

The Turning Point

Alfredo RONCHI

Politecnico di Milano, Piazza Leonardo da Vinci 32, Milano, 20133, Italy
Tel: +39 02 2399 6040, Mob: + 39 393 0629373, Email: alfredo.ronchi@polimi.it

Abstract: Digital transformation is reshaping society impacting on lifestyles. Are we facing a significant turning point toward a “New normal”? The research analyses, the present, mid-, and long-term impacts of this digital transformation on society starting from the most significant events that characterised the evolution and pervasiveness of cyber technology. The pandemic accelerated this process pushing citizens to go digital, sometimes forgetting some wise principles. The result is a cyber-based society relying on “digital”. This pillar is quite fragile, potentially subject to attacks and suitable for top-down discrimination. The Internet distributes “homogenised” content all-over the world that can jeopardise cultural identities. Citizens increasingly live in cyber-bubbles, have cyber-mediated human relations. They experience the world via a cyber device mediated approach, which are biased by mainstream on opinion dynamics and nudging. The Metaverse, one of the foreseeable risks is a kind of addiction to this “parallel life” training users to shift from real to Meta-life blurring the border between them. Future research development following the risk assessment phase will focus on mitigation of potential drawbacks.

Keywords: Digital Transformation. E-Services, Artificial Intelligence, Machine Learning, Human Rights, Privacy.

1. Setting the scene

This paper summarizes the evolving outcomes of a research project at Politecnico di Milano in collaboration with EC MEDICI Framework to explore the multifaceted impacts of digital transformation on society. Within the general framework of “Internet for social good” [1] this research proposes an insight on potential impacts and drawbacks due to the ongoing digital transformation, looking at this ongoing process from the humanities side, considering the mid- and long-term impact on society. One of the objectives of this study is to identify the potential disadvantages and side effects of digital transformation to mitigate or eliminate them both in sectors already digitalized and in those not yet approached by digital transformation. This is particularly useful in emerging countries who will fit directly into the new scenario, leapfrogging traditional progressive steps.

As Klaus Schwab wrote in the preface of “Shaping the Fourth Industrial Revolution”, “The world is at a crossroads. The social and political systems that have lifted millions out of poverty and shaped our national and global policies for half a century are failing us. The economic benefits of human ingenuity and effort are becoming more concentrated, inequality is rising, and the negative externalities of our integrated global economy are harming the natural environment and vulnerable populations the stakeholders least able to absorb the cost of progress.” [2]

The turning point we are facing can be termed, in relation to the previous ones, the Fourth Industrial Revolution and it is based on a portfolio of enabling technologies ranging between cyber, nano and bio. This paper focuses on “cyber” that seems to have the most relevant impact on a large part of society involving privacy, freedom, labour, security, behaviour, and more. Citizens are facing a significant turning point concerning the

“Tangible and intangible impact of information and communication in the digital age” [3], this paper will outline some of the significant changes and concerns due to this impact on society. For some decades citizens have been worried about the future of “labour”, concerns probably initially represented by the disappearance of some professional figures and the never-ending quest for cheaper production costs often obtained by reducing wages and safety and ecology friendly processes. Additional concerns, on the training side, are due to the shift from a well-defined set of curricula and skills addressing the needs of production toward a new set of often undefined skills or soft skills required by “services” or “gig economy”, and technology re-invented jobs.

1.1 Trends and Concerns

For a couple of decades, citizens faced the ever-improving role of digital procedures and tools reshaping the activities to evolve in the so-called digital transition or probably in the more meaningful term “digital transformation”. “Transformation” provides a better understanding about the outcome; society will be deeply impacted by this process. The economic model carried out [38] in the recent past shows its limits as does globalisation that was its side effect [4]. Nowadays we increasingly consider de-globalisation [5, 35, 36] as a scenario and the rediscovery of local “values” and “identities”. Therefore, in the western world, that recently discovered to be the absolute minority on the planet Earth, there is an evident lack of values and beliefs [6], a clear feeling that there is something “wrong” so in such an uncertain environment without clear references young generations are discovering new “gurus” and trends. To mention a few, the “cancel culture” movement together with the “politically correct” re-evaluation of history and facts in the light of today’s trends and thoughts [7, 8]. Furthermore, global warming, the rise of oceans level, lack of food and water and last but not the least the pandemic, sometimes interpreted as nature’s self-defence reaction, are generating a widespread feeling of risk for the survival of humanity. Will genetic engineering and nanotechnology allow us to escape human limitations, will general artificial intelligence (AI) design improve itself to overcome human intelligence¹?

