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Direct Democracy on the Blockchain

The Extension of Popular Sovereignty by Technological Means

Abstract: A deepening political crisis in Europe is accompanied by increasing civil discontent which directly translates into decreasing trust in political systems and political outcomes deficit of legitimacy. It is already contributing to the emergence of potentially dangerous and exclusive policies as populism and Euroscepticism is on spectacular rise, endangering liberal democracies of the continent and the European regional project. Therefore, a search for political innovation that could effectively address these issues is excessively justified. This thesis seeks to offer a solution by investigating the possibilities to extend popular sovereignty of citizens via the better integration of technological advances into the political life of European states. Such intention could not only carry the possibility to nurse some of the most serious societal grievances but also would adopt the conduct of 21st century politics to the ongoing trends set out by the Fourth Industrial Revolution.

Keywords: direct democracy, popular sovereignty, blockchain, digital citizenship, Eos

Table of contents

Introduction

On July 1, 2018, Estonia has become the first European country where public transportation is fare-free for citizens (Gray 2018). A five-years-long test period in the capital – Tallinn – was seen as a success by the government; they decided to extend the policy to the whole territory of the Baltic republic (O'Sullivan 2018). However; in 2013, most observers were convinced that Tallinn is going to face a disaster as the subsidized service will collapse. Most professionals throughout Europe simply could not comprehend an approach contrary to orthodox practices and capitalist logics. The project did not lead to a catastrophe; the public transportation company turned profitable for the first time in its history, while infrastructural developments financed through cost savings on ticket sales and controls have helped significantly increase the approval ratings of the service (Cats et al. 2017, p. 1100-1101). At the moment, several German cities are already in the planning stage to implement a similar policy that used to be considered a guaranteed failure (Bostas 2018). One gets the sense that a general skepticism about the wider applicability of direct democracy shows similarities with the case of free public transportation; there is a rather strong opinion commonly echoed in the public which assumes the fundamental inefficiency of this form of governance without having proper empirical evidence at its disposal to assess large-scale applicability. This currently 'bad PR' of direct democracy in Europe is strongly connected to recent misuses[1]; arguably, these were rather signals of deeper structural problems of contemporary representative liberal democracies than proofs of the unfitness of these instruments for extended use (Jones 2016, p. 41-42). According to David Altman (2011) – one of the most prepared contemporary authors of direct democracy – representative and direct democracy are not "necessarily at odds" and can "coexist in a mutually reinforcing" manner as it is demonstrated in Switzerland or Uruguay where ballots are frequently used in decision-making (p. i, 1, 43, 45). Political innovation would be much needed in many of the democratic states in Europe – greatly overlapping with the membership of the European Union[2] (EU) – where seemingly inflexible paradigms are rendering the possibility of reform void in the public, in an era when crises of representative democracies and the European regional project are evident. Some of these include a persistent dwindling of key democratic indicators such as voter turnout and civil participation, erecting constraints in implementing fair and equal representation to the entire polity, and growing discontent with the democratic deficit of EU

1 In 2016, the United Kingdom's ballot to leave the European Union and the Dutch Referendum aiming at the bulk of Ukraine's EU integration were predominantly characterized by the covert intention to pull out decision-making from the parliamentary theater of elected representatives without having to correspond to the standard processes of policy-making throughout the traditional channels of the democratic game.

2 Four countries of the continent – Iceland, Lichtenstein, Norway and Switzerland – are not members; however, similarities in the political and economic systems and in their degree of development with the EU are significant. Therefore; in this thesis, these states are going to be analyzed together with EU members.

institutions. As a symptom of crisis; politicians' populism[3] is on spectacular rise in post-2008 Europe[4]; this success is achieved through the magnification and exploitation of problems that are present through the construction of inner political frontiers, the extreme polarization of the electorate and the projection of responsibility for internal malfunctions on external(ized) scapegoats (Laclau 2005, p. 86-87). Therefore, the neglect of structural issues and an urge for reform could – and to some extent, already does – lead to exclusive and potentially dangerous policies that are overtly aimed at vulnerable and often defenseless groups such as migrants.

The recent data privacy scandal of Cambridge Analytica – a partner company of market leading social platform Facebook – heated up debates not only about basic data security concerns, business ethics and poor regulatory environments but also drew attention to broader theoretical considerations about the relationship of technology and power. The company has been accused of the illegal gathering and brokering of Facebook users' data in order to manipulate their political choices in favor of forces linked to the tech giant and its alliances (Kak 2018, p. 23). Information technology in the 21st century has been extensively expropriated by certain political forces as an instrument of biopolitics – as Foucault described it – and allowed for unprecedented degrees of mass surveillance and manipulation of vast populations (Wallenstein 2013, p. 11). It appears, that technology has been repeatedly exploited by political actors to shape citizens' behavior and preferences (Monahan, 2016, p. 229). However, new technologies that are more reliable and trustworthy could greatly contribute to the neutralization of such incentives and – to a certain extent – safeguard citizens from these abuses by providing a more appropriate context for the extension of popular sovereignty.

Blockchain technology – the tech behind cryptocurrencies such as bitcoin – by introducing a stark paradigm shift in networked interactions, could revolutionize conduct in semi-direct democratic political systems[5] (Mashelkar 2015: 244; Tabscott & Tabscott 2016: 27). By the decentralization of virtual networks and the reinvention of trust as a commodity, it could harmonize this abusive relationship of power and technology and unleashing unprecedented potentials in citizenship (Drescher 2017: 242; Whitehead et al. 2017: 210). Moreover, it could greatly contribute to the

3 According to Ernesto Laclau (2005), politicians' populism is characterized by the "broad non-ideological coalition-building that draws on the unificatory appeal of 'the people'" and claims to defend this unity from constructed threats. (p. 12).

4 Enough to think of the popularity of controversial figures such as Marine Le Pen (France), Geert Wilders (The Netherlands), Nigel Farage (UK), Viktor Orbán (Hungary) or Jarosław Kaczyński (Poland) and the rise of parties like Syriza (Greece), the Movimento 5 Stelle (Italy), Podemos (Spain) or Alternative für Deutschland (Germany).

5 A semi-direct democracy – such as Switzerland – is a polity which is governed through a dual system of representative bodies and frequent direct democratic initiatives (Steinberg 2015, p. 86).

removal of many of those anxieties which currently prevent the wider adoption of e-governance[6] (eGov) solutions – including e-voting – by introducing superior standards of privacy and security (Savoldelli et al. 2014, p. S63). The theoretical digitalization of politics and its migration into the virtual space are perfectly fitting into the ongoing trends set out by the Fourth Industrial Revolution (4IR) which are blurring the boundaries between physical and non-material in almost every field of science and profession (Li et al. 2017, p. 634). Furthermore, the political systems through which the states of Europe are governed, appear to be obsolete. The conduct of politics in representative democracies seems to be immune to technological changes and have remained more or less static throughout the modern history of the democratized world. Even in political systems which are considered more advanced such as that of Switzerland; ballots are predominantly paper-based and most votes are cast and processed analogously (Steinberg 2015, p. 98). Moreover, the 'Landsgemeine'; a non-secret ballot voting by raising hands at gatherings in public places such as squares, is still practiced in the digital age and has not changed much since the 18th century (Kaufmann 2018). While electronic voting machines (EVM) were tested – and most often than not, discarded – at polling stations in many country; arguably, this failure is mainly derived from the centralized nature of the process and an incorrect choice of technological context (Alvarez et al. 2018: 95; Gerck 2010: 1; Goler & Selker 2010: 83; Hapsara et al. 2017: 36-37). Even in a relatively recent paper published in the influential Political Quarterly, Birch et al. (2014) promote SMS – a more than quarter-century old tech – as a possible elixir for e-voting problems while many superior technologies were already – and readily – present (p. 190-191).

The main question is the following: in what ways could extended direct democratic involvement enabled by blockchain technology influence governance in well-established representative democracies? In the first chapter, this thesis provides an overview on the theoretical aspects of direct democracy in relevant academic literature of political science. Subsequently, it attempts to identify the contexts in which extended direct democratic involvement – complementary to existing representative structures – could function under a certain set of conditions. Consequently, by examining the most common concerns about this form of semi-direct democratic governance, criteria for further analysis will be established. The second chapter begins with an introduction of those features of blockchain technologies, which make them potentially useful as a medium of citizenship and could contribute to the wider adoption of eGov. It continues with a proposal of a virtual citizenship platform for direct democratic initiatives and a brief description how it would work on regular networked devices such as a smart phone. This leads to the third chapter which

6 Electronic governance means networked political interactions of democratic stakeholders to co-produce public goods and services (Meijer 2015, p. 198).

provides a deeper analysis – both from theoretical and practical perspectives – of such a hypothetical blockchain based citizenship software and its wider implications for a polity and its society. It is primarily interested in how the introduction of such a solution could influence political participation, enfranchisement, communal engagement and what are the broader consequences for existing governance structures. Finally, the limitations are going to be discussed while also marking the path for future research.

1. - Chapter One – An overview on direct democracy

This chapter begins with an overview on academic literature dedicated to direct democracy in order to establish a basic topology and framework, which will serve as the analytical foundation of this writing. This review focuses on the use of direct democratic initiatives under well-established, mature democracies of the European continent. The use of this institution under autocratic and hybrid regimes is outside of the scope of this outline. At the end of this section – aided by the conclusions of the review on relevant literature – a brief evaluation of the findings will be presented together with identified related topics, which will form the analytical framework of further discussions.

1.1 - Direct Democracy in Political Thought

Direct democracy is the oldest form of democratic governance as it was first manifested in ancient Athens. Citizens – forming the *demos* – represented directly themselves as sovereigns in a one person, one vote system of doing politics. A citizen in such a framework enjoys excessive power and responsibility in the three power branches: they are self-legislating (*autonomos*), self-judging (*autodikos*) and self-governing (*autoteles*) (Asimakopoulos 2014, p. 5). Today, discussions about the fitness of direct democracy for large-scale, modern societies are inseparably connected to the debates about representative democracy in general. David Altman (2011) – in his book titled *Direct Democracy Worldwide* – establishes two important 'liberal assumptions': first, that citizens are capable to "accurately" perceive their needs and second, they are the only ones who can best judge their own preferences (p. 7). John Asimakopoulos (2016) – author of the book titled *Social Structures of Direct Democracy* – shares similar premise: universal equality in democracies also means that citizens are equal to vote and represent (p. 437). By conditioning this right to certain qualifications – typically inaccessible to the disadvantaged – is the *de facto* disenfranchisement of segments of the population by denying their sovereign rights (Asimakipoulos 2016, p. 437). Altman (2011) counts 'popular sovereignty' among fundamental liberties and he believes that it should not be limited to the sole practice of voting once in a few years (p. 1). He argues that the concept has been neglected in the mainstream debates of political science (Altman 2011, p. 32). Altman (2011) defends the extension of popular sovereignty by pointing out that in representative systems interests of certain groups and individuals could greatly divert public institutions away from the interests of the majority and direct them towards the corrupt few. These processes require tight civil control enabled by a means to exercise popular sovereignty (Altman, 2011, p. 32).

