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Reconsidering human dignity in the new era

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ABSTRACT

Dignity is one of those human values, which have dramatically changed in the last few decades. This paper tries to raise awareness of the risks of massively used inventions and new technologies and their possibility to threaten human dignity. It briefly introduces the technologies that symbolize the new era by explaining their birth, current applications, benefits and challenges, and examines the decisive factors that might compromise human rights. Human dignity is concisely re-evaluated, paying attention to the consequences of the technologies that have already intensively modified the world we once knew. At the end, the paper offers some suggestions on how to make the future world better and more dignified.

1. Introduction

Human dignity is one of the central values promoted by UN universal declaration of human rights (Assembly, 1948). It is a religious, philosophical, ethical and legislative value, occasionally associated with the ideas of inviolability or sanctity of life, suggesting protection of the sentient life of all the living beings, because they are holy and worthy of life (Bayertz, 2012). Respect and self-respect are also considered human dignity virtues (Nordenfelt, 2004). Nordenfelt recognizes four different kinds of dignity: “the dignity of merit, the dignity of moral or existential stature, the dignity of identity and the universal human dignity”. Protection of human dignity is correlated with the preservation of human rights and freedoms (Andorno, 2014). Judicial interpretation of human rights includes dignity, personhood and morality (McCrudden, 2008). By examining the real-life interactions between elderly patients with the health care workers, Randers and Mattiasson concluded that the concepts of autonomy, or the ability to make own decisions, and the integrity, which covers personal honesty and strict moral principles are indivisible protectors of patients’ dignity (Randers and Mattiasson, 2004).

Post WWII world had an intention to create a society which respects and appreciates dignity, values and human status. The equilibrium established by the end of the 20th century has been obliterated with the rise of new technologies and their pervasiveness. This paper tries to raise the awareness of the risks of the massively used inventions and emerging new technologies, and to their impact to possible threatening of human dignity. In the second section, technologies that symbolize the new era: automation, ICT and artificial mind will be briefly introduced by explaining their birth and current application. Third section presents their benefits. It is followed by the other side of the coin, the challenges rising from the technological advancements. Fifth section examines several decisive factors that might compromise human rights and reveals the consequences of the technologies that have already intensively modified human lives. The conclusion offers suggestions on how to enhance human dignity.

2. Technologies symbolizing the new era

The first electromechanical computers were constructed in the beginning of the 20th century. Unlike today's computers, which are predominantly digital, the first widely used computer was actually analog (Calvert, 1995). The Torpedo Data Computer was the peak of the US Navy research in the area of naval surface computers, intended to control the fire-control systems aimed for destroying surface or air targets (Clymer, 1993). Similarly to these analog systems, most of the first digital programmable calculators and computers, such as: the famous code breaking computer Colossus (Randell, 1982); the implosion detection system Harvard Mark I, which was used as part of the Manhattan project (Pugh, Johnson, & Palmer, 1991); and the electronic calculator of ballistic tables and feasibility evaluator of thermonuclear weapons ENIAC (Harlow, 1983), were financed and implemented for military purposes only. Although not explicitly intended to be exploited by the army, the famous Zuse's invention Z3, the first programmable computer ever, was financially supported by the German Laboratory for Aviation DVL (Zuse, 1993).

The idea of constructing machines that can substitute humans is very, very old. As early as in the 10th century BCE, there is a story about the Chinese engineer Yah Shi who presented a human-like figure capable of moving, speaking and singing to King Mu of Zhou (Needham, 1960). Few years before making the blueprint for his famous

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mechanical calculator, Leonardo da Vinci designed the humanoid automaton called the Mechanical Knight (Huylebrouck, 2012). Over the last half century, robots have significantly developed and they became intensively incorporated as industrial robots for automobile production, manufacturing, mining, deep sea and space exploration; in agriculture for harvesting or weed control; in medicine, including surgery; in households, as utility or entertaining robots; and for military applications, supporting transport, search, rescue and attack (Hockstein et al., 2007). Modern robots are capable of communicating among themselves using cloud enabled infrastructure, creating the so called cloud robotics (Kehoe et al., 2015).

