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Digital Governance: The Case of Proofs of Vaccination

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ABSTRACT

The article aims to cast light on how digital governance tools, such as proofs of vaccination, would impact European freedoms during unstable Covid-19 times. Considering the EU approach to proofs of vaccinations, the e-Health network established trust framework and EU proposal for the “Digital Green Certificate” (“DGC”), the article scrutinizes some of already implemented proof of vaccination solutions in the EU. The analysis investigates whether and to what extent this initiative would be adequate to cope with the manifold challenges in managing Covid-19 pandemic. While digital governance tools can significantly improve crisis management, such tools can also affect the rights and freedoms of individuals and communities by exasperating already existing social, political, and economic inequalities. By taking an in-depth look at the existing proof of vaccination solutions in the EU, the article sheds light on how the same digital government proposed solution, the DGC, affect individuals and communities.

KEYWORDS

Vaccine Passports, Green Certificates, Pandemic debate, EU

1 INTRODUCTION

We have all heard of the Carte Jaune, an International Certificate of Vaccination or Prophylaxis, a World Health Organization (“WHO”) issued official vaccination record which may serve as a ‘medical passport’ to enter certain countries by travelers. The world has noticed the rise of the so-called ‘Immunity Passports’ or vaccinations certificates being issued by various nation states around the globe due to vaccinations against Covid-19 available in early 2021. In essence, immunity passports are certificates, either on paper or in digital format, that allow users with antibodies to show employers, government, and other members of society of their reduced risk of spreading diseases. The use of the term immunity passport and vaccination certificates, and the distinction and interplay between the two, is not clear. For instance, Iceland has chosen to issue a certificate of vaccination for all Icelandic residents who have successfully

undertaken vaccination against Covid-19. Such certificate includes name, surname, date of birth, nationality, identification number, name of the disease vaccinated and dates when the vaccinations were performed, and such certificate is provided in either paper or electronic format [1]. The purpose of such a certificate of vaccination is to ease up the free movement of persons in Covid-19 time. This in turn would allow upon the submission of such certification to be exempt from the quarantine requirement or Covid-19 testing requirement upon arrival to a country. Likewise, the Estonian government, together with Estonian tech firms Transferwise and Guardtime, have developed and tested the ‘ImmunityPassport’ app [2]. On the other hand, the Lithuanian government is working on an introduction of a similar tool called “Freedom ID” which would allow certain people to bypass Covid-19 related restrictions [3].

1.1 State of the Art: an overview

In the following section an overview of scientific literature on the topic is considered. In studies about various proofs of vaccination, it is typical to find work that addresses either technical solutions for the implementation or interoperability of the proofs of vaccination or on ethical and legal aspects of such tools. For instance, Corici et al provide a comprehensive overview of underlying technologies for digital proofs of vaccination [4]. Similarly, other studies, for example, focus on apps for Covid-19 vaccinations [5]. Other researchers address the general scientific and ethical feasibility of immunity passports [6]. The legal and ethical risks discussed in the research mostly include discussion on the legality of proofs of vaccination [7], privacy and data protection risks [8], discrimination, and implications on fundamental rights [9]. Lastly, some authors focus on providing critical analysis of the applicable regulatory framework as observed in [10].

Yet, few studies can be found uniting the discussion between the technical solution for proofs of vaccination and related ethical and legal challenges that may arise because of the use of digital technologies proofs of vaccination. Amongst those, some authors focus on providing an answer to the technological, ethical and security challenges, by proposing an architecture of a digital, decentralized, portable, immutable, and non-refutable health status cryptographic proof to evaluate the risk of allowing individuals to return to work, travel, and public life activities [5]. An observation should be made that most of the research and debate on the proofs of vaccination are held within the context of the ongoing Covid-19 pandemic, due to the specific nature of the event.

While digital governance tools can significantly improve crisis management, such tools can also affect the rights and freedoms of individual and communities by exasperating already existing social, political, and economic inequalities. With this background in mind, the article aims at contributing to the state of the art in the field by

taking an in-depth look at the existing proof of vaccination solutions in the EU and shedding light how the government proposed solution, the DGC, affect individuals and communities.

