities will shift significantly towards ensuring an appropriate use of citizens' data and digital technologies.

Tensions between open source and closed smart city systems are likely to continue. Civil society will need to find forms of engagement that work best in city contexts. As city dwellers become more aware of data privacy and security issues, any technology enabled transactions will need to be more secure in order to be trusted. Open source systems are more prone to hacks and disruptions. Policy and legal frameworks around using open source and data will need to continue to develop. Civil society and community leaders wishing to adopt new technologies will need to team up with developers and legal specialists.

Unmanned Aerial Vehicles (UAVs), commonly known as drones, are developing rapidly. Flying robots are currently sending a weak signal in the context of smart cities, especially due to the array of legal and safety restrictions of operating over densely populated areas and negative public perception challenges. However, it is expected that these machines will provide nearly all critical services in cities in the nearest future and will help bridge gaps in city infrastructures. This includes monitoring of roads, building conditions, and critical infrastructures; providing ubiquitous connectivity and security; express deliveries including merchandise, documents and medical supplies. Earlier in 2019, a US-based air mobility platform AirXOS together with the University of Maryland performed a delivery of a donor kidney in Baltimore and we can expect to see more such cases. Drones will be responsible for most of the data collection in cities.

Data privacy and security will continue to be a growing concern of smart cities, and trust in digital tools and parties running them using massive amounts of data (private sector, government and civil society organizations) will be the key to ensuring participation and collaboration of city dwellers. Data that is 'dirty,' i.e., biased, incomplete, skewed – used to train AI algorithms, can toss a wild card and undermine people's trust in data-driven tools and city solutions.

Conclusion

Cities have always been hubs of civil society activity. As this chapter suggests, smart city technologies can bring some exciting opportunities for civil society in fast-changing urban environments, but at the same time a number of challenges that could undermine trust and public participation.

The smarter cities become, the bigger role civil society needs to play to ensure that they serve the interests of the people who live and visit them. In the introduction to this chapter I outlined critical factors that civil society will need to address in order to impact future cities: awareness, motivation, accessibility, accountability, efficacy, and sustainability. The technologies described in this chapter could help civil society to address each of those factors and improve the way people will experience cities in the future. Given the tensions outlined above, cities will need to address some challenges in order to make the use of these technologies truly open and collaborative.

While people are becoming more aware of the impact that generation and sharing of personal data have on their lives, technology and data will continue to develop and support urban living through the use of personal data. Every decision in the city and every service will be based on the data that is available. A future civil society, in the context of a smart city, will be able to analyze vast amounts of data and use them in real time through various tools described in this chapter in order to engage stakeholders, improve services and address city challenges. The data will be produced and transmitted back to the user through various fabrics of city infrastructure.

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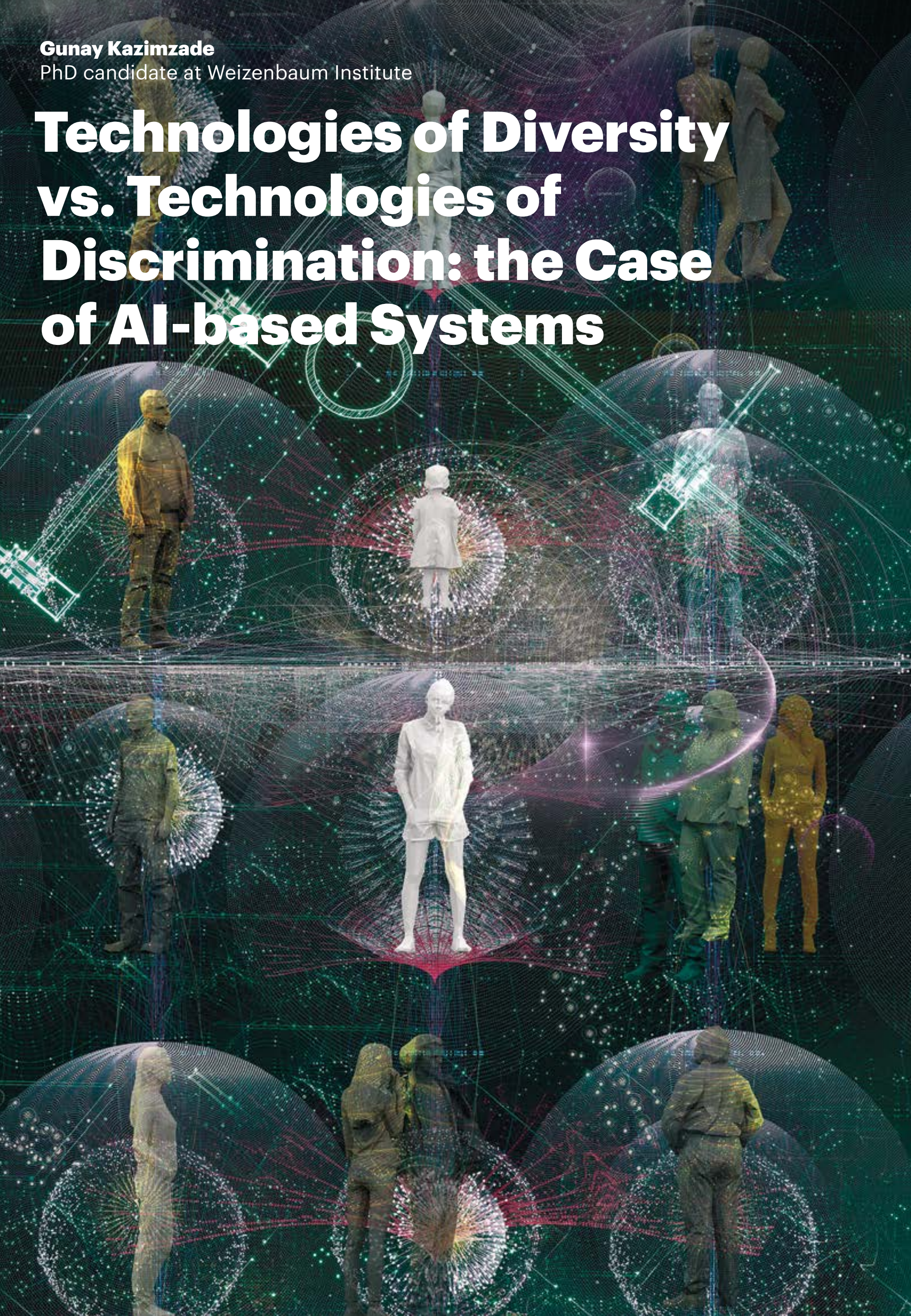
Technologies of Diversity vs. Technologies of Discrimination: the Case of AI-based Systems



Introduction

Today, AI systems are used in a variety of domains and, from a high-level view, these technologies function as systems of discrimination: they differentiate, rank, and categorize and therefore, in some specific cases, discriminate and create inequalities in society. As the current facial recognition systems are miscategorizing people of color, women are consistently underpaid, and automatic recruitment systems are excluding female candidates for technical and leadership positions, society faces the challenge of being "categorized," "discriminated" and "unfairly judged" by intelligent systems.[1,2,3,4]

As stated by the AI Now Institute report, there is a crisis of diversity[5] in the AI sector across gender and race.[6] Authors of leading AI conferences, decision-makers, workers, and research staff of "tech giants" such as Google, Facebook and Microsoft are predominantly white and male. Also, there is no public data on trans workers or other gender minorities, as stated in the same report. Even though there is a growing concern and social focus on "fixing" diversity problems of the AI industry by approaching data quality, fair models, and inclusive design, many argue that there should be a deeper analysis of workplace cultures, power asymmetries, harassment, exclusionary hiring practices and unfair compensation that are causing people to leave or avoid working in the AI sector altogether.[7]

Therefore, it seems that the inequality problem of AI is not just a technical problem, but an issue that needs to be addressed from the interdisciplinary perspective involving different stakeholders, decision-makers, and, most importantly, civil society.