John Asimakopoulos (2014) also warns of potential dangers of state capture within representative democracies (p. 3). To address this risk, he offers a complete political manifesto[7] – including ideas such as single term mandates through lotteries or random selection of delegates from a competitive pool of skilled professionals – of a hypothetical direct democratic political system based on the economic principle of equality. Similarly to economic systems, different social structures could be superior to each other in terms of measurable outputs such as life expectancy. This notion is inspired by Max Weber's "life chances" – an attempt to measure the quality of a political system (Asimakopoulos 2016, p. 3,6). The current social order set out by the political practice in Western representative democracies is imperfect: it is unable to create the desired outcomes for the wider society due to extremities in economic inequality (Asimakopoulos 2014, p. 2). This is strongly linked to a Marxist critique of capitalism: the constant pressure for growth and accumulation effectively undermines egalitarian principles of fairness and the 'common good' which also establishes a zero-sum game in the political field (Asimakopoulos 2014, p. 1,4). Asimakopoulos (2014) argues, that such economic power game could be effectively removed under a system with wider direct representation (2014, p. 4).

J.J.R. Thomas (1984) summarizes Weber's ideas about direct democracy. It contains two major topics: 'equality' refers to the notion that every citizen is equal in their qualification to fulfill social roles and 'positions of civic responsibility' while 'minimization' means the limitation of power attached to certain societal roles and a reduction in the numbers of such positions altogether (Thomas 1984, p. 225). Direct democracy is a rational form because it has precisely 'articulated' set of "political and administrative norms" while it is constantly being made aware of the very possibility of domination – a cornerstone idea of Weber's world view – by different forms of administration (Thomas 1984, p. 226). One of Weber's major concern about direct democracy is that the system could be occupied by those who can devote time: typically the wealthy or 'notable' – the very same elites which dominate representative institutions. Therefore, a direct democratic system's success greatly depends on the democratization of free time for the citizenry: an idea strongly connected to the critique of capitalism and employment in general (Thomas 1984, p. 227). In societies where citizens are constantly preoccupied with their economic survival, political participation is deemed to stay at low levels. Weber is rather skeptical about the applicability of direct democracy on large-scale industrial societies. He sees growing populations and technological complexity as being at odds with direct democracy as these conditions are ideal for increased legal

7 Unfolding Asimakopoulos' manifesto in great detail is outside of the scope of this work. It can be freely accessed at: http://www.scielo.br/pdf/rep/v36n2/1809-4538-rep-36-02-00430.pdf

domination which is in conflict with democratization of governance. In the views of Weber, direct democracy is an inherently "unstable attempt to be free of all domination" (Thomas 1984, p. 229).

Saskia P. Ruth (2017) – an editor of *Let the People Rule?* - and her colleagues are less skeptical about the applicability of direct democracy on larger scales (p. 1-2). They highlight the growing relevance of this field of study not only due to an increase in the numbers of direct democratic initiatives in contemporary Europe, but also because of their expansion into various distinct policy-fields and levels of administration (Ruth et al. 2017, p. 3). Moreover, they demonstrate that the rise of some 'new wave' European parties – such as the Podemos in Spain or the AfD in Germany – are setting new trends by successfully incorporating extended civil intervention in the decision-, and policy-making process (Ruth et al. 2017, p. 2). According to Ruth et al. (2017), such popular mechanisms could ease the "global crisis of representative institutions"; suffering from deficit of trust and legitimacy (p. 3). Laurence Whitehead (2017) – one of the most known contemporary democracy theorists – and his coauthors also defend the validity of direct democracy, its promotion and the conduct of research on the topic: they argue that "democratic idealism" has been the greatest driver of political innovation (p. 210). This work is seemingly more incline to bring technological changes – a topic generally absent from dedicated literature – as important factors affecting the socio-political nexus of direct democracy. Technology recently has offered some solutions, which could disrupt established political conjunctures. Furthermore, Whitehead et al. (2017) argue, they may enable new "citizenship potentialities" and means of direct democratic participation which have never been seen before (p. 210). They claim that the dialogue about direct democracy is strongly connected to the debate about 'good governance' and the crisis of partisan politics (p. 208). The 2008 financial crisis magnified these problems and led world politics into an age dominated by "populist disaffection" while crisis of representative institutions is evident (Whitehead et al. 2017, p. 209).

Mechanisms of direct democracy (MDDs) that are establishment initiated are usually problematic: they tend to be exploited in political games and they often have one well identifiable covert intension to "erode the power" of other institutions and/or interest groups by going around existing democratic procedures and platforms (Altman 2011, p. 2). Therefore, such MDDs should not be studied together with genuine manifestations of direct democracy. Altman (2011) calls these MDDs "populist placebos" (p. 7). Some bottom-up initiatives, on the other hand, are worthy of in-depth examination - an idea shared across relevant literature. Altman (2011) refers to them as "citizen-initiated mechanisms for direct democracy (CI-MDDs)" (p. 2). Yanina Welp – another editor of *Let the People Rule?* – and Saskia P. Ruth (2017) also underlines the importance of separately

analyzing reactive citizen initiated MDDs and proactive initiatives by authorities (p. 99). Altman (2011) thinks that MDDs should not be understood as idealized forms of "participatory or deliberative democracy", but rather as additions to the existing mechanisms of representative democracy in order to safeguard citizens from "perverse and unresponsive behavior" of representative bodies (p. 2). According to him, direct democracy is best used for contemporary societies as a complementary institution which aids the democratic process; within this procedure, it is the most suitable for decision-making (Altman 2011, p. i, 1). Altman (2011) argues that the outcome of CI-MDDs in a representative democracy is less important than the whole process itself: it enables citizens to function as 'checks and balances' and induce the whole procedure with additional legitimacy (p. 199). This rhymes with Asimakopoulos, who argues that political systems which absolutely exclude direct democratic initiatives are nothing more than "post hoc reflections of true power" and elite interest (2014: 45; 2016: 432). Whitehead et al. (2017) also argue that direct democracy could justify popular rule and improve governance quality (p. 214). As Welp & Ruth (2017) see it – CI-MDDs render citizens as "additional veto players in the decision-making process" (p. 101). They conclude that the citizenry's direct participation in policy formulation has the potential to strengthen many aspects of democratic governance (Welp & Ruth 2017, p. 113).

Altman (2011) notes a highly problematic phenomenon in the interpretation of direct democracy in the mainstreams of political thought: a commitment to evaluate the institution in a binary normative spectrum designating it as an inherently good or bad instrument (p. 2-3). He believes that such presupposition has no analytical usefulness and only brings stereotypes into a dialogue, which is already "plagued with normative and empirical tension" (Altman 2011, p. 2). Moreover, he reminds one; when MDDs are criticized based on their vulnerability to elite manipulation or misuse, one should recall the numerous times when other institutions of representative democracies such as elections, parliaments or even freedoms are being violated in a similar manner (p. 3). He stresses an important controversy here: opposite to the evaluation of direct democracy misuse, the exploitation of the aforementioned institutions does not directly translate into decreasing normative value. Therefore, the critique of direct democracy based on its occasional exploitation is drawing on a weak and somewhat inconsistent argument and assigns some general shortcomings of democracy in a wider sense to this specific manifestation of popular governance (Altman, 2011, p. 3-4). While the examined authors acknowledge that representative democracy is the best form of governance humankind has produced, there is lack of consensus how to address the major issues it is facing today. According to Altman (2011), the most relevant of these problems are "high levels of civic disaffection, distrust of political parties and … animosity toward the democratic game" (p. 4). He cites the Cambridge theorist John Dunn to illustrate the main problem with restricted popular

sovereignty: "One day's rule every four years has very much the air of the placebo" (as cited in Altman, 2011, p. 4). Therefore, free and fair elections are only necessary but not sufficient conditions for democracy to thrive (Altman 2011, p. 32). Accordingly, the improvement of democracies should be more than the mere improvement of electoral systems; it requires an update of the entire process of conducting politics. In this quest, popular sovereignty – a concept which Altman (2011) regards "systematically" marginalized – should be promoted and "must be revitalized in the form of" legally "binding CI-MDDs" (p. 5). Reform would be necessary in most representative democracies; they have a rather strong tendency to degenerate into oligarchies and plutocracies, they are vulnerable to party cartelization and susceptible to the development of "corridors of power"[8]. These issues must be addressed by contemporary democracies; offering both horizontal and vertical axis of control (Altman 2011, p. 5).

Critical considerations about the extended use of MDDs are centered on five major topics. The first main concern is elite manipulation and the exploitation of MDDs to move private interest forward. Such intention could derail any popular initiative; without a proper regulatory environment MDDs could be subjected to powerful groups (Altman 2011: 42; Ruth et al. 2017: 3). Therefore, appropriate legal frameworks must be developed to safeguard the institution from selfish motivations; strong rule-of-law is one of the key factors for successful expansion of MDDs (Whitehead et al. 2017: 215; Altman 2011: 59). The second topic of criticism is concerned with the collective understanding of the issue at stake; the citizens' competence to function as active political actors (Whitehead et al. 2017, p. 212). Altman (2011) dismisses the assumption that citizens are uninformed, unprepared and lack skills to decide over complex and difficult issues and considers them rational actors being capable of deciding over affairs which are influencing their daily lives (p. 43). Asimakopoulos (2016) argues that the insistence of qualifications – an exclusive construction – as a condition to exercise one's political rights is the signal of "fundamentally having no faith in or desire to democracy" (p. 438). The third topic is about fairness: the will of the majority leaves a minority dissatisfied by establishing a 'zero-sum game' (Altman 2011, p. 43). Moreover, MDDs' utility in extreme polarization is rather questionable and by being inherently reactionary, they may cause unnecessary social tension and instability by the erosion of political unity (Altman 2011: 44; Ruth et al. 2017: 3; Thomas 1984: 229). On the other hand, as Asimakopoulos reminds one, democracy by definition is a majoritarian system; in fact, the problems begin when a minority (typically one with economic power) takes over representative institutions. Therefore, "violating the concept of majority rule is a violation of democracy itself" (Asimakopoulos 2014, p. 84). The fourth

8 'Corridors of power' according to Altman (2011): "obscure places where the elite can impose their own will in how they interpret and implement policy without public scrutiny (e.g., bureaucracy, cabinet, courts, police force)" (p. 5).

topic is about fields and authority. Which policy fields fit for MDDs? Who has the authority to call for consulting citizens? How (and by whom) outcomes should be interpreted and implemented into wider structures of governance (Ruth et al. 2017: 3; Whitehead et al. 2017: 211, 213)? The fifth and last major concern is a cluster of related technical issues; feasibility and degree of deliberate participation, costs of MDDs in terms of time and funds and problems of scaling. MDDs are reasonably costly and lengthy to initiate, organize, perform, evaluate and validate (Altman, 2011, p. 42-44). Asimakopoulos (2014) admits that empirical evidence – from Switzerland or Uruguay – supports those who argue for the feasibility of MDDs on a small to middle scale, but points to the lack of such experience on larger scales (Asimakopoulos 2014, p. 40). However, he argues for feasibility and offers several realistic technical solutions for semi-direct democracies. To mention few: only single-term representation, appointment of skilled – not merely qualified – candidates in a competitive manner (similarly to the private sector), nominations based on lotteries etc. (Asimakopoulos 2014: 78-79; 2016: 440). Thomas cites Weber's technical solutions for protecting direct democracies from exploitation – greatly overlapping with Asimakopoulos' ideas such as rotation, limited terms (in time and occasion), random selection from appropriate candidates and strictly defined mandates (Thomas 1984, p .226). While some of these queries are valid to an extent, Altman (2011) highlights that many of the aforementioned problems could also be seen as inherent systematic problems of representative democracies in general (p. 58-59).