All these aspects have had an impact on society, as a mix of potential tragedies capable of generating uncertainty for the future [39]. This has prompted human beings to seek new development models based on a continuous full reshaping of society, a kind of imminent “new global order” based on climate change mitigation, circular and green economy, and more.

The omnipresent digital technology was considered one of the building blocks of this “new global order” even thanks to the relevant contribution that this technology has provided in one of the recent crises: the pandemic. Hence, one of the main vectors of this change was associated to the so-called Digital Transition or Digital transformation (DT or DX).

2. Objectives

The incredibly rapid success of the “Internet”, mainly due to e-commerce, information services, and social media, has given impetus to the trend of globalization, a shift toward uniformity, jeopardizing diversities, and cultural identities [9]. The research outcomes summarised in this paper refers to the interdisciplinary analysis of digital technologies and their applications. The main objective of the research work is to analyse the current and foreseeable medium and long-term impacts and potential drawbacks or unwanted side effects of digital transformation process with reference to social, economic, and

¹ Science fiction movies already proposed similar scenarios e.g. Wargames (1983 American techno-thriller film directed by John Badham) or Eagle Eye (2008 American action-thriller film directed by D. J. Caruso)

environmental aspects [40]. These objectives are even more relevant in countries not yet “digitally transformed” which, leapfrogging traditional progressive steps, can directly fit into the new scenario. The specific objectives of the present paper are to provide brief overview on the main foreseeable impacts of DT.

3. Methodology

The approach to the specific research topic is based on desk research, active participation in specific UNESCO IFAP, ITU and WSIS meetings and contribution to working groups, creation of ad hoc events and workshops², involved parties’ interviews, and evaluation of on the field implementations. The active participation to these events provided the most relevant contribution to the research activity as well as questionnaires and interviews.

The concept of digital transition [10] has been explored within the academic community and the outcomes may vary depending on the theoretical and disciplinary perspective adopted. However, the digital transition can be associated with a progressive switch from traditional procedure and tools toward a cyber mediated set of activities and procedures. Researchers have investigated the concept of digital transition also in relation to the advance of technological solutions [11]. This correlation also allows us to identify a cluster of cyber technologies. Although many scholars have explored the concept of digital transition, the growing use and development of cyber technologies in recent years is leading us to pay more attention to the question: what are we referring to when we talk about “transformation”? What are the criteria and characteristics that lead us to understand what role new technologies play in relation to daily life? What are the elements that make a cyber experience positive or negative?

The research aims to understand how the concept of digital transformation has been addressed so far in the literature and what, according to the analysis, its constituent elements are. To achieve this objective, a systematic literature analysis was conducted by adopting the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines [12]. Some of the literature sources some are reported in “References”. These guidelines provide a standard methodology that allows the literature review process to be replicated.

The research questions pertain to the investigation on digital transition applied across various domains, with particular emphasis on the areas of human rights, privacy, and lifestyle. A comprehensive literature review across different disciplines has proven instrumental in defining essential impacts and potential drawbacks associated with the notion of digital transition.

In addition to exploring the concept of digital transformation³, the research team conducted a literature review on emerging digital technologies⁴ to comprehend the current state of research and trend in these fields⁵. However, a more practical analysis is required to establish a connection between these theoretical concepts and the specific context of digital transformation. To collect a diverse range of DT case studies, various fields such as government, business, production, education, entertainment, culture, art, promotion, and more were examined⁶. The research team played a crucial role in facilitating the collection of these case studies through an online questionnaire, which will be further explored in subsequent papers. The collection activity tried to answer the questions:

- What are the fields in which DT / installations are present?