AI-based technologies are increasingly positioned in the center of our lives, developing new horizons for society. This buzzword "AI" is used to generalize technologies and systems which "imitate" human intelligence using a variety of techniques such as automatic speech recognition, image recognition, natural language processing, speech

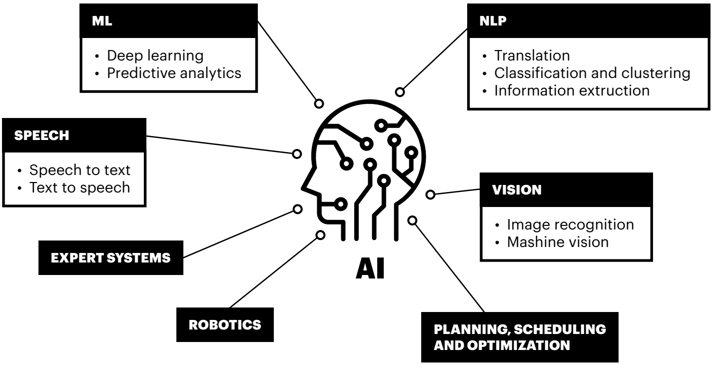


Fig. 9. Which AI-based technologies are experienceing a diversity crisis?

generation and so on. Machine learning is a subset of AI and focuses on the ability of machines to receive a huge amount of data and learn from it without being explicitly programmed. However, expert systems, which are also included under this "AI" umbrella, can operate with general programming techniques with or without machine learning algorithms. Therefore, it is important to differentiate between AI, machine learning, and other terms with regards to the scope and impact they have on the diversity and discrimination problem. In our article we focus on all these techniques and the discrimination problems caused by their implementation in a variety of domains.

Debates are ongoing on whether AI-based systems improve the quality of human life or, in contrast, increase inequalities and exclusion in society. Large-scale machine learning and deep learning techniques which enable computers to process and analyze vast amounts of data are widely used in domains such as insurance (specifically in credit scoring), loan applications, healthcare including healthcare analytics, healthcare robotics and illness diagnostics, in public safety and security (specifically in predictive policing and crime applications), in human workforce replacement and human resource management, in social media applications, games, digital entertainment services and in theeducational domain for teacher robots, children-robot interaction, intelligent tutoring systems, online learning and learning analytics.[9,10,11,12]

In specific use-cases, however, these socio-technical systems bring unfair, unethical, and discriminating results. Report by the AI Now Institute states that "Systems that use physical appearance as a proxy for character or interior states are deeply suspect, including AI tools that claim to detect sexuality based on a picture of someone's head, predict 'criminality' based on facial features, or assess worker competence via 'micro-expressions.' Such systems are replicating patterns of racial and gender bias in ways that can deepen and justify historical inequality. The commercial deployment of these tools is a cause for deep concern."[13]

The scandal involving Amazon's "sexist" AI-based recruitment tool which "learned" to eliminate female candidates was brought to public attention and the company itself in 2018. The reason behind the unfair judgements made by the system was its use of historical data that captured decisions made by human recruiters in the past 10 years. During that period very few women were hired to leadership and technical positions; therefore, the system trained on that data learned to imitate the biased decisions made by human workers at the company. After the scandal went viral, the company decided to edit the program in order to neutralize gender features; however, there is still no guarantee that the recruitment systems would not correlate other features with the candidates' gender attributes.

Timnit Gebru, who studies algorithmic bias at Microsoft, emphasizes[14] concerns about how deep learning could reshape the insurance market; minority and underrepresented groups may be discriminated against due to a higher volume of traffic collisions in more densely populated zones where they are more likely to live. A deep-learning program could "learn" that there is a correlation between belonging to a minority group and a higher volume of traffic collisions and use this to build a model with prejudices against people of color, for instance. In this case, that insurance system would have developed a racial bias.

Machine-learning algorithms in AI-based systems are currently applied in the healthcare industry to analyze high volumes of data to improve decision-making, guide treatment decisions and improve efficiency. Such data, collected over several years, can reflect historical biases against vulnerable populations. It leads to potential promotion of further bias, leading to disparity in the healthcare industry.

Predictive policing algorithms are becoming immensely popular in cities across the US, as well as in other countries. Many researchers and privacy scholars are concerned about critical consequences of decisions made by such systems, since they have the potential to reinforce racial and cultural biases. "Police in America is systematically biased against communities of color," according to New York Civil Liberties Union legal director Christopher Dunn told Fast Company. "Any predictive policing platform runs the risks of perpetuating disparities because of the over-policing of communities of color that will inform their inputs. To ensure fairness, NYPD should be transparent about the technologies it deploys and allow independent researchers to audit these systems before they are tested on New Yorkers."[15]

With the boom of smart technologies, social media platforms have become trusted spaces to share personal information, photos, activities, and discussions of topics such as politics, religious views, and other sensitive subjects. In order to operate at a larger scale, these platforms are applying AI-based techniques in filtering and targeting methods in recommendation systems for movies, music, and news channels, as well as news feed generation on social media platforms. They are manipulated with respect to the users' demographic information, gender, age and browsing history, thus providing information which fits within their existing "bubble" world view and explicit interaction with those who share that view. Over time, the biases and prejudices of those filter bubbles are reinforced and distributed within these communities. The issue is the same for non-traditional interfaces including Amazon Alexa and Microsoft Cortana. Growing numbers of users are experiencing these interactions manipulated by smart algorithms and there is a danger of these technologies limiting our choices and interactions without us even realizing it.

Considering the fast-paced evaluation of algorithmic decision processes it is likely that they will be increasingly affecting society in the coming years. It is vital that civil society speaks up about issues such as bias and discrimination in AI-based systems, as well as strategy, vision, and action plans to overcome these issues.

Possible development directions and desirable future

First we must consider how this can be done. What developments could society face with the exponential growth of data and implementation of AI-based systems in different domains, in particular socio-technical systems?

The first step towards solving the discrimination problem in AI requires the application of gender- and cultural-sensitive guidelines for fair data collection, data handling, design, and implementation layers of the AI-pipeline. Moreover, it is vital for each level of society, including governmental organizations, businesses, NGOs and educational institutions, to follow these guidelines and apply them in their own specific domains.

The other direction of development is in solving the inequality problem by applying emerging technologies for the needs of civil society. Data-driven applications trained on incomplete datasets, which only capture limited cultural or geographic groups, may produce results biased against other groups that were not captured in these datasets. This happens due to a lack of availability of quality data in these geographic locations. For instance, in the dataset presented by UK Biobank which aimed to genotype 500,000 individuals, ethnic minorities were significantly underrepresented, including Black (by a third), Chinese (by more than a third) and Indian and Pakistani (by more than half). White British participants make up 94.6% of Biobank samples, compared to 91.3% of the general population. This sample has a dramatic impact on medical diagnostics, creates a bias and increases the risk of wrong diagnoses in the underrepresented groups.[16] AI developers are targeting European and US populations due to the lack of quality data representing other populations.[17] Therefore, open data initiatives in marginalized communities may provide a unique opportunity to include underrepresented groups in the agenda of technological solutions aimed at solving cultural diversity problems.

The use of machine learning and AI-based technologies in the educational domain is one of the least discussed applications with respect to the role of emerging technologies in reducing social inequality. However, it shows promise in overcoming problems of social inequality caused by emerging technologies. With the current rapid development of technology, decision making, technology development and data collection are manipulated by a small elite. Thus, there is an opportunity to distribute this knowledge and power among all layers of the society. This is possible by educating the next generation of female tech leaders, teaching state-of-the-art technologies such as artificial intelligence and machine learning at an early age, teaching interdisciplinarity, promoting intercultural cooperation and diversity as well as conscious and unconscious human biases reflected on technologies impacting the society.

Civil society should play an essential role in this case by understanding and adapting data-driven technologies and privacy, and their political and economic influences, as well as new opportunities and risks that these technologies bring.

With respect to such issues as social media profiling, political manipulation and discriminating decision-making systems, civil society could serve as a bridge between society and policy-makers and technology reinforcers in bringing the communities they serve to the table and including underrepresented groups in development processes.

The most relevant role of civil society here is in understanding the dangers of the biases caused by AI systems and how they may affect the issues they implement and the people and communities they serve. The goal of civil society organizations could be set towards raising awareness of companies and organizations implementing new algorithms on challenges such as fairness, transparency, and accountability; the same applies to policymakers, responsible for forming new laws and regulations, designed to govern these technologies, as well as monitoring and analyzing the impact and consequences of the implemented strategies and standards.

What could go wrong?