2 EU APPROACHES TO PROOFS OF VACCINATION

In late 2020, the e-Health network has established non-obligatory guidelines for the proofs of vaccinations that aim at establishing an EU wide interoperability framework for such tools. Such guidelines were adopted by the Member States with the support of the European Commission in first weeks of January 2021 and can be described as the first coordinated response by the EU towards a pan-European solution for proofs of vaccinations. The said guidelines are established based on Carte Jaune, the paper format of the vaccination proof and vaccination certificate, however, they explicitly deal with the digital format of the proof of vaccination which in most scenarios calls for some sort of automated processing. The guidelines are specifically designed to be used as proof of vaccination for medical purposes and establish basic interoperability elements of such proof to establish a trust framework for this digital tool. Interestingly, the guidelines are established on the four following principles: simplicity which would allow the certificate schemes to be established in both paper or digital formats; flexibility and compatibility with existing national solutions; rigorous protection of personal data; and stepwise approach, with agreement among the Member States at each step of the way [11].

The purpose of this scheme for digital proofs of vaccination is established for the sole purpose of proofs of vaccination for medical purposes only. The eHealth Network does not consider such proofs of vaccination for any other purpose, nonetheless, it acknowledges that such proofs may be used by the Member States for other purposes. However, such uses are subject to ethical and legal considerations as vaccination certificates may lead to direct and indirect discrimination of individuals or groups of individuals.

The guidelines establish two primary elements for the proofs of certification. The first one is the establishment of a minimum dataset that capture basic information required for the certificate. Such information must at least include three elements which are a person's identification, vaccination information, and certificate metadata. The first element of the vaccination certificate would consist of personal data, including name, surname, identification number, sex, and date of birth. The second element concerns specific information with respect to the vaccination and would include disease or agent targeted, vaccine, vaccine medicinal product, marketing authorization holder (e.g., Pfizer BioNTech), batch/lot number, date of vaccination, center of administration of vaccination, country of vaccination, future dates for vaccination. The last element of the proof refers to the certificate's metadata which may include certificate issuing entity, certificate identifier, certificate validity date. These three datasets would be interoperable and sharable between the Member States while any other data that may be included in the certificate may not necessarily be shared.

A crucial point addressed by the eHealth network in the established guidelines is that "the vaccination certificate system should be designed in such a way that the data subject can control the use of the certificate data".[11] How such control is to be ensured is

quite unclear as the guidelines only refer to the GDPR data minimization principle for proofs of certifications, while other GDPR related issues such as automated processing are not addressed.

Also, the guidelines establish a so-called trust framework for the proof of vaccines. The said trust framework is composed of trusted entities that can issue, authenticate, and validate such vaccination certificates. The guidelines fail to mention what would be such "trusted entities", nonetheless one may consider that it is left up to the Member States to decide which government entities would be named as trusted entities.

To conclude, the guidelines on the proofs of vaccination established and adopted by the EU Member States are the first true, and more importantly, timely attempt to establish a true pan-European solution for these second-generation tools. The guidelines establish a noble first step for such proofs of vaccination with the introduction of the minimum data set, nonetheless, they still fail to address in more detail data protection and security issues related to digital proofs of certifications.

2.1 EU Regulation on the "Digital Green Certificate"

The European Parliament and the Council in March 2021 have issued an urgent proposal for a regulation for the issuance of verification and acceptance of interoperable certificates on vaccination, testing and recovery for the SARS-CoV-2 disease, otherwise dubbed as the "Digital Green Certificate" [12]. The proposal was adopted on 15 June 2021 and since then serves as a single coordination tool for the EU DGC (the "Regulation") [13]. In essence, the Digital Green Certificate is a three-in-one, EU wide solution for Covid-19 related certifications. The adopted regulation aims to facilitate the exercise of the right to free movement within the EU during the COVID-19 pandemic which should allow EU citizens and their family members exercising their right to free movement to demonstrate that they fulfil public health requirements imposed, in compliance with EU law [14]. The reason for the proposal was to ensure a single EU wide action on any Covid-19 related certifications and the aim of the proposal was to facilitate the free movement of persons as a fundamental right, established in the TFEU.