² E.g. WSIS Forum workshops, ICCC panels, UNESCO IFAP sessions, Global Forum Webinars.

³ What is “digital transformation”? Which experience could be recognized as “transformation”, and why? What are the main items / characteristics that made this experience being felt as digital transformation?

⁴ E.g. Artificial intelligence, machine learning, blockchains, etc.

⁵ What are recognized into literature as digital transformation key technologies? What are the characteristics that made these technologies representative?

⁶ This activity is based on the analysis of the products submitted to the World Summit Award selection.

- Who is participating into the design process for these solutions, who are the main actors, roles, stakeholders involved into it?
- Which are the tools needed for the creation of these solutions?
- Which are the different human profiles potentially impacted by these solutions?
- Which are the direct and short-term impacts of these solutions?
- Which are the direct and long-term impacts of these solutions?

The different sections of this paper provide a synthesis of the answers to these questions.

4. The roadmap to our digital future

One of the key enablers of DT has been the development and worldwide diffusion of web technology. In 1995 web technology flourished on the consumer and home markets even thanks to Microsoft motto “Where do you want to go today?” outlining the idea of a small world entirely connected online. Since that time (1995) personal computers moved from the nerd’s bedroom to the living room and kitchen.

Since the dawn of digital technology, the number of application and solutions based on this technology has had an astonishing growth rate. The widespread use of computers overlapped more and more with any activity generating an impact on society. Nowadays there is no field of human knowledge that does not make use of or is based on “digital”: information and communication, education, government, health, energy, mobility, etc [28]. Governments, international organization, private companies all together promote and facilitate the full deployment of this technology, the transition from analog to digital. We are increasingly leaving the analog, face to face, paper-based world to enter the intangible digital mediated one. Digital transformation⁷ is considered the natural evolution of the current society in light of a pervasive technology such as digital.

4.1 Side effects of Platforms

Following the diffusion of web technologies and related services to citizens, starting from the first decade of the twenty-first century, several governmental bodies, institutions, and private companies around the world, both in industrialised and developing countries, invested time and resources on e-Services [13].

The key element of this success was the cyber element termed “platform”, the main component of any type of service or information provision. Citizens are increasingly using platforms exploring the new possibilities for buying and selling goods online, booking their trips and holidays. They have also enjoyed social media and several other services, unthinkable before the Internet, from extremely vertical services to crowd services [14] or funding. Platforms have been the real “silver bullet” that has created great opportunities and a real impact on society and the economy. A significant part of digital transformation relies on platforms and standards [15]. These aspects are directly linked to the “owners” of these platforms and standards.

This can be considered a kind of monopoly not yet regulated - a kind of grey area. The platforms are mainly private, and the key ones are concentrated in few countries creating a kind of “oligarchy”. The “control buttons” of our daily lives are often beyond the control of our nation. Therefore, in the digital transition, despite antitrust laws, there is a potential risk of falling under the control of few key players. Google holds an approximately 85.53 percent share of the global search engine and advertising market, Meta stated that 3.81 billion people were using at least one of the company's core products (Facebook,

⁷ A comprehensive definition of the term digital transformation should be the integration of digital technology into all areas of activity, from business to public sector, fundamentally changing how to operate and deliver value to customers or citizens.

WhatsApp, Instagram, or Messenger), and Amazon holds 37.8 % of the market share⁸. Again, can we call it "oligarchy"? This aspect has recently been highlighted by the censorship action of some platforms which have deleted user profiles and entire video channels, opening the discussion on the balance of rights between the owner and the user of the platform.

Further remark is needed. It is true that platforms open the "global" market to small and micro businesses by offering them a "window" on the globe, but it is equally true that access to global service platforms creates a shortcut between supply and demand shortening the traditional added value chain, thus replacing shops and shopping centres with platforms. This as we will illustrate later, apart from the disappearance of several job opportunities, may cause serious troubles in case of unavailability of access to the platforms either due to malfunctions, hackers' attacks or in the event of a top-down decision to selectively deactivate the service. A plan B in such a situation, if not present, will require long time to implement.