Without proper safeguarding, AI-based systems may bring negative consequences to society by creating an authoritarian and centralized way of manipulating, filtering, and discriminating underrepresented groups in society. Inequality of access and geographic underrepresentation could be applied by manipulating training data and machine learning models in critical cases such as employment. This could lead to the use of these technologies for distributing uneven power among society, power of distribution and creating "disconnected" bubbles in society.[18] AI technologies may also bring privacy-related issues with respect to personal data, fake-news and political manipulation through targeting and filtering on social media; these are the ultimate risks of the "divide and conquer" approach that threatens democracy.[19]

The centralization or decentralization of power within these technologies can have consequences concerning societal equity and equality if and when such technologies are used as a tool to manipulate, govern, and direct further development of society. In this sense, for instance, China's social credit system has been compared to the Black Mirror TV series, Big Brother reality show, and other dystopian future science fiction narratives. "What's really scary is there's nothing you can do about it. You can report to no one. You are stuck in the middle of nowhere," says one of the black-listed journalists from China who was "tagged" as "not qualified" to buy a plane ticket and banned from travelling by certain train lines, buying property, or taking out a loan.[20]

Unknowns

Extensive discussions on the topics of transparency, fairness and accountability of the algorithms and technologies used to impact society are ongoing, although they are not fully incorporated in the design and implementation of these technologies. Not all machine learning and deep learning algorithms can explain their decisions, and most of the data used to develop data-driven systems is biased and does not capture the entire population it is aimed at. How will "black box" algorithms be governed? How will AI biases impact the people AI is aimed at? Who is responsible for governing all these technologies? We are yet to find answers to these questions. There are, however, ongoing initiatives of organizations such as the AI Now Institute, Alan Turing Institute and Leverhulme Institute for the Future of Intelligence which are raising awareness on approaching crucial problems of discrimination and exclusion problems in data-driven systems, as well as the implementation of new technological solutions for eliminating the negative impact of issues concerning AI strategies and policies introduced by different decision-makers and commissions.

Weak signals regarding the role of emerging technologies

Although we discuss bias and discrimination caused by AI-enabled technologies, it is possible to use such technologies to detect biases occurring at the different stages of the technology development lifecycle. It is one of the directions which has a slow but important impact on overcoming inequality problems in society.

For instance, a team of US researchers has developed an AI tool for detecting bias based on race and gender of job or university applicants. The system is trained on a vast volume of data and makes recommendations on hiring female candidates, if they have been underrepresented in specific positions or faculties for a long time.

These kinds of technologies can be used and governed by civil society organizations, as it is the direct responsibility and aim of these organizations to measure and mitigate biases and discrimination in socio-technical systems.

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The Internets of the Future: What They Can Be for Civil Society

It is sometimes said that today's internet is different from what it used to be. As if it had become ruined or spoiled, ceased to truly help people, and started to be harmful to democracy.[1] This idea is much discussed by activists, programmers, and engineers. One of the most striking cases is the appeal[2] that Tim Berners-Lee addressed to a broad public audience in 2019. One of the creators of the World Wide Web, Berners-Lee writes that the internet was initially supposed to be something quite different and now it is important to refashion it, to come up with new technical solutions that will allow the users themselves to control their data. But behind each such opinion, pessimistic or still optimistic, there lies a certain vision of what the internet is and what it might be, as well as a certain idea of the desired future, as something the internet will help bring about or prevent.

The future of the internet and its impact upon the development of civil society hinges on how people understand the internet now. Herein, I propose to examine variation in how the internet is understood today, and how those differing visions may influence its development in the future.

"We just wanted to get packets [of information] from one point to another."[3]

Nowadays the internet is something different from what it was when it was invented and constructed as a part of people's lives. And it might change again in the future, maybe more than once. All kinds of mobile services and applications, modern messengers and streams, State Services and ride-sharing apps – none of these things existed just ten years ago. The internet was something that basically worked via browsers and computers, not ubiquitous mobile connections. Even 15 years ago, the internet was still called "the World Wide Web" or "the Internet", always capitalized, whereas now in English and other languages (e.g., Russian) it is increasingly being written in lowercase, or shortened to just “the net” or “online.”[4] Nowadays people simply say they “met online” or “downloaded something from the net,” reflecting how such things have become increasingly embedded into their lives.

What part of this changing phenomenon will we still call the internet in the future? A purely technological description of it is not enough to answer this question. Even developers and engineers are saying that to understand the internet, one needs to understand what it is for different users.

And for internet users, the internet is diverse. When people say “internet” in daily conversations, they usually mean a number of components: texts, pictures, movies, memes, letters, music, programs, and algorithms. When the internet is used by organizations, the meaning of the internet includes not only wires, but also data that passes through them, content that users post. The internet is both technology and communication; it is infrastructure together with services and platforms.

In this article the term *internet* will not imply something holistic, a kind of stable technology with stable elements, functions, and meanings. On the contrary, I focus on the variability of what is called the internet and what acts under this name in society. Often the internet is understood in the context of the utopia that has been surrounding it since about the time it first came into being (and perhaps even before then – many scientists of the twentieth century were creating an imaginary of possible global data sharing networks). Initially, this utopia spread in the Western countries and developed in an emerging global environment. But the more people use the internet, the more unstable becomes the idea of one single view on it, claiming to have a comprehensive description of the phenomenon. Rather, it is necessary to adapt our understanding of the internet to various interpretations and technological solutions, which are already part of the internet and which will continue to multiply.

This diversity of definitions of the internet is something normal in a situation of constant technological change. The infrastructural configuration and social role of the internet vary in different contexts. The specifics of the internet in certain regions are influenced by the available type of telecommunication networks and other ways of transmitting the signal.

For example, optical fiber has allowed much larger amounts of data to be transmitted over longer distances at a higher speed. Mobile internet has made it possible to use the internet in new situations. But both broadband and mobile internet appeared in many Russian cities only by 2010. Not only the geographical location, but also the urban structure itself influences the perception of the internet. For example, in the city of Kazan, internet providers divided the market according to parts of the city, as they are rather remote and independent of each other.

Besides the infrastructural differences, it is necessary to remember about the variety of practices of interaction with the internet – these practices will differ for each group of users, locations, regions, countries (this is one of the important conclusions of the project Why We Post[5]). Some users, for example, associate the internet with public interactions, others exclusively with private interactions. This plurality of practices is particularly important in the analysis of civil society. After all, the originality and independence of user practices can be the basis for various grassroot initiatives.

How is the changing integrity of this multi-sided phenomenon maintained? Theories of internet governance usually argue[6] that there are several participants or actors involved in decision-making about its future: these are commercial companies, civil society, and national states. Let us consider how these actors try to influence the future of the internet.

Corporations, governments, and civil society: three positions on the development of the internet

Corporations (Facebook, Google, Yandex, Amazon and others)

One possible future scenario is the internet that will fully belong to global corporations. Imagine that the internet does not exist as a whole phenomenon, but instead there are separate companies – Facebook, Yandex, Google – and each of them sets its own rules and tries to create an overall ecosystem which the user will never leave.[7] There can be almost anything in such ecosystems: communication, films and music, city maps and applications, working tools, etc.

In 2017, Mark Zuckerberg described the future as a global "social infrastructure" designed to "bring humanity together."[8] All kinds of social interactions (including the formation of "civil participation") can take place within this infrastructure. But even if we skip the critics' questions about the over-centralization of such a "public" system,[9] the question will remain: who will be able to pay for its maintenance?

Online services are often free for the user. But the payment for the "free" use is personal data, which online platforms sell to advertisers. This business model, named "surveillance capitalism," raises questions for civil society (data collection turns into surveillance; privacy and the ability to share something important prove all to be at risk), for nation states (as data is transmitted across borders, it is increasingly difficult to protect one's data-rights in such a situation); and for users (the information so collected can be utilized to profile and manipulate people's consciousness, not to mention generating super profits at the users' expense).

As corporate platform ecosystems evolve, they usually develop imposing paid functions. It is possible that the share of such paid services will grow. Perhaps, in the process of the development of paid services and the "freemium" model – with part of the services free, part paid (premium) – the most interesting functions may become paid: expanded access to educational resources, business platforms, communications, etc. And free services and content will remain either only businesslike and infrastructural, or "enticing."

Researcher Nicole Staroselski warns of a new "infrastructure" inequality: "Only those who can afford to pay will have access to data backup and adaptive architecture, and those who cannot pay will sacrifice their privacy and autonomy"[10]

Money and attention converted into advertising attention will not be the only currency; but also data itself will be a currency: the more data the user gives to one company, the more convenient service and better search system he or she will receive in return. This provides new opportunities for companies – the user's entire life can be analyzed, the data can be included in predictive models, and the likelihood of success in promoting new products and services will be even more effective. Similar schemes are available now in many apps with movies and books: they offer you only something that is sure to be appealing to you. It is worth bearing in mind that this can result in increasing "information bubbles" and the redistribution of power in favor of those who own data (and this is not the users themselves).

