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What is the impact of Information Systems on democracy promotion and the role in decision-making process

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Dissertation presented as partial requirement for obtaining the Master's degree in Statistics and Information Management

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by

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Dissertation presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization with a specialization in Information Systems and Technologies Management

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ABSTRACT

This study aims to contribute to a better understanding of modern democracy and how democracy can be shaped by information systems solutions. We discuss the role of information systems and social media in democratic activities and how information systems can be a part of core democratic processes and contribute to finding solutions for some of the problems democracies face today. The main question being: how is democracy fostered by the introduction of information systems and the existing information systems platforms today?

Several common problems of democracies will be identified, analyzed and paired with relevant information systems platforms or solutions resulting in a conceptual framework that nations can use to improve their democratic processes. Areas identified as relevant for the study are direct democracy using existing technological solutions, collaborative democracy, which would allow citizens to increase participation in the creation of laws, the allocation of budgets and online voting. Although it might not be possible to provide an exhaustive listing of all existing solution, due to the rapidly evolving nature of the information systems field, several existing solutions already provide interesting opportunities for the improvement of current democratic processes and if there was a wider adoption of these technologies it would improve the participation of citizens and reduce the increasing percentage of alienated citizens that abstain from taking part in the democratic process of their countries.

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1. INTRODUCTION

Today, information systems are supporting modern decision-making processes (James A. O'Brien, 2003; Kroenke, 2008), connecting people with the information they need and having a strong impact on society as a whole (Hayes & Sharma, 2003; Polack, 2009; Tucker et al., 2003). Information systems play an important role in democracy and how democracy can be implemented in a modern society. New social concepts such as E-Government and E-Democracy (Jafarkarimi, Sim, Saadatdoost, & Hee, 2014) have emerged from the desire for fairer and transparent governments. There is a wish for more direct democracy and ease of access for all in a more common language (Pia Mancini, 2014). Information systems are trying to simplify the decision-making process by given easier and faster access to the information to those who make decisions and those that want to be part of the decisions.

The aim of this study is to contribute to a better understanding of modern democracy and how democracy can be shaped by information systems. We discuss the role of information systems in democratic activities and how they can be a part of the democratic processes and contribute to find solutions for some of the problems democracies face today. The main question to be answered: How is democracy fostered by the introduction of information systems and the existing platforms today? To achieve this, there are two objectives to be answered, first 1) Which are the democratic problems that can be solved by information systems? and second 2) How and under which conditions are the information systems encouraging participation of the people in a democracy?

Common problems of democracies will be identified, analyzed and paired with relevant information systems, platforms or solutions resulting in a conceptual framework by using the Design Science Research (DSR) (Hevner et al., 2004; Vaishavi et al., n.d.) approach as the research method. Although it might not be possible to provide an exhaustive listing of all existing solution, due to the rapidly evolving nature of the information systems field, several existing solutions already provide interesting opportunities for the improvement of current democratic processes and if there was a wider adoption of these technologies it would improve the participation of citizens.

In more detail, some of the most common problems of democracy are lack of trust and participation due to the major problem of corruption. The imperfection of the current political systems is obvious, and people are not represented as they will want. This doesn't motivate people to participate in such unfair political system and makes them wish for a more direct and fair democracy. The introduction of IS technologies and the internet gave solutions to the above problems and made governments more trustworthy and efficient by providing security, trust and access for people to participate and be part of the decision-making process.

The Design Science Research (DSR) approach has been selected as the research method to discover and identify problems relevant to democracy and pair them with the relevant information system technologies or platforms, resulting in a new or improved conceptual framework. The framework with be evaluated through interviews with experts using semi-structured questions, there will be 9 experts interviewed for 60 minutes. The main goal of these interviews is to investigate a range of different opinions and views to help validate the proposed framework and to enable a deeper understanding of the main research question.

1.1. STRUCTURE OF THIS THESIS

This work is separated into the following chapters:

- Chapter 2 - Literature Review: This chapter presents the analytic literature review established awareness of the problem for the concept of democracy, information systems and the technologies that can serve democracy directly. Several common problems of democracies and information systems solutions were identified and analyzed.
- Chapter 3 - Methodology: This chapter describes Design Science Research (DSR) which is the research paradigm used for this study. It is examining different research process in DSR for choosing the suitable one for this study. A detailed explanation on the improved research process that is tailored to this study is presented.
- Chapter 4 - Conceptual Framework: This chapter demonstrates how the development and evaluation of the conceptual solutions took place. It presents the solution for solving the problem identified.
- Chapter 5 - Research findings: This chapter presents the summery of the findings for this research study and evaluation according the experts opinion. Is divided into three sections, in the first section an overview of the conceptual solutions is presented and followed by a discussion concerning the theoretical contribution of this research. It comes from a complete perspective by presenting the main finding and outcome of this study.
- Chapter 6 - Conclusion: This chapter is the conclusion of this research study and it started with an explanation of the fulfilment of the research objectives. Next, the recommendations for further research.

2. LITERATURE REVIEW

2.1. DEMOCRACY

Democracy is a political system of government where power comes from the people. The term comes from the Greek word "Demokratia", that it is a composite word from Demos that means "people" and Kratos that means "rules". It was first used in the 5th century BC by the Athenians. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017) In a modern approach, democracy is a political system of government where people express power directly or elect representatives through the process of voting to form a governmental body or a parliament which will make decisions for the good of all (Stevenson, 2003). Democracy should be practiced by the people and serve their interests (Stephen D. Tansey, 1995).

2.1.1. Historical evolution of Democracy

2.1.1.1. Antiquity

2.1.1.1.1 Classical Greece

Around 700 BC Sparta was already using a form of direct democracy. Their political institutions consisted of two kings, the gerousia, the apella and the ephors. The apella was the Spartan assembly, their most democratic element, where decisions were made by voting and shouting. In the second half of the 7th century BC after the revolt of the helots in Sparta, Lycurgus established the first written constitution of the world in order to avoid future revolts from the helots. In Sparta, even women had rights. (Cartledge, 2001; Pomeroy & Rogers D. Spotswood Collection., 1999; Terry Buckley, 2010; The Editors of Encyclopædia Britannica, 2016) Their political systems it is classified as an oligarchy, although it had several democratic characteristics. (Kurt A. Raaflaub, Josiah Ober, Robert Wallace, Paul Cartledge, 2007; Terry Buckley, 2010)

One of the first lawmaker and statesman of Athens was Solon in 638 – 558 BC. In 594 BC he gave to the Athenians their first code of law which defined the composition and functions of governmental bodies. (Dunn, 1994; Kurt A. Raaflaub, Josiah Ober, Robert Wallace, Paul Cartledge, 2007; Lynn Hunt, Thomas R. Martin, Bonnie G. Smith, Barbara H. Rosenwein, 2008; Robinson, 1997; Theodore John Cadoux, 2017)

The term "democracy" was first introduced by Cleisthenes in 508 – 507 BC when the first democracy was established by the city-state of Athens during the classical antiquity in ancient Greece. He was the one that introduced the principle of equality for all, the "isonomia". (Russell Meiggs, 2015) Athenians developed a system of popular rule. Although the Athenian democracy was a form of direct democracy it excluded a large part of the population, as women, slaves, foreigners, and non-landowners were not allowed to vote. (Grinin, 2004; Lape, 2009) The main institution of the government was the Assembly "Ekklesia" where decisions were made by vote using the rise of hands and the majority of votes prevailed, as in the later democratic systems. The power of Assembly was limited and the agenda and topic for discussion were set by the Council of Five Hundred, which was composed of representatives chosen by a lottery. The number of representatives was specified according to the population of each of the 139 demes, small territorial entities that were created by Cleisthenes.

