

Impact of Covid 19 Pandemic on Digital Transformation of Public Administration in European Union

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Abstract — In the context of the COVID-19 pandemic, it has become evident that digital transformation is not only desirable, but also absolutely necessary for an efficient and functional public sector. Over the past year, positive steps have been made in the field of digitalization and e-government for more efficient, inclusive and transparent administration and public services.

In this paper the authors will give an overview of impact of Covid-19 pandemics on the digital transformation of public administration in the Republic of Croatia and European union, The authors will also present the best practices in digital transformation as a step towards the improvement of existing processes and systems, the rapid implementation of innovative solutions in overcoming this and future crisis, using technology to generate positive solutions and strategies for successful digitalization of government, economy and digital society in whole.

Keywords: Covid-19, digital transformation, digital economy, digital society, pandemic, public administration

I. INTRODUCTION

Digital transformation presents adoption of digital technology to transform services or businesses, through replacing non-digital or manual processes with digital processes or replacing older digital technology with newer digital technology. Digital solutions may enable – in addition to efficiency via automation – new types of innovation and creativity, rather than simply enhancing and supporting traditional methods. [1] While digital transformation is predominantly used in a business context, it also impacts other organizations such as local governments, public sector agencies and organizations which are a in tackling societal challenges such as ecology subjects and demographical problems by leveraging one or more of these existing and emerging technologies. [2] Before pandemics, in the most European countries digital transformation was still at the beginning of process, but year after digital transformation even aims to impact all aspects of life. In the scope of this digital transformation overview, the main emphasis has been put at the public administration but pandemics has had high impact on all aspect - business dimension also the most. [3] The mentioned development of new competencies revolves around the capacities to be adapt to so called “new normal” which includes “physical distance” and in that way most of the services were oriented to develop more “agile” digital solutions, and the most important: people-

oriented, innovative, customer-centric, streamlined, efficient and able to induce/leverage opportunities to change the status quo and tap into new information- and service-driven revenues in order to conduct the public administration services in pandemic era. [4] The rapid implementation of innovative solutions has presented itself as the solution in overcoming this pandemics crisis as well as the future crisis, using technology to generate positive solutions and strategies for successful digitalization of government, but also economy and digital society in whole. [5]

During the pandemic, consumers have moved dramatically toward online channels on digital markets, and companies and industries have responded in turn. The new McKinsey Global Survey of executives was conducted in the field from July 7 to July 31, 2020, and garnered responses form 899 C-level executives and senior managers representing the full range of regions, industries, company sizes and functional specialties. The survey results confirmed the rapid shift toward interacting with customers through digital channels. They also show that rates of adoption are years ahead of where they were when previous surveys were conducted—and even more in developed Asia than in other regions (as shown on Figure 1). [6] Respondents are three times likelier now than before the crisis to say that at least 80 percent of their customer interactions are digital in nature. [6]

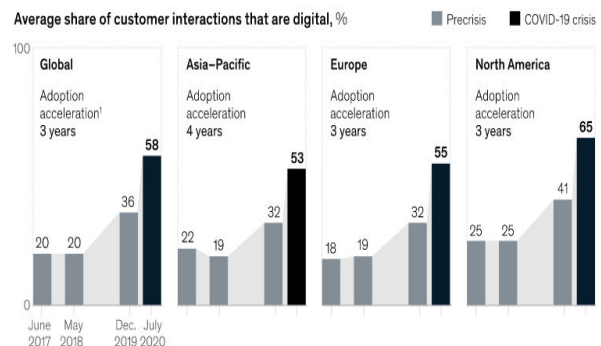


Figure 1. The Average share of customer interactions that are digital % . Source: McKinsey Global Survey of executives