4.2 The dark side of networking

We usually view "security" as an integral part of our lives, seemingly something cost-free, without needing to invest or worry about it. This seems to be true until we face small or large problems. Pickpockets steal our wallet, thieves steal our car or some of the possessions we have at home, hackers seize our data or any other event that breaks our "belief" of "feeling safe".

Then we start to worry about security, it is no longer a zero-cost "commodity", we need to invest some resources to reach a certain level of "insecurity". Why do we say, "level of insecurity"? Because there is no such thing as total security but only different levels of insecurity". The concept of "security" is not an absolute and permanent status, but we can identify it as a "dynamic balance" between a specific "asset" or "assets" to be secured, the specific context, sometimes for a specific period of time, the range of potential threats, and more. We draw attention to the dual nature of "cyber" which many times contributes to improving resilience but due to its pervasive attitude it can be the target of attacks and generate the "perfect storm".

We already faced several relevant attacks due to hackers, some targeting governmental or law enforcement agencies and institutions, some targeting critical infrastructures, others targeting large companies⁹. Financial markets may be influenced or tilted by cyber-attacks. Smart cities and grid models must carefully consider cyber security issue, as more as we install IoT and other cyber devices and services as more the risk to be cyber-attacked increases. This mainly because such devices were and are many times not designed to be "secure". The early generations of IoT devices were designed before the Internet and the deployment of hordes of hackers.

During the pandemic, cyber technology offered a valuable contribution to ensuring business continuity: public services, justice, healthcare, culture, education without forgetting supply chains and more, all of them moved to online procedures, a significant number of "digitally divided" citizens have been forced to "go digital" without any notion of cybersecurity. What about today's industrial machinery fully computerised, or the management of critical infrastructures? In a cyber warfare scenario [16], it could be enough to dispatch on the network a keyword like "sunrise" to collapse the whole target infrastructure. Jeremy Jurgens recently predicted, at the World Economic Forum, the

⁸ Source of data: <http://www.statista.com>

⁹ <https://www.databreachtoday.com>

possibility of a global cyberattack that will take us back to the Stone Age¹⁰. Of course, this message could also be fake news.

We are surrounded by “critical infrastructures” managed by cyber components which, in the event of attacks, can create greater or lesser impacts on our daily lives [17]. We do not just mean the typical critical infrastructures like communication, energy, water, health, transportation, and last but not less important nowadays, financial services. Thanks to the appreciation of citizens and their role as everyday “tools” we consider information services, social media, geo-positioning, home automation, smart cities, safety, and security devices, and more. It will not be surprising if in a few years key service platforms such as GAFAM will be considered critical infrastructures. Furthermore, there is a clear need to reconsider supply chains and their resilience. There is a widespread need to promote a “culture of cyber-security” starting with kids who spread sensitive information online to improve their Facebook, Instagram or Tik Tok profiles or to download latest games on their smartphones and tablets. The Apps ask permission to access our address book, phone, camera, mike and more, essentially taking almost full control of what we consider our vault hosting business information, bank account, digital identity, etc.

The current trend is to transfer as many as possible any “traditional” process and document into the digital domain, so in a glimpse government procedures and citizens’ documents and data will flow in the form of bit streams [29]. Sometimes, under the pressure of critical events, this process was not designed to ensure security [18]. All the rest of our personal data is already stored somewhere in our country or abroad thanks to our “buddies” like our smart phone or smart watch.

Surviving “almost” traditional documents will be soon enforced by cross validation thanks to our digital ID. In the “analogue” world we had different pipelines and “channels” to carry out our activities, thanks to different tools and means, in the cyber world the entire activity depends on a single “bottleneck”: cyber technology. This pillar is rather fragile and subject to attacks or suitable for top-down discrimination. This dependency represents a significant weakness coupled with the widespread lack of digital literacy and cybersecurity awareness among citizens. If this pillar fails, does not work properly, or is turned off, our life will suffer from sometimes unpredictable problems, without cyber tech we will lose our digital identity, bank account, social security, service provision, news, and much more. Consequently, the more we digitise, the more the attack surface expands, the more vulnerable we will be to hackers and hybrid threats [19]. Of course, the overall scenario includes many other aspects and “nuances”.