Ephialtes and Pericles expanded the work of Cleisthenes and distinguished themselves as great democratic leaders. (Kurt A. Raaflaub, Josiah Ober, Robert Wallace, Paul Cartledge, 2007; Ober, 2008) Pericles described the Athenian democracy as "the school of Hellas", he said "All we are equal in front of the laws, no matter where we are coming from or our economic level. Everybody can serve the state and the freedom we enjoy in our government, we enjoy it also in our ordinary life." (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

The Greek philosopher Socrates was the first to think about the relation and position of an individual in the community, he was the one to lay the foundation for political theory and philosophy. This theory was continued by his student Plato and later Plato's student Aristotle. Aristotle one century later discussed democracy and compared it with other constitutions. He identifies three types of perfect constitutions, each of them having a perfect and perverse form. Moreover, "rule by one" is monarchy in its perfect form and tyranny in its perverse form, "rule by the few" is aristocracy in its perfect form and oligarchy in its perverse form and "rule by the many" is "polity" in its perfect form and democracy in its perverse form. He proposed that democracy and liberty are connected in his observation that "the basis of a democratic state is liberty", citizens are free to take part and participated in the decision process of their government. (Dahl, 1991; Gross & Dahl, 1957; Pettinger, 2013; Robert A. Dahl, 2017)

2.1.1.1.2 The Roman Republic

About the same time, in the city-state of Rome in Italy another political system of government appeared, the Romans named their system Republic, the term comes from the Latin "res" that means thing or affair and the "public" that means public. In other words, a republic is a thing that belongs to the citizen of Rome, the "populus Romanus". The Roman assemblies were meeting in the Forum at the city center. As the Roman Republic grew rapidly, the Romans create a very complex political structure that consisted of a powerful Senate plus four assemblies, the comitia ("assembly") or Concilium ("council"). In the Assemblies all the decisions were taken by voting units, the majority of units prevailed the voting. The powerful Senate was composed of senators selected by the Comitia Centuriata from the aristocracy during the monarchy and during the republic also from certain "plebeian" families. About six centuries after the collapsed of Roman Empire in the north of Italy several city-states, such as Venice, Pisa, Siena, and Florence had governments which may be described as small scale precursors of representative systems. (Dahl, 1991; Gross & Dahl, 1957; Pettinger, 2013; Robert A. Dahl, 2017)

The Greek and Romans philosophers inspired political thinkers over centuries, but they were focused on the small scale of the city-state, so it was not easy for the later creators of democratic governments in northern Europe and North America to adopt these systems. The fundamental dilemma of the huge difference in the size between the city-state and a nation-state led us to the representative government, which first appeared in northern Europe in the 18th century. (Dahl, 1991; Gross & Dahl, 1957; Pettinger, 2013; Robert A. Dahl, 2017)

Until the 17th century there were few countries that implemented democratic policies, however, there were some exceptions such as the Vikings in Scandinavia and the Swiss in the Alps. The Swiss Confederation was founded in the 13th century and the Vikings created by 930 the Althing, the first example of today's parliament or national assembly. (Dahl, 1991; Gross & Dahl, 1957; Pettinger, 2013; Robert A. Dahl, 2017) The freemen and nobles of these areas were organized in local

assemblies and participated directly. Later these assemblies became nations-state assemblies consisting of representatives that were elected by voting.

2.1.1.2. 17th to 19th Century

2.1.1.2.1 England

Another important milestone in the history of democracy was the creating of the English Parliament during the Middle Ages. The initial purpose of the Parliament was to discuss and fix grievances as a judicial function. Through the years it got involved in more important matters of the state and became part of the decision process of the state. By the end of 15th century, the political systems started displaying some of the characteristics of the modern parliamentary government such as the creation and establishment of laws required approval from the houses of Parliament and the monarch. But still the British government cannot be characterized as a democratic system because not all of the male population could suffrage until the acts of 1832, 1867 and 1884, and only the act of 1928 allowed for all adult women to participate in the suffrage. (Dahl, 1991; Gross & Dahl, 1957; Pettinger, 2013; Robert A. Dahl, 2017)

In the same period, the English philosopher John Locke adopted the classification of democracy by Aristoteles in his Second Treatise of Civil Government. He was a big supporter of political equality, majority rule, democracy and individual liberty. He was the one that first talked about equality of man and put forward the idea of a "social contract" that later influenced political theorists such as Jean-Jacques Rousseau in his work "The Social contract" (1762). (Dahl, 1991; Gross & Dahl, 1957; Hirschmann, 2009; Korab-Karpowicz, 2010; Robert A. Dahl, 2017; Sharma, Urmila & Sharma, 2006) The idea of majority rule and the consent of the governed started by Locke influenced the later democratic theorists and became the foundation for all later theories of democracy. He believed that these ideas are totally connected and that for a government to be legitimate it must enjoy the consent of the governed and the consent must be obtained through the majority rule. (Dahl, 1991; Gross & Dahl, 1957; Hirschmann, 2009; Korab-Karpowicz, 2010; Robert A. Dahl, 2017; Sharma, Urmila & Sharma, 2006)

Locke separated the various form of government according to where the people choose to place the power to make laws. His forms were the following: if people have the legislative power themselves and the power to nominate those who execute the laws then it "is a perfect democracy". If the power is in the hand of a few then it is an oligarchy and at last, if the power is on the hand of one, then it is a monarchy. For all governments, the main source of power is the people and the people have the right to replace the government if the current government violates the people's rights and abuses its trust. Locke was quite revolutionary for his time, he introduced the right of revolution against a despotic government, although he was not using the term. The government according to Locke needs representatives chosen by the people and that the rule of the majority is been implemented in the parliament by election. (Dahl, 1991; Gross & Dahl, 1957; Hirschmann, 2009; Korab-Karpowicz, 2010; Robert A. Dahl, 2017; Sharma, Urmila & Sharma, 2006)

The English philosopher, scientist and historian Thomas Hobbes reject Aristotle's politic theory that the humans naturally should live in cities and exercise their role of citizen. He believed that by nature humans are unsuitable for political life. Humans like to compete and act on their own self-interests and they cannot control the aggression and anarchy that come with it. He believed that social order can come only if humans stop thinking about themselves and delegate the power of

judgment to someone else, the sovereign. For Hobbes, the social contract means the exchange of liberty for safety and that the sovereign is not part of that social contract, but people choose to follow him because he promises their safety. For him the "law of nature" is the moral system that binds everyone together for safety inside the state. (Tom Sorell, 2017)

2.1.1.2.2 United States

The first development of a representative government joined with democracy appeared in the British colonies of North America, leading to the establishment of the United States of America. The long distance from Britain meant autonomy for the colonies and led to the emergence of colonial legislatures with elected representatives and governors assigned by the King. Plus, the belief in fundamental human rights and that the colonists should not pay taxes to a government in which they were not represented. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

The Americans started creating the American identity after 1765 when Britain imposed direct taxes thought the Stamp Act (1765). After starting a war with Britain in 1775 and the Declaration of Independence in 1776, the Americans created a confederacy of states under the Articles of the Confederation in 1781-89 and a federal government under the Constitution of 1789. Because of the large size of the new country and population, the delegates decided that they could govern only by electing representatives. Very soon the need emerged to create political parties to organize the members of Congress and the electorate. Political parties would provide representatives to compete in elections for states, national offices, and local communities. Some of the local associations had the form of direct assembly like the Athenians. By the end of 19th-century political parties became one of the most important element of a democracy for a healthy and competitive government. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

At that time, it was not clear the name of the new representative political system and the terms republic and democracy been used interchangeably. James Madison in the Federalist 10, one of the 85 essays known as the Federalist papers, defined that democracy is for the small-scale and for being applied directly, and that republic is for the larger scale and meant for representative government. In November 1787, James Wilson defined a new classification for the two terms. He said that there are three forms of governments: The monarchy where the power is in one person, the aristocracy where a group of loyal govern and at last the democracy that the power comes from the people that are being represented or the govern directly.

The French political scientist Alexis de Tocqueville characterized the American political system as the first representative democracy of the world in his four-volume study Democracy in America (1835-40). (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017; Seymour Drescher, 2017)

Another theorist of Democracy that played a key factor in the evolution of Democracy and influenced many of the founders of America was the French political theorist and philosopher Montesquieu with his very important work on the theory of politics The Spirit of the Laws (1748). (Charles de Secondat baron de Montesquieu, 1793) For Montesquieu, the classification of Aristotle's was not correct. He defines three perfect forms of government, a monarchy where one person governs by specific laws, despotism where one person governs by his own will, and at last the republic that can be a democracy or aristocracy dependent on where the power is centralized in a body or a specific number of people. He believed that for a republic government, either a democracy

or aristocracy, to exist, the people that govern must be driven by the public good and act in the public interest, "public virtue". (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

Moreover, the work of the Scottish philosopher and historian David Hume influenced Madison, he also strongly believed that the factions have a big power for destruction. Hume and Madison believed that it is better to govern in a nation-state and that the bigger an association is, the better because the representatives have more diverse interests, that is why Madison in the Federalist 10 used the term republic and not democracy to describe the representative government. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

2.1.1.2.3 Rest of the Word

In Sweden, during the Age of Liberty, the power of the state moved from the monarch to the parliament, where people who paid taxes were represented although their power was limited, plus the people that didn't pay taxes did not have the right to vote. In 1755 the Corsican Constitution gave the right to vote to women and all men above 25 years old. (The National Archives, n.d.-b, n.d.-a)

Jean-Jacques Rousseau a more radical democrat than Locke, in his most important and influential work "The Social contract" (1762) stated that a democracy is not compatible with representatives and that the moment people allow themselves to be represented, they are no longer free. Rousseau was a strong supporter of direct democracy and believed that if a political association is not small enough to practice direct democracy then they will be replaced by a nation-state association and as a result will stop been democratic. On the other hand, in a footnote on the Book III chapter 15, he wrote that democratic governments can be stronger and viable when they join all together in confederations. He was one of the main democratic theorists that influenced the French Revolution, but he never solved the problem of size or scale of democracy. (Dahl, 1991; Gross & Dahl, 1957; Pettinger, 2013; Robert A. Dahl, 2017)