II. EU DIGITAL TRANSFORMATION STRATEGY SHAPING EUROPE'S DIGITAL FUTURE UNDER IMPACT OF COVID-19

Digital technology is changing people's lives around the world. In surroundings of big economic crisis which has been caused by pandemics that has caused moving all the business processes from physical to digital (virtual space toward complete digital business transformation. Although, the public administration and services in European union and in Croatia as well moved from "physical services" to digital solutions and applications almost "threw the night" making services of e-government available to citizens more than ever before. In the EU level, the European Commission is determined to make this Europe's "Digital Decade". On 19th February 2020, the European Commission presented the new EU Digital Strategy entitled "Shaping Europe's Digital Future". [7] The strategy was adopted in furtherance of the "A Europe fit for the digital age" priority and set out ambitious goals for the following 5 years, including putting Europe in a position to be the trendsetter in the global debate around digital transformation. The successful pursuit of the aforementioned objectives was almost immediately put to test with the COVID-19 outbreak. One of the main takeaways during the crisis has been the central role digitalisation has played in tackling it. Although measures within the EU have been different, states have generally resorted to solutions such as building information and contact tracing mobile apps, digitalisation of public services and remote working. They have also felt the importance of ensuring swift and reliable exchange of information across national borders. European businesses have also had to adapt by transferring large parts of their activities online.

Under pandemics of Covid-19 the European Commission is continuously working on success of digital transformation that will benefit both: public sector and business sector. [8] The European approach in digital transformation of public administration, especially focusing on EU under pandemics influence, according to the published official document, will be based on three main pillars to ensure that Europe seizes the opportunity and gives its citizens as the key focus of public administration and public sector, businesses and governments on top level to control over the digital transformation:

- Technology that works for the people
- A fair and competitive digital economy
- An open, democratic and sustainable society. [9]

In the context the developing technology under pandemics the EU's digital strategy is investing also in digital skills for all European citizen in order to protect them from cyber threats (hacking, ransomware, identity theft) which has been on the highest level than ever under pandemics, ensure Artificial Intelligence digital solutions in public services are also developing in ways that respect people's rights and earn their trust, accelerate the roll-out of ultra-fast broadband for homes, schools and hospitals throughout the EU and expand Europe's super-computing capacity to develop innovative solutions for medicine, transport and the environment as the mail public administration services. [9] As already stated, EU digital

strategy is also focused on fair and competitive digital economy the EU's digital strategy will enable a vibrant community of innovative and fast growing start-ups and small businesses to access finance and to expand, strengthen the responsibility of online platforms by proposing a Digital Services Act and clarifying rules for online services, make sure that EU rules are fit for the digital economy, ensure fair competition of all companies in Europe and increase access to high-quality data while ensuring that personal and sensitive data is safeguarded – especially in digital transformation in the EU pandemics era. [10] One of the main goals the EU's digital strategy of digital transformation of public administration formed under pandemics on the EU level is developing an open, democratic and sustainable society in order to use technology to help Europe become climate-neutral by 2050, reduce the digital sector's carbon emissions, give citizens more control and protection of their data, create a "European health data space" to foster targeted research, diagnosis and treatment and fight which has been (and it still is) of great importance under pandemics Covid-19 and also fight disinformation online and foster diverse and reliable media content. [10] In this respect, even before pandemics of Covid-19, the most important document "Shaping Europe's digital future to 2050 follows the Europe Digital Agenda for Europe 2020 that has adopted first concrete measures and targets for meeting digital transformation goals for Europe in 21st century which have been now, more than ever, of great importance in public administration transformation when digital solution for public services have been needed in order for public administration functioning under pandemics.

III. DIGITAL TRANSFORMATION OF PUBLIC ADMINISTRATION AND DIGITAL SOLUTIONS DURING THE COVID-19 PANDEMICS

In a digital transformation context in whole, and especially now in public administration services under pandemics, 'managing information' and data is crucial but it's not enough. In today's and tomorrow's information- and data-driven business, insights, intelligence and actions matter most: the outcomes. [11] That's where context, semantics, artificial intelligence and activation come in. With development of the Internet of Things (here and after - **IoT**) technology and Artificial intelligence (here and after - **AI**) upon us the *intelligent dimension* becomes more important regarding to making sense of *unstructured information, automation, connected devices and putting information at work*. It's why we talk about '*intelligent information activation*' focused on developing "smart public administration" toward developing so called "*Smart Cities*" making data actionable, introducing devices (IoT) in an increasingly complex and growing data landscape, the steep growth of unstructured data, deriving meaning and insights from information and leveraging it at the right time and right moment for the right reasons and actions are all critical. [12] At the same time the activities around and value of data are looked upon from the perspective of engagement, outcomes and the last mile. Under Covid-19 pandemics, making data actionable, introducing devices (IoT) in an