Information and communication technology (ICT) symbolizes the convergence of telecommunications and information technology, leading towards massively ubiquitous computing (Holtgrewe, 2014). Its major driving force is the Internet. Initiated and funded in the late 1960s by US Department of Defense, ARPANET and the TCP/IP protocol suite enabled the first permanent computer link between two Interface Message Processors in 1969 (Perry, Blumenthal, & Hinden, 1988). In 2017, Internet penetration rate has already reached more than 50% worldwide (Internet World Statistics, 2017). Internet enables the network interconnection of everyday physical devices, including: home appliances, transport, and buildings; infrastructure and energy management; healthcare; manufacturing; and governmental activities (Gubbi et al., 2013). This concept was named Internet of things (IoT) in 1985 by Peter T. Lewis, who visionary predicted that people, processes and technology will integrate with the devices using remote connection (McGee, 2016). The estimation about interconnected devices in 2020 ranges between 24 billion (Gubbi et al., 2013) to 50 billion (Evans, 2011), or in average between 3 and 6 devices per person. It's fascinating, isn't it?

One of the fastest developing technologies are brain-computer interfaces (BCI). Initially, they were used for diagnostic purposes and in neuro prostheses as assistive technologies (Millán et al., 2010). The direct brain-computer communication started with a research at UCLA, financially supported by DARPA (Vidal, 1973). Even now, US Department of Defense is one of the major supporters of BCI, as part of the BRAIN Initiative (DARPA, 2017). Their projects include self-healing of the body and mind, development of brain implants, and telepathic communication. Three ambitious projects: DeepMind, Neural Lace, and recently, Kernel, supported by Google, Elon Musk and Bryan Johnson respectively, intend to merge the computers with the healthy human brain (Metz, 2017). If they succeed, they will undoubtedly significantly contribute to the creation of artificial mind, or systems that exhibit intelligent behaviour (Laird et al., 2017).

Most of these projects are powered by nanotechnology and genetic engineering. Nanotechnology originates from the molecular electronics, which was conducted in the late 1950s by Westinghouse on behalf of the US Air Force (Choi & Mody, 2009). The initial program failed, but twenty years later, it was revived in the Naval Research Laboratory. National Nanotechnology Initiative was established in 1999 as a federally-funded research and development initiative, with an intention to become a general purpose technology by 2020 (Roco, 2011). Since 2017, US Federal Budget has allocated $24 billion in researching nanotechnology, mainly provided by the Department of Energy, and the Department of Defense. Yet another military technology, which is already intensively implemented in commercial products, medicine, biotechnology, and industry.

According to John Turney, genetic engineering was inspired and influenced by Frankenstein's ideas about biomedical sciences (Turney, 1998). The first fascinating achievements of the direct manipulation in the organism's genomes were synthetic insulin and hepatitis B vaccine, products that are nowadays massively implemented worldwide (Hughes, 2001). Even their creators Boyer and Cohen were aware of the potential biohazards connected with the research they do (Berg et al., 1974). Apart from medicine, genetic research is applied in agriculture, and industry, including the enzymes used in laundry detergents.

Most of the inventions introduced in this section are typical dual-use technologies, discoveries developed for military purposes and commercially adapted for ordinary people and industries (Knight, 1999). They have already dramatically changed our lives. The emerging technologies might change it even more dramatically. One concern should be seriously taken into consideration: no device built to be used by the army is definitely neither generous, nor altruistic. It was designed to enable the dominance of their creators.