The French Revolution in 1789 adopted the Declaration of the Rights of Man and of the Citizen on 26 August 1789, according to the declaration, men are born free and equal in rights. The historians characterize it as one of the most important events in human history. The monarchy was replaced by the establishment of a republic and after many violent periods led to a dictatorship under Napoleon. (Fehér, 1990; Frey & Frey, 2004; Gregory, 1985; Livesey, 2001; Palmer & Colton, 1978) Furthermore, the February Revolution of 1848 led to the creation of the French Second Republic which established universal male suffrage. (Albert Guérard, 1969; Johnston, 2008)

Another important thinker of his time, John Stuart Mill, the son of James Mill, in his work "On Liberty" (1859) argued that for practical reasons the individual freedom cannot be legitimately infringed upon by the society, government or individuals unless the actions of individual's harms others. In his book *Considerations on Representative Government* (1861) said that the perfect type of government is both democracy and representative government. Also, he puts forward the foundations of some of the basic rights and freedoms in modern democracy, such as freedom of collaboration or association and was one of the first to strongly argued for women suffrage. At last, he argued for the freedom of speech and he mentioned the importance of discussion and difference of opinions. He supported that the different arguments in a discussion is an important part of any society that looks for the truth. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

John Dewey, an American philosopher, contended that Democracy is the most ideal and desirable form of a government because it gives people the right space and freedom to express ideas and exchange opinions with each other's, they are free to choose for themselves. Plus, they have the freedom of collaboration for common goals or to solve common problems in a spirit of respect and good will, as he notes in Democracy and Education (1916). Moreover, people should be free to criticize and try to improve the political system for the public interested. They should not think of the democratic political systems as perfect and unchangeable institutions. He believed that education is playing a very important role in the creation of those ideas, that must be learned from a young age. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

John Rawls was one of the leading supporters of modern democratic state. In his work "A theory of Justice" (1971), he supported a democratic liberty political system based on equality, fairness, and rights. He argued that everyone needed to have equal opportunities in social goods, power, wealth, status or positions, thus everyone must have the same levels of liberty and at last the distribution of wealth in society must be such that everyone lives better than in other distributions. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

Suffrage began to be an important part of the representative system and the requirements for voting became less. In the 19th century in the United States the requirement of property to vote was finally removed. In 1893 New Zealand was the first country to give women the right to vote, by the middle of the 20th century almost all democratic countries gave full suffrage to women and other political rights. Although, not all citizens had yet the right to vote, in United Stated the African Americans claimed the right of voting in the Civil Rights Act of 1964. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

2.1.1.3. 20th and 21st Century

Most of the countries during the 20th and 21st century adopted the representative democracy as their political system of government. The rapid expansion of democracy became possible because of the significant failure of nondemocratic systems. In addition, with the market economies expanding and the levels of high education increasing because of the growth of the middle-class, the demands for more and further democratization increased rapidly. The economic well-being helped democracy to establish itself as a part of the modern culture and society, and today democratic values and beliefs are shared globally. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017) The introduction of new technologies changed the political environment and allowed news and ideas to go viral in minutes, a typical example of this is the Arab Spring that showed how the social media can empower people, for good or bad. There are political events and movements such as the Arabic spring and the Occupy Movement that shows the continuous capacity of the ideas of democracy to influence the political action and the masses. (Cudd & Scholz, n.d.)

The Russian-British social and political theorist Isaiah Berlin supported that Rousseau's relation and the idea of freedom by following the General Will allowed despotic leaders to oppress the public in the name of freedom, and Rousseau became "one of the biggest enemies of liberty in the whole history of human thought." (Archard, 2005; Damrosch, 2007; George Crowder, 2003; Riley, n.d.)

An analysis by the Freedom House funded by the U.S. Government shows that until 1900 there was not a single democracy with universal suffrage and that by the year 2000 62% of the world's nations

were a democracy, that is 120 of all 192 existing nations. Moreover, in 1900, the 13% of the nations had "restricted democratic practices" and by 2000 only the 8% of the world's nations still do. (Aghekyan, Dunham, Repucci, & Tucker, n.d.; Francis Fukuyama, 2004) Different countries have different forms of democratic institutions, the choice of institutions depends on the historical experience and specific conditions, such as the ethnic and religious composition of the population and other characteristics of the country. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

2.1.2. Characteristics of Democracy

Aristotle helped to identify and understand the basic characteristics of the existing democratic government with his classifications about an Ideal or perfect democracy. However, the ideal democracy is only used to identify essential features of a system, as the real world is much more complicated than the ideal. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017)

The basic characteristics of a perfect democracy are:

- Political freedom and freedom of speech, citizens should be free to express themselves publicly without fear of punishment on relevant political subjects. They should be able to criticize and judge the political decisions and the democratic process.
- The right to be informed, to gather information from political independent sources that are not under the control of the government or any other group. The right to publish information and to be protected by law and the right to use that information.
- Free and fair elections that require full and effective participation in voting and society. All the citizens have the right to participate on equal footing with others.
- All citizens have equal say in law-making and their votes should be counted as equal.
- Legal equality, all the citizens are equal before the law and have access to the legislative process and political collectivism.
- The rule of law and the rule of the majority although many argue that democracy allows the political minorities to be absorbed by the "tyranny of the majority".
- The freedom of association where citizens have the right to participate and to create independent political organizations, such as parties and groups of their interest.
- The right to represent and to be represented where decisions are being made and the people that make those decisions are accountable to the electorate for their actions.

There are several freedom indices from many organization that can be used to measure democracy, such as The Freedom in the World from the U.S. Freedom House that has been published since 1972 every year. It ranks countries by political rights that are been measured by the Universal Declaration of Human Rights. (Aghekyan et al., n.d.) The *Democracy Index* from the U.K Economist Intelligence Unit rates the democracy of countries and separates them into five different categories. (CIRI Human Rights Data Project, 2013) The *Index of Freedom in the World* from Canada's Fraser Institute, Germany's Liberals Institute, and the U.S. Cato Institute, is an index measuring classical civil liberties. (Ryan Craggs, 2013) At last, the *Worldwide Press Freedom Index* from France Reporters Without Borders, which is published every year since 2002 and measures the democratic condition of each country. (Reporters Without Borders, 2017)

2.1.3. Challenges and Problems of Democracy

Perhaps one of the biggest challenges that democracy faces is that most of the people are not able to participate in government in a competent or meaningful way because they do not have the necessary experience, intelligence or knowledge. (Dahl, 1991; Gross & Dahl, 1957; Robert A. Dahl, 2017) Democracy is not a perfect system and has been criticised for being flawed economically, politically, morally and found to be unrealistic by many authors. There are several factors that influenced democracy such as, the introduction and the use of social media and technology to express, make known and expand political events and global movements, the influence of Big money and democratic capitalism. As a result, people seem to be more dissatisfied with the democratic process and the political parties while the participation of voting has decreased, and the political polarization increased. (Cudd & Scholz, n.d.; Gustaf Arrhenius, 2011; M. S. Perry, 2015)

Political philosophers, such as the Levi-Strauss with his idea of Democracy as a Social Myth and Richard de George in the book Philosophical Perspectives on Democracy in the 21st Century that employs the idea of Democracy as a Social Myth, are sceptical and argue the relationship between the practical and theoretical democracy, by giving a warning about parochialism. (Cudd & Scholz, n.d.) Furthermore, scholars are arguing and criticizing the Judicial constitutions and its compatibility with democracy (Cudd & Scholz, n.d.; Lynn Hunt, Thomas R. Martin, Bonnie G. Smith, Barbara H. Rosenwein, 2008) and rights in addition with the value of democracy. (Cudd & Scholz, n.d.) According to Corey Brettschneider and Emily Gill, a government of a state can be characterize as fully democratic, not only when it protects the rights of freedom, conscience, association, and expression but also when it promotes and underlie the rights amongst civil society and the value of self-government. It is not what organizations believe but how they act. (Cudd & Scholz, n.d.; Gustaf Arrhenius, 2011)

Globalisation and open markets foster the social and economic inequality, debates between the multinational companies and the government seems to be in favor of the first, by ignoring basic human and social rights. The influence of the big money can distort democracy in many ways such as, the manipulation of the electoral processes and the undermining of the conditions that are mandatory for true democracy. (Cudd & Scholz, n.d.) Brighouse said that capitalism is completely incompatible with the political equality today and that the current situation can be changed only with a big and massive redistribution of wealth. (Carter & Stokes, 2002; M. S. Perry, 2015)

The economist Bryan Caplan characterized democracy as an inefficient system because most of the people that vote do not have correct and sufficient information to make informed and balanced decisions. Most of the voters make decisions without having a complete point of view on serious issues that they are been called to vote on. He supports his argument with the fact that the cost of knowing is higher than not knowing. (Caplan, 2005) Furthermore, some economists, such as Meltzer and Richard, believe that the democratic systems are inefficient because of lack of participation, in other words, the decisions are been made by the few and many are unsatisfied. (Meltzer & Richard, 1981) Studies have shown that young people under 35 have been noted for their lack of political interest and activity. (McNitt, 2008; PUBLIC & FOR, 2011) The American judge Louis Brandeis said that we can have democracy or wealth in the hand of few, but never both. (ASchumpeter, 2003) The people that have greater wealth usually use them to influence the political system for their own interest, as a result, there is political inequality, plus inequality in the distribution of wealth in the

society. (Bohman, 1999; Cohen, 2003; Dahl, 1991; Gross & Dahl, 1957; Gustaf Arrhenius, 2011; Lijphart, 1999; McNitt, 2008; Merriam Webster, n.d.; Pia Mancini, 2014; PUBLIC & FOR, 2011; Robert A. Dahl, 2017)

Another challenge democracy is facing today is the fair and equal distribution of influence, not all voices are being heard and people don't have equal rights to access democracy. As Morris mentions the ideal democracy is when we give the opportunity to people for equal power and maximum power. A decision can be characterized as optimally democratic, if and only if the influence of each individual on the decision is in the perfect analogy of how much their interest is been affected by the decision. Everyone should have the same say on every decision, "one person, one vote". (Gustaf Arrhenius, 2011) Studies in social psychology show that the politicians and the politics tend to support prior beliefs rather than engage in real dialogue.