increasingly complex and growing data landscape, the steep growth of unstructured data, deriving meaning and insights from information and leveraging it at the right time and right moment for the right reasons and actions are all critical and very important for developing public services and making available and open “Smart cities” with public services and public administration available for all citizens 24/7. [13]

In the wake of the coronavirus crisis, the public administration of European union has become one of the primary goals. The European Commission’s renewed Digital Strategy gained renewed importance as digital tools which were used to:

- monitor the spread of the coronavirus (through online official websites, applications and online official statistics)
- research and develop diagnostics, treatments and vaccines in health services of public administration,
- ensure that Europeans can stay connected and safe online with all public services fully available.

While restrictions are in place, and social and economic activities became almost fully digital, citizens and businesses in their work rely on the internet and connectivity. Thanks to broadband networks (which have been developed based on past digital strategies) and e-government models and digital infrastructure, European citizens have been able to keep on learning, keep the “social contacts” and working. Also, under coronavirus pandemics, public administration strived to ensure continuity and the availability of public services: services for businesses, eGovernment and eHealth especially, while trusted security systems that have been developed on EU countries level, protected our identities online. In November 2020 under coronavirus pandemics Croatian National CERT (CERT.hr) as a national body for prevention from cyber threats and protection of the security of public information systems in the Republic of Croatia has reported that it was discovered that 47 thousand user accounts with .hr (Croatian domain) and 24 thousand passwords leaked and were published in plain text form in one of the largest cases of data leaks in history. [14] This was also a proof of higher risk and data protection under pandemics and as well need to give more attention to citizens education of data protection in digital surroundings.

In the next section of paper will be given the overview of best practices in digital transformation of public administration and public services as a step towards the improvement of existing processes and systems which have been developed in different areas from national contact tracing and warning apps, supercomputers, online platforms fighting disinformation to trustworthy connectivity of functional broadband networks and online learning services.

A. National contact tracing and warning digital applications under coronavirus pandemics

National contact tracing and warning apps can be voluntarily installed and used to warn users, even across borders, if they have been in the proximity of a person

who is reported to have been tested positive for coronavirus. In the case of an alert, the app may provide relevant information from health authorities, such as advice to get tested or to self-isolate, and who to contact.

Contact tracing apps, if fully compliant with EU rules and well-coordinated, can play a key role in all phases of crisis management. They can complement existing manual contact tracing and help interrupt the transmission chain of the virus. Thereby, they can contribute to saving lives. [15]

A lot of concern has been given to users’ personal data protection. The European Commission has published an EU toolbox on contact tracing and warning apps and guidance on data protection that define a series of guiding principles for these apps according to General Data Protection Regulation (EU) 2016/679 that include:

- contact tracing and warning Apps should only be voluntarily installed and used,
- the data minimization principle: only the data which are strictly necessary for the running of the service are collected, nothing more,
- apps should use proximity data based on Bluetooth technology,
- no location data is requested or utilized by the tracing App,
- contact tracing and warning apps do not track people’s movements,
- the data should not be stored longer than necessary – 14 days,
- data should be protected through state-of-the art techniques, including encryption,
- the applications should be de-activated as soon as the pandemic is over. [16]

Health data is considered sensitive data under the General Data Protection Regulation (GDPR) (Article 9) and their processing can therefore only take place under strict requirements. Aggregated statistical data on the use of contact tracing apps that does not enable identification of the concerned natural persons are not considered personal data and therefore the GDPR does not apply. [16]

B. Role of digital solutions of artificial intelligence in public health services, european supercomputers and data from space as coronavirus response

Data, artificial intelligence (AI) and supercomputers, with their analytical power, are major assets in detecting patterns in the spread of the virus or potential treatments. AI also plays a part in powering the robots that have come into their own in times when human interaction is kept to a minimum. Newer and emerging digital technologies such as quantum computing or blockchain can also potentially bring unexpected solutions and approaches. Data are also crucial for devising recovery strategies. With their help, public health sectors can monitor the spread of the coronavirus and quickly devise effective response strategies. In the healthcare industry, artificial intelligence also plays a part in powering the robots and other tools used when coming into contact with patients, as human interaction should be kept to a minimum.