In response to platformization and increasingly closed-off platform ecosystems, user innovations are likely to emerge (standard technologies used with non-standard methods or for non-standard purposes); initiatives that develop users' skills (including the ability to work with their own data – as in the new Solid project by Tim Berners-Lee, described in the article by S. Ronzhin – to deal with privacy modes, to read legal documents); groups like sci-hub,[11] that combine activism and protest against the global copyright system and major owners of scientific information. Such activist groups and services create opportunities for those who cannot or do not want to use large monopoly-services. Perhaps, services which are more likely to be alternative today may be developed, such as a browser that respects user privacy and does not collect query history, like DuckDuckGo.

The goals of corporations, however, may be transformed: corporations will begin to pay even greater attention to social impact on society (rather than just to market dominance or commercial profit): for example, in their internal performance indicators, companies will consider growth of well-being, strive to improve the education level of consumers and clients, etc. See, for instance, the multiple initiatives of different companies to develop social projects or their response to the coronavirus situation.

On the one hand, this means that companies will make a claim to take the functions of state or other "traditional" social structures, for example, in the sphere of education and culture. Google has already done much to preserve culture: Google Books and Google Arts & Culture, notwithstanding any criticism, are influential international projects in the field, that do not generate immediate profit.

The conclusive platformization of the internet entails another risk: platforms replace and displace various small internet projects,[12] which initially choose these platforms for their activities. This matter has been discussed for more than a year,[13] but the symptoms remain. When we use the internet exclusively with the help of platform services, the platforms absorb the "designers" and turn from the "market" of various service providers into monopolistic service producers. (Amazon first collected data about the best-selling products, but then created its own goods which best meet the market demands.[14])

The user relationship with internet services is simple and clear: pay for the service – receive it. internet services will be simplified, as any technology is simplified when it enters the wide market, so that it can be used by different people. The influence of platforms can also be reflected in censorship: for example, in 2018 Facebook and Instagram, following new US laws, imposed restrictions on conversations about sex.[15] This was supposed to prevent new cases of sexual slavery organized via the platforms. An unpredicted consequence of establishing moral norms inside social networks, however, was the threat of closing many projects on sexual education, for example, in Russia blogs by Arina Vintovkina and Tatiana Nikonova.

An internet that has been turned into a platform for services could become another utility infrastructure, something like running water or electricity. It could be a stand-alone channel with content and means of communication, supplying us with movies, news, correspondence, and memes. In this form, it will not be the internet familiar to us at present, with all its complexity and variability, but something more akin to such closed and centralized platforms as VK, YouTube, Netflix and Yandex. Imparting upon the internet the status of a utility service does not automatically mean the collapse of all hopes associated with the internet, but does mean redefining the original internet utopia, whereby the internet is seen as a flexible tool for connecting everyone with everyone.

State governments and large international organizations

In the 2010s and 2020s in almost all countries of the world, internet governance began to take place with greater state involvement. In Russia, for example, the number of laws regulating the behavior of internet actors has increased dramatically. Similar processes can be observed in the European Union (GDPR), the United States and other countries. The combination of these rules, if viewed from afar, can create what some experts call a "state-platform"[16] – the position of state when it begins to act as a provider of conditions "that will help a person to discover his abilities and create for him a comfortable and safe environment and opportunity to realize his potential, as well as to develop and implement innovative technologies." Such a technocratic approach to the role of the state means that the state "will move away from providing single 'point' services (...) to dealing with complex human life situations which are based on a single array of data and algorithms, to work with the data, that were jointly developed by the federal executive authorities." To realize such a vision of the future, states will need to collect, store and control citizens' data. States will need more and more data that will be in their jurisdiction and available to their regulatory authorities.

Already now, states are forging close relationships with corporations – striving to manage their policies with advertisers, as in the U.S., or forcing them to store data on their territory, as companies in Russia had to do after the adoption of "Yarovaya package." If the idea of such development continues to exist, we can talk about the possible platformization of governments. Another story involves the centralization of huge amounts of data, for example, by mobile operators. If that data is combined with what public services know about citizens (starting with schools and ending with clinics for children), then in its development it will look more like a dystopia of total power than the idea of the state as a service provider.[17] Greater intersplicing of IT companies with the state seems quite likely but how it will develop is still unclear. But it is worth bearing in mind already now that the expected role of civil society in this process is to tend to participate in the formation of this hybrid, and not only to oppose its existence.

Activists and Civil Society

When the internet first appeared, a large part of the world experienced strong change. Alongside with the qualitative change in technologies, many scientists and politicians began to say that the internet could change the world for better. Many conferences and forums discussed how the internet would become a tool for political mobilization, help people with disabilities, allow more free dissemination of knowledge, etc. The early history of the internet is full of such expectations, and in many ways, they were created by people for whom knowledge and technology were important life components.

Accelerating the spread of knowledge, political mobilization and greater inclusion were not the only promises of the internet. In the Declaration of Independence of Cyberspace, John Perry Barlow stated a key idea: the internet will allow many of the previous rules and laws to be ignored. For the pirate activist movement, which became popular in many countries at the end of 20th century, freedom of information was the main value. But the pirates did not focus just on breaking the rules. They wanted to change those rules. The pirate parties lobbied changes at the legislation level of single countries. The pirate movement changed not only the laws, but also the practices: the work of Napster and Pirate Bay began to influence the music and other industries, reducing the role of intermediaries in the exchange of works of music.

Legal initiatives and new copyright formats, such as Creative Commons, emerged and became popular. They made it easier to distribute music pieces and other works with the author's consent. The internet became part of the official activist political agenda and changed entire markets.

Not all the initiatives were able to implement their vision. The shape of many current internet projects would surprise those who used to think about decentralization and activism. Civic initiatives are spreading in many different environments, for instance, Tinder and TikTok. Civil activists, rather than placing their own photos as their main picture on Tinder, have instead posted photos of posters and descriptions of important political actions they support. If it is impossible to change the software, users possess inventiveness in working with the content or transforming the functions of these environments for their own purposes.

Internet activism does not only mean activism dedicated to the internet itself. It is also the use of the internet as a means of mobilization. Internet tools have been used around the world to organize assistance to victims of forest fires or other natural disasters. The protest movements of different countries have begun to use the internet on par with leaflets and posters. Instead of calling or gathering people at home, activists have created groups on social networks.

Does the internet actually help social movements, or – apart from making communication faster – does it rather simply inherit previous methods of communication? Have the social media networks impacted political activism, for example during the Arab Spring, or were they more a tool for the established strategy of action? Researchers Seynep Tufekci and Christopher Wilson claim that social media primarily provided an opportunity for political activists to remain connected with one another, as they were out of the government control.[18] In this situation, representatives of national states are not inactive, trying to control online communications. John Perry Barlow's ideas that states do not have access to online bodies are becoming increasingly utopian.[19]

In response to the state subordination of the newfound communications, activists are proposing new initiatives, such as decentralized, anonymous internet, out of the control of large players. This is not so much about large projects like TOR, which is being developed together with U.S. government agencies, but about more compact and sometimes little-known projects.

The contours of the internet's future

Weak signals

Increased numbers of internet actors. Not only people and organizations connect to the internet. The meaning of the internet is beginning to encompass more and more entities: smart homes, cities, and items of clothing. There is an attempt to unite these entities together, not under the Internet of Things, but rather under the Internet of Everything (for instance, in the projects of Cisco[20]). The internet has long been inhabited not only by people, but also by bots, online-assistants, virtual characters. It is worth thinking if we are offering new internet users the role of slaves and creatures who follow people's orders, or providing an opportunity for them to show themselves, even if now they seem different from us?

Fragmentation of private networks. In parallel with changes on online platforms (see above), which restrict the possibility for user self-expression, private services are now developing personal diaries, small internal networks for family and friends. At the end of 2019, Professor Sarah Oates of the University of Maryland described changes in internet expectations the following way: "People are less interested in one big internet, and are much more interested in smaller, more intimate online-communities and personal experience."[21] Thus, there may emerge isolated fragments inside the "Big Internet."

At the end of 2019, Bitcoin co-developer Marty Malmi wrote[22] about trust networks as a key technology – what is more, not only social but also technical. Malmi created the decentralized social network Iris,[23] where data is stored on a user's device, and user-to-user interaction occurs directly, without a centralized platform as the link it created. With this example, Malmi predicted the development of small, separate networks where all the participants trust each other and interact directly, and this interaction impacts the rest of online life. For example, an Iris user can set up search filters to show, firstly, results that are appropriate for people of the user "trust network."