1.2 - Evaluation

In this sub-chapter a quick evaluation of the findings in the previous section will be presented while also answering the naturally raised question: if direct democracy has such potential to improve current political systems and overall societal outcomes, why isn't it used more frequently and on a wider scope of policies? The trust in the institution of direct democracy in Europe in the light of recent controversial referendums has been scattered. However, the controversies around the Dutch Ukraine referendum or the Brexit vote are seemingly more connected to some internal political problems of these states and wider issues of European regionalism than to the general suitability of direct democratic initiatives in mature democracies. The misuse of MDDs in inappropriate cases should not be translated into normative judgments of the tool's general utility. It was demonstrated in the previous section that direct democratic initiatives are only genuine if they are bottom-up, citizen-initiated projects. None of the recent controversial referendums qualify for this criterion as they were establishment initiated (parties or even the Prime Minister called them) and had well-circumscribed undemocratic political motivations. Therefore, in the study of CI-MDDs, these recent negative experiences of populist

disaffection are rather irrelevant. Accordingly, in further analysis only this genuine type will be discussed.

As for the scope of policies, it is suggested in public narratives that some policy fields might be inappropriate for direct democracy. Such topics are foreign and economic policy or other fields which are considered technocratic. Additionally, securitized topics – such as defense – are also included in this basket. However, this categorization overlooks the fact that any topic could be securitized according to political desires to remove the issue from the dimension of public debate. In the 2000s, supposedly competent technocrats greatly contributed to the emergence of the most serious financial crisis since the Great Depression with disastrously poor policies. This suggests that a distinction between technocratic and bureaucratic policy fields have limited usefulness for this analysis. As such, henceforth this thesis avoids this categorization and shares the assumption with liberal and critical theorists who argue for the citizenry's ability to effectively engage topics concerning their daily lives. In fields of special skills – such as health-care – appropriate selection and appointment of professionals in a direct democratic way appears to be possible. The necessity to fulfill certain public functions of special knowledge and the need for grand scale organization to provide certain necessary services (utilities for example) assumes the need for – at least – minimal bureaucratic structures; therefore, the state – even in a exclusively direct democratic political system – is still going to be the main container of politics. However, there is significant potential to reduce its size.

While the technical details of conducting full-scale direct democracy in all power branches and policy fields are thoroughly researched and outlined in political thought, this thesis aims to stay on realistic grounds by focusing only on the application of CI-MDDs in the existing and working structures of contemporary, well-establish European representative democracies. Even within these states – based on existing empirical evidence and experience of feasible semi-direct democratic political systems such as that of Switzerland – it focuses on the applicability on a small to medium scale. The justifiability of this approach is suggested by the lack of empirical evidence on the extended digitalization of political interactions in large states with sizable electorate. Such evidence is however present on a micro to mezzo scale as demonstrated by – for example – e-Estonia, a pioneer in this quest (Tapscott & Tapscott 2016, p. 201). This thesis aims to explore how the incorporation of blockchain technology as the context of a digital citizenship platform running on personal electronics could influence governance; the analysis will focus on the application of CI-MDDs in decision-making following Altman's interpretation of the current practical utility of binding CI-MDDs as complementary tools within existing frameworks of representative

democracies. Laurence Whitehead is seemingly more open than his peers to the idea of bringing technological advance into the account of direct democracy. The topic is rather under-discussed or absent in other works. Yet, he misses to name blockchain technology as a potential solution for extended direct democracy even though the technology was close to its first completed decade at the time of his writing in 2017. Therefore, this work aims to fill this gap by providing a comprehensive analysis on how technological innovation – namely, blockchain networks – could contribute to the digitalization and democratization of politics.

Table 1 - Specification of subject of analysis

Subject of analysis				
Mechanisms of Direct Democracy	***Direction***	***Status***	***Stage***	***Function***
	Citizen initiated	Binding	Decision-making	Complementary

The dedicated literature has revealed the main topics of direct democracy debate. These will also form the analytical framework of the main chapter of this thesis. They fall in two broad categories: theoretical and technical considerations. The major theoretical considerations are: *legitimacy*, *sovereignty* and *trust*. The second major grouping of concerns contains: *efficiency, feasibility* and *security*.

Table 2 - Theoretical framework

Issue: **Extended use of binding CI-MDDs on a blockchain based virtual citizenship platform complementary to existing representative structures**			
Theoretical Considerations	Legitimacy	Sovereignty	Trust
Technical Considerations	Efficiency	Feasibility	Security

1.3 - Methodology and Goals

This thesis attempts to address the identified problem through a qualitative text-based research aided by the aforementioned theoretical pivots extracted from relevant academic fields. It aims at establishing validity for a proposed reform in the political systems of mature democracies in

Europe. This quest is approached through a more general argumentative attempt without an articulated focus on specific cases. The major goal is to connect social sciences to the more pragmatic disciplines of computer science, software engineering and public policy to offer a solution – create a product – which beyond academic relevance has also practical applicability.

2. - Chapter Two – Potentials in Decentralized Virtual Networks

Bitcoin – the pioneer of cryptocurrencies – is only one specific application of blockchain technologies among many others which are completely outside of the universe of money. Probably, the most remarkable – and best funded – projects are being developed in private health-care; a resource rich and competition intensive industry where privacy and security in the handling of patients' data – arguably the most sensitive and intimate personal information – is of pronounced importance (Engelhardt 2017: 23; Griggs et al. 2018: 1; Greengard 2018: 32, Leventhal 2017; Patel 2018: 3). In the following chapter, the main features of blockchains will be presented in a non-technical manner together with an explanation of how – and to what extent – it could serve direct democratic initiatives. It will be demonstrated how the integration of blockchains could contribute to a significantly broader adoption of eGov solutions while its shortcomings are also going to be discussed.

2.1 - What is Blockchain Technology?

The fundamentals of blockchain technology were laid out in 2008 when an unknown author or group published the white paper of bitcoin under the pen name of Satoshi Nakatomo. The proposed electronic cash system is enabled by a recent innovation in virtual networks and cryptographic software technology: the blockchain (Nakatomo 2008: 3; Golumbia 2016: 8). Blockchains blend several existing inventions together such as "peer-to-peer (P2P) networking, public-private key encryption and consensus mechanism" in a truly novel way (De Filippi & Wright 2018, p. 13). Currently, most virtual networks are highly centralized structures with the presence of hubs; they run on special server computers which are stored in clusters in data centers. These include the most popular commercial services – such as Facebook and Google – and the networks of public and private institutions such as bureaucracies, banks or universities. Due to this property, these systems are rather vulnerable to external manipulation and exploitation; most importantly, they are completely defenseless from their operators (De Filippi & Wright 2018, p. 2). As the Cambridge Analytica scandal demonstrated, owners of centralized virtual networks enjoy complete monopoly over accessing, altering and transferring data without having to consult – or even to inform – those to whom it actually belongs; the users.

This would be excessively difficult and improbable in blockchain networks which are organized in a decentralized fashion (De Filippi & Wright 2018, p. 2). Such a system is not hosted by centrally allocated specialized server computers; it is distributed to, and collectively run by each and every

single node (computers, tablets, mobile phones, smart electronics, etc.) which is connected to the network (Golumbia 2016, p. 26). While the currently dominant centralized systems are also characterized by a hybrid approach to delegate certain functions across their web; according to Drescher (2017) most cannot be regarded as distributed due to the presence of single components within the network which are of existential necessity (p. 16). This means, that such systems lack integrity; once a critical hub – being fundamentally definitive for the network's topology – is eliminated they will collapse (Barabási 2002, p. 71). The main purpose of blockchain networks – by operating without the need of such centers – is to introduce and maintain integrity in virtual networks (Drescher 2017, p. 17). The solution of blockchains for keeping an intact record of interactions is the so called 'globally distributed ledger'. In the case of cryptocurrencies, this means the complete history of transfers and a snapshot of balances. Each and every unit hosts this log in parts or in its entirety. In this way, no participant of the network has a monopoly to access or alter history and data, as it is spread across the whole decentralized web (Drescher 2017: 147-148; Tabscott & Tabscott 2016: 23). This information is stored in so-called virtual blocks: elaborate datastructures protected by the most advanced cryptographic technologies available (Wattenhofer 2016, p. 84). They are created one by one – in bitcoin's network in every 10 minutes; this is referred to as 'block time' – in a democratic manner by the cooperation of active nodes[9] after reaching cross-network consensus on verifying interactions and changes in data (Drescher 2017, p. 133). Nodes have to solve high numbers[10] of tasks in a "mathematical guessing game" by trial and error which is referred to as 'mining' (De Filippi & Wright 2018, p. 23-24). Once a node succeeds to find a valid 'hash'[11] – a cryptographic "digital fingerprint" defined by an algorithm – it informs the other nodes (Khatwani 2018). If more than half of the nodes verify that the so-called Proof-of-Work which the 'miner' broadcast is indeed correct, the block closes and becomes 'chained' to the previous ones forming an integral virtual structure (Karame & Androulaki 2016, p. 46). De Filippi & Wright (2018) illustrates this sensitivity to alteration by comparing blockchains to an inflexible majoritarian political system in which the architecture of the chain "favors the *status quo*" and it is "highly resistant to change" (p. 36). Unauthorized manipulations in the blockchain are theoretically possible; however, the execution of a successful attack requires considerably more complex and costly methods than hacking into traditional centralized networks due to the decentralized nature of storage and the need for consensus.

9 Inactive nodes are synchronizing with the network once they return online by verifying the ledger and downloading blocks that have been created since last activity (Wattenhofer 2016, p. 79).