4.3 Impact on Society and Ethical aspects

Digital technology, in general, have had and still have a strong impact on society, the pandemic accelerated and amplified this impact especially on younger generations [20]. Social media, global content providers are “educating” young generations offering a “unified global” approach, which will impact future generations and their cultural identity.

By leveraging on laziness and relaxation citizens spend less time outside the home, shop online, purchase food and drinks delivered on their table, “meet” friends on Zoom or WhatsApp, interact with the “external environment” though the mediation of social media and video clips.

Considering ontology point of view Cyber Technology is a new entity, a new class of objects. Cyber data can be duplicated without any difference (cloned) and transferred on the fly through networks. These properties made cyber objects difficult to manage on the legal side and even created some ethical problems. The humanistic point of view was probably taken into consideration because web technology has opened up the use of the Internet to a

¹⁰ <https://www.weforum.org/press/2023/01/geopolitical-instability-raises-threat-of-catastrophic-cyberattack-in-next-two-years/>

multidisciplinary group of users including several sociologists and art historians¹¹. In the first phase of the WSIS (World Summit on the Information Society) held in Geneva in 2003, a specific working group on Information Ethics was activated [21]. This later became WSIS Action Line C10 “Ethical Dimensions of the Information Society” [22]. Relevant documents such as the “Code of Ethics for the Information Society” have been issued. Therefore, in the last decade, philosophers and humanists have begun to professionally engage with computer scientists and innovators [23]. These scholars usually considered the medium and long-term impacts of technologies on society.

4.4 *Citizens’ meta-life shaped by ML and sustainability*

Since more than two decades we have been wrapped in our personal cyber-sphere in a kind of symbiotic relation. Citizens experience the world thanks to an approach mediated by cyber devices; the “new reality” is the one provided by devices. Metaverse [24, 33, 34] and virtual reality are inter-twined, but they are not the same thing. So far, digital technology has mainly acted as a human insulation technology, computer mediated human relations or even a “loneliness relation” with your terminal, a smart phone, gaming console or laptop. It happens that friends sitting around a table at breakfast or lunch do not interact with each other but watch their smartphones sending messages or browsing the web sites. According to the current perspective the Metaverse will progressively create a clone of our environment, but it will not limit itself to this goal, creativity will extend this limitless universe beyond the imagination. Cyber-loneliness, one of the foreseeable risks, is a sort of addiction to this “parallel life” that trains users to shift from Real- to Meta-life blurring the boundary between them, this can happen as much as the number of services and duties will be “moved” on the other side of the Alice’s mirror. Meta-life may propose a new normal [37] that once accepted in the Meta-life could be accepted in the real life (e.g. restriction of human rights). The same obviously applies to mainstream information and opinion dynamics, especially if perceived as real and reliable.

Opinion [31, 32] formation is a complex and dynamic process mediated by interactions among individuals in social networks, both offline and online. Social media have drastically changed the way opinion dynamics evolve, in any case, they provide a reservoir of data for the study of opinion dynamics on social networks [30]. Social media has become a battlefield on which opinions are exchanged, often violently. In turn the social media behaviour has become an important early indicator of social change. In the “new reality” closely linked to artificial intelligence and machine learning there is a concrete and present risk of manipulating opinions thanks to digital media and influencing the decision-making process.

After the previous interest in the 1980s the emerging trend related to AI and ML is raising concerns. While AI will benefit citizens, businesses, and public interests it will create risks to fundamental rights, potentially liberating humans’ beings from ethical dilemmas. AI should be as neutral as possible to cover techniques that are not yet known/developed. The overall goal is to cover all AI, including traditional symbolic AI, Machine learning, as well as hybrid systems. In such specific area, EU Regulations adopt a risk-based approach to regulation.

Furthermore, a massive decrease in the level of critical thinking and the emergence of waves of information epidemics are observed both nationally and globally (mainstream communication, limited opposition, censorship, and fake news). Post-truth in its heyday, with public perception, shaped more by addressing predetermined feelings and opinions rather than facts, with fakes, click baits, hype and other tools introduced to shape post-reality in the political and media culture [25].