3. Benefits of living in the new era

The process of massive computerization started in the 1980s, when the first inexpensive personal computers became an unavoidable equipment of the technological elite and computing enthusiasts (Kling, 1996). The actual revolution started in the mid-80s, with the popular IBM PC compatible computers, the iconic Macintosh and their successors, which were sold in hundreds of millions of copies (Singer, 2014). Computerization and automation revolutionized manufacturing, aircraft, communications and other industries (Freeman & Soete, 1997). They have significantly increased the productivity and reduced the direct human labour cost (Kristal, 2013), improved the quality of production and just-in-time manufacturing and assembly process (Fawcett & Pearson, 2015), and upgraded the quality of care (Leu et al., 2013). The benefits of computers in medical diagnosis, decision making and disease treatment have completely revolutionized medicine (Hunink et al., 2014). As a consequence, healthy life expectancy increased (Murray et al., 2015), disability-adjusted life-years remained constant (Salomon et al., 2013), and health-related quality of life has rapidly evolved (Fayers & Machin, 2013). The quality of working life increased as well (Korunka & Hoonakker, 2014).

Robots successfully substitute people by performing precisely heavy-duty repetitive or unsafe tasks, occasionally in unhealthy or dangerous environments, which can be toxic, radioactive or explosive. Space robots perform remote operations and send valuable artefacts from distant planets and satellites. For 30 years, a variety of robots have been effectively implemented in medicine, including surgery (Ghezzi & Corleta, 2016). The promising trend is the creation of soft robotic technologies, introducing robots which are made of soft, smart and deformable materials (Rossiter & Hauser, 2016). They will probably modernise human life, enabling the robotic soft co-workers, household robots, robots for socialization, healthcare, entertainment, adult industry and edutainment, but also for agriculture and architecture. Household and healthcare robots are designed to be unconditionally reliable, meaning they avoid the harming of their owners. Human – robot collaboration will soon become common, imposing very high security and occupational safety standards (Veruggio, Operto, & Bekey, 2016).

Thanks to the expanding Internet penetration, communication has never been cheaper and easier (McChesney, 2015), knowledge and information access better (Manyika et al., 2016), and the free speech and expression so transparent and influential (McDonald, 2015). Crowdsourcing, outsourcing, and collaborative publishing improved professional and academic cooperation. News aggregators, fuelled with sentiment analysis provide a “comprehensive supply of information from different points of view” permitting their readers to create their critical opinion (Ploch, 2015). Philanthropy, charity and fundraising became fun and usual activities among Internet users, “generating internal solidarity” (Tennant, 2013).

The pervasive presence of various things and objects, which mutually interact and cooperate is the future of the Internet movement. The Internet of things (IoT) is embedded in several environment application domains: home or office, healthcare, city, agriculture, water, and transportation and logistics (Atzori, Iera, & Morabito, 2010). Recently, knowledge communication and social infrastructure intended for the urban population was extended via smart cities, which gather various data to enhance the quality, performance and interactivity in

urban communities (Dustdar, Nastic, & Scekic, 2016). Robot taxis are among the futuristic IoT applications, which are a great challenge for most car manufacturers. Waymo, Google and Fiat Chrysler announced their self-driving cars for the end of 2017. Inevitably, they will reduce traffic accidents and successfully replace professional car and truck drivers. Environmental monitoring will improve environmental protection by permanent examination of water and soil quality. Healthcare monitoring of senior citizens or patients with coronary, kidney or chronic diseases will further improve the life expectancy.

Brain technologies intensively research mind mapping, aiming to decode the human brain and understand the differences between functional and structural changes in the brains of healthy persons and people with neurological diseases (Amunts et al., 2016). Recently, neuroscientists extended the projects done with nonhuman primates to human subjects and managed to create prosthetic devices that are induced by electrical brain stimulations (Collins et al., 2017). Brain implants enabled re-establishing of lost motor functions and recreating of lost communication of patient with partial paralysis (Ramsey, Aarnoutse, & Vansteensel, 2014). Deep brain stimulation became approved as an efficient treatment of essential tremor, Parkinson's disease, dystonia and obsessive-compulsive disorder (McIntyre et al., 2015). The success of these experiments is already great, and many neuro prostheses have enabled a more comfortable and more dignified life of people with hearing or visual impairment, motor disabilities or cognitive problems. The demand for brain assistive technologies will become much greater, due to the increasing ageing trend of human population, particularly in the developed countries (United Nations, 2015).