An important controversial argument in the evolution of democracy is the tyranny of the majority, many political theorists question that the rule of majority is an "uncontested good" (Fierlbeck, 2008) such as John Adams (Adams, 2001) and John Stuart Mill in his famous book On Liberty (John Stuart Mill, 1913). Many countries have laws and parts in their constitutions that do not protect the minorities and human rights. For example, in 20th century in Sweden, a democratic country, the government sterilized by force thousands of "mental defected" women. (Treano Paul, 2016)

Democracy is criticised for not offering enough political stability, nowadays. The frequency with which the governments are been elected and the political changes that brings in their policies leads in instability, the political pressure from the oppositions and the press can bring unexpected political changes. Immigration and terrorism are helping increase this instability and led the emergence of radical political parties and movements such as the skinhead movement in the United States and Britain, the National Front in France. (Bohman, 1999; Dahl, 1991; Gross & Dahl, 1957; Gutmann & Thompson, 2004; Robert A. Dahl, 2017) Acts of terrorism, especially after the September 11 attacks of 2001, forced government to take more strict measures against terrorism by promoting and giving power to their law enforcement agencies. (Carter & Stokes, 2002; Dahl, 1991; Gross & Dahl, 1957; Gustaf Arrhenius, 2011; M. S. Perry, 2015; Robert A. Dahl, 2017)

The media had been accused of trying to manipulate and control public opinion, thus to control democracy and resulting in political instability. Scholars, such as Russell Waltz, have considered similar issues and talk about the role of "Journalists as Purveyors of Partial Truths". Politician like to use the press to influence the public against or in favour of them or of the government. For example, in 2016 the FBI announced 11 days before the election in United States that they would examine Hillary Clinton's private email for potentially incriminating evidence. The intelligence agencies of United States, the same year, concluded that Russia tried to influence the opinion of the United State public against Hillary Clinton and favour Donald Trump by passing materials that were published by WikiLeaks. (Bishop George, 2015; Copley Caroline, 2017; Cudd & Scholz, n.d.; Davis, Bowers, & Memon, 2011; Gaycken Sandro, 2016; Gorton, 2016; Jordan Robertson, Michael Riley & Juan Arredondo, 2016; Lawrence R. Jacobs, 2001; Slater Dan, 2017; Somin Ilya, 2014; Staufenberg Jess, 2016; Tremblay Pinar, 2017)

Corruption within governments and unfair elections is something that we can see all over the history of democracy. Most modern democracies are representative democracies, where people elect representatives to act for their interests. However, they have the freedom to act according to their

own judgement. For that reason, one can criticise representative democracy (David Romano, 2015; Richard Hooker, 1997), pointing out the contradictions of the representation mechanisms versus the will of the represented. (Disch, 2006; Landemore, 2007; Merkel, 2013) Moreover Isaiah Berlin argued that Rousseau's association of freedom with obedience to the General Will allowed totalitarian leaders to defend oppression in the name of freedom and made Rousseau "one of the most sinister and formidable enemies of liberty in the whole history of human thought." (Damrosch, 2007; George Crowder, 2003; Riley, n.d.) Moreover, politicians are interested in helping or favouring their supporters, this kind of behaviour is more common in countries with low levels of economic development and education, such African or Sub-Saharan countries. Those country also lack an effective legal system to protect human and civil rights. (Archard, 2005; Cudd & Scholz, n.d.; Dahl, 1991; Damrosch, 2007; George Crowder, 2003; Gross & Dahl, 1957; Gustaf Arrhenius, 2011; Paul Collier, 2009; M. S. Perry, 2015; Riley, n.d.; Robert A. Dahl, 2017; United States government, n.d.)

Another very important problem that affects democracy is the lack of educations of the voters and/or the people who govern and make decisions. Many believes that the voters do not have the necessary level of education to express their voting right and that the lack of education is been exploited by the politicians who compete more in public relations way than in ideology. Lipset's essay for democracy in 1959 shows that a good education is a key factor for a democracy to emerge, on the other hand Caplan in 2005 added that education alone cannot maintain democracy. (Bendix & Lipset, 1957) In addition, having politician that are not educated enough or lack specific knowledge on the field they are making decision on, leads to bad judgements and unequal decision. (Carter & Stokes, 2002; Chung-pin Lee, Kaiju Chang, 2011; Cudd & Scholz, n.d.; Dahl, 1991; Gustaf Arrhenius, 2011)

To sum up, the problems of democracy that faces today are:

- Globalization and Democracy Capitalism
- Influence of Big Money.
- Not being fair and transparent.
- Lack of education of its citizens and representatives.
- Inefficient processes.
- The tyranny of the majority, which does not protect the minorities and human rights.
- Unequal distribution of influence, not all voices are being heard, there are not equal rights to access democracy.
- Lack of participation in the political system, especially among young people.
- Imperfect representation of social groups.

Democracy has taken many forms and has suffered many changes through the years. The recent introduction of the internet and information systems changed the way citizens interact with the government. Technology now allows citizens to participate in the proposals, development, and creation of laws. Democracy is not a perfect system, but it remains the most desirable and qualitative system of governance. (BBC NEWS, 2008; Bendix & Lipset, 1957; Graeme Auld, 2017; Popper, 2003; Stefan Schultz, 2010) As a result, the fundamental issue is to rethink and ask again for the quality, limits and scope of democracy today. We must reconsider all the new factors that today are influencing and shaping the democratic and decision-making processes and check the compatibility with the human rights and with the democratic rules. What are the main problems

and issues that should be decided democratically and who should vote, why and how? Does the new technology foster the democratic processes? How can we make democracy better? At last, how should democracy be practiced, are the representatives the correct people to make the decisions or who should be able to decide for all? (Gustaf Arrhenius, 2011) This paper is focused on the research for answers to the question of what is the impact and the influence of the information systems in democratic and decision-making processes.

2.2. INFORMATION SYSTEMS

An information system is a system that is responsible for collecting, organizing, storing and communicating data in an structured way to provide and produce information. (Bulgacs, 2013; James A. O'Brien, 2003; KARIMI, 1988; Tucker et al., 2003; Vladimir Zwass, 2016) The study of IS involves the study of theories and practices related to the social and technological areas, which determines the use, development and effects of information systems in organization and society. (Bulgacs, 2013; James A. O'Brien, 2003; KARIMI, 1988; Tucker et al., 2003; Vladimir Zwass, 2016) It involves the study of the interactions between people, computers and organizations. (YOURDON, 1993) It aims to support management, operations and decision-making processes that organizations and people use to interact. (Bulgacs, 2013; James A. O'Brien, 2003; KARIMI, 1988; Tucker et al., 2003; Vladimir Zwass, 2016) This study will focus on the social impact of information systems in society, more specific in the decision-making process and the impact of them on democracy promotion.