Opting out of "Big Internet." It is possible to imagine the development of whole communities living without the net at all, and without and such platform ecosystems that most users of big cities are used to. In this case, the development of alternative mesh networks cannot be avoided[24] (decentralized airtight communication networks not connected to the "Big Internet") or emergence of large-scale new projects aimed at completely re-inventing the net (Berners-Lee).

In the same vein, this can be considered a desire for "digital disengagement" (a matter explored in detail in the article by Adi Kuntsman): people with access to all the internet's possibilities nevertheless consciously limit themselves and do not avail themselves of certain services and/or technical solutions. Sometimes this is due to fears about surveillance, sometimes due to a rejection of commercial decisions. Such practices are attributed to developers and people who understand how the internet works, and who choose for themselves only a certain segment, ignoring all the others. Perhaps such "internet deniers " will come to the idea of reusing previously created gadgets.

The desire for decentralization. Changes in the internet are inseparable from political issues. The emergence of the internet in its current significance is associated with the international adoption of the TCP/IP protocol. But this decision was not the only one possible, and its adoption was controversial: many representatives of European countries did not like the fact that the protocol came from the United States (Abbate, 2001).[25]

It is possible that in the future the national interests of states will make corrections to the way the internet is developing. There is a desire for decentralization at the national state level. This is obvious due not only to disputes over internet regulation, but also due to the construction of national corporate internet platforms. Today, outside the United States, several countries (China, Russia) are promoting commercial projects to create their own platforms that will store user data within countries, as well as provide "traditional" internet functions. In Russia, there are several such services: Yandex and Mail.ru Group, which are ahead of the relevant services of Google and Facebook in terms of numbers of users.

Not only states fearing U.S. hegemony, but also new generations of entrepreneurs and technologists are agitating for decentralization. Researcher Nikolai Rudenko shows in his work that activists and entrepreneurs working with cryptocurrencies often project their own expectations, which were previously connected with the internet,[26] onto block-chain technologies. Thus, people disappointed in the revolutionary social possibilities of one technology, carry their hopes over to the next technology – perhaps it will be able to realize their vision of the future. The TON initiative from the creator of VKontakte and Telegram Pavel Durov, which promised to create "their own internet" based on the already existing database of "Telegram" messenger users, closed down in May 2020.

Energy costs. The development of the internet may be influenced by factors which now seem unusual. However, amid the depletion of fossil energy resources, the problem of internet energy efficiency could become more important. One of the serious arguments against cryptocurrencies was the argument about disproportionately high energy consumption of blockchain for implementation of its coding and verification functions.

In a 2015 article, Chris de Decker, the creator of the Solar-Power Sites Support Scheme and the editor of *Low-tech Magazine*, wrote that to reduce energy consumption, a site should be static, whereas modern site design is geared towards extensive consumption of energy resources, both in terms of aesthetics and in terms of rhythm of work.[27] In addition, de Decker draws attention to the energy consumption of different types of communication: 3G networks consume 15 times more energy than Wi-Fi networks, 4G networks 23 times more.

De Decker's inference is to set a speed limit for the internet to stop the extensive growth of energy costs on the internet, based on relatively cheap electricity. This, in his opinion, can be done with the help of intensive and careful use of the internet at small capacities.

Satellite internet, involving cableless communication via artificial satellites, orbiting a thousand kilometers above the Earth. The first versions of satellite internet already exist, but so far they are expensive and inconvenient. Now one of the most talked about projects is Elon Musk's Starlink, but there are also Inmarsat, Outernet, and several other start-ups that still exist in project status, are very expensive, or are not demonstrating the speeds we are accustomed to with modern conventional networks.

The main question is who will be the first to create a really fast and inexpensive way to turn this technical novelty into an alternative to the internet that we know today. In the market of mobile operators and providers, the advent of satellite internet could completely restructure the relationships between users, providers, and states. However, now that satellites are increasingly being spoken about as lying beyond the jurisdiction of states, we cannot be sure that projects like Elon Musk's will be successfully implemented, rather than governmental ones. It is worth bearing in mind that providers often try to work not only with the infrastructure, but also with the content – to open up their publications and services to subscribers.

Calls to reinvent the internet. It is important to pay attention to new initiatives aimed at "fixing" or reinventing the internet. One of the largest such initiatives in Europe is The Next Generation Internet project. In 2019, one of its developers, Oliver Bringer, called it the "people's internet"[28] built on greater involvement of different people and regulation of business and created to promote transparency in the use of data (sovereignty of data is provided by the users themselves[29]). However, this is not the first initiative of this kind; previously the European Commission had the idea of creating D-CENT (Decentralized Citizens Engagement Technologies) and the platform Horizons 2020.

There are major initiatives that deal with promotion of the agendas of different groups and serve as a kind of mediator – for example, The Web We Want. They work with users and with single groups, for example, bringing together teachers and the parents of students.

In addition, MAZI and netCommons[30] are being developed in Europe. In various forms they claim that perhaps the internet concept itself, as we knew it in 2020 and before, should change.

The future of the internet for civil society

Negative scenario: closed and manipulative internet

For the past 20 years, Geert Lovink, a Dutch critical researcher, has repeatedly argued that instead of flash mobs for the sake of defending minority rights, gathering people for "occupy" campaigns, and alternative spaces for speaking out, the social networks are increasingly being used for right-wing populist campaigns and targeted ads.[31]

Civil society, which once seemed to be or indeed was the beneficiary of the internet, is now, on the contrary, suffering from the spread of modern services. This vector of the internet's change is viewed as a negative one. And it is not connected with the will of individual actors, but with many actions of different stakeholders, which are mentioned above. As a result, the internet is often a cause for conflict, and small groups or civil society have fewer opportunities for action than large companies or states. International institutions cannot artificially support multistakeholderism,[32] and as a result, the internet may turn out to be an alternative utility service like running water, instead of being a space and a tool for opportunities.

What to do and what to consider in this situation? Perhaps not only the internet will change, but so will civil society, as we know it today. The very concept of "civil" activism is indeed changing: ten years ago, there was a different feminist agenda, there was no #metoo or other similar movements, and there was no political, public pressure on the technology companies' transparency practices and standards. Of course, a civil activist sometimes gets to choose which side to take, and it is often the choice of lesser evil, rather than an ideal future. It is necessary to be ready for this, as serious changes are impossible without some losses, including pleasant opinions about the world.

We may have to reconsider our views on what freedom of speech is, how different are the real and the virtual, where are the boundaries of private and public. But if now we look back, we will see that some of these changes have already happened. Not long ago, using your real name on the internet seemed like something unusual, and now many users do it on social media. Ethical norms are also changing: the ironic and provocative statements of the 2000s, the headlines and photographs of those years, may today look like manifestations of ageism and objectification.

It can be assumed that the initiatives which today seem “convenient” and “harmless” will not remain such in the future. On the contrary, if the fragmentation of the internet now looks like a lack of fragmentation of the global network for civil initiatives, in the future it may be an opportunity to rediscover forgotten initiatives and learn more about the possibilities of local communities.

Positive scenario: internet of skilled users

We may assume that the most favorable scenario of internet development involves the development of a wide variety of user innovations, both technological and social. Even on a small scale, initiatives that are gradually changing the world are already in place. For example, there are local “micromedia” when people turn their phones with the ability to distribute Wi-Fi into independent media, something like a radio receiving station: you connect to the internet and get access to the files that only members of your network see. Such local projects can help a lot, for example, in the situation of a blockage or lack of access to external information.

Local projects, which combine both technological solutions and the social agenda, can exist not only in the distant future. We can look at local groups and their initiatives. These groups exist focusing on mutual assessment, such as parent groups,[33] local automobile fans, or fishermen. For instance, in the expeditions that we conducted with the Club of Internet and Society Lovers in 2017-18, we learnt different stories in every city. In Tyumen, female activists from the group Gerbera made a map of sexist advertising with the help of Yandex.Maps, explaining what was wrong with images of naked women advertising tires.

What to do and what to think about in this situation? Decentralized user projects will not appear just like that. The relationship between people and technology should change. I see a potential in new educational solutions: groups modifying existing platforms and creating new ones. The experience of such groups can be useful for civil society. Today such projects look more like a weak signal, indirectly affecting the future, but this may solely be due to the optics of research: such initiatives are insufficiently studied and have yet to be included in the agenda of media or academic research.