Nanotechnologies contribute to brain-computer interfaces, which have significantly improved some aspects of everyday life. For example, they are widely used in agriculture, food processing and food packaging (Scott & Chen, 2013). The delivery of nutrients and vitamins is on a nanotechnology level, and it is done using the nanocochleates and nanosprays. Graphene based technology was successfully used to remove salt from the sea water, which will be crucial to considerably reduce the announced alarming water scarcity (Abraham et al., 2017). Nanotechnology is the decisive factor for upgrading the medicine and pharmaceutical industry, embracing in vivo imaging, blood purification, drug delivery and tissue engineering (Drouet et al., 2015). Researchers announce that nanoparticles will soon replace the antibiotics and enhance the traditional cancer metastasis treatments. One step forward in researching and replicating brain activities is the attempt to create an artificial brain. Artificial cognitive architectures are already capable of implementing emotions into computing systems (Vallverdú et al., 2016). Emotion processing was used to emulate human intelligence and leverage human-computer interaction (Zdravkova, 2017). The computational framework uniting artificial intelligence, cognitive science, neuroscience, and robotics has been established (Laird et al., 2017), so it can be expected that in near future the idea of artificial brain or mind will become true.

4. Challenges of living in the new era

In the 20th century, the fascination of computer technology was disputed by a smaller group of worried opponents, who argued that new technology will not improve the working conditions or community life (Kling, 1996). Undoubtedly, the most radical refusal to accept new technology was the extreme and controversial neo-luddism movement, which promoted a substantial rejection of all modern technology (Jones, 2013). Were the neo-luddists right that automation will destructively affect occupations? One crucial argument in favour of their claim is the fact that in the highly computerized world we now live in, still too many adults are computer illiterate. In the recent study in OECD countries, it was estimated that approximately one fourth of adult population can't use computers at all (Outlook, 2013). Due to their lack of technological proficiency, they usually lose the opportunity to compete for the jobs they are interested in, work more and less effectively, and consequently, their wages are lower. On a contrary, a very interesting and exhaustive survey made by James Bessen deduced that although the employment of lower-wage jobs decreased, the higher-wage jobs increased, preserving, or even increasing the employment rates in the whole world (Bessen, 2016).

Expectedly, the inequality of wages within occupations became greater, and the gap between the rich and non-rich kept widening for years. The three prominent economists, Kapur, Macleod and Singh introduced the concept of Plutonomy, or economy “powered by the wealthy”, and suggested that “the World is dividing into two blocks – the Plutonomy, and the rest” (Kapur, Macleod, & Singh, 2005). Since this article was published, the new global financial elite has become even wealthier, and less than 1% of the richest people have more wealth than the rest of the world (Murray and Peetz, 2014). The disparity is still growing. World Inequality Report 2018 published in December 2017 reported that: “Global top 1% captured twice as much growth as bottom 50%” (Piketty, 2017).

An additional problem related to the increased computerization is the fact that elderly people are sceptical to accept technology, reluctant to computers, they have lack of competences, making them technologically disabled. They need support to be in touch with the remaining world, sometimes for such ordinary activities as use of ATM machines, POS terminals, or more sophisticated home appliances.

For younger population, the greatest obstacle is Internet overuse. They tend to say: “We can live 30 days without food, 3 days without water, but only 3 h without Internet”. The intensive search of 69 papers proved that Internet addiction has epidemic dimensions (Kuss, Griffiths, & Billieux, 2014), such as excessive browsing being linked to stress, anxiety and depression (Harwood et al., 2014). Negative psychological effects are intensified by mobile phones, which additionally support gaming, texting, messaging and social networking. Moreover, it was empirically verified that the addiction-related behaviour, including game abuse, family conflicts, and gambling problems among adolescents was influenced by, but also affected the emotional intelligence of the adolescents (Parker et al., 2013). Russian paediatrician and neurologist Komarovskiy (Komarovskiy.net) noticed that many of his three years old patients incapable of speaking manifested an autistic behaviour, which was caused by the too early exposure to new gadgets. Instead of the diagnosis for such manifestations, which is named pseudo-autism, he proposed the new term: “screenmania”.