2.2.1. Concepts of Information Systems

The first computers used to process information for administrative use was the UNIVAC I installed in 1951 in the U.S. Bureau of the Census and for commercial use on 1952 at General Electric. (Vladimir Zwass, 2016) In the 1970s the personal computer was introduced, followed by the internet and in 1991 the World Wide Web, invented by Tim Berners-Lee, led to the worldwide spread of the internet. All the above innovation brought big and deep changes to human lives, human governance and business organization. (Vladimir Zwass, 2016) They changed how people access and process information, and enabled them to create new types of relationships between themselves and organizations. All this digital transformation brought by the internet made information systems become part of our daily life. Information systems have been extended to support mobility as the natural human condition and support modern decision-making processes (James A. O'Brien, 2003; Kroenke, 2008) by connecting people with the information they need, which has a strong impact on society as a whole. (Hayes & Sharma, 2003; Polack, 2009; Tucker et al., 2003)

The main components of Information Systems are:

- Computer hardware
- Computer software
- Telecommunications
- Data – Databases, Data Warehouses
- Procedures
- People – Human resources

The first three components make Information Technology (IT), which is the key factor of an organization to survive and be innovative. (James A. O'Brien, 2003; Kroenke, 2008; Vladimir Zwass, 2016)

Traditionally information system consists of three layers to support a specific organization function:

- The operational support layer or the operational management is the base of an information system and contains various transaction processing systems for producing, designing and delivering products and services.
- The support of knowledge work layer for Middle management is the middle layer that contains sub information systems to support information sharing in an organization.
- The management support layer for Senior management is the top layer and contains sub information systems to support effective management and evaluation of the organization's goal and resources. (Vladimir Zwass, 2016)

As technology evolves through the years many different types of Information Systems have emerged, trying to serve all levels of an organization or society in the best and most efficient way possible. (James A. O'Brien, 2003; Kroenke, 2008; Vladimir Zwass, 2016) They can be classified according to the following categories:

- Operational Support and Enterprise systems:
  Transaction processing systems that support operations such as designing, producing, marketing and delivering products and online electronic commerce.
  - o Electronic commerce systems such as:
    - Online securities trading, shopping systems, and banking.
    - Systems that deliver information, entertainment, education services, price discovery and search engines.
    - Social networks sites that support communication between individuals and customers. A powerful tool that evolves and creates new ideas and opinions. Expose and promote new social movements and concepts. (James A. O'Brien, 2003; Kroenke, 2008; Vladimir Zwass, 2016)

Enterprise systems that are transaction processing systems on a larger scale for bigger organizations or societies. (James A. O'Brien, 2003; Kroenke, 2008; Vladimir Zwass, 2016)
  - o Enterprise resource planning (ERP) systems support many functional department and units, such as sales, human resources, finance, production and marketing. To sum up, the value chain of an organization is a sequence of activities to add value to its services and products. (Vladimir Zwass, 2016)
  - o Supply chain management (SCM) systems support the entire supply chain which an organization can be part off. Manage all the levels of the supply chain such as the flow of information, products, money and data. (Vladimir Zwass, 2016)
  - o Customer relationship management (CRM) systems support the management of the relationship with the customers, dealing with the customer service, marketing, sales with the main goal of having better satisfied customers. It handles each customer as unique and enables to create a proactive long-term relationship.
- Knowledge work systems support the use, manipulation, and sharing of information and knowledge in an organization or society. (James A. O'Brien, 2003; Kroenke, 2008; Vladimir Zwass, 2016)
  - o Professional support systems are systems that support specific tasks of a specific profession such as biochemists and automotive engineers. (Vladimir Zwass, 2016)
  - o Collaboration systems support the communication, collaboration, and teamwork within an organization or society. They are also used in virtual life systems or social networks.

In an open information society, they can be used to increase people participation in creating new products, ideas or projects and show their outcome.

- Workflow systems support the automatic sharing of information between teams and the automation of processes.
- Groupware systems allow different people to work at the same time on shared projects 24 hours a day and access them from anywhere.
- Wikis support the addition and edition of content by multiple participants online.
- E-mails and videoconferences.

o Knowledge management systems support the gathering and sharing of knowledge through an organization or society, for example, Microsoft SharePoint. (James A. O'Brien, 2003; Kroenke, 2008; Vladimir Zwass, 2016)

- Management support systems support the management of an organization by allowing for the accumulation of useful information for the organization from any research outside or inside the organization. Information can comes from web or from transaction processing systems. (Vladimir Zwass, 2016)

o Management reporting systems provide reports specific for each management areas with past or present information.

o Decision support systems are systems that have been designed for the purpose of supporting the decision-making process. They are designed and developed to analyze huge collections of data, known as big data. (Vladimir Zwass, 2016) There are five main types of these systems, such as:

- Model-driven decision support systems support decision making by using a small or limited set of data stored in a database for a small period. Usually, they are preprogrammed models. (Vladimir Zwass, 2016)
- Data-driven decision support systems, known as business intelligence systems and analytics have the objective of gathering, storing, accessing and analyzing large quantities of data to help business users make better decisions. It is based on the transformation of data into information, then into decisions and finally into actions, together with the necessary control and monitoring over a long period of time. They include statistical models and might use artificial intelligence techniques, for example, neural networks, expert systems or machine learning. They use data mining to try to find significant patterns in the data and text mining and/or mining numeric data in order to extract useful information from social media, networks, blogs, and wikis. (Neto, 2017; Vladimir Zwass, 2016)
- Group decision systems allow decisions makers to work at the same time on shared projects accessible from anywhere. They can be tools for reaching consensus and brainstorming. (Vladimir Zwass, 2016)
- Geographic information systems are systems that use digital maps and are designed to help display and analyze data to support rapid decision making. (Vladimir Zwass, 2016)

o Executive information systems are systems that summarized critical information for the executive management of an organization or society in a convenient way, usually via graphical digital dashboards. (Vladimir Zwass, 2016)

Information systems can be developed internally in an organization or outsourced. The development process is known as the life cycle of a system and it is a systematic process with sequence of stages. (Vladimir Zwass, 2016) There are several methods and models that can be used to develop and maintain an information system, such as Waterfall - Linear Sequential Model (cascade), Prototype building model (prototyping), RAD (Rapid Application Development), Incremental models, Spiral model and at last, the most use nowadays, the agile methodology. All the above models have a common goal, to develop information systems with specific requirements and usability that satisfies the users. (Santos, 2017)

2.2.2. Digital Transformation

Nowadays, in modern developed countries, the Internet and Information Systems (IS) is part of our daily life and is being used by almost everyone, with over three billion people having access to the Internet (Sanjay Acharya, 2014) and 8 in 10 people being users of smartphones (Rowinski, 2015). Telecommunication is a basic component of information systems, supporting mobile computing and the internet as it is a "network of networks" that collects and processes massive amounts of structured and unstructured data, as well as textual data. A massive "Internet of things" has emerged that can provide relevant information for decision-making processes. (Vladimir Zwass, 2016) The processing of textual data, such as reviews and opinions on social networks and blogs allows automated sentiment analysis, competitive intelligence and the gathering of data for other decision-making purposes. (Klewes, Popp, & Rost-Hein, 2017; Vladimir Zwass, 2016)

All this digital transformation affects all aspects of human society, it has been characterized as "the total societal effect of digitalization's" (Khan, 2016) and has created the bases for an information society and affects how people think or make decisions. The digital transformation initiative (DTI) research launched in 2015 by the World Economic Forum studied the impact of digitalization and supports that the collaboration between the private and public sectors make sure that digitalization unlocks and brings new opportunities and wealth to both society and industry, and that it can deliver huge value over the next years. (World Economic Forum, 2015) Our society can be characterized as an information society and as an extension of it as a networked society, we are moving from simple citizens to digital citizens. Scholars talk about information age and information capitalism, the new social morphology of society. In addition, Frank Webster believes that the information has transformed the way that we live today and that in order to define the information society there are five major types of information that can be used, such as cultural, economic, technological, occupational and spatial. (Klewes et al., 2017; Webster, 2004)

Today information systems support modern decision-making processes (James A. O'Brien, 2003; Kroenke, 2008), connect people with the needed information and has a strong impact on society as a whole (Hayes & Sharma, 2003; Polack, 2009; Tucker et al., 2003). Information systems play an important role in democracy and how democracy can be implemented in a modern society. However, democracy can still be improved and has been criticized for being inefficient and dysfunctional by several authors (Caplan, 2005; Meltzer & Richard, 1981), as a result, new social movements and concepts of democracy such as E-Democracy and E-Government (Bertot, Jaeger, & Grimes, 2010; Tolbert, Mossberger, Tolbert, & Mossberger, 2006) have emerged from the desire for fairer and transparent governments. There is a wish for more direct democracy and ease of access for all in a more common language (Pia Mancini, 2014). All voices should be heard, providing equal

rights to access democracy and protect the minorities. Information system try to simplify the decision-making process by given easier and faster access to the information to those who make decisions and those that want to be part of the decision.