Notwithstanding this aim, the Regulation has already received criticism. Besides being a misnomer whereas green certificates in the EU are issued to the renewable energy producers, the Regulation even before its adoption was criticized for having a hidden agenda. With "vaccination tourism" becoming a reality in some of the European countries, the criticism of the Regulation is that the introduction of DGCs could facilitate greater free movement restrictions for EU citizens who have received non-EMA approved vaccines, such as the Russian Sputnik [15]. While non-intentional, it could lead to grounds of discrimination of a large number of EU citizens.

The Regulation establishes an interoperable framework for proofs of vaccination against SARS-CoV-2, negative test results, or recovery from SARS-CoV-2. One cannot notice that the certification framework and the trust framework of the Regulation are based on the trust framework and the interoperability framework introduced by the eHealth Network, as also acknowledged in recital 15 of the Regulation. It was discussed earlier that while interoperability

and trust framework guidelines establish a single European solution, they did not address any data protection and privacy concerns that surround such digital solutions. The Regulation takes a great leap forward in this direction. It not only acknowledges that data protection and privacy should be ensured, but it also specifically addresses data protection related issues with respect to the issuance of such certificates. In particular, the issues addressed in article 9 of the regulation include the legal basis for the processing of personal (sensitive) data, data minimization principle, purpose limitation and storage limitation. In all cases, the Regulation provides specific explanations for what purposes and to what extent personal and personal sensitive data may be processed. What is especially relevant with respect to, for instance, the data minimization principle, is that the Regulation also establishes an exhaustive list of personal and personal sensitive data that would need to be included in the certificates, which would allow to ensure that unnecessary personal data is not collected.

3 IMMUNITY PASSPORTS, CARTE JAUNE AND VACCINATION CERTIFICATES: POINTS OF CONTENTION

The given examples of the immunity passport, Carte Jaune, and the vaccination certificate all do have qualities that are common to all three documents, nonetheless, there also are some significant differences between them. The fundamental distinction is the different nature of the incentives of these documents [16]. Vaccination certificates and Carte Jaune incentivize individuals to obtain vaccination against the virus, which is a social good while by contrast, immunity passports incentivize infection [16]. Immunity passports, certificates of vaccination or Carte Jaune all put different burdens on individuals' health risk, bodily integrity, or an individual's capacity to consent and control. Considering this, in times of crisis such as the Covid-19 pandemic and considering that states have the right to adopt emergency powers to protect the social good, the use of immunity passports becomes a contested issue. While Carte Jaune is an internationally recognized and accepted vaccination record, the fact is, that Covid-19 vaccination is not yet officially recognized under the International Health Regulations (2005) and cannot be included in the Carte Jaune. Until such time arrives, states may impose additional requirements such as immunity passports or vaccination certificates for travelers.

Some argue that the use of immunity passports should be discouraged per se as several scientific, legal, technological, and ethical issues can be observed from the introduction of the use of the said immunity passports. The application of such an immunity app is disputable since there is not enough evidence to provide individuals with a "risk-free certificate" as the research world has not yet agreed whether the antibodies developed by individuals who tested Covid-19 positive provide an adequate level of protection. In fact, WHO in April 2020 has published a scientific brief stating that there is no clear understanding yet that the human body develops the necessary antibodies for the SARS-CoV-2 and thus the use of so-called immunity passports or "risk-free certificates" should be done with caution [17].