In the process of digital transformation of public administration and fighting the coronavirus the three powerful European supercomputing centres are engaged in studying and developing vaccines, treatments and diagnoses for the coronavirus. By comparing digital models of the coronavirus' proteins and matching them against a database of thousands of existing drugs, the aim is to discover which combinations of active molecules react to the virus. The supercomputers complement the classic trial and error clinical approach. Program notably through its Earth Observation component, Copernicus, and its satellite navigation system, Galileo, offers free and open data/information that helps monitor and potentially mitigate against the impact of the coronavirus outbreak. Since the beginning of the crisis, EU satellites have been monitoring traffic congestions at border crossings between Member States and mapping medical facilities, hospitals and other critical infrastructure. Data that is collected from satellites, in combination with artificial intelligence, provides public authorities at EU and national levels with models to better understand and tackle the emergency more efficiently.

The EU Space Program offers solutions for multiple issues, such as:

- safeguarding public health with Galileo - the most accurate positioning system in the world
- monitoring how we deliver on the Green Deal with Copernicus - the best Earth Observation system of its class
- ensuring a secure communication channel for Member States. [16]

On 5 June 2020, the European Commission launched the 'Rapid Action Coronavirus Earth observation' in collaboration with the European Space Agency. The Rapid Action tool relies on satellite data to measure the impact of the coronavirus lockdown and monitor post-lockdown recovery at local, regional and global levels. The data is then analyzed using new digital tools, such as artificial intelligence. [16]

C. Trustworthy national networks, connectivity and staying safe online under coronavirus pandemics

As EU Member States have introduced social distancing measures to fight the coronavirus pandemic, the demand for Internet capacity has increased drastically - be it for teleworking, e-learning or entertainment purposes - thereby straining networks. To prevent network congestion and to allow everyone the enjoyment of digital entertainment, the European Commission called upon telecom operators and users to take action and met with the CEOs of streaming platforms. Streaming platforms are encouraged to offer standard rather than high definition content, telecom operators should take mitigating measures to allow for continued traffic, and users should apply settings that reduce data consumption, including the use of Wi-Fi. The EU operators indicate that there is an increased demand of connectivity. Although no network congestions has occurred thus far, the Commission and the Body of European Regulators of Electronic Communications (BEREC) have set up a special reporting mechanism and monitor the internet

traffic situation in each Member State to be able to respond to capacity issues. [17]

The coronavirus pandemic has led a sudden and large shift towards online services. Such heightened online activity can attract malign actors and increase the potential of cyber-attacks. This also concerns children, who now spend more time online, possibly unsupervised, than before. While this allows them to continue their education and stay in touch with their peers, there are signs of increased risk. Therefore, EUROPOL has collaborated with international partners to develop Online Safety Advice for Parents and Careers to help keep children safe online during the coronavirus pandemic. A lot of online scams related to products that allegedly can cure or prevent coronavirus infections have taken place online and have sold medicine or other remedies, including test kits, online as a scam.

The European Commission under pandemics have been monitoring for any signs of threats to a safe online environment for European citizens throughout this vulnerable time by working closely and giving digital services with

- the European Union Agency for Cybersecurity,
- EUROPOL (the European Agency for Law Enforcement Cooperation),
- the Computer Emergency Response Team for the EU Institutions,
- national authorities,
- other EU institutions,
- ther bodies and agencies. [18]

They are following the situation, while providing threat reports and guidance as well as regular reports on cybersecurity. EUROPOL supported the successful investigation into a mask-selling scam aimed at EU Member States' governments and helped foil another attempt to swindle authorities out of millions of euros for medical supplies. The European Commission has been working with Europol and the providers of website domain names to prevent the granting of domain names to criminals and foster swift cooperation between providers and authorities to identify and disable scam websites. The providers have already issued guidance.