2.2.3. E-Government

E-government is the electronic form of government, by using the information systems and internet to provide public services to citizens in a cost-effective and efficient manner. (Barman, 2014; David Garson Jones, 2006; Jain Palvia & Sharma, n.d.; Jeong, 2007) There are many different definitions and designations of the term, such as eGovernment, digital government, digital government services and electronic government services. (EUROPEAN COMMISSION, 2016) The main use of information systems is to make government more open to citizen participation and involvement, and be a tool for better government. The use of the internet gives the opportunity to increase political participation and reorganize and reshape the governments into a more open and efficient organization. This process of delivering services to citizens through the internet is known as E-government. (Barman, 2014; David Garson Jones, 2006; Jain Palvia & Sharma, n.d.) E-government can respond to the needs of citizens who want to participate and influence the public services. Another point of view is that e-government does not require direct participation but benefits citizens indirectly by been more efficient by automating routing task and procedures. (Andrew Chadwick, 2016) E-government allows for government transparency and accountability, increases voter awareness and leads to more a democratic and true democracy, e-democracy. It simplifies bureaucratic processes and can have environmental benefits too. (Barman, 2014; Bertot et al., 2010; David Garson Jones, 2006; Tolbert et al., 2006; Whitehouse.gov, 2013)

Some of the main activities of E-government are to inform and consult the citizen, to encourage them to be more involve in order to increase participation for better representation. (Jain Palvia & Sharma, n.d.; Toni G.L.A. van der Meer, 2014)

E-government has the following four dimensions:

- Government-to-government (G2G), is the use of technologies to provide better and more efficient public services internally, more productive public bureaucracies.
- Government-to-business (G2B) is the use of the Internet to reduce the costs that government spend on suppliers and third parties' companies for services and goods.
- Government-to-citizen or government-to-consumer (G2C) is the use of the Internet to provide better and more efficient public services.
- Government-to-employees (G2E) (Andrew Chadwick, 2016; David Garson Jones, 2006; Jeong, 2007)

There are several technologies that are used to serve the needs and ideas of e-government, such as specific public-sector portals and platforms, web services that serve the requirements for both government and citizens, websites and the use of social networks that increase the participation of the citizens and helps government to act fairer for the public good. In addition, government can use blogs, listservs, mobile messaging, RSS feeds and micro-blogging services to monitor and measure the satisfaction of the public with their services. Moreover, they use them also to share and discuss information and common concerns with the people. To support the idea of open source government and direct decision-making process, governments can use collaboration tool and technologies, such

as internet tools combined with open source platforms such as website, wikis, widgets, and apps. At last, there are some specific technologies that can be characterized as sub-categories of e-government such as, ubiquitous government or mobile government and GIS applications. (Mossberger & Jimenez, 2009; Nicusa, 2006; Seifert & Chung, 2009; Toni G.L.A. van der Meer, 2014) Ultimately, blockchain technologies are changing the way power and control are distributed by redistributing the power and moving away from central elites. It is promising more efficient public services and simpler processes. They try to engage people participation by building better relations with governments through more transparent and democratic system. (Boucher, Nascimento, & Kritikos, 2017; Speech, 2018) For example, the Dutch Government is exploring blockchain use cases through many concurrent pilot projects, such as digital identity, income tax, autonomous vehicles, logistics and debt counseling**.** (Dutch government, 2018)

For example, Estonia has established an e-government program and has been recognized as a leader in e-government innovation and in technological infrastructure and society. In more details, Estonia in 1996, with the support of the EU, started introducing e-government services with an e-Banking platform and have developed since then a full I-Voting system, e-Residency for foreigners, e-school, e-Prescription and more. More European countries are following the lead of Estonia and Europe shows significant advancement in the field. (E-Government Academy, 2016; European Commission, 2016)

On the other hand, e-government has its critics, there are some minor disadvantages that concern the theorists of the field and the public opinion such as the inequality of public access to information systems and the internet for people with low income or very old people. Moreover, there is concern about the social, economic and political impact of e-government and the reliability of the information that is been shared with the people and how this can affect the public opinions. Furthermore, there are concerns about the vulnerability of those information systems to cyber-attacks and hacking. (Andrew Chadwick, 2016; Atkinson, Robert D.; Castro, 2008; Rose & Grant, 2010)

2.2.4. E-Democracy

E-democracy is the use of information and communication technologies to foster and sometimes replace representative democracy, it can be characterized as a full electronic democracy. (Andrew Chadwick, 2013) It is a form of government where all citizens are equally eligible to participate in the process of decision making and the creation of laws. (Jafarkarimi et al., 2014) One of the first instances of e-democracy was the community networks that emerge in the 70s such as the Berkley Community Memory Project. The main idea was to allows ordinary citizens to be part of the decision-making process in their area. In the 21st century, this idea evolved, and e-democracy projects are being created to connect people with political processes, moreover to promote democracy. Most theorists believe that some of the traditional limits and problems of the current democracies can be solved and overcome by new forms of online communication. (Andrew Chadwick, 2013)

The main goals of e-democracy are to improve existing political systems, make democracy more democratic and fair, enable the free and equal practice of political self-determination and encouraged voting equality. (Dahl, 1991; Jafarkarimi et al., 2014; Seifert & Chung, 2009) It tries to encourage human rights and freedom of speech, all voices can be heard and represent different

viewpoints and ideas. It allows people to participate and express their opinions in a more effective and flexible way. (Dahl, 1991) It Increases the collective decision making by giving more power to the citizen and helps politicians make better, fair and faster decisions by creating a more efficient and productive society that can handle problems better. The internet lets people be better informed in a faster way for political issues and politicians, and as an extension lets politicians get advice in real time from a greater number of people. (Leighninger, 2011) Moreover, the internet allows for better government transparency and participation. (Anttiroiko & Ari-Veikko, 2003; Bertot et al., 2010; Toni G.L.A. van der Meer, 2014) As a result, this has a great impact on the society as a whole and changes the way people think and deal with the democratic and decision-making processes.

There are several technologies that serve today e-democracies, such as wikis, blogs, internet forums, peer-to-peer networks, collaborative software and mails lists. The social media is playing a very important role in the democratic discussions plus technologies such as semantic web and big data analytics that all of them are an emerging area for e-democracy. (H. M. Hilbert, 2009)

New models of government have emerged after the evolution of E-democracy, such as the hybrid model which is based on the use of the Internet for more transparent government and greater participation in the community and in the decision-making process. (Anttiroiko & Ari-Veikko, 2003) Electronic direct democracy, known also as collaborative e-democracy or open source government, is a political system in which citizens are applying direct democracy by using information systems. They can vote directly via electronic or online platforms and therefore can be directly involved in the legislation process. Government and citizens collaborate to develop new policies and public laws. As an extension of making decisions together each citizen can be a part of this decision-making process directly via the use of social networks, sites and other information systems. (Georgios Mavropalias, n.d.; Petrik, 2009, 2010) For example, the People's Administration Direct Democracy party in the UK is a direct democratic party that supports the Electronic direct democracy. (PEOPLE'S ADMINISTRATION - mainstream UK party for reform to Direct Democracy, n.d.) Moreover, some countries such as Argentina and Finland are already starting to experiment with a new term of WikiDemocracy, that is based on the use of a wiki for decision-making process and policies. (Aitamurto, n.d.; J. Manuel Feliz-Teixeira, 2012; Mancini, 2017)

On the other hand, e-democracy has been criticized because of the inequality of public access to information systems and the vulnerability of all those online platforms to cyber-attacks and hacking. The government must ensure the security of them thus protecting stored personal data and people's privacy. (Andrew Chadwick, 2016; Atkinson, Robert D.; Castro, 2008; Rose & Grant, 2010; Toni G.L.A. van der Meer, 2014)

2.2.5. Opinion and Challenges

In the recent research on information systems and democracy, there are several opinions that support the argument that information systems can promote democracy and its processes. In the 90's there were scholars who believed that the use of information systems can lead to more direct democracy and solve the communication gap of the system (Jafarkarimi et al., 2014). There is no doubt that information systems can have a strong impact on the democratic processes, such as the process of decision-making. For example, voting, a collective decision-making process that is one of the core processes of democracy, would benefit from the introduction of information systems. (Vragov & Kumar, 2013). Proponents of e-government believe that the use of social media by

governments can help them to act more for the public good. According to Hilbert´s study about e-democracy and the maturing concept of e-democracy, the revolution of social media and the Web 2.0 have shown that it is possible to overcome the traditional problem of the size of the group that participates in the democratic processes and the depth of will expressions. On the other hand, he mentioned that it is very hard to find will expressions in social media that make sense and can be understandable because most of them are unstructured data but he believes that new technologies, such as big data analytics , can solve this problem. (H. M. Hilbert, 2009)

Many scientists, such as Duff (Duff, 2005), support that argument, more specific they believe that information systems offer an opportunity for better and fairer social order. At last, according to Nam's (Nam, 2012) study about online transformation for political activities, we can divide the role of information systems in democratic changes into the following three categories:

- Information systems that are not able to solve the problem of participatory inequality or the generation gap in the use of information systems for political activities.
- Information systems that are attracting new citizens to participate in political activities but does not include everyone and the quality of the participation is questionable.
- Information systems that can convert the existing offline participation in political activities to an online participation. (Jafarkarimi et al., 2014).