Data protection is a matter of great discussion with respect to immunity passports. While data from various Covid-19-related studies

are important to understand the effectiveness of the vaccination and data from various serological studies is crucial to find the infected part of the population, such data would also form part of the individual policymaking. In cases where AI or any other similar technology is used for such policy decision making could not only affect people at a community level, but also at the individual level. At the community level the policy may require further social distancing measures to be implemented and at the individual level, due to, for instance, false-positive results of Covid-19 tests, might lead to a change of one's behavior despite still being susceptible to infection, potentially becoming infected, and unknowingly transmitting the virus to others. Software solutions attempting to implement such immunity passports will have data protection implications. Covid-19 vaccination results are considered as personal sensitive data under the existing GDPR provisions and thus would require an additional level of protection. Collection and processing of such data in terms of the GDPR is prohibited, unless such collection and processing fall under Article 9(2) GDPR exemptions. One of such exemption as already discussed earlier in the work, that may be applied for such immunity passports, may be public interest public interest in the area of public health, such as protecting against serious cross-border threats to health on the basis of Union or Member State law which provides for suitable and specific measures to safeguard the rights and freedoms of the data subject (Art. 9(2)(i) GDPR).¹ Similarly as with contact tracing apps, Member States' law may provide for such provision allowing to implement immunity passports at a national level, which, however, would undergo the highest level of scrutiny in terms of law, yet what would happen if private actors would implement their own/private immunity passport software to manage the spread of pandemics? While the same data protection legislation is directly applicable to private actors, the current GDPR enforcement mechanisms may fall short when assessing such apps, especially if they are implemented in the private sector. Further, the use of immunity passports or vaccination certificates could raise a question on whether such decisions would fall under Article 22 of GDPR and would require additional compliance. We should also acknowledge that decisions would be based on, for the time being, no-evidence based data on the effectiveness of Covid-19 vaccines as there is not enough scientific proof that individuals who have recovered from Covid-19 have developed enough antibodies and thus are protected from further infections. Such individual-targeted policies predicated on antibody testing, such as immunity passports, are not only impractical given these current gaps in knowledge and technical limitations, but also pose considerable equitable and legal concerns, even if such limitations are rectified [16].

Another point of contention for the immunity passports are the ethics of such passports. On the one hand, employers, schools, and the society at large may benefit from an additional level of security and protection from the spreading of pandemics using apps such as immunity passports. Such tools would allow individuals to come back to social activities in a more secure manner. On the other hand, factors such as race, social background, socioeconomic status may influence the treatment people may access and receive [18]. This in

¹ Article 9(2) of GDPR does contain other basis for such processing of personal sensitive data which may also be applied in this context.

turn may lead to marginalized groups being discriminated against and existing inequalities being exacerbated in certain environments. In addition, tools such as immunity passports do impose an artificial restriction on a person prohibiting one to participate in social, civic, and economic activities. In [19] authors note that the equity principle does not imply equal access to vaccination, that vaccines can create stigma due to classification of individuals based on their immunological status, and risks of unintended harms of vaccination passports.

Lastly, the use of Immunity passports may lead to stigmatization of persons and has been compared to the yellow stars used by Nazis on Jews to distinguish them and discriminate against them [20]. While yellow stars divided persons based on their religion and race, Covid-19 immunity passports, even with the purpose to serve the interests of public health, would not avoid stigma and inequality, take for instance, where a business uses Covid-19 test results as an assumption of immunity. On the other hand, sector-based policies that prioritize access to testing based on societal need are likely to be fairer and logistically more feasible, while minimizing stigma and reducing incentives for fraud [19].

4 A LOOK AT THE EXISTING PROOFS OF VACCINATION IN THE EU

Since the launch of the campaign for DGC, several European nations launched their own versions of proofs of vaccination even before the adoption of the Regulation. The divergent forms available of such tools ranged from “ImmunityPassport” in Estonia, certificate of vaccination in Iceland, or an “Opportunities Passport”² in Lithuania. Iceland, being the first European country, has chosen to issue a certificate of vaccination for all Icelandic residents who have successfully undertaken vaccination against Covid-19. Such certificate includes name, surname, date of birth, nationality, identification number, name of the disease vaccinated and dates when the vaccinations were performed, and such certificate is provided in either paper or electronic format.[1] The purpose of such certificate of vaccination is to ease up the free movement of persons in Covid-19 time. This in turn would allow upon the submission of such a certification to be exempt from the quarantine requirement or Covid-19 testing requirement upon arrival to a country. Similarly, Iceland’s government has also introduced the same requirement that it will accept upon entry to the country certificates of vaccination against Covid-19 issued by the WHO or Carte Jaune once the necessary registration of the vaccine is done according to WHO instructions [1].