10 A specialized bitcoin mining device – such as Bitmain's S9 computer – with a 'hash rate' of 13,5 TH (terrahash) solves 13,5 x 1000^4 (13,5 trillion) cryptographic tasks a second.

11 A comprehensible, short explanation of hashes is available at: https://coinsutra.com/bitcoin-hash/.

It happens repeatedly that enthusiastic amateurs break into systems of strategic importance such as that of the NASA or the Pentagon (Ali 2016). These cases are clear demonstrations of how vulnerable centralized structures are; teenagers with a budget notebook could corrupt systems – with relative ease – that cost millions to maintain by an army of the best IT professionals. This is allowed by inherent structural weaknesses that are seemingly impossible to overcome without a completely new approach to virtual networking; the task blockchains seek to fulfill. When hackers wish to attack orthodox networks; they always target central hubs where most data and interaction is concentrated. They exploit weaknesses of these centers and the poor security of regular users – or networked smart devices such as a thermostat – unsafely connecting to them, in order to alter or extract data for benefits. However, what does one do when there are no centers at all to attack and the quality of connection between nodes is not determined by user-end security[12] (Karame & Androulaki 2016, p. 1)? Hackers who plan to attack blockchains must take control over more than half of nodes in the globally distributed network and alter data individually on their physical hard drives within the interval of the block time. This way the fraudulent action becomes a truth and it is being incorporated in the ledger by the rest of the nodes. A '51% attack' happened in smaller cryptocurrency projects where a group of untrustworthy miners were able to deploy such tremendous amount of computing power which exceeded half of the networks' total size (Risberg 2018). However, it has not yet occurred in bigger projects – including bitcoin – which are protected by their sheer size (De Filippi & Wright 2018, p. 25). The feasibility of such a complex and elaborate attack is less and less likely as these networks grow.

The main controversies connected to blockchain technology are primarily stemming from its newness – it is barely a decade old. First of all, legislators are lagging behind with regulation which allowed for several fraudulent projects to seize investors' money that was raised in cryptocurrencies. They were also protected by the privacy of certain blockchains and could disappear in the dark. These issues are undeniably destructive for the technology's reputation and bulk adoption. Second, their complexity and novelty may prevent and discourage many users from adoption. Arguably, it takes considerable efforts to engage with some of the basic concepts and learn the terminology. Third, incompetent operators of commercial services could incorrectly blend the blockchain with less secure and outdated approaches which undermines security and eliminates the benefits of the ledger[13]. Another concern is related to the physical global communications infrastructure of cables, switches, hubs, ports etc. and the structural vulnerabilities derived from the presence of large hubs; however, this problem is inherent to all other networks (such as the Internet

12 Refers to individual cybersecurity consciousness. Does the user have malware protection, strong passwords, etc.?

13 The greatest scandal in blockchain's history is certainly the so called 'DAO attack'. In June 2016, 50 million USD were stolen from a cryptocurrency fund due to human error and incompetence (Finley 2016).

and Tornet[14]) on this hardware and services hosted (bank transfer, email communication, etc.) by them. Furthermore, the operation of blockchains consumes considerable amounts of energy, rendering some of the solutions highly inefficient. This results in tremendous waste[15]; the majority of available electricity is still generated in a heavily polluting way by burning fossil fuels. This adds to the manifold environmental challenges of the planet. Lastly, there is no solution readily available on scaling securely in larger frames: the biggest blockchain is that of bitcoin's, processing circa 240,000 transactions a day with a maximal theoretical capacity of 604,800. It is a friction of the traffic of 150 million daily bank card interactions (De Filippi & Wright 2018, p. 57). However, to significantly increase the number of processed transactions is a highly complex issue; it is referred as to the 'scaling problem'[16] which is the most crucial technical challenge in blockchain development. These concerns are going to be discussed in more details in the following.

2.2 - e-Governance Reinvented

While bitcoin's blockchain – the first as such – is suffering from weaknesses in terms of operation[17] and security; many of these nascent problems are effectively addressed by some of the new generation blockchain solutions (Casey & Vigna 2018: 77-78; Karame & Androulaki 2016: 152). To mention a few; these include the reduction of block time to few seconds, stricter reinforcement of rules, more advanced cryptography, faster interactions, more efficient operation and better scalability via faster process of increased numbers of transactions (Karame & Androulaki 2016, p. 174-175). Furthermore, some of the recent projects work on a completely different basis than Proof-of-Work 'mining' which beside decreasing the likelihood of '51% attacks', result in less robust ledgers that require considerably less electricity, calculating power and storage space on individual devices. Moreover, many offer 'smart contracts'[18] and a complete internal software environment where applications (dapps) could be built and run utilizing the most common programming languages such as Java – similarly to operation systems like Windows, Linux or Android. All these aforementioned properties are merged in one of the most advanced blockchain available by the time

14 The Tor network has been developed with the help of CIA to aid dissent in Iran and China but quickly became the favorite network of illegal vendors (Martin 2014, p. 351, 366).

15 Based on data from the US Energy Information Administration, the bitcoin network as of May 2015 consumed the amount of electricity which is equivalent to the need of more than 285.000 US households (Bradbury 2018).

16 It is outside of the scope of this work to explain this elaborate issue in detail. For more information, see: https://blockgeeks.com/guides/blockchain-scalability/

17 A high concentration of miners in China allows for manipulations which result in higher transaction costs (Karame & Androulaki 2016, p. 150-151)

18 A smart contract is a computerized transaction protocol which autonomously satisfies common contractual conditions (Szabo 1994). It is not a new concept but blockchains are more appropriate to host them than traditional centralized networks (Derose 2016).

of this writing: the Eos[19] network which after a long test period went live on June 15, 2018 (Bach et al. 2018: 1793; Dhillon et al. 2017: 151-152; Bambara & Allen 2018: 171). One could build public registers, databases and platforms of – even political – interaction in this environment enjoying the benefits of decentralized networking and globally distributed ledgers (Dhillon et al. 2017: 42; Raval 2016: 15). The Eos environment appears to be an appropriate container for the proposed virtual solution for popular initiatives in micro to mezzo levels being able to process thousands of interactions a second[20]. For convenience, in the following this thesis introduces the project name *Demos* – as a tribute to the ancient Greek roots of direct democracy – to refer to this platform.

Established political bodies are still rather resistant to share power through the digitalization and democratization of governance; they often intend to remorate the adoption and/or the functional extension of eGov through the emergence of institutional and political barriers (Savoldelli 2014, p. S67). However, despite the resistance of some democratic stakeholders and a pace of adoption below previous expectations, eGov solutions are increasing in use throughout Europe (Savoldelli et al. 2014: S63, S66, Meijer 2015: 198-199). Larsson & Grönlund (2014) argues that due to an enhanced cooperation in the delivery of common goods, eGov is predominantly different from traditional bureaucratic structures and requires altered management (p. 137). eGov allows for unprecedented degrees of engagement in the political process by significantly reducing costs – temporal and material – of administration and barriers to participation. This decreases the weight of the government among other stakeholders of the polity and successful leadership becomes excessively coupled to the democratization of power. While several states in Europe have already incorporated eGov functions allowing for remarkably more efficient administration, potentials in the extension of popular sovereignty still remain largely untapped. Even though online voting is possible in some European countries such as Switzerland and Estonia – a pioneer in political innovation – it is still shrouded in suspicion and mostly restricted to the migration of regular ballots onto a virtual platform (Tapscott & Tapscott 2016, p. 200). Therefore, the true capabilities are still unexploited as reform does not reach beyond the update of current prevalent forms while the underlying principles and practices remain unchanged. The vast majority of the current eGov projects are based on rather outdated technologies – even in the more developed countries – including centralized processing and storage, old software, etc.; they are not only insecure but also quite expensive at the same time (Alvarez et al. 2018: 95; Joshi et al. 2017: 15). By the application of more advanced and secure technological solutions anxieties about eGov could be effectively

19 The white paper is available at: https://github.com/EOSIO/Documentation/blob/master/TechnicalWhitePaper.md

20 In the third test phase of Eos, the network was able to securely process 3000 transactions per second on average (TPS) – bitcoin's network processes maximum 7 (seven) – however, the developers promise over one million TPS after the next update is implemented (Larimer 2018).

reduced. The incorporation of blockchain technologies in networked governance could lead to more reliable and trustworthy systems and contribute to wider adoption of eGov solutions.

2.3 - Politics in one's pocket

In contemporary societies one's skill to operate electronic devices – most importantly, computers – is extensively considered tantamount to one's ability to read and write. Trends dictated by the 4IR – such as the proliferating application of automation, robotics and artificial intelligence in every segment of production – suggest that technological illiterates are facing increasing difficulties in their everyday lives and soon they are going to be unemployable (Li et al. 2017, p. 630, 632). Interestingly, the growing pressure for acquiring tech skills is less pronouncedly voiced as a criticism in connection to the digitalization of professions. On the other hand, it constitutes the backbone of counter-arguments against eGov solutions and the digitalization of political participation (Rajput & Nair 2013, p. 138-139). The critique of digital political innovation based on the barriers posed by technological skills is a fallacy; it is not different from arguing against books because learning to read takes considerable time and effort. The degree of complexity and abstraction in postmodern capitalist democracies already requires citizens to acquire certain skills and knowledge in order to partake in the democratic process. Trends in the 4IR suggest that the inclusion of digital literacy in the required tool set of conscious citizens is unavoidable. To equip students with this knowledge is already an emphasized element in educational strategies throughout the EU (Javorský & Horváth 2014, p. 770).

A growing civil discontent in Europe signals public demand for political reform; the rapid emergence and apparent success of political populism, Eurosceptic and anti-establishment rhetoric are rather clear symptoms. It is difficult to see in what ways popular demands for increased communal engagement and the extension of civic participation would lead to the worsening of the political landscape in existing representative democracies of Europe. The software engineering industry has already produced some of those tools and technologies which are necessary for the development of a blockchain based software solution to extend citizenship. Those advanced blockchains which provide the opportunity to program smart phone and PC dapps within their environments, already possess most of the essential features and could offer a degree of security which appears to be sufficient for the *Demos* platform. Therefore, the beginning of coding and testing (and ultimately, implementation) solely depends on political will. Owing to the unique properties of blockchain networks, the cost of establishing such a system is considerably lower than that of traditional centralized eGov networks (Casey & Vigna 2018, p. 22). Once the software

design phase, development, and testing is accomplished; citizens are one download away from political participation on their personal electronics: engaging with the community of their polity, launching initiatives, raising digital signatures for collective action, voting about issues on various levels of administration. While this is certainly not a magic elixir to all problems of mature democracies in Europe and their regional project; the inefficiency, unpopularity and increasingly questioned legitimacy of the current practices in political life justify a search for reform and experimentation. The extension of popular sovereignty by technological means enabled by the decentralization of networked interactions between democratic stakeholders could effectively address some of these issues. Potentials reach far beyond mere cost cutting and time saving in public administration. In the next chapter, more details about the operation of *Demos* will be presented while the possible pitfalls are also going to be discussed.