The Commission in digital transformation of public services under pandemics also works with online platforms participating in the structured dialogue on tackling online consumer scams related to the coronavirus pandemic, together with consumer protection authorities. The Commission and the Consumer Protection Cooperation Network are in regularly contact with the 11 major online platforms: Allegro, Amazon, Alibaba/AliExpress, CDiscount, Ebay, Facebook, Google, Microsoft/Bing, Rakuten, Verizon Media/Yahoo and Wish to discuss new trends and business practices linked to the pandemic. As a result, the online platforms have reported the removal of hundreds of millions of illegal offers and advertisements and confirmed a steady decline in new coronavirus-related listings. This consists of two parts: a high-level screening of online platforms, and an in-depth analysis of specific advertisements and websites linked to products in high demand because of the

coronavirus. [9] In the Commission exchange of information with the major online platforms it has been proofed that platforms have replied with a strong commitment to the protection of consumers, and have confirmed their continued efforts to proactively take down misleading ads, including for 'miracle' food supplements illegally advertised with claims related to coronavirus.

Fighting disinformation which are spreading rapidly online, particularly on social media, has also been one of the most challenging tasks of digital service of e-government. At times, this goes beyond simple mistruths. Fake or alleged 'remedies' can lead to serious harm or health risks. In order to fight disinformation the European Commission has been in dialogue with the signatories of the EU's Code of Practice on Disinformation (Google, Facebook, Twitter and Microsoft), who agreed to actively promote authoritative sources, demote false or misleading content, and launch new tools that lead users directly to authoritative sources or that provide accurate multilingual information on the crisis. On 10 June 2020, the Commission highlighted important actions to tackle COVID-19 disinformation and set up a program to monitor the actions that platforms are taking to limit the spread of COVID-19 disinformation. The online platforms have been using all the tools at their disposal to remove disinformation relating to the coronavirus. They have taken down illegal content or content that could cause physical harm (fake and harmful virus remedies) or affect public order (disinformation around the 5G deployment allegedly being the cause of the coronavirus). [18]

D. Digital transformation of online learning as public service of education during the coronavirus pandemic

The outbreak of the coronavirus in Europe has caused significant disruption to the provision of education. The public education sector through European union, as well in Croatia, has been facing the new ways of online learning require solutions that are innovative, creative and inclusive. Teachers and students have been forced to go from classrooms to online learning almost over night as the Europe has been in lockdown. New solutions and recommendations were given from ministries of education on the national levels of EU countries using available online platforms as digital service infrastructure for online learning. In Croatia, the national Ministry of education and science has given guidelines to schools to use Carnet Loomen and Merlin e-learning infrastructure as well as free digital solutions of Google, Zoom and Microsoft Teams (which has been adapted specially for primary schools). Also, the special television program has been provided for students in lower primary school grades. The special part of service and e-learning as public education is a present project of delivering tablets and free internet for primary school students to provide connectivity for all students and making online learning functionable. [19]

On EU level the Erasmus+ Program is mobilized for a strong response to the pandemic and the European Commission has adopted a revision of the Erasmus+ 2020 Annual Work Program. Additional funding of €200 million will be provided to projects supporting:

- digital education and training,

- digital youth work,
- creative skills and social inclusion.

The funding will also provide new opportunities for schools, youth organizations and adult learning institutions to support skills development, boost creativity and enhance social inclusion through the arts, calls for project proposals in these areas will be published in early autumn and interested organizations may get in touch with the Erasmus+ national agencies.

