

DIGITALIZATION AND DEMOCRACY: THOUGHTS TO THE DISCUSSION ON E-VOTING

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Abstract: *The general mantra is that digitisation is necessary to make companies and public administration more efficient. In both cases, more efficient ideally means better, faster and more convenient; what it also usually implies is cheaper. In this paper we focus on the public side of the issue, namely on the topic of democracy. We consider aspects of the polling system, for instance, e-voting should help increase poll participation and promote inclusion, however, it also has its pitfalls.*

1. Introduction

Digitization or digitalization, sometimes also called the digital transformation, does have its advantages.¹ To name a few examples, it can improve accessibility and inclusivity (by providing access from almost everywhere), is more convenient (independent from time and place), faster, and cost efficient. To cut costs seems to be the primary driver for digitalisation in the public system and is accordingly also a strong argument for the adoption of e-voting. The service side of public administration is steadily decreasing, and the usually more expensive human workforce is replaced by machines, or, to put it more precisely, by software. In this paper we are looking specifically at the consequences of e-voting in relation to polling systems.

Thus, on the positive side, e-voting will enhance participation because it is more convenient and promotes inclusion via improved accessibility. E-voting also provides almost immediate polling results since it makes the counting of votes much faster. Furthermore, it ensures a modern image of a digital/virtual government. However, we argue that despite these undoubtedly positive aspects of digitalization in general, there are limits or at least there should be, especially when it comes to the very heart of the society as we know it, our democratic system.

2. Democratic system as a communication process

A democratic society ideally means that the people rule themselves. Whilst, this ideal may not be entirely achievable, it can be promoted by means of a voting system. In Switzerland, there are direct voting systems in place where citizens vote on almost all topics, however for the majority of the western world there are repre-

¹ Digitisation is the process of converting information from a physical format into a digital one, digitalisation is the process of leveraging digitisation to improve business processes. Digital transformation is another word that appears alongside digitisation and digitalization, basically, digital transformation is the impact caused by the process of digitalization, see <https://workingmouse.com.au/innovation/digitisation-digitalisation-digital-transformation>, 12.10.2020. See also <https://medium.com/@colleenchapco/digitization-digitalization-and-digital-transformation-whats-the-difference-eff1d002fbdf>, 15.11.2020.

sentative democracies in place, where people decide at least who is ruling them (like in Austria and the UK). Let us explore the topic of e-voting from the perspective of a democratic society.²

As pointed out, democracy is an expression of the desire to uphold the ideal of the identity of those in power and those controlled as closely as possible.³ As Alexander Balthasar describes it for Austria, and that can more or less be said for all democratic countries, the aim of democracy is for the entire law to be radically related to the people, that is, to the entirety of its citizens.⁴ The democratic principle is a central basic principle of the Austrian republic and is also anchored in the European Constitution on several occasions. Accordingly, Art 1 of the Austrian constitution (B-VG) states that Austria is a „democratic republic“, the law comes from the people.⁵ Further anchoring can be found in Article 8 of the State Treaty of Vienna, in Article 2 TEU, and in Article 3 para 1 of the Additional Protocol to the European Convention on Human Rights.⁶

Being such an important foundation for our society, the legal systems provide safeguards for polling in many ways, it even creates certain barriers to protect people from their own hasty decisions.⁷ There are strict rules such as for the promotion of parties, for polling places, and voting times. After all, democracy can also be seen as a processual set of communication processes.⁸ This view seizes the thought of liberty as well as of equality.⁹ Being a set of communication processes also means, that at the same time the democratic principle is mostly merely a formal requirement. It defines the processes and the procedure, i.e., the method of communication for generating values, but not the values themselves. If the processes or the communication do not function in the sense of its genuine values like freedom, equality, equal participation of different groups, then the values and the results themselves are no longer harmonious.¹⁰ This can be seen already. If, for instance, the information given is not objective and balanced, people cannot make decisions that are really in their best interest. However, this is an imperfection of democratic systems regardless of its implementation.

The strictly legal obligations have been more and more expanded with an – maybe additional – Public Governance-Approach. This formal steering instrument was discussed mostly from the perspective of a market-oriented coordination of public services. Because of this market-oriented view, tasks between the state and its citizens were newly distributed, but the consequences involve more than just a redistribution of markets or hierarchies. New forms of cooperation or also new ways of communication will have to be created.¹¹

3. The polling system

Let us dwell a bit longer on our ideal democratic system, where the issues related to voting can be divided into several successive steps. Before people cast a vote, they will reflect upon all the information available to them about the candidates and the party programs. Based on that information, they then make their own, considered decision. The state has an updated and complete register with all people that are allowed to cast a vote. Registered people proceed to the polling stations, proof of their identity at hand which is immediately crosschecked with the public register. Voters then enter a private booth and make a cross on a ballot paper

² SCHWEIGHOFER et al (Hg), *Auf dem Weg zur ePerson* (2001), 257ff.