Information systems have an impact on the quality of life. They are a medium for human communication and expression. Their usage via the internet is increasing and increasing citizens participation in decision-making process. It is a necessary tool for knowledge sharing and full participation in modern society. Citizens can use it to take part in government decisions through the electronic vote and electronic elections, polls, and referendums. Information systems can provide electronic access to government services and information, such as electronic filing of taxes and direct deposit of government checks. Government operations can be more transparent, faster and easier to use. (Andrew Chadwick, 2016; Atkinson, Robert D.; Castro, 2008; Bertot et al., 2010; Rose & Grant, 2010; Toni G.L.A. van der Meer, 2014; Vladimir Zwass, 2016)

One of the main advantages of using information systems to support the democratic decision-making processes is that information systems help in the civic engagement and gives citizens the opportunity to become more involved. Civic engagement means to be informed and have a good knowledge of political and public issues, trust the political system and finally participation in decision-making process. (Bakardjieva, 2009; Caldow, 2004; Leighninger, 2011; Norris, 2000; Organisation for Economic Co-operation and Development., 2003; Saglie & Vabo, 2009) According to Maria Bakardjieva and Matt Leighninger, the Internet improves the participation of citizens when interacting with the government. It empowers individuals and groups of people by giving them better access to the information that allows them to have an impact on public policies. (Bakardjieva, 2009; Leighninger, 2011) Citizens by using information systems can participate in an easier and efficient way in the decision-making process and the public discussion forums improve the collaboration with local citizens to help government focus on solving local issues. As a result, they improve their communication and regular citizens become part of the decision-making process of their community. Information systems create an open communication and collaboration for the common good. (Bakardjieva, 2009; Bertot et al., 2010; Caldow, 2004; Leighninger, 2011; Norris, 2000; Saglie & Vabo, 2009; Toni G.L.A. van der Meer, 2014)

Moreover, the use of information systems and the internet helps all voices to be heard and use them as a way to support and encourage the civil society. The low cost of internet access and the easy and fast exchange of information on it makes the Internet very important in the democratic process. (Jensen, Danziger, & Venkatesh, 2007; Merkel, 2013; Norris, 2000; The Economist, 2008) It increases and supports the deliberative democracy, where millions of voices and point of views can be shared all over the world at incredible speed, encourage freedom of speech and the exchange of ideas. The freedom the Internet offers is able to encourage and support changes and is crucial in decision-making processes and democracy. (Gimmler, 2001; John D. Sutter, 2012; Seifert & Chung, 2009) As an extension of all the above, governments become fairer and transparent with great accessibility and information sharing.

The use of information systems to support democracy has been suggested as a way to increase young peoples participation and awareness of the decision-making process and, in general, democracy by increasing voting and political knowledge. For example, the Highland Youth Voice in Scotland allows young people between the age of 14 and 18 to participate in the decision-making process via websites and online forums that allow them to be a part of the online political debate and try e-democratic models for online-voting. Through this process, they aim to understand the young people's needs and hear their opinions. (Andrew, 2008; Coleman, 2008; Highland Youth, n.d.) On the other hand, there are concerns about the youth e-citizenship because although it can allow for the engagement of young people, it can also be a way to try to manipulate them and manage them. Some scholars believe that young citizens have the right to be heard and others that they do not have the correct levels of experience and knowledge. (Andrew, 2008; Coleman, 2008)

There is some opposition from scholars about the use of information systems in society, with the most important issue being the security of the information that has moved to the forefront of concerns. Sometimes the entire society depends on this security of vulnerable information systems that require strict controls and maintenance. There are several types of threats, such as human error, computer crime and abuse, system failure and disasters. For example, how safe is an e-voting system against cyber-attacks and hacking? (Andrew Chadwick, 2016; Atkinson, Robert D.; Castro, 2008; M. Hilbert, 2003; Rose & Grant, 2010; The Department of Economic and Secretariat & (UNDESA), 2007; Vladimir Zwass, 2016)

In addition, there are several social and ethical issues to be considered, such as individual privacy, lack of equality in public access to computers and the internet and a false sense of transparency and accountability. Personal and individual privacy can be lost because of the massive use of the internet of things and the massive collection of data. In addition, many third world countries do not have access to information systems, mainly because of poverty and lack of infrastructure. People with low education and social status, and, homeless people do not have access to internet and information systems too. In addition, social media can be manipulated as all other media by the influence of big money. (Atkinson, Robert D.; Castro, 2008; M. Hilbert, 2003; The Department of Economic and Secretariat & (UNDESA), 2007; Vladimir Zwass, 2016) Moreover, with the introduction of artificial intelligence can be a threat and compete against human professionals. Information systems can be used for both democratic and anti-democratic ends because they can foster both participation and coercive control. The application of direct governance tends towards the polarization of opinions, populism, and demagogy. (Andrew Chadwick, 2016; Atkinson, Robert D.; Castro, 2008; M. Hilbert,

2003; Rose & Grant, 2010; The Department of Economic and Secretariat & (UNDESA), 2007; Vladimir Zwass, 2016)

However, the list is still missing a conceptual work on how specific elements of democracy are met by specific information systems. This is the goal of this study.

2.2.6. Technology serving Democracy directly

There are several technologies currently in use that serve the needs and ideas of democracy and try to solve the main problems of it. The most important technology of all is the Internet and the access to it. Most of the information systems are deployed on the internet, although there are systems that can work offline too. In addition, it might not be possible to provide an exhaustive listing of all existing solutions and technologies, due to the rapidly evolving nature of the IS field. Those technologies are:

1. Web 2.0: the evolution of the content platforms to focus on user-generated content, such as:
   a. Forums, discussion boards: Platforms that allow people to create communities that are interested in discussing various topics.
   b. Social Networks: Platforms that allow people to share content with others in their social network.
   c. Wikis, collaborative platforms, knowledge sharing tools: Platforms that allow a community to maintain a curated knowledgebase about specific topics and share it with others. For example, the Etherpad that is being used by the Piraten party Deutschland is a highly customizable Open Source online editor providing collaborative editing in real-time. (The Etherpad Foundation, n.d.)(Piraten Partei, 2013)
   d. Blogs, Micro-blogging: Platforms that allow organizations or individuals to publish their views on any topic.
   e. Participative budgeting platforms: Platforms that allow the citizens to participate in the allocation of budgets for various governmental entities. For example, the Portuguese government uses the following platforms.: Portugal Participa and the Orçamento Participativo. (Orçamento Participativo, n.d.; Portugal Participa, n.d.)
2. Internet of things / Ubiquitous Computing: an inclusion of chips and connectivity to the internet in every object, resulting in a network of sensors (Daniel O'Maley, 2016), such as:
   a. Automatic meters: Devices that support bidirectional communications to allow for accurate billing of utilities such as gas, electricity, and water.
      For example, smart license plates, high tech devices that provide the same functionality of the standard license plate but add several features that would reduce the bureaucracy related to car license plates. (Brian Cooley, 2017)
3. Electronic voting: is the process of voting using computer systems. It has been considered an inevitable development that simplifies and reduces the cost of elections and speeds up all the processes around them. It can increase engagement and turnout of citizens, and even restore the relationship between citizens and political institutions. (Boucher et al., 2017) There are two types of electronic voting, those that are use the internet and those that don't (René Peralta, 2016), such as:
   a. E-voting: are systems engineered for the specific purpose of voting and are not used online. There are two main types:

<li style="list-style-type: lower-roman">
Direct recording electronic machines are computers connected with a touch screen that citizens use to vote. They have features to assist users for better use.

<li style="list-style-type: lower-roman">
Optical scanning systems that read a ballot previously filled out by the voter. If the vote is not valid, the device will inform the user to restart the process. Some optical scanning systems allow the user to fill the voting form on a computer, then print the result and insert them into the electronic scanning device.

b. I-voting: a voter can vote from any computer connected to the internet, even from their homes through an online voting platform. (René Peralta, 2016)

For example, Estonia´s voting systems that are based on the I-voting system. (E-Government Academy, 2016; European Commission, 2016)

4. Artificial Intelligence: is the use of algorithms to obtain deeper insights in various subjects, for example:

a. Big data analysis, Cognitive services: Through the analysis of massive amounts of data, it is possible to infer useful information about trends and preferences. This tool is being deployed in both business and governmental entities. An example is the use of past criminal activity to predict future criminal activity which is known as predictive policing. (W. L. Perry, McInnes, Price, Smith, & Hollywood, 2013; Rienks, 2015)

b. Textual data, Automated sentiment analysis: Unstructured information present in various free-form text fields such as blog posts or product reviews.

c. Anomalies detection, Fraud detection: A technique that uses available data to establish a baseline and alert of deviations of normal behavior. These are used to flag uncoherent or uncommon datasets for further analysis. It is a standard tool being deployed by various tax enforcement agencies.