Digital service and funding on EU level digital transformation in order to help ensure continuity in education and training activities have delivered a wide range of online learning materials available online platforms, EU-funded projects, "Stay at Home Digital Toolkit" and SELFIE digital tool which is a free self-reflection tool to help schools make the most of digital tech available in 31 languages. The tool can be used to produce a snapshot of a school's strengths and weaknesses by gathering anonymous views from students, teachers and school leaders on using digital technologies. [18]

IV. LEGAL AND REGULATORY FRAMEWORK IN DIGITAL TRANSFORMATION OF PUBLIC ADMINISTRATION UNDER COVID-19 PANDEMICS

European digital transformation of public administration process is based on acting together and joining forces between the EU and its Member States, especially under Covid-19 pandemics which means involving regions and municipalities, academia, civil society, financial institutions, businesses and social enterprises. Because of undergoing coronavirus economic crisis Europe needs to pool its investments in research and innovation, to share experiences, and to cooperate across countries in order to continue the process of digital transformation. Promoting the digital transformation of public administrations throughout Europe under coronavirus pandemics is also crucial in this regard. [18]

The key to successful digital transformation process is set on EU legal and regulatory framework for both public and private sector based on: White Paper on Artificial Intelligence setting out options for a legislative framework for trustworthy AI (adopted together with this Communication), with a follow-up on safety, liability, fundamental rights and data (Q4 2020); Building and deploying cutting-edge joint digital capacities in the areas of AI, cyber, super and quantum computing, quantum communication and blockchain. European Strategies on Quantum and blockchain (Q2 2020) as well as a revised EuroHPC Regulation¹¹ on supercomputing; Accelerating investments in Europe's Gigabit connectivity, through a revision of the Broadband Cost Reduction Directive¹², an updated Action Plan on 5G and 6G, a new Radio Spectrum Policy Programme (2021). 5G corridors for connected and automated mobility, including railway corridors, will be rolled out (2021-2030) (2021-2023); A European cybersecurity strategy, including the establishment of a joint Cybersecurity Unit, a Review of the Security of Network and Information Systems (NIS) Directive¹³ and giving a push to the single market for cybersecurity; A Digital Education Action Plan to boost

digital literacy and competences at all levels of education (Q2 2020); A reinforced Skills Agenda to strengthen digital skills throughout society and a reinforced Youth Guarantee to put a strong focus on digital skills in early career transitions (Q2 2020); Initiative to improve labour conditions of platform workers (2021); A reinforced EU governments interoperability strategy to ensure coordination and common standards for secure and borderless public sector data flows and services. (2021) [15]

V. CONCLUSION:

Digital transformation of public administration in European union is based on European Union's Digital Strategy in its current state successfully addresses most of the issues the outbreak of COVID-19 raises. Over the past year, positive steps have been made in the field of digitalization and e-government for more efficient, inclusive and transparent administration and public services. Nevertheless, the present opinion piece has argued that there is still room for improvement. The post-COVID world would be different to the one we were used to. The demand for digital services would be higher than ever and the EU needs to adapt in order to be at the forefront of the global debate. The strong need for interoperability, allowing for fast exchange of information between public authorities in different Member States, especially in the health sector, has also been evidenced. The recommendation is also to consider aiming for a legal framework on interoperability since digital solutions in public services, especially. Impact of Covid-19 pandemic has evidently proven significant on digital transformation of public administration for efficient and functional public sector European union as well as in Republic of Croatia as . Physical coronavirus distancing has transformed the public services and public administration irretrievably. The best practices in digital transformation of public administration under impact of Covid-19 have been given in this paper and shown as a step towards the improvement of existing processes and systems, the rapid implementation of innovative solutions in overcoming coronavirus crisis as well as future crisis, using technology to generate positive solutions and strategies for successful digitalization of government, economy and digital society in whole. In reality, the Digital Strategy and digital transformation of public administration in the EU has proven to have adequately anticipated the main issues raised by COVID-19 as the baseline strategy structure has demonstrated. Therefore, it does not need to change the strategy, but it is certain that strategy needs an update. On this trail, on digital transformation plan, EU has already announced plans to re-write the rulebook for our Digital Internal Market: giving one set of core digital rules – instead of this patchwork of national legislation and national regulators for the same company: creating a single set of rules for all digital solutions and services operating in Europe on the European Single Market which can truly take the process of digital transformation of public administration under the Covid-19 to a new level.

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