3.- Chapter Three – Analysis of a theoretical blockchain powered citizenship platform

This chapter provides an analysis of the theoretical and technical aspects of the proposed virtual direct democratic political platform and its probable implications. Additional technical information of *Demos* and blockchain networks in general are also going to be unfolded in more detail while addressing some of the main concerns about the possible incorporation of this new technology into political life.

3.1 - Theoretical Considerations

3.1.1 - Sovereignty

Steinberg (2004) points out, that technology may undermine state sovereignty by empowering non-state actors (p. 329). This is already happening to an extent; powerful transnational tech corporations such as Google behave similarly to states and have significant power to influence policy on multiple levels of administration. But what happens when technology begins to empower single citizens? Political leverage extracted from social capital could make an impact on the allocation of power within a polity similarly to how businesses benefit from their economic weight. In a Clausewitzian[21] understanding, excessive state power (and institutions that constitute it) of contemporary democracies – in the context of the liberal peace of the EU – is unjustified. However, it is often argued that the maintenance of these archaic forms – once constructed for the conduct of effective warfare – is necessary for the delivery of efficient governance. Critiques of direct democracy suggest that the "correspondence between popular preferences and political outcomes" does not necessarily translate into good policy (Altman 2011, p. 56). According to Slavoj Žižek (2016), sovereigns must occasionally include and conduct calculated risk assessments and implement actions that do not match public demands, in the hope of being justified retroactively sometime in the future (51:18). He cites Angela Merkel's 2015 'wilkommen' policy[22] which could have been verified on humanitarian or economic grounds; however, it rather turned out to be unfeasible and has been *de facto* abandoned (Barigazzi 2017). Even if one assumes the possible success of an excessively unpopular political move; what is the necessary and justifiable degree – if any – of delegates' free judgment in a democratic system? This leads one to the 'mandate-independence controversy' (Altman 2011, p. 2, 33). To what extent could delegates be trusted with

21 Clausewitz claimed that the emergence of modern European state structures were primarily necessitated by waging wars which he regarded as the continuation of politics (Barkawi & Brighton 2011, p. 129)

22 It refers to the German government's unconditioned acceptance of those refugees and migrants who were stuck in the states of the Balkan-route in 2015 following a spectacular collapse of the Dublin Regulation – the EU's official policy for asylum seekers (Karnitschnig 2015).

such freedom of agency that also allows for dishonest and corrupt behavior when private interest penetrates into representative structures? Furthermore, does a government – such as the one led by Syriza in Greece that introduced austerity a few days after a rejective referendum in 2015 – have the right to act against the will of the voters they represent (Forelle & Fotiadis 2015; Žižek 2016: 5:44)? If one thinks of representatives as trustees of the represented, such action could be destructive to the political fabric of a democratic system. Perhaps, this controversy has also contributed to the recent German coalition crises and to the disruption of the relatively stable and harmonic political milieu that has been established since reunification (Karnitschnig 2018). The crisis in Greek politics has been worsened by the untrustworthy behavior of Syriza which also demonstrated that the anti-establishment, revolutionary rhetoric of European populist parties is merely theatrical and their politics are principally motivated by elite competition within existing structures (Laclau 2005, p. 117).

Discussions about the validity of extended popular sovereignty are strongly connected to debates about the citizens' competence to exercise such power. Could they be trusted with it and are they able to make rational decisions? The EU was built on a Kantian vision articulated by the liberal democracies that established this unity based on norms and values that are – claimed to be – shared across the continent (Amstutz 2013: 114; Nilsson & Silander 2016: 45). In the liberal school of thought, citizens are perceived to be free, autonomous, responsible and rational both on individual and communal levels (Altman 2011: 4; Hobhouse 1964: 27, 29). In contemporary public debates of Europe, these rights and skills are repeatedly questioned when popular initiatives are discussed. This discourse undermines not only the very foundations of liberal institutionalism – for which the EU claims to be a model case – but liberal democracy itself. It suggests that the denial to exercise vertical accountability – control over the sovereign – and to apply coercion in popular systems could be justified on a rational basis. Sovereignty of citizens could be denied in favor of the state – vulnerable to selfish interests – in order to deliver more efficiency in the production of economic and social output. This is also a central notion in fascism and state capitalism; the ideologies that greatly contributed to the creation of those traumas which necessitated the construction of a liberal order which is seemingly the sole guarantee of peace in a continent that used to be characterized by permanent warfare. Therefore, the extension of popular sovereignty should be promoted in the EU not only to sustain hard-achieved stability but to protect the intellectual integrity of ideas and norms on which it has been built. In the midst of the deepest political crisis in post-Cold War Europe, this appears to be of vital importance. The proposed solution of this thesis could offer an affordable and relatively rapidly implementable way to construct a complementary structure which may relieve some of these pressures.

3.1.2 - Trust

After a short period in the 90's, when the Internet was celebrated as the new chance for empowerment and inclusion for ordinary people, it reproduced existing hierarchies rather quickly and became characterized by the "complete absence of democracy, fairness and egalitarian values" (Barabási, 2002, p. 55). Ever since, tech giants like Facebook and Google are quasi impossible to circumvent and they have penetrated areas of online activities where their presence is hard to justify. They standardized the systematic abuse of their competitors and users into a successful business model which commodified private data and transformed it into one of the most valuable resources of the postmodern era (Lanchester 2017: 4; Lyngbø 2016: 189-190). In recent academic works inspired by Foucault's analysis of Jeremy Bentham's Panopticon[23] – summarized by Greg Elmer (2003) – the automatic disciplinary effect of technological surveillance – 'dataveillance' – is questioned; users are not simply coerced but – to some extent – attracted into a (semi)conscious giving away of personal information "in exchange for perceived personal benefit" (p. 232). He cites Reg Whitaker who argues that the "Panopticon rewards participation" (as cited in Elmer 2018, p. 232). In return users could make a search, play a game or use a service which falsely claims to be fare-free as – for example – Facebook does. Most users do not realize that they were involved in a non-materialistic trade. However, it is an unfair deal for the users because they have no say in establishing the terms. The benefits of the barter for the single individual are marginal while the tech company derives disproportional profits from it; it is a form of exploitation. If these networks would be decentralized and users could exercise control over their data; the relationship between the service provider and the customer could be more equal. One could agree on giving away some data in order to use services on the condition that – for example – Google shares a percentage of profit with them; an autonomous 'smart contract' goes into effect when the company profits[24] on that data which automatically triggers the transaction of some material reward to the user. This appears to be a valid claim; currently, tech giants make disproportionate profits by practically monopolizing parts of what is called the 'general intellect'[25] – a common good – and they are "appropriating the rent extracted from it" (Žižek 2012, p. 9). A popular demand – perhaps manifested in a binding CI-MDD – to dismantle these monopolies is not only morally justifiable, but also reasonable from an

23 The Panopticon is a circular prison building with an all-seeing watchtower in the middle in which the guards are not visible. Inmates are isolated from each other and they discipline themselves because of the constant possibility of being watched even when the tower is vacant (Foucault 1995, p. 200-201).

24 For example, sells it as a part of a user behavioral database or uses it for targeted marketing (O'Neil 2016,p. 68, 70).

25 In the Marxist school it means the collective knowledge produced by humankind arching through time and space (Virno 2007, p. 3-4).

economic and legal perspective. It depends on political will if these anti-competitive practices are going to be recognized as such and incorporated into the EU Competition Law.

Arguably, the development of bitcoin's blockchain was partially motivated by the intention to continue the liberating quest in which the Internet has failed. It was then further accelerated by the irresponsible behavior of trusted institutions prior to, during and in the aftermath of the 2008 financial collapse. The bailout of banks triggered public outrage all across the globe and citizens felt rightfully betrayed by their governments who failed to penalize those who gambled away life-time savings and pensions of others. Not surprisingly, this caused a global crisis of trust; cryptocurrencies – in fact – are manifestations of this radical shift from a "centralized trust model to one of decentralized trust" (Casey & Vigna 2018, p. 3). Popular demand has tremendously increased for the reconstruction of some core economic orthodoxies; most importantly, the *raison d'être* of trusted institutions is excessively questioned. In the universe of cryptocurrencies, one does not need banks or other financial intermediaries for the transaction or storage of value; trust is substituted for mathematical proof secured by advanced cryptography (Casey & Vigna 2018: 34; Nakatomo 2008: 1). By reducing barriers, this is already an unprecedented opportunity for the nearly two billion 'unbanked' people all around the globe who currently have no access to financial services (Larios-Hernández 2017, p. 872). This carries opportunities that have never been seen before, also in political life, through the potential inclusion of previously marginalized or even disenfranchised populations. Probably, the most crucial aspect in the intense competition between blockchain companies is the invention of best practice in the establishment of this proof-based trust in distributed P2P networks. Many cryptocurrency projects – those with the highest market capitalization – successfully convinced investors and traders to trust their ledgers; in December 2017, overall capitalization of the crypto market[26] reached half a trillion USD – more than the GDP of Poland (Brown 2017; World Bank 2017).

Drescher (2017) argues that the market is an inherently unreliable and untrustworthy environment in which distributed ledgers seek to create trust directly between peers as an alternative for existing trusted channels (p. 133). Similarly to the market, other networks – such as the society of a polity – could also be understood as structures in which the reliability and trustworthiness of the nodes is unknown. Peers in a democratic society – citizens, public institutions, businesses, civil organizations and several other stakeholders – are predominantly led by selfish motivations and should be regarded as fully rational players who wish to maximize output. While agents with low gravity – such as citizens and other non-state entities – are relatively easy to rein, selfish behavior of

26 The crypto market is led by bitcoin taking up around one third of value, dictating trends also in the market of altcoins; hundreds of other P2P payment projects competing the giant and each other for adoption and – ultimately – survival. For further information, see: coinmarketcap.com.

state bodies that enjoy the privilege of producing policy could be problematic. Stable and mature democratic states have the tendency to improve inflexible, alienated institutions that are heavily challenged in the management of social demands because they are often more occupied with competing with each other for funds and powers or to serve narrow interests (Altman 2011: 197; Bigo 2002: 63-64). Extended popular sovereignty could allow for the effective curbing of such behavior of certain privileged stakeholders; channeling popular demands into policy and restoring scattered trust in state institutions by the democratization of power. In post-Brexit Europe; a narrative to securitize this topic has seemingly emerged and a false disillusioning in direct democracy is exploited to discourage citizens from demanding more control by envisioning havoc. However, empirical evidence on micro to mezzo levels does not justify such fears; 150 years of Swiss semi-direct democracy has not proven to be disruptive, rather the previously modest country has emerged as one of the wealthiest in Europe (Ackerman 2017: 21; Altman 2011: 56). As Ackerman (2017) concludes: when direct democratic ballots are frequent and citizens "encounter new political issues and variety of ... ideas", that "renders protest unnecessary as a means of" thematizing the public agenda (p. 36).