³ RILL/SCHÄFFER, Art 1 B-VG, in Kneihls/Lienbacher, (Hg) *Rill-Schäffer-Kommentar, Bundesverfassungsrecht*, (6. Lfg 2010) Rz 7.

⁴ Meant also as distancing from any transcendental (natural law) foundation; Balthasar, *Die österreichische bundesverfassungsrechtliche Grundordnung unter besonderer Berücksichtigung des demokratischen Prinzips* (2006) 13.

⁵ FUNK, *Einführung in das österreichische Verfassungsrecht* (2011)14 86ff.

⁶ FUNK, *Einführung in das österreichische Verfassungsrecht* (2011)14 86ff.

⁷ MERLI, *Langsame Demokratie*, in Jabloner et al (Hg), *GS Walter* (2013) 487–504.

⁸ MERLI, *Langsame Demokratie*, in Jabloner et al (Hg), *GS Walter* (2013) 487–504.

⁹ RILL/SCHÄFFER, Art 1 B-VG, in Kneihls/Lienbacher (Hg), *Rill-Schäffer-Kommentar, Bundesverfassungsrecht*, (6. Lfg 2010) Rz 6.

¹⁰ BALTHASAR, *Die österreichische bundesverfassungsrechtliche Grundordnung unter besonderer Berücksichtigung des demokratischen Prinzips* (2006) 14; see generally to the problem of governance with voting systems: <https://medium.com/civic-tech-thoughts-from-joshdata/so-you-want-to-reform-democracy-7f3b1ef10597>, Joshua Tauberer, 20.10.2020.

¹¹ RECHBERGER, *Wirkungsorientiertes Kontraktmanagement* (2013) 106; Eberhard, *Der verwaltungsrechtliche Vertrag* (2005), free translation by the authors.

with a pen. They put their vote into an envelope and place the closed envelope into a securely sealed box with all the other votes from their polling station. At the end of the day, all the votes are manually counted, a procedure that takes quite some time and is supervised by representatives from all parties participating in the vote. Finally, and only after all polling stations have closed, the results are announced.

Digitization of the voting system can occur during all those steps, so let us discuss some of these steps in turn. There are different definitions for e-voting in place, but taking the one from the Council of Europe from 2004, updated 2017, it defines e-voting as such:¹²

*“e-vote: electronically cast vote; e-voting: the use of electronic means to cast and/or count the vote; e-voting system: the hardware, software and processes which allow voters to vote by electronic means in an election or referendum; e-election: a political election or referendum where e-voting is used;”*¹³

E-Voting therefore is an e-election or e-referendum that involves the use of electronic means in at least the casting of the vote, and an r-election or e-referendum is a political election or referendum in which electronic means are used in one or more stages of the election process.

As we start to consider the different steps of the voting system, we will start with the generation of information which is a prerequisite for an informed, deliberated decision.

4. Information for voters and their deliberate decision-making process

Free and open access to information, on both sides, must be available for all parties, interest groups and citizens. Without this information, it is not possible for voters to make a true, informed choice. Jürgen Habermas sees the principle of democracy as an increasing means for self-determination of the people. According to him, this has been expanded by the possibilities offered by new technologies, particularly in three areas: Access to information, the ability to express opinions and to make decisions.¹⁴

a. Increased risk of social engineering

Ideally, the promotion of the different parties is analysed by some public or neutral media and then presented as information to the general public. This is a topic connected with Media Law and basic rights. Austria is permanently criticized for its high concentration of media, not only with regard to newspapers, but also regarding the cross-media concentration.¹⁵ As depicted by Habermas, digitalization could actually be an advantage for both sides but again, the economy of scale makes it hard for smaller groups.¹⁶ The big players with their enormous amount of data hold an almost monopolistic position.