¹¹ On the Third World Wide Web conference held in Darmstadt (D) major part of the participants were from humanities.

Post-reality is changing the value system with the “new normality” (semantic shifts, etc.), obviously politically correct. The new ethics calls into question personal free will and freedom of choice; traditional cultural regulators of social relationships and processes are being replaced by automated social algorithms (growing role of algorithms and ML). The spread of simplified virtual mock-ups and simulacra not only blurs the boundaries between the real and digital world, but also led to mass collection of data for managing people’s behaviour (evaporation of privacy, data protection) [26].

The extensive use of artificial intelligence (AI), machine learning (ML) and big data, in addition to various ethical issues, can lead to some significant drawbacks. We feed ML systems mainly with big data from Western countries, sometimes both due to the opacity of the algorithms and the inability to predict the “patterns” identified by the system we receive risky or not useful outputs. Citizens are increasingly using AI “bots” to carry out different activities ranging from writing a poem to creating a deep fake. How can we identify a human “product” from a machine product? Lawyers are already animating the debate together with other interested parties (e.g. IPR issues).

Recently it appeared that Microsoft acquired OpenAI, and former OpenAI leaders Sam Altman and Greg Brockman now work at MSFT. This acquisition multiplies investments in these technologies by extending their use to different scenarios. Open AI recently released a new ML solution that offers much better performances than previous ones, so developers have switched to this product considering their previous results already outdated.

As a further case study let’s consider “nudging”. The progress of AI has allowed the development of much more powerful nudge mechanisms thanks to the effectiveness of statistical and inferential AI systems. The impact of AI-based technology on human autonomy is enormous. AI-enhanced nudges strengthen designers’ ability to achieve goals by using cognitive biases, emotional impulses, and other human behavioural mechanisms both intentionally and unintentionally.

The pervasiveness of cyber technology, the Internet and the rapid deployment of emerging number crunching applications are emphasizing energy consumption, at the same time the rapid pace of innovation in consumer devices produces significant amount of waste to be recycled or disposed of. Consequently, can cyber technology be considered sustainable, green, and resilient?

5. Conclusions: The post DT “New Normal”

This is not a complete overview of the key aspects and trends that have emerged in recent times, obviously considering each single technology and trend there are no specific concerns and technology simply seems to facilitate our daily lives but by delving deeper into each single innovation or putting together all the visible “tiles” of the “new normal” mosaic we can be concerned. If on the one hand the entire architecture is based on cyber technology, with all the potential risks it entails on the other hand the “rules” of the cyber-world have can express a power that none of the “rules” of history have never had. Information and big data are the assets to be analysed, influenced, reused. Some authors call them “the new oil” but this type of “oil” can be used, abused, and misused many times.

Furthermore, more recently we started discussing about the Global Digital Compact, this was one of the key topics of the WSIS Forum 2023 together with AI tools and their developments. “The Global Digital Compact that would set out principles, objectives and actions for advancing an open, free, secure and human-centred digital future, one that is anchored in universal human rights and that enables the attainment of the Sustainable Development Goals.” [27] The aim of the debate is to outline a shared vision on digital cooperation providing an inclusive global framework for a sustainable digital future, hoping that the outcome of this debate will fully represent what is expressed in the above statement.

The challenges for the upcoming years are the ways to sustain the human's role and the inviolable right to freedom and personal privacy in an era of unlimited collection of information. Once again, the need to find a proper balance between humanities and technologies is omnipresent. Social sciences and humanities must establish a tight cooperation in the design or co-creation of cyber technologies always keeping humans in the focus.

The research activity will continue and get much more in detail in identifying potential benefits, drawbacks, and biases. The real impact of some of the emerging technologies such as machine learning and artificial intelligence are often emphasized by the media, it will soon be possible to assess the real impact of these technologies on society in specific fields such as employment or professional profiles. In conclusion, is this the "new normal" we are aiming for? Is all that glitters gold?

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