Roboethics warns about the dangers of unlimited use of technology, and particularly of the merged evolution of robotics, genetic engineering and computer science, which might soon create artificial life. Another warning was issued by the economists, who have recently predicted that by 2030, approximately one third of the jobs, mainly low-wage, will be stolen by the automated bots (UK Economic Outlook, 2017). New jobs, generally middle-wage will be created to supervise, maintain and adjust these robots. Global economic consequences of such jobs redistribution will probably remain stable, because the major source of income is generated by the richest people who pay the highest taxes. However, personal economic, social, health and moral consequences of the newly created army of unemployed will definitely be acute (Barr, Miller, & Ubeda, 2016).

Although industrial and home smart appliances will make life more comfortable, like laundry machines and dish washers already made it, the concerns of security challenges, or intentional disabling of the connected devices will certainly decrease their positive effects. Web and mobile phones are under constant surveillance, minimizing citizen privacy (Hacker, Acquah-Baidoo, & Epperson, 2016), RFID and GPS tagging raise additional privacy concerns (Voas & Kshetri, 2017). Ethical considerations connected with the RFID use among human are worrying (Das, 2017). A very comprehensive reference study indicated that many scholars react against different privacy, accessibility and property concerns provoked by this technology (Boeck & Durif, 2014). Human microchipping, which is done by implanting the passive tags in the prosthetic devices, or as standalone chips have already posed

medical downsides, privacy and security risks, and the risk of "insurmountable control of governments over citizens" (Michael & Michael, 2013). Several companies, like the Swedish start-up Epicenter implant employees with chips. Is this the beginning of human cyborgization?

Credit card fraud is a common felony. Many users still publicly reveal their PIN, and rarely check the accounts, thus this fraud is frequent and successful. Bank tellers know how to route amounts from customer accounts to their own accounts, and wire funds without authorization (Costello & Watts, 2017). They sometimes sell customer personal information to criminals. Blocking of bank accounts, identity cards, passports, social security, driving license, or professional ID, can be easily done with one click. If done simultaneously, identities can be modified or permanently removed from the official databases in a glance. In an instance, any person can be digitally altered or simply disappear. A quarter century ago, these unpleasant scenarios couldn't happen.

Information security breaches of customers usually cause revenue loses and strong anxiety. Attacks of IoT devices can destroy victims' and neighbour's property and lives. Security hazards against companies ruin their reputation, trigger severe financial harm or loss of intellectual property (Levi, 2017). Breaches against critical systems can have devastating effects on possessions, financial assets, intellectual property, human lives and the environment. Ransomware attacks on hospital networks may seriously endanger patients' lives, and generate financial losses (Kruse et al., 2017). Cyberattacks on medical devices, including the brain implants will accelerate the opportunity of criminals to commit cyber murders. Safety and reliability vulnerabilities can disable: home appliances, affecting stress, anxiety and financial problems; robotic systems, resulting in unpredicted activities or production of dangerous products; transportation systems, causing massive fatal accidents; and brain technologies with unforeseeable health consequences.

While industrial and enterprise systems "generate, process, and exchange vast amounts of security-critical and privacy-sensitive data" (Sadeghi, Wachsmann, & Waidner, 2015), home smart systems have already widely opened the curtains for all the curious and malicious people interested to observe and expose the lives of their victims to the whole Internet community. A victim can be anyone, everywhere, and at all times. Internet based computer crimes intensified financial misconducts and dishonesty, identity thefts and frauds, extortions, drug, human and credit card trafficking. Victims are people who can't recognize the manipulation performed with the social engineering techniques, including knowledge workers (Krombholz et al., 2015).