Digitization also raises concerns around increased opportunities for social engineering. Approaches such as behavioural nudging can be utilised for unethical reasons (the website <https://darkpatterns.org/> provides many examples of this). Whilst these concerns have always posed a problem, digitization can help to exacerbate this problem through increased opportunity and ease. The individualisation of information on the internet is not restricted to politics, the content we encounter online is consistently being tailored to us for many reasons; including keeping our interest to increase screen-time, encouraging us to purchase products, or manipulating our social media feeds to show us only the news that some algorithm deems in keeping with our interests,

¹² Appendix to the Guidelines on the implementation of the provisions of Recommendation CM/Rec(2017)5 on standards for e-voting, https://search.coe.int/cm/Pages/result_details.aspx?ObjectID=0900001680726c0b, 20.01.2021.

¹³ Appendix to the Guidelines on the implementation of the provisions of Recommendation CM/Rec(2017)5 on standards for e-voting, https://search.coe.int/cm/Pages/result_details.aspx?ObjectID=0900001680726c0b, 20.01.2021.

¹⁴ HABERMAS, Faktizität und Geltung: Beiträge zur Diskurstheorie des Rechts und des demokratischen Rechtsstaats (1998); Merli, Langsame Demokratie, in Jabloner et al (Hg), GS Walter (2013) 487–504.

¹⁵ <https://kontrast.at/medien-oesterreich/>, 11.11.2020; study on pluralisme <https://cmpf.eui.eu/mpm2020-results/>, 11.11.2020.

¹⁶ HABERMAS, Faktizität und Geltung: Beiträge zur Diskurstheorie des Rechts und des demokratischen Rechtsstaats (1998); Merli, Langsame Demokratie, in Jabloner et al (Hg), GS Walter (2013) 487–504.

attitudes and beliefs. Much of this individualization is beneficial to us – it helps us to find the information we are looking for more quickly, it helps our devices to learn what we want them to do, and it makes our online experiences more personal. However, issues can arise when online information is designed to manipulate by feeding into human biases. For example, as humans we naturally display ‘confirmation bias’, i.e., we have a natural tendency to seek, interpret and remember information that is consistent with our pre-existing beliefs.¹⁷ Algorithms on social media are designed to exploit this. This has led to social media, and perhaps the internet more widely, being described as an ‘echo chamber’.¹⁸ Whereby we are fed an inaccurate amount of information that plays to our beliefs. Furthermore, humans tend to assume that ‘their reality’ is an accurate representation of the world. Therefore, if we are only seeing a particular opinion or viewpoint on our social media accounts, we will tend to assume that most of the population also share that viewpoint. This is potentially dangerous when exploited for malicious reasons, including when content is designed to manipulate our perceptions of political parties. We draw the line here between ethics and law.

b. Shift from reasoned to reactive decision-making processes

Mature and educated people should be able to understand the information they get, then make a decision accordingly. That can be a decision that is either good for themselves (*homo oeconomicus*, i.e., self-interested) or good for society (altruistic).¹⁹

As humans, we have two recognised decision-making processes, often referred to as the reasoned and reactive pathways.²⁰ The reasoned pathway is slower and more effortful, this is the type of decision we tend to engage in when making an important decision; it is careful and considered. The reactive pathway is a much quicker decision-making process which we use for less important, day to day decisions (e.g., choosing what to eat for lunch). This system is less effortful for the individual. There are concerns that the use of e-Voting may decrease reasoned decision-making processes and instead push users towards using reactive processes. Merli describes this as promoting a ‘one-click democracy’ and envisages an ‘emoticon-accompanied yes-no app’ that the user may use between ordering a pizza and taking a photo’.²¹

5. Trust and Confidence

Before we start with the core technical issues that arise with the e-voting system, we would like to point out the general matter of trust and confidence. Trust and confidence are vital for all societies but especially for democracies. It is about citizens’ trust in the functioning and reliability of the state and its institutions, the confidence that the system generally functions for the public good. This trust or confidence is called the meta-effect.²² The digital decision-making process is regarded as very critical, and has already been outlined in several papers, i.e. one paper of Franz Merli.²³ Here, the way for manipulation would be wide open even

¹⁷ Nickerson RS. Confirmation Bias: A Ubiquitous Phenomenon in Many Guises. *Review of General Psychology*. 1998;2(2):175-220. doi:10.1037/1089-2680.2.2.175.

¹⁸ GARIMELLA, KRIAN ET AL 2018, Political Discourse on Social Media: Echo Chambers, Gatekeepers, and the Price of Bipartisanship, in Proceedings of the 2018 World Wide Web Conference (WWW ,18) International World Wide Web Conferences Steering Committee, Republic and Canton of Geneva, CHE, 913–922, DOI:https://doi.org/10.1145/3178876.3186139.