It is important that users can unite when working on such educational programs to better understand how the internet works and what happens to it. We can imagine this by looking at the millions of people around the world today who have similar understanding of the human body's structure and how it works, referring back to medical atlases and the school courses in anatomy. It is worth remembering that the perception of the human body was quite different just eighty years ago.

Unfortunately, numerous courses on computer literacy and data analysis have not so far explained the more general principles and links between the different components of the internet and the skills to work with it. After all, practical skills are not efficient without knowledge of how modern technologies work. So, it is not enough to have a thermometer to understand why someone has a high temperature and what steps should be taken (if any). But today many people have basic knowledge of the body and what processes take place in it. Similarly, as we can measure our temperature today, we might be able to be researchers of our own life with the internet: to understand exactly how our communication circles work, what are the norms within them, where the platform limits us and manipulates us to maximize advertising profits, and where it helps and inspires, how the infrastructure and content change on the internet, how it differs from user to user.

For the internet to be built in a fairer way, users need to arrange their role as users to be more creative, more reflective, more inventive. Maybe, the main agenda for civil society is to support and encourage such user movements, if it wants to assert itself as a stakeholder in the future development of the internet.

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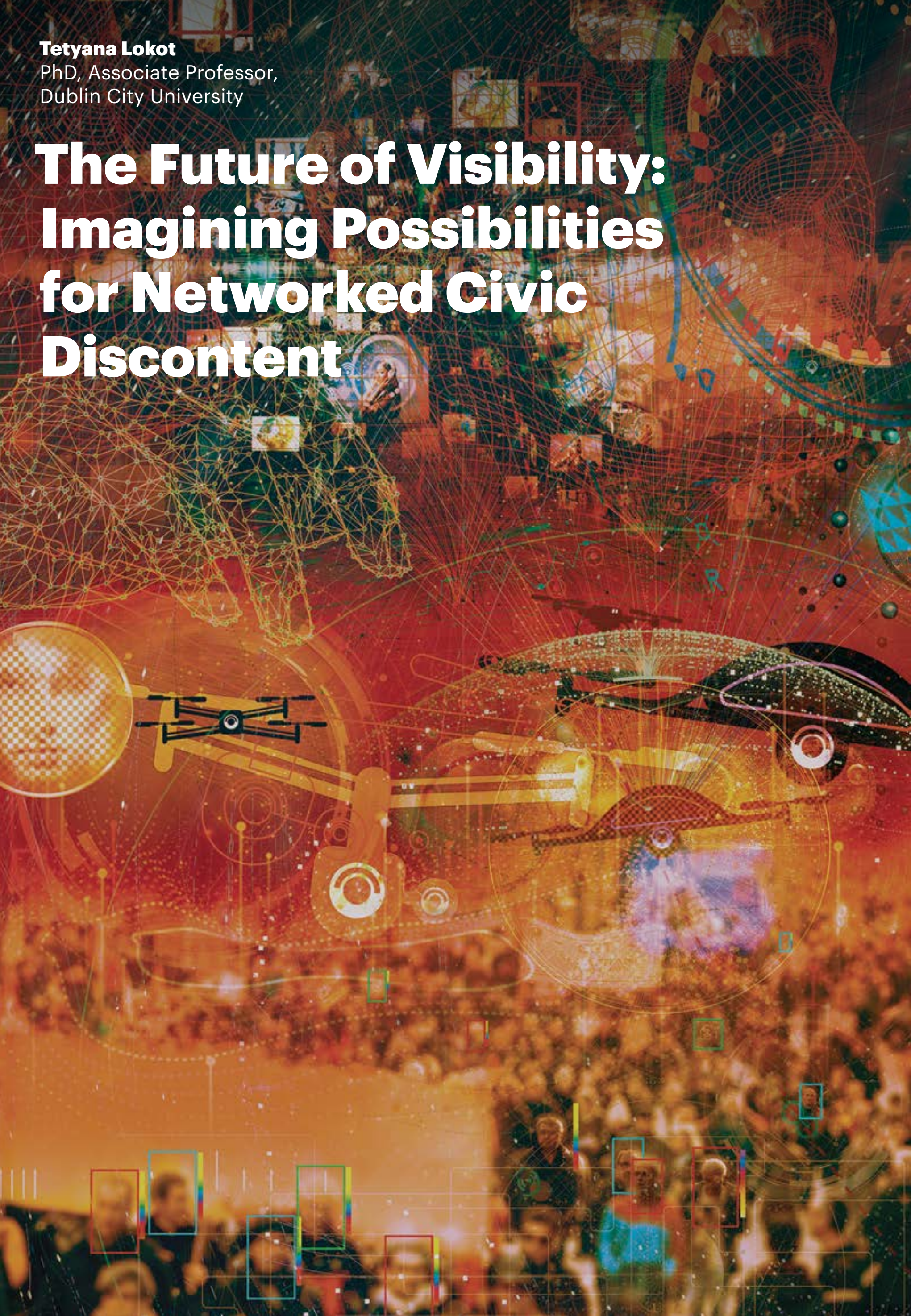
The Future of Visibility: Imagining Possibilities for Networked Civic Discontent



Issue Field and Key Actors

How technologies are entangled in understanding, constructing, and doing citizenship is of key importance to civil society. Expressions of public discontent are traditionally considered one of the key elements of performing citizenship.[1] This article explores the potential futures of technologically augmented discontent and the implications these future scenarios might have for civil society as a source of alternative voices on key social issues and civic rights.

Though there are many issues at stake for civil society actors participating in social protest, including mobilisation tactics, managing presence in public spaces, participant security and negotiating legal norms, I focus on the issue of *visibility of discontent* in a mediated world,[2] and the role emerging and future technologies, such as AR, VR and holographic technology, might play in making social protest more or less visible, in both optical and algorithmic terms.[3]

At a time when users' attention is a key currency in the networked information society, the potential discoverability or invisibility of protest activity and messages have clear implications for the power of protest movements to set agendas and win hearts and minds, but also to inform people about potential risks and fragility of control over what is made visible.

I conceptualise the future potentialities of technologically augmented protest visibility through the prism of *technological affordances theory*.[4] Affordances refer to the potential opportunities or limitations of action that emerge at the nexus of actor intentions, technological capabilities, and the environment in which they interact.[5] Such a context-dependent approach is useful in horizon scanning as it allows to account for a number of potential scenarios of technology use and to speculate how each may shape the value and impact of certain technological interventions for particular civic publics.

Developing future scenarios of protest visibility must account for the various actors implicated in this issue, such as social media platforms, technology manufacturers and distributors, civil society groups and national and international regulatory bodies producing policies that regulate both the use of technology and the formats and possibilities of peaceful civic protest.

Background and Context

The technologically mediated nature of everyday life has contributed to the emergence of the *social attention economy*,[6] with social media platforms and other networked technologies empowering citizens to reach out to broader publics, while competing for eyeballs in the era of information overload. This focus on attention, coupled with new affordances of networked technologies for less formal organisation, allows civil society actors to organise spectacular, 'statement' movements more easily.[7] Such protest activity combines peaceful discontent with high-visibility actions aimed at capturing public attention, as well as expressing civic identities, grievances, and concerns. Therefore, the visibility of such movements and actions becomes a key element of protest organisation in the hybrid media system,[8] where old and new media logics co-exist.

Relevance for Civil Society

Protest helps stage important interventions into the fabric of everyday social life. Finding creative ways of using existing digital technologies or experimenting with emerging tools is therefore key to making those interventions visible in a context where every form of social interaction and information exchange is permeated with technology. The visibility of protest-based interventions, in both physical and digital public spaces, underpins successful claims-making and contributes to informing policy developments and decision-making about a number of issues relevant to civil society work, be it urban planning, human rights and equality, or environmental concerns.

From Strong to Weak Signals

The evolution of civic protest visibility will rest on a number of emerging technologies, but some of them are more predictable than others. Social networking and targeted distribution of protest messages to niche audiences will continue to play a crucial role, and the development of drone technologies can contribute to new ways of making visible both protest action and key protest-related issues. At the far futures horizon, technologies that extend reality such as VR, AR, drones, and holograms can afford new kinds of visibility to civic discontent but could also contribute to visibility siloes, further individualisation and the fracturing of social reality, especially in the context of the possible splintering of the global internet infrastructure.