3.1.3 - Legitimacy

Max Weber (1946) argues that domination needs to be validated; he refers to the successful outcome of this process as the establishment of a justified belief in the ruler: legitimacy (p. 79). David Beetham (1991) argues that the Weberian view on legitimacy as a belief is problematic as it insufficiently explains how power is perceived in contemporary societies and in what ways radical structural changes in political systems occur (p. 8-9). The more concentrated the allocation of power is within a given societal context, the more necessary it is for the powerful to verify their rule via the construction of a shared consent within existing power relations (Beetham 1991, p. 3, 99). This process is consuming tremendous efforts and resources in overly centralized political systems; the forces at work to establish legitimacy are drained away from actual governance. Arguably, this waste of potential and funds[27] could be reduced by focusing on the reformation within established power relationships rather than the justification of the actions of the ruler. The frequent application of CI-MDDs in a representative democracy appears to be an appropriate tool for this task. The formulation of policies is often expropriated by the 'notable' to serve private interest, and especially, some post-2008 economic policies – such as austerity measurements – are increasingly regarded in the public as illegitimate domination. When an overt intention has manifested into

27 The Hungarian government enjoys absolute majority in the parliament and solid support of the electorate. Nevertheless, in 2017, they spent 40 million EUR on a domestic communication campaign to justify their – otherwise popular – migration policy (Erdélyi 2018).

policies to compensate for the losses of neoliberal economic elites by extracting funds from ordinary tax payers, a crisis of legitimacy in the mainstreams of European politics has emerged. The impotence of the EU in the management of the 2015 migration crisis has worsened these adversities and loaded European right wing populists[28] with political capital. It is already casting dark shadows over the future of European regionalism as the rise and success of Eurosceptic politics demonstrates. Extended popular sovereignty could nurse considerably some of these societal grievances.

In most European states, a number of – usually one-hundred thousand – signatures must be collected for popular initiatives prior to constitutionality inspection; most of them are collected at stands erected in public places or by door-to-door campaigning. In *Demos* it would be possible to launch initiatives and collect digital signatures directly on the platform. Theoretically, this could allow for flooding the theater of direct democracy with large quantities of proposals to sabotage the process. Private interest groups that have lost their previous degree of influence due to the democratization of decision-making would most certainly attempt to derail the system in this way; claiming it inefficient and demand restoration. However; if at the first stage, a certain portion – for example a fifth – must be obtained in the traditional way, that could not only safeguard from such malice but could effectively prevent frivolous or unrealistic proposals from entering the platform. See Appendix B for a probable synopsis of the policy making process via *Demos* in 10 steps.

Another concern is that such a system would be dominated by populist policies. While this is a realistic fear, empirical evidence suggests that direct democracy is not more vulnerable to such disaffection than purely representative systems (Altman 2011: 31; Qvortrup 2017: 142). The "sudden and amazing success" of the 2014 Swiss anti mass immigration vote is often cited as evidence of the inherent populist nature of direct democracy; however, Steinberg (2016) argues that it was more connected to broader political trends – the rise of right wing politicians' populism – in contemporary Europe (p. 138). Furthermore, most citizens pay considerable amounts of taxes and they could comprehend that the budget is a zero-sum game and 'free beer' policies are not feasible. In 2016, the Swiss electorate overwhelmingly rejected a proposal of guaranteed basic income which planned to unconditionally grant 2500 CHF – a significant sum – for every adult citizen on a monthly basis (van Elm 2017, p. 1). Additionally, according to the Swiss experience, policies produced via CI-MDDs also tend to be more lasting (Steinberg 2016, p. 308). They "enjoy a large

28 Due to this impotence, Viktor Orbán by the erection of a single fence on Hungary's southern borders – a crude policy of no sophistication – has established himself as an influential European politician and greatly contributed to the future success of political populism all across Europe (Barigazzi 2017).

legitimacy that hardly anyone wants to immediately erode" including established parties and other representative institutions (Altman 2011, p. 47-48).

Another main concern of legitimacy is about participation. Could a policy created in a direct democratic manner be regarded legitimate when participation is low? This criticism is often voiced also in wider sense when representative democracies are discussed. Indeed, voter turnout in Europe does not suggest a genuinely active electorate. A study conducted in the 2000s in Europe found that voter turnout has a mean of 64.21% with a standard deviation of 12.45; in some of the EU regions not even one-third of the electorate is mobilized (Sundström & Stockemer 2015, p. 168). Not surprisingly, the authors found strong negative correlation between the untrustworthiness of political systems, delegates and the willingness to participate (Sundström & Stockemer 2015, p. 166). Additionally, low turnout could also be linked to a general apathy and disappointment in established parties which are becoming excessively alienated from the majority of citizens; they are increasingly considered elitist and hollow (Whitehead et al. 2017, p. 207). A persistent growth in income inequality only accelerated these dynamics within society while discontent builds up in those layers that are seemingly excluded from broader economic benefits and experience increasing hardships (Piketty 2015, p. 48-49). These include a growing sense of bleakness, the lack of calculable stability, unlikely permanent employment, depreciation of tertiary degrees, unlivable wages, marginalized worker unions, shrinking welfare services etc. All these factors are contributing to some extent to a feeling of powerlessness among the citizens, which negatively influences political participation. Furthermore, a Keynesian prophecy about better life-labor balance – he predicted a 15 hours working week by the end of the 20th century due to increased productivity allowed by technological advance – has never materialized and many jobs – especially in the service industry – are unfulfilling pseudo activities without meaningful output (Graeber 2018, p. 9). However, a modest but steady downward trend in working hours is observable in Europe and further decline is expected; moreover, Huberman & Minns (2007) suggests a recently occurring positive correlation with voter turnout especially in the Benelux states (p. 556). Furthermore, they argue that an obvious gap between the old continent and the "New World" has emerged; Europeans work significantly less in a global comparison partially due to the outcome of policy choices (Huberman & Minns 2007, p. 539). Nevertheless, it is still over 40 hours a week on average (Eurostat 2017). A popular demand for decreased working hours seems to be a valid claim and could contribute to a more fair allocation of free time which could allow for increased communal engagement in political life. While this might seem unrealistic to some; changes in norms could be surprisingly rapid. According to Finnemore & Sikking (1998) they emerge and travel rather fluidly; if they turn out to be successful in addressing some of the most crucial societal issues there is a high

likelihood for internalization (p. 891-892). Ongoing processes in the 4IR indicate that the need for human labor is decreasing in every sector; therefore, the further democratization of free time is expected and could be stimulated by appropriate policies.

3.2 - Practical Considerations

3.2.1 - Feasibility

Probably, the most valid feasibility concern is about restricted internet access. In a global context the lack of proper broadband connection is a very real problem. Populations residing territories that are cut off from the network suffer great disadvantages. However, this thesis is concerned with the mature democracies of Europe where more than four fifths of households have internet access – mostly broadband; fast and reliable – and electronic networked devices that can connect to it (Eurostat 2017). The share of EU citizens who have never used the internet – 15% of total adult population in 2017, typically among the most elderly – is rapidly decreasing (Eurostat 2017). Those who use it, do it rather frequently: 80% of them connect the Internet at least once a week. These figures hardly justify the fears about mass disenfranchisement due to connectivity issues; the level of internet coverage and usage in the EU seems to be sufficient. In tertiary education and in the private sector, online submission of one's work is the standard practice; few European citizens would claim that this barrier prevented them from studies or employment. Places without coverage are usually so remote, that paper voting also wouldn't be a likely option for the citizens who are located in these areas at the time of voting. However, providing internet access in previously uncovered areas is a routine job for internet service providers in the era of satellites and advanced wireless technologies[29]. The proliferation of free public wifi services in European cities demonstrates that the provision of internet as a public good is feasible. In 2015, the European Commission has announced the 'Digital Single Market' initiative in which they propose that by 2025 "all European households, rural or urban, should have access to connectivity offering a download speed of at least 100 Mbps - upgradeable to gigabit speed" (EC 2017, p. 69). Arguably, citizens' right to internet access in the digital age should be a norm; moreover, if political will is indeed present – especially if connectedness is increasingly coupled to the exercise of political rights – it should be included in the Charter of Fundamental Rights of the European Union.

29 An example: a Hungarian firm, HotSpotSystem specializes in providing affordable internet access in the most remote places – theoretically anywhere. Their customers include the US diplomatic mission in Iraq, public institutions of remote islands (e.g. schools), transportation companies that wish to connect their ever moving vehicles (ships, trucks, buses) to the net. For more information, see their website at hotspotsystem.com.

Another critique of the feasibility of extended use of up-to-date technology in public affairs assigns generally low tech skills to the average members of the electorate. While this is to a certain extent true; one's voluntary depth of knowledge about the underlying technology – that is, the individual mental partitioning of the tech – has often little impact on that person's ability to use it (Drescher 2017, p. 4). It is not only true for ICT but generally for all tech inventories and services; in this case only smart phones[30] are going to be discussed. One should distinguish between functional and non-functional aspects of a technology; the properties derived from them are clustered into the two 'mental layers' of application and implementation:

Table 3 - Example of mental layering of a smart phone		
Layer	Functional Aspects	Non-functional Aspects
Application	Taking photos Making phone calls Sending emails Browsing the internet Sending chat messages	The graphical interface is attractive Easy to use Operates fast
Implementation	Saving user data internally Making connection to the nearest mobile connector Accessing pixels in camera	Store data efficiently Saving energy Maintaining integrity Ensure user privacy

Source: Drescher 2017, p. 5

Any partition which goes beyond application is irrelevant for the average user and is sufficient to use it beneficially. One does not need to master encryption protocols and learn the science of wireless connectivity to pay his bills in a mobile banking application. Consequently, limited or no prior knowledge about blockchains and ledgers does not impede a citizen's ability to efficiently use the *Demos* platform. One's voluntary understanding of the scientific principles behind a certain tech is often misinterpreted in public debates and falsely connected to the wider utility and feasibility of complex systems. Drescher argues that such confusion could be effectively reduced by the legal standardization of how a technology is partitioned (2017, p. 4-5). In this case; what are those sufficient skills which are realistically expected from citizens to use a virtual political platform? Arguably, it does not require more than basic digital skills – ability to operate a regular smart phone (use the touch screen, navigate in the operational system, etc.) – and literacy which is over 99% in the EU (World Bank 2018). By adjusting to the industry standards of user experience, the ease of operation – this also includes assistance functions for those who live with disabilities – must be a

30 Demos would run on smart phones, tablets and personal computers. It is not necessary to separately analyze these three mediums; in the recent years, hand sized smart gadgets are built with similar hardware structures as regular computers which makes them operationally very similar.

major objective during the design and development of the *Demos* platform (Táborský & Vranić 2016, p. 759-760). This implies clarity in the arrangement of objects, easy navigation, straight-forward organization of functions etc. See Appendix A for a raw layout sketch for *Demos* and for more information about its functional operation.