¹⁹ Towfigh/Petersen, *Ökonomische Methoden im Recht* (2010) 177; Storr, *Governance, Behavioral Science und das Bild des Menschen im Verfassungsrecht*, ALJ 1/2014, 78-88.

²⁰ KAHNEMAN, D. (2011). *Thinking, Fast and Slow*. Penguin, London UK.

²¹ MERLI, *Langsame Demokratie*, in Jabloner et al (Hg), GS Walter (2013) 487–504.

²² KONRAD, *Rechtsstaat, demokratische Legitimation und Effizienz: Funktionen und Garanten eines sachgerecht flexiblen Legalitätsprinzips*, in FS Norbert Wimmer, *Recht Politik Wirtschaft* (2008) 1–21; Funk, *Einführung in das österreichische Verfassungsrecht* (2011)14 10ff; Stephen Covey, *Schnelligkeit durch Vertrauen* (2009).

²³ MERLI, *Langsame Demokratie*, in Jabloner et al (Hg), GS Walter (2013) 487–504.

apart from all the technological issues of intercepting the device. Cybersecurity risks and potential systematic manipulation of cast and counted votes pose a serious threat to trust and confidence.

We will not venture into hacking, cracking or other illegal interception, but just want to raise some questions around legal possibilities to interfere with an e-voting system. What companies will be involved to provide for the polling machines, servers for storage and all the necessary software? Presumably, the usual big players like Google, Microsoft and the like. Do we really trust mostly US companies for ensuring a fair, transparent, and equal voting system in Europe? Even if national players are involved: With e-voting, one big provider of such systems is the Italian company Rousseau, quite well known because they supported the 5-star movement in Italy but also because of their – let’s call it careless - handling of personal data for which they got a fine from the Italian data protection authority.²⁴ The following reasons could speak against the introduction of e-voting: Possible loss of the secrecy of the vote especially in combination with the necessary verification of identity, lack of confidence in the correctness of the polling system, lack of trust in the machines, security and privacy of the chosen internet platform, software and data storage, and the whole election administration system. However, we will now focus on the voting machines.

6. Technical aspects

“Direct-recording electronic” (DRE) voting machines which record the vote by the push of a button have been commonplace for many years and are in widespread use in countries such as the United States, Germany and Brazil. DRE voting machines can be seen as a close analogue to the traditional paper-based ballot voting, as voting is still performed in designated polling places, however without the use of paper ballots. The recorded votes are stored in memory cards, or additionally on paper trails, and the tabulated results are typically transferred by the individual precinct to a centralized location.²⁵

The advantage of this kind of voting machine is twofold: Machine based voting and tabulation allows for faster vote counting. Additionally, common voting mistakes such as under and overvoting can be prevented since the machine can inform voters about these issues before the vote is ultimately cast.

a. Security issues with DRE machines

Recent security audits of DRE^{26,27} voting machines have shown that even this rather simple form of digitalization can introduce a number of security issues in both software and hardware. Many of the commonly used voting machines have inadequate protection against physical manipulation. This issue is especially problematic as physical access can then be used to manipulate the machine’s software. For example, device such as the Nedap/Groenendaal ES3B which are used in the majority of Dutch elections have no provisions against running modified or hacked software and generally lack modern security concepts such as code signing, virtualizations, physical and tamper protection such as eFuses (electronic fuses). In contrast, modern consumer devices such as Apple’s iPhone or gaming consoles such as Sony’s PlayStation are designed with far better security concepts and are far harder to break ²⁸than most DER voting machines.

The reason why some manufactures of popular consumer devices place such a high emphasis on the security of their product is because of commercial reasons. In case of entertainment products, the reason is most likely

²⁴ <https://easygdpr.eu/de/gdpr-incident/strafe-gegen-5-sterne-bewegung/>, 15.11.2020.

²⁵ KEVIN KWONG-TAI CHUNG. Patent US7422150B2- Electronic voting apparatus, system and method (2001).

²⁶ J. BANNET/D. W. PRICE/A. RUDYS, J. SINGER /D. S. WALLACH, „Hack-a-vote: Security issues with electronic voting systems,“ in IEEE Security & Privacy, vol. 2, no. 1, pp. 32-37, Jan.-Feb. 2004, doi: 10.1109/MSECP.2004.1264851.

²⁷ KURZ, C./RIEGER, F, NEDAP-Wahlcomputer – Manipulationsmethoden an Hard- und Software. Informatik Spektrum 30, 313–321 (2007). <https://doi.org/10.1007/s00287-007-0182-4>.