The optimistic prospects of nanotechnology are suppressed by their toxicity and side effects (Lee et al., 2014). The increased risk of poisoning and inhalation problems due to a short disposition to nanoparticles and environment pollution are also possible (Nayak, Nanda, & Bhat, 2016). If the results of enriching atomic weapons by nanomaterials are accidentally hacked, the most superior weapons will become easily accessible to malicious people. Hopefully, the so-called gray goo scenario, where the nanobots start consuming everything around themselves to self-replicate is no longer rational (Holm, 2014).

The greatest ethical challenges of the bionic devices are: the availability of these expensive technologies; the responsibility of the unexpected consequences or unpredicted reactions on patients' health; and the accountability of sudden reliability or safety hazards of brain implants, particularly when the patient is performing a safety critical task (Zdravkova, 2015). Moreover, constant wireless monitoring of brain – machine interfaces and automated brain testing for tracking the cognition, mood and pace of the patient impose further privacy and security threats, strengthened by the risk of a brain-jacking siege (Pycroft et al., 2016).

Maybe a greater obstacle is the potential abuse of brain-to-brain interfaces, which might cause a violation of neural privacy, enhancement of human capabilities beyond the "limits of nature", and accidental injury caused by misinterpreted or intentionally transmitted information (Trimper, Root Wolpe, & Rommelfanger, 2014). These telepathic interfaces work in both directions, they read and control minds (Xu, 2014). Thus, the risk to remotely or telepathically convince someone to act against his/her will becomes a reality. Even without any implants, neuroscientists believe that the human brain can be hypnotically influenced by subliminal messages in a form of signals, messages or images (Ruch et al., 2016). They simply pass below the normal limits of perception, and can be used to change human thoughts, attitudes, emotions, and actions. So, even without the scaring scenarios of brain implants, subliminal stimulations can nonconsciously shape decision-making (Ruch et al., 2016).

In the last decades, the world has been immensely transformed by the digital revolution in a way very few could imagine. In the next decades, it will transform it even more. Based on the current technological development, next section presents the greatest factors that might influence human values, rights and dignity.

5. Do new technologies affect human dignity?

Modern society is rather dichotomous. New technologies divided people into digitally illiterate vs. digitally literate, offline vs. online persons, and cash payers vs. e-payers. The digital divide affects the additional separation: unemployed vs. over-employed, and poor vs. rich (Ball et al., 2017).

Digitally illiterate manually perform many time-consuming tasks. They have very limited access to information and knowledge, and therefore their opinion and conclusions can be easily manipulated. Due to technical incompetence, their job offers are limited, the wages and social security much lower (Chetty et al., 2017). It is expected that the risks of getting fired is high, decreasing their already low income. In case of some impairment, they will have less opportunities to use the assistive and adaptive technologies. Irish initiative done by the Special Education Support Service (SESS) discovered that the digitally illiterate are discriminated on the basis of age, competency, disability, and employment (Daly, 2015).

Digitally literate can enjoy the technological tools that automate many of their activities but they risk their privacy and security and usually develop an addiction to technology. Online persons develop a compulsive dependence on Internet and instant communication, called FOMO (Fear of missing out), which influences their mental peace and stability (Alt, 2015). Their digital social life is very rich, but in reality their face-to-face contacts, and physical activities are limited. They are usually over-employed, and their working hours are extended to their leisure time, which is usually minimal, if it exists at all (Fuchs & Sandoval, 2014). Furthermore, they are victims of constant monitoring and eavesdropping. Many inexperienced social networking users expose their private data overtly risking not only their private lives, but also their security. They sometimes receive embarrassing and offensive replies to their online statuses, in many occasions done from fake accounts. Cyberbullying and humiliation are frequent, particularly among younger users (Kowalski et al., 2014). Broadcasting sites present embarrassing images and videos, which further disturb mental peace. Electronic identity and payments can be stolen or hacked. Technologically experienced are usually richer than average people, striving to become even wealthier, because luxury is an addictive drug. Their expectation of becoming richer increases their stress and decreases their leisure time, while their children "show disturbingly high rates of s substance use, depression, anxiety, eating disorders, cheating, and stealing" (Luthar, 2013).