The pilot app of the Estonian immunity passport allowed users to manage their data about medical certificates issued with respect to the RNA (RT-PCR) test results and antibody detection (immunological) test results issued by doctors on Covid-19. The Estonian app was developed by a public-private sector collaboration, the Estonian government and two of the well-known tech companies in Estonia to support measures for Covid-19 spread. The app was supposed to be used by individuals who would be willing to share their immunization details in several situations, when requested by the government, with their employers and so on.

²Direct translation from Lithuanian

Lithuanian “Opportunities passport” was sought to be an incentivizing tool that would encourage individuals to vaccinate. It is also said to bring back some activities that are paralyzed due to quarantine restrictions. The introduction of the “Opportunities passport” enabled some individuals and businesses have wider freedom as people with vaccinations, recent negative COVID-19 test could engage in more activities, have more freedom, take part in sports, and participate more actively in social life [21]. It was expected that the solution will be integrated into the EU DGC framework, yet the country has retained both the EU DGC and the “Opportunities passport” in use. The EU DGC is used for travelling purposes within the EU while the latter is used for access to various public and private services (shops, restaurants and so on) and can only be used within the territory of Lithuania.

Since the adoption of the Regulation, the EU DGC is applicable throughout the EU as of 1st July 2021. According to data available, all EU Member States have implemented the EU DGC framework including some non-EU Member states such as North Macedonia, Norway and so on [22].

5 DISCUSSION

With different proofs of vaccination taking different shapes in various European countries, we analyze to what extent is the proposed European solution up for the task and how essentially the same proposed solution can affect individuals and communities in different regions. Further, we analyze whether proofs of vaccination, which may take up various shapes such as immunity passports carrying different implications, can be intrinsically discriminatory towards certain individuals or groups of individuals.

As observed in [9], Covid-19 vaccination certificates *de facto* generate a sort of immunity passport. Further, a critical question is raised on what kind of immunity statuses are legitimate to grant immunity-based licenses and, equally importantly, what rights and liberties these statuses will entitle [9]. We instead observe that a vaccination *de facto* generates proof of vaccination. Depending on where the vaccination is done, such proof may take a form of an immunity passport, opportunity passport or a similar shape, carrying with it different consequences for the vaccinated individual or groups of individuals. It also should be noted that none of the already existing solutions nor the EU DGC consider what level of immunity against Covid-19 could be considered legitimate. Instead, in all the existing applications of proofs of vaccination, there is a presumption of immunization for those who were vaccinated or those who have developed antibodies after being infected.

While early and voluntarily adoption of the proofs of vaccinations was highly encouraged by the EU Commission (through the voluntary adoption of the EU DGC framework before it entered into force), the reality is that the Member States’ approach to proofs of vaccination diverges from that encouraged by the EU Commission. In Lithuania, for instance, besides the EU DGC, a secondary certificate in the shape of an “Opportunities passport” became a sort of tool of social control imposed by the government on individuals. The reason for such control is supported by the need to ensure public safety and health due to the increasing numbers of Covid-19 infected persons. Yet, Lithuania is not the only country with such requirements. The Italian government issues the EU DGC

upon vaccination [24]. It further requires providing the certificate when accessing certain private and public services such as dining inside and so on [23]. Similarly, as in the case of the Lithuanian example, access to services is limited to avoid increasing numbers of Covid-19 disease and its variants, which begs the question to what extent national law can override Union's regulations in this respect.