3.2.2 - Efficiency

The simplification of user experience has been always a major driver of technological innovation. Smart homes and self-driving cars are probably the best manifestations of this evolution of automated user friendly technology. The compression of partitions is also a dominant trend; not only merging previously parted devices into one – such as multi-component PCs shrunk to single unit notebooks – but also reducing visible partitions within single devices – as the disappearance of physical keyboards from phones signals. It is not only true for hardware development; in software engineering, the new main objective is the incorporation of maximal number of functions and services in one single interface similarly to the Chinese WeChat[31] (Lien et al. 2017, p. 403-404). Moreover, innovations that are enabled by the rapidly advancing artificial intelligence and machine learning solutions are channeled into the process of developing "human-centric" software seeking "optimally harmonized performance" with the end-user (Fujita & Papadopoulos 2016, p. vi). Therefore, while the latest advances of 4IR are indeed enabled by exceedingly complex and difficult sciences, the ease of use of consumer tech is increasing at a rapid pace in every sector. No R&D is deliberately focused on producing operational difficulties; why should the deeper integration of technology into political life be any different?

Arguably, there is no reason that the use of *Demos* should be more difficult than – for example – online banking. Currently, more than half of the EU's adult population uses such services; the figure has doubled since 2007 and continues to increase as banks are deliberately driving customers out of physical branches to save on costs (Eurostat 2018). Few of them would claim that the difficulty of operation in online banking undermines its utility; rather, it has introduced comfort and flexibility into an industry which used to be associated with the lack of these properties. Similarly, when popular sovereignty is exercised at physical places, that implies inherent inconveniences compared to an online solution. Additionally, the existing bureaucratic processes to launch initiatives in most European states are rather lengthy and costly; therefore, most citizens are

31 WeChat or WeiXin (original name in China) is a multi-functional instant messenger application for smart phones in which social media functions, public administrative and financial services are integrated in a single interface (Lien et al. 2017 p. 403). However, by being centrally controlled by the Chinese state, it is inherently untrustworthy and fundamentally different from *Demos*.

discouraged of active participation. Furthermore, the realization of paper ballots is resource intensive: the United Kingdom's government declared that the non-campaign related[32] technical costs of the Brexit referendum were well over 1 million GBP (UK Electoral Commission 2016, p. 126). Producing paper based materials, erecting and staffing polling stations, collecting and analogously processing the votes, then evaluating them; all these require considerable funds and time – not to mention the possibility of human error and the security gaps in this practice. Blockchain technology could offer a solution to perform most of these stages of a ballot in a decentralized virtual space and evaluate them digitally for a friction of the cost of a paper-ballot without producing waste. The major element of the *Demos* platform's budget would be the technical maintenance and customer support.

When a bitcoin payment is made – in fact – nothing is really being transferred; the digital coin that exists in the virtual blockchain changes properties and the private key (an address of the user similar to an anonymous bank account number) of the recipient is stamped over the sender's key proving a change in ownership (Karame & Androulaki 2016, p. 33). *Demos* would work similarly; political interactions happen by 'transferring' cryptographic tokens. However; in this case, they do not represent value but votes. In this way, multiple votes cannot be cast; in a given initiative the platform grants only one non-delegable token for each member of the electorate. The 'zero-knowledge proof' algorithm utilized by the blockchain of Monero[33] – a privacy focused cryptocurrency project which claims to be untraceable[34] – could be well adopted in this network. Once a valid hash is created – a regular vote is cast – the algorithm hides the source, destination and the amount – the content of vote (yes/no) – by shuffling this information into a nonsense blend of 0s and 1s (Di Filippi & Wright 2018, p 49). Yet, a proof remains that the token indeed existed prior to the transfer and changed ownership complying to the strict protocols while the content remains; the amount – vote – is not lost or altered. Owing to this quality, Monero is the most popular cryptocurrency in the black markets of the Tornet for trade in illegal goods (Möser et al. 2018, p. 1). However, this property of the technology could also be used *bona fide* and could provide the necessary secrecy of a ballot. Probably the most remarkable innovation of bitcoin is that the 'miner' who solves a block gets rewarded with coins for finding a valid hash; therefore, it has introduced an economic incentive[35] for trustworthy behavior (De Filippi & Wright 2018: 25; Karame &

32 All together the costs exceeded 142 million GBP (UK Government 2016).

33 The white paper of Monero explains the working mechanisms of its algorithm. It could be accessed at: https://lab.getmonero.org/pubs/MRL-0001.pdf

34 There are some admitted flows in the nascent technology. However, development is intense and involves some of the best workshops for software engineering including the MIT and Princeton University (Möser et al. 2018, p 143).

35 As of June 22, 2018 block reward is 12,5bitcoin which equals cc. 80,000 (eighty thousand) USD. This sum is one-third higher than the annual median income of U.S. households (U.S. Census Bureau 2016).

Androulaki 2016: 45). In the context of *Demos*, a political incentive would be created; the more trustworthy nodes operate in the network, the less likely that manipulation could happen. Therefore, becoming a network operator which is fully enforcing the rules on the blockchain equals a form of political activism by safeguarding integrity. One could perform this task by merely running an application on a computer or smart phone. A form of economic incentive could also be created by offering tax discounts or other symbolic benefits for the most active network operators. For example, extra points at university applications or reductions in tuition fees could be granted to motivate youngsters – the most susceptible for new technology – for more active communal engagement and political participation.

3.2.3 - Security

In 2015, an estimated 75 billion USD were spent on cybersecurity globally; however, most of this spending turned out to be largely ineffective, in the same year roughly 400 billion USD were lost due to online fraud theft (Casey & Vigna 2018, p. 37). This failure is largely related to the centralized approaches utilized in most virtual systems. Another major factor is incompetence; in 2015, half of the worst cybersecurity breaches in the UK were caused in-house by 'inadvertent human error' (Arora 2018, p. 1). The current practice of paper-based ballots is exposed to both dangers; besides the risks derived from incorrect operation, there are rather huge security gaps inherent to centralized mechanisms. The process could be manipulated with relative ease by those who have physical access to it due to public function or fraud. According to the annual OSCE-ODIHR[36] report; in 2017, the main shortcomings in European ballots included the lack of confidence in electoral bodies, concerns of administrative accuracy and an insufficient commitment to ensure the exercise of political rights and the opportunity to vote (2018). Most of these problems could be effectively addressed by the proposed system of this thesis; the reduction of human agency and the decentralization of the electoral process could eliminate some existing monopolies of certain state bodies to access ballot materials or influence one's right to partake.

The universe of Internet and the cyberspace in general is characterized by paranoiac distrust. However, this strong negative association is more related to the approaches how humans use these technologies and less to the technology itself. No surprise that citizens are suspicious about EVMs; even if they would utilize the most trustworthy technologies – in reality, the choice of tech is often poor – these centrally allocated, state owned machines are insufficient by nature to establish trust in

36 The Office for Democratic Institutions and Human Rights belongs to the Organization of Security and Co-operation in Europe. The institution is the major observer of democratic elections in broader Europe (including the states of the post-Soviet space) and issues probably the most comprehensive reports in this field of research.

the secrecy of the ballot. E-voting in a centralized manner appears to be an inappropriate approach which is unnecessarily destructive for an otherwise potentially useful institution. When citizens could exercise political rights in the secrecy of their homes on a privately owned personal electronic device and the votes are processed in a decentralized distributed system co-operable by any member of the electorate; that is a completely different context for e-voting in which it may function in a more trustworthy manner.

There are some digital technologies already in use in public administration – such as the digital ID (DigiD[37]) in The Netherlands – which could aid identification in *Demos*. Near Field Communication (NFC) chip powered electronic ID cards are being adopted in a rapid pace in the EU; most regular smart phones are able to read these chips which could be used as an additional factor in verification (Benlamer et al. 2014: 38, Kilani & Jensen 2013: 95). Other eGov services (platforms for taxation, education, subsidies, health insurance, pension, etc.) could also move onto this single platform; it is not only more convenient for citizens but considerable costs could be saved by not maintaining multiple systems. Paying communal taxes or administrative fees could be realized by the integration of instant online banking solutions such as the Dutch iDeal[38] which is already incorporated in public networked interactions in The Netherlands. Additionally, more layers of security could be added for further protection from fraudulent behavior such as offline personal authentication applets[39], anti-bot filters, fingerprint and face recognition etc.

Recently, data privacy scandals involving some of the biggest global corporations have become rather frequent. While their benefits from data phishing[40] are manifold and tremendous profit is derived from it; the Cambridge Analytica scandal was extremely destructive for Facebook's reputation and budget (Kak 2018, p. 26). Based on the logics of the capitalist markets and competition; it is difficult to see how the currently dominant market player would survive on a long run without adjusted behavior. A market gap has opened in which trends may uplift a newcomer with a voiced adherence to higher moral standards and better protection of users' right for data privacy by offering them the monopole control over one's own data. Such dethronement could lead

37 For more information about the DigiD see: https://www.digid.nl/en/about-digid/

38 iDeal offers instant card-free online payments for account holders of major Dutch banks. For more information see: https://www.ideal.nl/en/

39 Both ends (the network and the user) set up a shared encryption key which defines the rules for generating a number (usually six digits) every minute. This runs in a separate application – does not require connectivity –, preferably (but not necessarily) on a separate device from which it needs to be copied into the platform's login screen once the username and password were given successfully. If there is no match, log in is denied (Lee et al. 2016, p. 652, 654-655).

40 It means the illegal gathering of sensitive data for economic benefits.

to a paradigm shift in the private sector which could positively contribute to the popular judgment about the trustworthiness of technology and its deeper applicability in political life.

3.3 - Limitation

The promotion of political reform – which implies the acknowledgment of systematic problems – carries considerable risks and safer topics – such as migration – promises more gains for the incumbent. Therefore, in the current European political milieu, it is unlikely that any government would regard such action beneficial; however, citizens could initiate demands for the democratization of power via the deeper integration of more trustworthy and reliable technology in political interactions that could allow for the efficient conduct of CI-MDDs. Blockchain networking is a novel technology with many nascent problems; some of them – such as the scaling problem – are rather serious issues that have not yet been adequately addressed. On the other hand, R&D – especially in private health-care and finance – is intensive and resource rich which suggests that problems related to the novelty could be overcome. Some of these issues are at the core of competition between the best software engineers in a quest for recognition, fame and probably self-fulfillment. Moreover, many of these IT professionals regard the engagement in this technology as a form of activism which could greatly contribute to the empowerment of significant groups of marginalized and disadvantaged people.