People living in the digital era have to accept the fact that the privacy is eroded and that the process of discretion deterioration is irreversible. Globally, high-level monitoring and surveillance is done by the public institutions (Marthews & Tucker, 2015). Many govwares, i.e. state sponsored malwares have been created, such as the Swiss "Bundestrojaners" MiniPanzer and MegaPanzer (Berlit, Wegewitz, & Berlin,

2008), German FinSpy (Marczak et al., 2014), UK FinFisher or Chinese Intercept (Marquis-Boire, Marschalek, & Guarnieri, 2015). Governments exactly know where people are, who they communicate with, what they search for, what are their preferences and possessions. With the brain technologies, they will soon know what people know, think and intend to do. There will no longer be a possibility to be secluded, at least for a while.

Although Internet provides a great freedom of speech, many counties suppress it using pervasive censorship and surveillance (Clark et al., 2017). Increasing fake information published online, subliminal messages, possibility for massive manipulation via social networking or online campaigns, and in near future, telepathic persuasion of patients with brain implants to act unconsciously will diminish the ability for rational behaviour, decisions making and actions, declining human autonomy and integrity.

Human dignity should seriously be reconsidered. Are people, who are still living in the 20th century discriminated? Or maybe, people who entered the technologically superior 21st century unprepared are even more victimized? Privacy and discretion are deteriorating in the digitally connected world. Human autonomy, integrity and ability to make own decisions decline due to subliminal messages, and manipulation via social networking. Cyberbullying definitely gravely decline the sentient life. Human rights and freedoms can be diminished by discriminations opposed by the digital divide, government and enterprise monitoring and censorship, and massive manipulation of opinions and conclusions. Mental peace and stability are acutely influenced by technology overuse and uncontrolled contents available online. Increased media attention results in decreased life satisfaction due to income inequalities (Schröder, 2016). Self-esteem of many social networking users is usually decreased by the inflated profiles of their friends, causing them to feel depressed. Malwares can trigger instant revenue loses, financial failures, stress, and strong anxiety. Health care can be reduced due to security and reliability breaches. Reliability problems of safety critical systems can cause massive fatal accidents and unforeseeable health consequences.

6. Conclusion

Younger generations cope with the transformations technology brought and grasp new gadgets without the anxiety or fear of the consequences they might impose. Is their attitude right or not? Will their lives be better than the lives of their parents?

More than 15 years ago, Clark insisted that we are already human-technology symbionts, profoundly dependent on digital inventions and their applications (Clark, 2001). In the near future, real cyborgization will occur, and healthy people will merge their brains with the computers aiming to become stronger, smarter and enduring (Metz, 2017). If not wisely and carefully used, this could be the greatest threat humanity has ever witnessed. But, if we are aware of the challenges new technologies bring, the approaching era will be marvellous and human lives more dignified than ever.

American writer Alex Haley once said “Either you deal with what is the reality, or you can be sure that the reality is going to deal with you.” (Shaw, 2006). His words have never been more applicable then today. To deal with the reality of the new era, the awareness of end-users and technology designers should be raised to minimize privacy, security and reliability threats. Governments should redirect their monitoring efforts towards real extremists, and enable the creation of more liberal societies. Laws, regulations and policy guidelines should be upgraded to sanction any inconsistent and vulnerable implementation of new technologies. Decision makers should protect common values and virtues rather than self-interests. Organizations defending civil liberties should try to influence the conscientious scientists, activists, and legal representatives to become more propulsive and protect online human rights. Psychologists should provide new empowerment theory principles and frameworks to initiate behaviour change towards higher autonomy and identity of all humans. Cognitive-behavioural therapists should suggest ICT addicts how to control their thoughts, feelings and actions. Sociologists and psychologists should unite their efforts to develop new, empirically based theories of self-concept. Parents should be more attached to their children and try to escape all together from the virtual world. Neuropsychologists should invent such subliminal stimuli that will encourage physical activity, empathy, accountability and creative thinking. The developers should embed them in all the applications intended for massive consumption. In such a society, the real benefits of new era will become available to whole humanity.

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