²⁸ MOORE/MAGGILI/MARRINGTON/RODRIGUES. “Preliminary forensic analysis of the Xbox One” (2014). Fourteenth Annual DFRWS Conference.

related to software piracy: A tightly secured system which can only use preapproved software via strictly regulated distribution channels is far less susceptible to the use of unlicensed or counterfeited software.

b. Online Voting

While DRE voting still takes place at regular polling places, online voting offers a comfortable alternative by allowing citizens to cast a vote at home via the internet. Switzerland and Estonia are among the first countries to introduce this voting mechanism.

However, independent security audits have found security issues^{29,30} on nearly all online voting platforms. It is worth mentioning here that constant improvements of these platforms are taking place. For example, the e-voting system of the Swiss Post is currently following modern security engineering practices such as open sourcing the voting platform and offering bug bounty programs to encourage security researchers.³¹ The encouragement of a more transparent and open development process for voting software is certainly a step in the right direction and might enhance the trust in the overall system. Especially since such methodologies are already considered best practice in the development of other open-source software projects. It however remains to be seen if these improvements of the development process will actually result in more secure and therefore more trustworthy online voting platforms as online voting itself is still in its infancy with only very few countries and regions employing such a system.

Nevertheless, transparency remains the central issue with this kind of voting. Regardless of the level of engineering and security expertise involved in developing online voting, the overall process is not transparent to the average voter. Understanding the principles of online voting requires a solid understanding of both computer science and cryptography and only experienced security researchers are able to audit and validate such systems.

This lies in stark contrast to the traditional paper ballot-based process which is not only understandable by a lay person but also lends itself to active participation in the form of voluntary election workers. Transparency and understanding are vital components for developing user trust and the authors argue that this is nearly impossible to achieve with online voting systems.

7. Conclusion

The Public Governance-Approach as a formal steering instrument in the public sector was discussed mostly from the perspective of a market-oriented coordination of public services, which means that new forms of cooperation and communication have to be created.³² We feel the following statement helps to summarise the issue: *Digitalisation is far more than just transforming former analog steps into the digital space. It means that we need entirely new processes, new forms of communication to secure the functioning and by that reinstall trust in the whole system.*³³

Digitalisation actually undoubtedly improve quality of life in many ways, but transferring existing problems into the digital world can increase the burden, magnify the scale of the problems and even pose a threat to the

²⁹ SPRINGALL/FINKENAUER/DURUMERIC/KITCAT/HURSTI/MACALPINE/HALDERMAN. "Security Analysis of the Estonian Internet Voting System" (2014) In Proceedings of the 2014 ACM SIGSAC Conference on Computer and Communications Security (CCS), 14). Association for Computing Machinery, New York, NY, USA, 703–715.

³⁰ LEWIS/PEREIRA/TEAGUE. „Trapdoor commitments in the swisspost e-voting shuffle proof (2019).“ <https://people.eng.unimelb.edu.au/vjteague/SwissVote.html>, 15.11.2020.

³¹ <https://www.post.ch/en/business-solutions/e-voting/publications-and-source-code>, 15.11.2020.

³² RECHBERGER, *Wirkungsorientiertes Kontraktmanagement* (2013) 106; Eberhard, *Der verwaltungsrechtliche Vertrag* (2005), free translation by the authors.

³³ RECHBERGER, *Wirkungsorientiertes Kontraktmanagement* (2013) 106; Eberhard, *Der verwaltungsrechtliche Vertrag* (2005), free translation by the authors.

freedom of individuals, groups and/or to society. To cite efficiency as the highest goal, and to propose digitalization as a simple solution to achieve that goal fails to address the associated issues. A democratic system is a delicate, volatile, and complex system that needs careful consideration. Especially in law, a purely economic view results in truly absurd results. As a well-known example for that the black-market trading system can be named; whilst ideal if you take purely economic considerations, it is certainly not contributing to a just or an equal society – societies most of us would want to see in place³⁴

We therefore strongly suggest considering the bigger picture and taking a closer look at all the matters at stake, instead of rushing towards digitization as a ‘swift and cheap’ solution. The solution may be swift and convenient, but it should never be cheap. As, at the end of the day, the latter could cost us more than just money.

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³⁴ TOWFIGH/PETERSEN, *Ökonomische Methoden im Recht* (2010) 177; Storr, *Governance, Behavioral Science und das Bild des Menschen im Verfassungsrecht*, ALJ 1/2014, 78–88.

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