Amongst all the risks of proofs of vaccination mentioned in the literature one that requires further analysis are risks associated with groups of individuals and its impact to such groups. Groups of individuals may become subject to discrimination due to the inability to receive vaccination because of medical reasons or unwillingness to vaccinate (non-medical reasons). In the first case, non-vaccination due to medical condition could be considered a valid justification in terms of law and such group of individuals should not be excluded from receiving the EU DGC. Yet, the Regulation does not address the issuance of DGC in cases of valid-justifications, subjecting groups of individuals to continuous Covid-19 testing to obtain the DGC (unless a person has recovered). Such testing in most Member States is not free, thus putting a group of society at risks of social exclusion due to inability to continuously pay for Covid-19 testing. The Regulation instead focuses only on establishing a framework for proofs of vaccination for interoperability yet does little to address heightened risks and unequal treatment of groups of individuals in different regions.

6 CONCLUSIONS

The European right to free movement crumbled like a house of cards once Covid-19 pandemic stroke. Restoring this freedom is a challenge, especially when a balance between public health and safety, personal freedoms, and unjust discrimination is ought to be maintained. On the one hand, the EU Regulation on the DGC provides the first single, truly pan-European digital governance solution in the healthcare sector for Covid-19 management. On the other hand, the Regulation fails to incorporate oversight and accountability mechanisms that would protect EU citizens from the potential misuse or negative, discriminatory effects of the EU DGC. A starting basis for further consideration should include an acceptance of unavoidable- those effects of dividing society into two large groups, the seropositive and the seronegative [9].

Lastly, we must also acknowledge that while proofs of vaccination may not necessarily violate equal treatment as the obtainment of such proofs is not based on factors such as religion or race, but rather on hard scientific evidence, the use of such tool in its essence may still exasperate inequalities and discrimination. It would group individuals based on who has had the vaccine, who has developed immunity. Consequently, as rightly observed in [19], any guidance on immunity passports should acknowledge that immunity passports cannot be evaluated against a baseline of normality. If you are not ill or uninfected, then you have complete freedom of movement and if you were, you have limitations.