Near Futures: Informing Tactics

Seamless social sharing, and especially streaming real-time social video is among key tools affording visibility of peaceful street actions, as mobile broadband technology is becoming cheaper and more efficient, while smartphone cameras and other mobile image capturing devices are evolving in sophistication. Along with increased visibility of any urban protest on the ground, social video also affords new kinds of co-presence, amplifying the sense of scale for co-occurring public events and allowing participants to see themselves as part of a larger network of civic activism. Importantly, social video streams bypass mainstream media framing and, especially in environments with limited media freedom, increasingly serve as customised reporting channels for specific civil society initiatives.

Though many platforms and apps, such as Instagram, YouTube, and Twitter, already offer conventional streaming video capabilities which allow for immediate visibility and are difficult to censor en masse, the emergence of new tools and platforms such as TikTok and Instagram Reels, may bring new parameters of visibility, as they experiment with video formats, image filters, geolocation markers and offer non-live looped video capability that also contributes to creative expression. A diverse range of tactics speaks to the complexity of mediated visibility, as it encompasses capture, editing and sharing of audio-visual data to networked audiences.

Other emerging aspects of the social web afford civil society members engaged in protest activity the capability of one-to-few publishing, enabling strategic visibility of curated content and messages to specific audiences. Focusing communicative efforts on comparatively small, but highly responsive issue publics is made possible by targeted subscription offers and creative use of messaging apps such as Telegram and WhatsApp. In the near future, we can expect to see more niche networks launched by civic interest groups and various rights advocates, including individual or community newsletters, messaging app channels, podcasts and video blogs, close-range mesh networks, and even interactive applications in areas such as citizen science and environmental accountability.

The key challenge in terms of affordances of social network technologies for mediated co-presence, strategic visibility and discoverability of protest-related content is that social media platforms tend to tweak their algorithms in real time, so changes in discoverability and virality rules can be unpredictable. Most recently, these algorithmic tweaks have sought to minimise the spread of bot-driven and artificial discourse and misinformation across platforms. In the near future, these tweaks will continue to happen, though most of them may be insignificant.[9] Keeping up with the uncertainty of the “always-in-beta” mode of network-enabled social visibility will demand resourcefulness and quick reaction from civil society groups who wish to remain at the top of their constituents' news feeds.

The ongoing growth of networks of CCTV cameras and sensors in urban public spaces spells new risks for protest participants, when they become visible to authorities but lose control over their visibility. Increasingly sophisticated image and facial recognition technologies, powered by machine learning and AI, are being harnessed by governments and law enforcement to police protests and public space in general. In response, activists are developing new obfuscation tactics, using lasers,[10] anti-surveillance reflective clothing[11] and camouflage face paint[12] to disrupt the image recognition capabilities and to remain visible on their own terms while preserving anonymity. However, facial recognition technology is also growing in sophistication[13] and presents an ongoing challenge for activists.

Drone technology presents a wide array of affordances for visibility of civic protest activity. For mass protest events, drones can capture the scale of the effort from above, contributing to "digital enthusiasm" or "collective effervescence"[14] and fostering solidarity among protesters. Advanced camera technology and increased computational power can help drones count participant numbers with greater precision. These affordances of drone technology are, of course, also beginning to be used by law enforcement for protest policing and general surveillance, thus creating tension for civic interpretations of visibility as valuable, but also potentially risky.

Camera-equipped drones are becoming more affordable and can assist civil society groups with issue visibility as well. For instance, faster processing, better algorithms, and AI capabilities are on track to allow activists to engage in real-time mapping[15] of hard-to-reach areas, that, together with satellite imagery,[16] offer new opportunities for visualising key issues related to urban transportation and construction, conflict and human rights advocacy, environment, and biodiversity. These remote issue visibility capabilities will contribute to constructing credible protest claims about key aspects of urban governance, environmental policy, and social welfare.

Far Futures: Informing Strategy and Vision

Civic protest is fast moving towards a hybrid reality where material and digital aspects of discontent extend into each other, creating what Wanenchak calls "augmented eventfulness."[17] Correspondingly, there is a whole field of mixed reality technologies that could offer new affordances for protest visibility in this hybrid environment. Also known as extended reality technologies, they introduce various enhanced, manipulated or computationally generated layers or immersive environments where human interaction, communication, and thus, contestation and claims-making, can occur. The field of mixed reality technologies includes AR (augmented reality), VR (virtual reality) and more novel tools such as holographic technology. Though these technologies have become firmly embedded in the popular imagination and the technology industry has been quick to begin developing commercially viable applications, they are far from ubiquitous in everyday life. Furthermore, they are virtually unexplored by civil society actors, though they can offer great creative potential in terms of enabling new forms of visibility for contentious action on key civil and human rights issues.

AR technologies offer exciting possibilities for making protest action visible as they provide digitally simulated overlays onto our fields of vision, either through custom headsets or through smartphone screens. Building AR solutions for mass gatherings could allow civil society actors to create better navigation for protest participants and make mediated participation more meaningful through strategic placement of protest slogans and claims made visible in the augmented layer. Especially in urban spaces, protest actions focusing on urban issues such as preservation of historic buildings, green public spaces or building more sustainable transport infrastructure, could offer visible representations of potential threats or improvements by generating symbolic visuals and placing them in key locations. These symbolic representations of alternative solutions could become a viable, non-threatening form of occupying public space, as the intervention would only happen in the AR layer, yet still be meaningful if experienced by citizens through AR-enabled phone screens or headsets such as Microsoft's HoloLens.

Virtual reality technology offers even greater immersive potential than AR, affording the ability to place viewers in computer-simulated environments to experience events and spaces in new ways. A number of technology companies are making their own VR gear, including Facebook-owned Oculus Rift, as well as headsets from Sony, Samsung and Google. VR is increasingly being used in entertainment and media scenarios, but there is also a potential for using it to advocate for specific issues of public importance and making them visible to the public in new ways. For instance, if a protest campaign defending an urban public park or an architectural gem that has fallen into disrepair seeks to gather more signatures for an online petition, it could create a VR experience for those who are unable to visit the locations in question. By being able to step into them virtually and be immersed in the visual representation of the space, citizens can potentially feel a closer affinity and an affective connection to the building or the park, and be inspired to sign the petition or engage in other ways. Similar virtual reality interventions could help make visible the plight of underserved communities or victims of human rights abuses, affording new opportunities for emotional and empathetic connection and contributing to protest mobilisation. Social VR, which should enable collective simulated experiences, could further contribute to meaningful shared experiences informing protest sensibilities.

Another extended-reality technology, holograms, enables the projection of images in three-dimensional space. So far, holograms have been predominantly used in entertainment (e.g., BASE Hologram has organised concerts featuring holograms of deceased performers) and media (with CNN piloting holographic representations of its reporters in the studio). But we are also seeing political and social actors starting to experiment with the technology. In the US, 2020 presidential candidate Andrew Yang announced plans to use holographic projection to campaign "in several places at once."[18] In Spain in 2015, civic activists with the No Somos Delito movement protesting against a new public safety law collaborated with a digital advertising firm DDB Spain to create "the first hologram protest in history."[19] Holograms for Freedom crowdsourced photos and video recordings of people from around the world, which were then rendered as holograms and projected near the parliament building in Madrid. In 2016, Amnesty International used a similar tactic to crowdsource content for a holographic protest planned in Seoul, South Korea, to protest alleged erosion of free speech in the country.[20] The holographic technology thus emerged as a creative solution for visible public protest even in the face of prohibitive rules for physical mass gatherings.

While extended reality technologies are evolving quickly, they are still largely out of reach of the average citizen or activist. High costs of required equipment and content generation mean that it may be a while until these technologies are scalable, so as to be useful to ordinary civil society groups. Still, despite their limited applications and prohibitive costs, they should remain on the watchlist for civic activists exploring the creative potential of future technologies for protest visibility.

Possible future scenarios

Desirable Future

Civil society activists have free reign to creatively explore the affordances of social networking, drone imaging and mixed reality technologies for protest visibility. The emergence of open-source solutions and DIY devices is bringing down the previously prohibitive costs of AR- and VR-ware, and commercial companies are starting to offer free or freemium versions of firmware and software enabling extended reality construction. Costs of mobile internet connections keep falling, and streaming video is becoming the default way to report from protest events and enable mediated co-presence, with popular streams gathering huge audiences and eclipsing mainstream news channels. Satellite internet connections and drone technologies are becoming deregulated and extensively used by both commercial and civic actors. Drone videos and satellite imagery exposing environmental and biodiversity threats, large-scale evidence of corruption, and urban issues such as congestion or lack of bicycle lanes are becoming a mainstream genre in civic advocacy and protest. Street protests are growing increasingly powered by AR technology, with protesters designing AR-enabled posters, signage, and clothing to create additional opportunities for those who engage with the protest through screens and headsets. AR representations of sustainable social imaginaries are widely used in urban protest action to provide context. Human rights organisations excel at creating immersive VR experiences that allow citizens to step into the shoes of minorities, animal rights activists or underserved communities, and these immersive experiences significantly boost protest campaign participation. Even in those societies where public protest is restricted by tougher regulations civic activists successfully conduct mass holographic protests, making projection technology the norm for protest participation.