Alvarez et al. found that citizens trust more those technologies which they have already used before in given context; this is a major factor why newer solutions used in EVMs – such as touchscreens instead of buttoned devices – are welcomed with suspicion (p. 99). However, smart phones are widely used and most members of the electorate are familiar with its operation; moreover, most already trust this context to perform sensitive tasks comparable to voting such as banking and administration. On the other hand, the operation of the platform certainly requires promotion, and educational campaigns must be conducted. Issues of disenfranchisement due to connectivity and hardware malfunction could be effectively overcome by providing voting hotspots and a ballot time frame – for example, 48 hours – which should be sufficient to access another personal electronic device. Identification with existing digital ID solutions appears to be feasible. Digital literacy is already an integral part of educational strategies in Europe; if the exercise of political rights is going to be excessively coupled to these skills, their acquirement must be even more pronounced from an early age.

Evidently, there is no empirical experience present of this solution. *Demos* could be tested in micro scales in existing semi-direct democratic systems in a local level in Switzerland or introduced in states which are susceptible to political innovation such as The Netherlands or Estonia. Based on the evaluation of these experiences, implementation on superior levels of administration – ultimately on a supranational level of the EU – could be gradually tested and introduced. This would be feasible after conducting essential research and development by a prepared team of political scientists, policy professionals[41], software engineers, virtual network experts and legal staff.

Conclusion

The lack of recognition and acknowledgment of existing issues of European representative democracies and the EU, a limited political will to take the risks necessary to move the *status quo* comes with a high price. It directly translates into democratic deficits by increasing alienation within societies and decreasing trust in popular political systems. Therefore, experimenting with political innovation – especially in the midst of the 4IR in the digital age – appears to be a valid claim. This thesis offered a possible option: decentralized networked solution with a platform – the *Demos* – which could serve as a potential e-citizenship medium for extended direct democratic governance via citizen-initiated mechanisms that are complementary to existing representative structures. Furthermore, it could be updated as a universal electronic governance tool to merge multiple systems into this one single interface. It was demonstrated in what ways the extension of popular sovereignty by technological means could potentially address a deepening political crisis in post-2008 Europe while acknowledging the challenges derived from the nascent nature of blockchain technology and resistance of established political entities.

41 See Appendix C for a basic policy analysis comparing different political systems with digitalized interactions and without.

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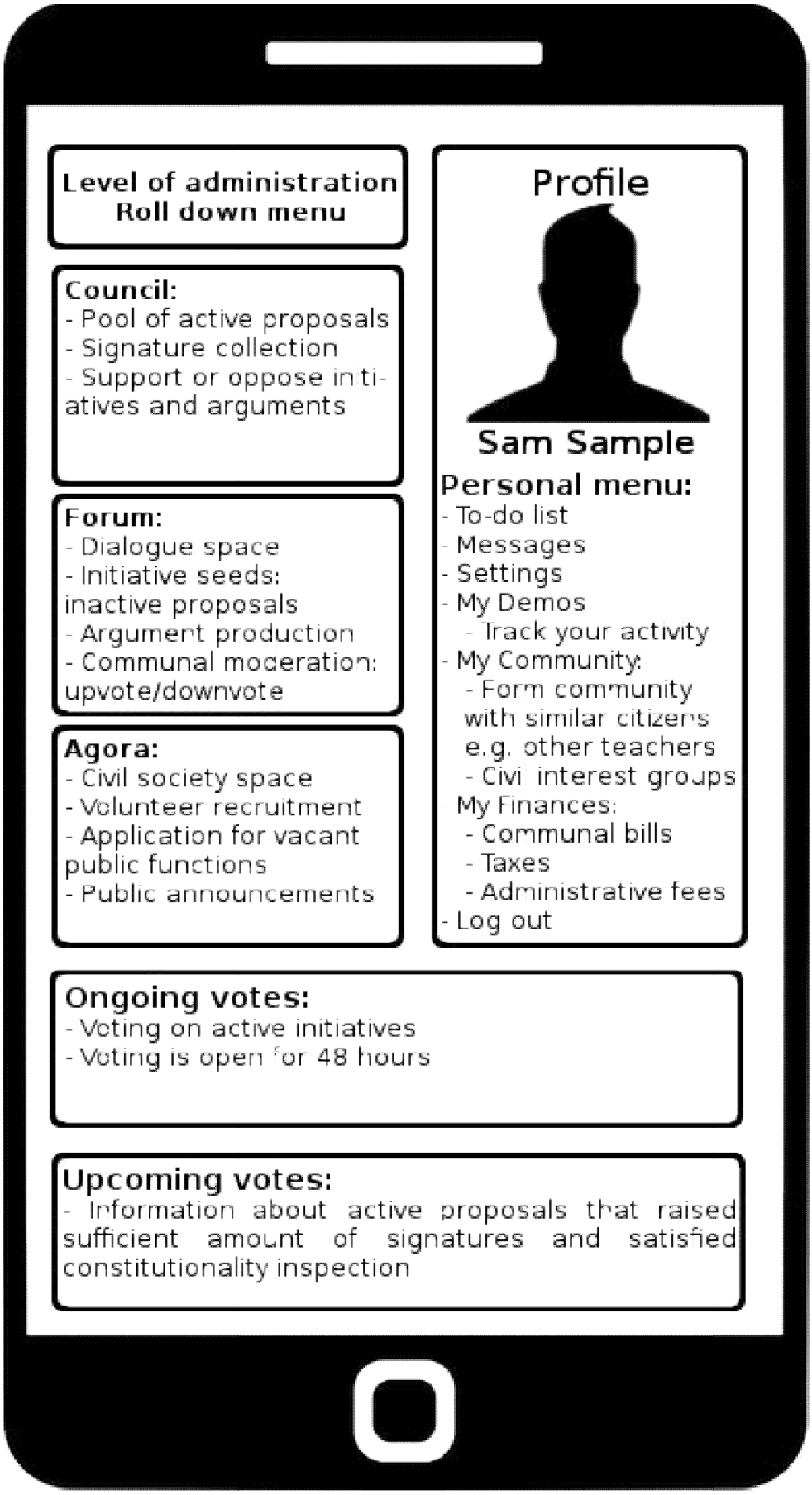
Appendix A - Layout sketch for *Demos*



Appendix B - 10 steps of CI-MDD in *Demos* from formulation to policy implementation:

Note: Certain numeric details are not fixed or specified due to the lack of empirical experience. Further research and experiments must be conducted to by trial and error find the best practice.

1. Formulation of problem; creation of an 'initiative seed'.

2. Testing the 'initiative seed' in the Forum by the collective production of arguments and counter-arguments.

3. Most popular seeds after collecting a certain amount of up-votes within a certain time interval become 'inactive proposals'. Most popular arguments and counter-arguments (probably 3-3 of them) also becomes static and fixed to the proposal.

4. First round of signature collection for 'inactive proposal' analogously (e.g. 20%).

5. An 'inactive proposal' becomes 'active proposal' if step 4 succeeds – verified by established electoral authority – and enters the Council.

6. 'Active proposals' could be digitally signed if one supports; it is possible to oppose proposal but support argument and *vice versa* similarly to the Swiss model (See: Sciarini, P. (2017). *Direct Democracy in Switzerland: The Growing Tension Between Domestic and Foreign Policy.* In Ruth, S. P., Welp, Y. & Whitehead, L. (Ed.), Let the People Rule? 169-187. Colchester: ECPR Press. p. 178-179)

7. If sufficient signatures and constitutionality via juridical inspection is met proposal enters the pool of upcoming votes.

8. After sufficient time is granted for citizen for preparation and social dialogue the vote goes live.

9. Initiative is rejected or confirmed in a majoritarian manner (50%+1). Confirmed initiatives become binding if participation (not yet specified, common practice is 50%+1) is sufficient.

10. Successfully confirmed initiatives are transferred for legislation and implementation by the government.

Appendix C – Criteria/Alternatives Matrix[42] Analysis for ways of exercising popular sovereignty

Note: This analysis is raw and by its nature subjective, and should be considered as a loose guideline for further research.

Criteria	Alternatives		
	Semi-direct democracy, Decentralized, Digital[43]	Semi-direct democracy, Centralized, Analogue[44]	Purely representative, Centralized, Analogue[45]
Responsiveness	Best (3)	Best (3)	Poor (1)
Efficiency	Best (3)	Moderate (2)	Poor (1)
Equality	Best (3)	Moderate (2)	Poor (1)
Feasibility	Moderate (2)	Best (3)	Best (3)
Security	Best (3)	Poor (1)	Poor (1)
Cost	Least (3)	Most (1)	Moderate (2)

Responsiveness: Pure representative systems respond poorly to popular demands. Semi-direct democracies are faring much better in this task; however, analogue approach makes it slow.

Efficiency: Analogue approaches take considerably more effort to produce the desired outcomes.

Equality: Analogue and centralized approaches offer many possibilities to exclude members of the electorate from the democratic process.

Feasibility: Centralized analogue approaches are practiced for centuries while the solution proposed in this thesis have no empirical experience.

Security: Centralized approaches are extremely vulnerable to manipulation. Analogue processing is exposed to the very possibility of human error.

Cost: A digital non-physical approach without the need to maintain central apparatuses is clearly less costly both in material and temporal terms.

[42]Guidelines for CAM Analysis is acquired from: Munger, M. C. (2000) *Analyzing Policy: Choices, Conflicts and Practice.* New York: W.W. Norton.

[43]Such as the system proposed in this thesis served by *Demos.*

[44]For example: the political system of Switzerland.

[45]Most common practice in European states. Popular sovereignty is restricted to elections; paper based ballots at polling stations. EVMs are not considered based on the problems discussed earlier in this thesis about their centralized nature and insufficient secrecy, trust and security derived from it.

Evaluation:

- Semi-direct democracy, Decentralized, Digital: 3+3+3+2+3+3=**17**
- Semi-direct democracy, Centralized, Analogue: 3+2+2+3+1+1=**12**
- Pure representative, Centralized, Analogue: 1+1+1+3+1+2=**9**

It is suggested by this analysis that the exercise of popular sovereignty with low frequency – how it is currently practiced in most states of Europe – is most probably a significantly poorer approach from a civilian point of view then semi-direct democratic solutions. Furthermore, it suggests that existing semi-democratic political systems could considerably benefit from decentralization and extended digitalization of political interactions. A centralized and analogue approach in ballot voting is risky and poor performing enough which would justify experiments with solutions that better fit the needs and possibilities in the digital age.