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REFERENCES

- [1] [1]'Certificate of vaccination against COVID-19 accepted at the border'. <https://www.landlaeknir.is/um-embættid/greinar/grein/item44162/Certificate-of-vaccination-against-COVID-19-accepted-at-the-border> (accessed Feb. 03, 2021).
- [2] [2]'ADM Systems in the COVID-19 Pandemic: Estonia - AlgorithmWatch'. <https://algorithmwatch.org/en/automating-society-2020-covid19/estonia/> (accessed Mar. 09, 2021).
- [3] [3]'Lithuania to introduce "COVID-19 passports" for certain groups | Reuters'. <https://www.reuters.com/world/europe/lithuania-introduce-covid-19-passports-certain-groups-2021-04-14/> (accessed May 06, 2021).
- [4] [4]A. A. Corici, T. Hühnlein, D. Hühnlein, and O. Rode, 'Towards Interoperable Vaccination Certificate Services', *16th Int. Conf. Availability, Reliab. Secur.*, pp. 1–9, Aug. 2021, doi: 10.1145/3465481.3470035.
- [5] [5]M. Eisenstadt, M. Ramachandran, N. Chowdhury, A. Third, and J. Domingue, 'Covid-19 antibody test / vaccination certification there's an app for that', *arXiv*, vol. 1, pp. 148–155, 2020, doi: 10.1109/ojemb.2020.2999214.
- [6] [6]R. C. H. Brown, D. Kelly, D. Wilkinson, and J. Savulescu, 'The scientific and ethical feasibility of immunity passports', *The Lancet Infectious Diseases*. Lancet Publishing Group, Oct. 16, 2020, doi: 10.1016/S1473-3099(20)30766-0.
- [7] [7]L. O. Gostin, I. G. Cohen, and J. Shaw, 'Digital Health Passes in the Age of COVID-19: Are "Vaccine Passports" Lawful and Ethical?', *JAMA*, vol. 325, no. 19, pp. 1933–1934, May 2021, doi: 10.1001/JAMA.2021.5283.
- [8] [8]A. ALEMANNI and L. BIALASIEWICZ, 'Certifying Health: The Unequal Legal Geographies of COVID-19 Certificates', *Eur. J. Risk Regul.*, pp. 1–14, Jul. 2021, doi: 10.1017/ERR.2021.38.
- [9] [9]I. De Miguel Beriain and J. Rueda, 'Immunity passports, fundamental rights and public health hazards: A reply to Brown et al.', *J. Med. Ethics*, vol. 46, no. 10, pp. 660–661, Oct. 2020, doi: 10.1136/medethics-2020-106814.
- [10] [10]I. G. LANG, 'EU COVID-19 Certificates: A Critical Analysis', *Eur. J. Risk Regul.*, vol. 12, no. 2, pp. 298–307, 2021, doi: 10.1017/ERR.2021.24.
- [11] [11]The eHealth Network, 'eHealth Network Guidelines on proof of vaccination for medical purposes-basic interoperability elements', 2021.
- [12] [12]The European Parliament and The Council, Proposal for a Regulation of the European Parliament and of the Council on a framework for the issuance, verification and acceptance of interoperable certificates on vaccination, testing and recovery to facilitate free movement during the COVID-19 pandemi. 2021.
- [13] [13]Regulation (EU) 2021/953 of the European Parliament and of the Council of 14 June 2021 on a framework for the issuance, verification and acceptance of interoperable COVID-19 vaccination, test and recovery certificates (EU Digital COVID Certificate) to facilitate free movement during the COVID-19 pandemic . OJ L 211, 15.6.2021, p. 1–22 : The Commission, 2021, pp. 1–22.
- [14] [14]EU Commission, Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on a framework for the issuance, verification and acceptance of interoperable certificates on vaccination, testing and recovery to facilitate free movement during the COVID-19 pandemi. 2021.
- [15] [15]A. K. Verma and S. Prakash, 'The Commission against the internal market and EU citizens rights: Trying to shoot down Sputnik with the "Digital Green Certificate"?'', vol. 09, no. 5, pp. 7352–7363, 2020.
- [16] [16]A. L. Phelan, 'COVID-19 immunity passports and vaccination certificates: scientific, equitable, and legal challenges', *Lancet*, vol. 395, no. 10237, pp. 1595–1598, May 2020, doi: 10.1016/S0140-6736(20)31034-5.
- [17] [17]"Immunity passports" in the context of COVID-19'. <https://www.who.int/news-room/commentaries/detail/immunity-passports-in-the-context-of-covid-19> (accessed Nov. 05, 2020).
- [18] [18]R. C. H. Brown, D. Kelly, D. Wilkinson, and J. Savulescu, 'The scientific and ethical feasibility of immunity passports', *Lancet Infect. Dis.*, vol. 0, no. 0, Oct. 2020, doi: 10.1016/s1473-3099(20)30766-0.
- [19] [19]T. C. Voo, H. Clapham, and C. C. Tam, 'Ethical Implementation of Immunity Passports During the COVID-19 Pandemic', *J. Infect. Dis.*, vol. 222, no. 5, pp. 715–718, Aug. 2020, doi: 10.1093/infdis/jiaa352.
- [20] [20]G. Persad and E. J. Emanuel, 'The Ethics of COVID-19 Immunity-Based Licenses ("Immunity Passports")', *JAMA - Journal of the American Medical Association*, vol. 323, no. 22, American Medical Association, pp. 2241–2242, Jun. 09, 2020, doi: 10.1001/jama.2020.8102.
- [21] [21]'Freedom ID to open more activities currently closed | Ministry of the Economy and Innovation of the Republic of Lithuania'. <https://eimin.lrv.lt/en/news/freedom-id-to-open-more-activities-currently-closed> (accessed May 07, 2021).
- [22] [22]'EU Digital COVID Certificate | European Commission'. https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/safe-covid-19-vaccines-europeans/eu-digital-covid-certificate_en (accessed Aug. 24, 2021).
- [23] [23]'FAQ - Certificazione verde COVID-19'. <https://www.dgc.gov.it/web/faq.html> (accessed Aug. 24, 2021).
- [24] [24]'Certificazione verde COVID-19'. <https://www.dgc.gov.it/web/faq.html> (accessed Aug. 24, 2021).