Undesirable Future

Civil society activists face prohibitive costs and stricter government regulation of the key emerging technologies. Though social streaming video remains popular, quality mobile broadband connections remain concentrated in large cities, which impedes mass adoption of social sharing of protest action through video. Large-scale internet shutdowns during protests in authoritarian states have become the norm. Civic protest organisers resort to low-bandwidth sharing measures such as one-to-many publishing and use encrypted messaging platforms to make protest-related content visible to small, highly engaged issue publics. Drone technology is still prohibitively expensive and subject to strict state regulation. Drone surveillance of protest action, along with networked sensors and CCTV cameras used for facial recognition, is widespread, but activists themselves are mostly unable to use drone videos and photos as airspace in most cities is restricted by no-fly zones or is only open to commercial drone deliveries and law enforcement video drones. AR and VR technologies also remain costly and building apps for most mobile operating systems or headsets requires licensing from the proprietors of the technologies. Holographic technologies continue to be used in entertainment, but their use for protest purposes is episodic, though select civil society groups continue to use them successfully in small-scale protests in conditions when mass public gatherings are prohibited. These limitations impede creative civic efforts to boost and reinvent protest visibility through experimenting with new technologies.

Warnings

Image recognition with the use of AI and machine learning algorithms presents a key challenge for mediated protest visibility. The ongoing developments in facial recognition technology signal further risks for protesters in those societies where physical occlusion of faces (e.g., with a mask or balaclava) at public protests is already outlawed. As citizens and activists create new tools to obfuscate their persons and faces from surveillance (e.g., lasers, camouflage paint, etc.), we can expect these counter-tactics to become illegal as well.

Some experts argue that excessive personalisation and augmentation of our environments and surroundings through AR technology may lead to alienation and dissolution of a collective reality.[21] By experiencing societies, relationships, and spaces through highly customised layers of AR, individuals may become less likely to possess shared or common experiences, which can lead to the fracturing of civil society, communities of action, and issue publics and severely impede protest mobilisation.

Wild cards

One weak, but persistent signal on the horizon is the potential splintering or "balkanisation" of the global internet and the implications of this emergence of local or national internets for the use of networked technologies in making protest more visible. Recent developments in internet regulation, informed by concerns such as data protection and national security, are increasingly suggestive of the potential for a fragmented internet (see, e.g., EU's GDPR legislation or Russia's "sovereign internet" laws). Given that the majority of social network sites and services are owned by Western corporations, and that the makers of AR- and VR-enabled devices also have national affiliations, it is increasingly likely that cross-border compliance and connectivity will become key factors for the availability of these technologies to civil society groups. Unless there is a concerted effort to harmonise internet regulation and technology standards across the globe, a splintered constellation of national internets could result in a differential landscape of opportunities for visibility and impede the creative potential of civic activists to make their protest efforts visible to their local and global audiences.

Likely Future

The most likely future is a delicate balance, where civic activists will be able to creatively experiment with available social and mixed reality technologies, while acting within the limitations of affordability and of relevant norms and regulations. Organisers of civic protest and advocacy campaigns will continue to use targeted publishing to make their activity visible to issue publics. Social streaming video will grow in popularity, but further growth will be predicated on the availability of affordable mobile internet connections and video-enabled devices. Drone videos and satellite images will be used by civil society in an opportunistic manner, but this use is likely to be sporadic until these technologies become more widespread. It is likely that mass commercial use can make certain civilian applications of drones more acceptable, despite them being a dual-use technology.

AR- and VR-technology will likely be limited to a small number of manufacturers and, unless there are more opportunities for open-source development, civil society will find it difficult to popularize creative use of extended reality applications. In this respect, civic protest groups will likely seek the most affordable modes of engagement and visibility, be it simple AR overlays or crowdsourced holographic projections. It is also likely that civil society groups in those societies where physical mass protest is regulated more tightly will be pushed to find more creative approaches to using extended reality technologies to compensate for the limitations of occupying material public or urban spaces.

Control over key internet infrastructure and public surveillance networks will likely continue to be the power lever used by governments to curtail or control protest visibility. New developments in image recognition technology, decentralised social connectivity and anti-surveillance tools will be the site of contestation between citizens and those in power.

Known Unknowns

The key unknowns, with regard to future technological affordances for civic protest visibility, revolve around several key variables. The first variable is one of costs: there is not enough information currently to predict whether networked technologies, especially more sophisticated extended reality ones, will become sufficiently affordable in the next 10-15 years to warrant broad adoption by civic groups and citizens. Many of these technologies are proprietary and while there is a small proportion of open-source software and DIY mixed reality hardware, most of these are protected by patents and owned by large technology companies whose primary goal in developing these technologies is generating profit.

The second variable is the possibility of future equal access to these technologies. This is likely to be modulated by emerging regulation of networks, information, and technology, as well as by other factors. The trend for internet and technology legislation in many European countries has been to apply national norms to the regulation of online spaces, discourse, and content. As governments seek to protect their citizens' data and identities, they also contribute to the fracturing of global networks. If standards for extended reality technologies become significantly different from country to country, this may impede transnational creativity and collaboration opportunities for civil society groups. In terms of licensing for specific technologies, this may also prevent certain brands or companies from operating in particular markets. The other side of technology regulation deals with strategic geopolitical and security concerns: the use of encrypted messaging platforms for one-to-many publishing may become difficult as states seek to minimise the use of encrypted communication for national security reasons; drones, already a dual-use technology, may face stricter regulations and in some states their use may be limited to military and law enforcement purposes, impeding both commercial and civic creativity.

Conclusion

Making civic protest efforts visible is a cornerstone of performing citizenship in increasingly mediated and networked societies. Understanding which technologies are or may become entangled in this visibility work is central to short-term tactical planning and long-term strategic vision development for civil society groups that engage in activism, advocacy, and protest activity in the area of civil freedoms, citizen welfare and human rights.

The lens of technological affordances presents a useful toolkit for horizon scanning the possible futures of technologically augmented visibility of civic protest. Affordances emerge at the nexus of actor intentions, technological capabilities, and the contextual environment in which civil society groups operate. As I've demonstrated, thinking about near and far futures of how particular technologies will evolve is only part of the story: to constructively imagine possible futures for civil society we must also account for the creativity of its constituents as well as for the potential regulatory, commercial and cultural contexts that will come to circumscribe the uses of particular technologies. Though technologies such as social streaming video, drone imaging, and extended reality technologies such as VR, AR, and holograms hold many possibilities for making peaceful civic protest activity and messages visible, such possibilities will be tempered by how these technologies evolve in terms of cost, access, and opportunities for creative modification and by the regulatory field that emerges around these technologies in particular countries.

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The overarching purpose of this collection is to broaden the spectrum of social and technical imagination in the context of civil society. Is it possible to anticipate the unforeseen destructive consequences of a particular technology? Is it possible to imagine the vectors of development of technologies and social systems, on the basis of available data, in order to identify the earliest possibilities for civil society to act upon? These are the questions addressed herein by an interdisciplinary group of scholars, drawing upon the "Horizon Scanning" methodology in order to analyze the possible technological impacts on civil society's development.

The volume has several set objectives. First, to analyze how technological advancements may influence the development of civil society in Russia, the former Soviet Union, and Central and Eastern Europe. Second, to assist those involved in such issues to make decisions in the context of possible future development scenarios. The authors hope that the proposed analyses of the future will help improve the effectiveness of long-term civil society development solutions, augment the range of opportunities associated with building strong horizontal communities, and assist readers in becoming leaders in social innovation. Moreover, the project should also help in anticipating the risks associated with restrictions on civil liberties and threats of human rights violations resulting from technological advancements.

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* Teplitsa – Greenhouse [rus]

The initiator of the publication is the Teplitsa. Technologies for Social Good — is an educational project aimed to develop cooperation between non-profit sector and IT-specialists. Teplitsa (Теплица, a greenhouse in Russian) is a brand that encompasses a website, a series of educational events, and a software development team with associated products. Teplitsa's mission is to strengthen civil society with the smart use of technology.