5. Systems Integration / Inter-Operability: Information systems are made of various systems that need to exchange information between themselves and need to have compatible interfaces and data formats.

a. Web services, data standards: A common set of technologies that allows different information systems to transfer information between themselves using a standardized data format. An example for this is the XML SAFT standard that allows business to transmit accounting data to the tax office. This requires all accounting software to implement the same data format to make all business compatible with the tax authority information systems. It also simplifies and automated tax processes such as tax submission and allows the existence of systems like the e-fatura in Portugal. (Portuguese Republic, n.d.-a)

b. Public key infrastructure, smart identity cards: A fundamental problem of any information system is to authenticate its users. This also applies to any service provided by the state to its citizens. The use of national identity cards that include a digital certificate solves this problem, as it allows for information systems to authenticate the citizen using a state-managed public key infrastructure. Once all citizens have digital certificates it becomes possible for all to benefit from the recent advances in cryptography allowing for legally binding digital signatures and the dematerialization of most bureaucratical processes, as is the case in Estonia. (E-Government Academy, 2016; European Commission, 2016)

6. Distribution of Information: Information in the form of data is what flows through the internet and it the main use of the internet.

a. RSS feeds: allows the user to subscribe to sites and get a feed of updates to its content. For example, Ushahidi: is being developed by Ushahidi, Nairobi, Africa. Is an application allowing users to upload real-time data, respond to issues, election monitoring, and crisis response? "Was developed to map reports of violence in Kenya after the post-election violence in 2008". (Ross, 2016; Ushahidi, 2008)

b. Portals/ websites/knowledge sharing tools: allows users and organization to publish and share information. For example, USA.gov, the official site of the United States government, which is a directory that links to every federal and state agency (United States government, n.d.). In addition, Estonia and Portugal make use of this kind of portals. (E-Government Academy, 2016; Portuguese Republic, n.d.-b)

c. Emails lists: allow the distribution of messages for groups of people.

d. Mobile Computing: mobile phones are now small mobile computers that allow people to do many of the tasks previously only possible with larger personal computers.

e. Blockchain technology: it is a way of recording lists of transactions in a remarkable decentralized and transparent way. It can be used for digital currencies such as Bitcoin, one of the most well-known uses, and for non-financial tasks, such as casting votes in elections or proving that a document existed at a specific time. Moreover, it can be used for all kinds of public services such as health and welfare payments without the need of central validation or human intervention. It is changing daily interactions with technology by redistributing the power and moved away from central elites. They improve and make more efficient service delivery to citizens and make systems more transparent and as an extension more democratic. They are making it simpler to involve more people in the decision-making process and adopting long-term strategies. (Boucher et al., 2017; Speech, 2018) For example, the Dutch Government is exploring blockchain use cases through many concurrent pilot projects, such as digital identity, income tax, autonomous vehicles, logistics and debt counseling. (Dutch government, 2018)

f. Peer to Peer networks: allows users to download and sharing information in a decentralized way and not requiring the data to be stored in a central location.
For example, Open data services cooperative: is being developed by Tim Davies and his team in the UK. They help people publish and use open data with the aim of making open data useful, usable and in use by supporting activities that promote social impacts. (Ross, 2016; Tim Davies, n.d.)

7. GIS applications, for example, maps for taxes reasons:

a. Geographic information systems allow to accurately identify location, areas and give a special view of the terrain. Considering the recent development and general availability of online maps with high-resolution imagery of the earth it is possible to improve services provided by the state, such as land registry and other services where geographical data is relevant. Another improvement is navigation as currently, most modern mobile phones have GPS, Galileo or Glonass systems for geographic positioning and access to maps. (European Global Navigation Satellite Systems Agency, 2018; Information- analytical centre (IAC). Russian Space Agency, n.d.)

3. METHODOLOGY

## 3.1. AN INTRODUCTION TO DESIGN SCIENCE RESEARCH

For this work, the Design Science Research (DSR) approach is the selected research method to discover and identify problems relevant to democracy and pair them with the relevant information system technologies or platforms, resulting in a new or improved conceptual framework.

The reasons for chosen Design Science Research (DSR) are the followings:

- DSR is a problem-solving paradigm (Hevner, March, Park, & Ram, 2004) with very specific guidelines for developing and achieving knowledge of a specific problem domain and understanding it by building an application of design artifacts. The artifacts in this study are the conceptual framework of pairs.
- DSR core mission is to develop valid knowledge and design solutions specific problems. (Joan E. van Aken, 2004; Joan Ernst van Aken, 2005)

Design Science Research (DSR) is a sequence of synthetic and analytic activities that produce an innovative or improved product or artifact. It is a problem-solving paradigm that tries to generate a designed final artifact or solution on a specific problem. (Hevner, March, Park, & Ram, 2004) The main advantage of this method is that the design of the artifacts helps to understand the problem better, the continued re-evaluation of the problem improves the quality of the design process, plus the build-and-evaluate loops until the final solution has been generated. (Hevner et al., 2004) It must ensure that the solution is contributing to the research area of the study and must either solve a problem or provide a better solution. (Vaishnavi, Kuechler, & Petter, n.d.) Basically, the mission of DSR is to develop scientific knowledge to support the design of solutions or artifacts by professionals and to emphasize its knowledge-orientation. The design science research method is not concerned with the action itself, but with the knowledge to be used in designing solutions, to be followed by design-based action. (Aken, 2004)

There are two DSR research process models, the research process model proposed by Vaishnavi and Kuechler (Vaishnavi et al., n.d.) as in figure 1 and Hevner (Hevner et al., 2004) as in figure 2.
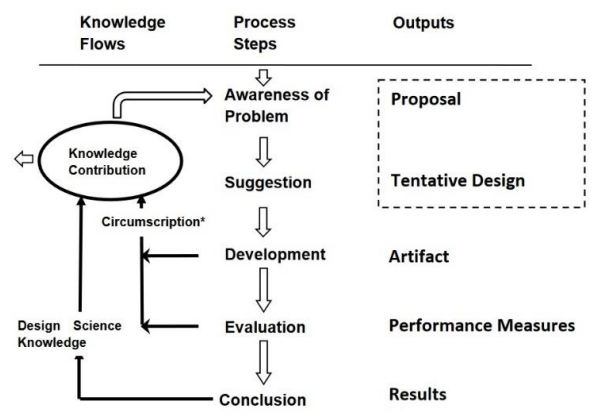
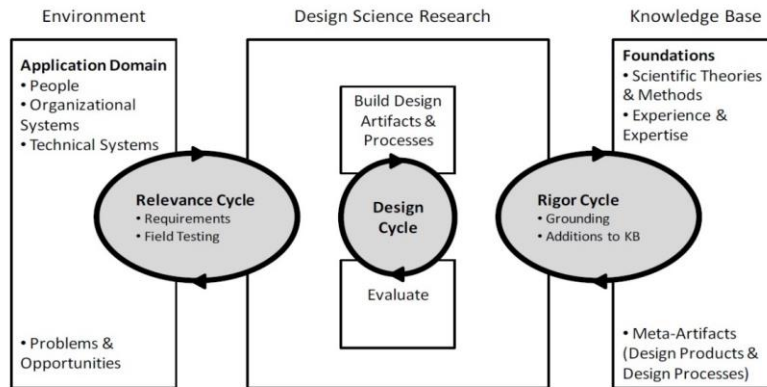Figure 1: DSR Process Model (DSR Cycle) (Vaishnavi et al., n.d.)

Figure 2: DSR Process Model (DSR Cycle) (Vaishnavi et al., n.d.)

This study uses the Vaishnavi´s and Kuechler´s (Vaishnavi et al., n.d.) DSR research process model because it is more abstract and has a theoretically based methodology for performing research compared to the Hevner´s that is a more practical based process and focused on real practical problems in an actual environment. Therefore, a detail discussion on the process steps of the Vaishnavi´s and Kuechler´s (Vaishnavi et al., n.d.) model is explained below:

Awareness of Problem: in this stage, the research problem must be identified and investigated. The objectives are to describe, explain and address the problem using theory and studying the existing knowledge of the problem. The output of this phase is a proposal for a new research question/problem. (Vaishnavi et al., n.d.)

Suggestion: this stage follows the proposal and it is strongly connected to it by creating a tentative design of a prototype for the desired solution to the problem. It is a creative step that exists in most research methods. (Vaishnavi et al., n.d.)

Development: in this stage, the tentative design is being implemented and further developed, resulting in an artifact. The techniques might vary depending on the artifact we want to develop. (Vaishnavi et al., n.d.)

Evaluation: this stage is the process of evaluating the developed artifact/solution and using the feedback to refine the design further. The solution is evaluated according to the criteria specified in the awareness of the problem stage. In the evaluation stage, hypotheses are being made about the behavior of the solution and the analysis either confirm or contradict the hypothesis. Usually, the results of the evaluation stage are feedback and additional information about the behavior or the quality of the solution that can lead to another round of suggestions or a new design. (the circumscription arrow of Figure 1) (Hevner et al., 2004; Vaishnavi et al., n.d.)

Conclusion: this stage could be the end of a research cycle or the end of a specific research effort. The end of a research effort is when the behavior of the solution still has small defects but its results are "good enough". In this stage, not only the result of the effort is considered but also the knowledge gained during the process and the facts learned that can be repeatedly applied. One more important aspect of this stage is the knowledge contribution of the research effort to the

research area and the added knowledge from the results. (the small leftward arrow coming out of Knowledge Contribution in Figure 1) (Hevner et al., 2004; Vaishnavi et al., n.d.)

3.2. RESEARCH STRATEGY

The following section described in detail how each process step of the DSR research process model is been used for this study.
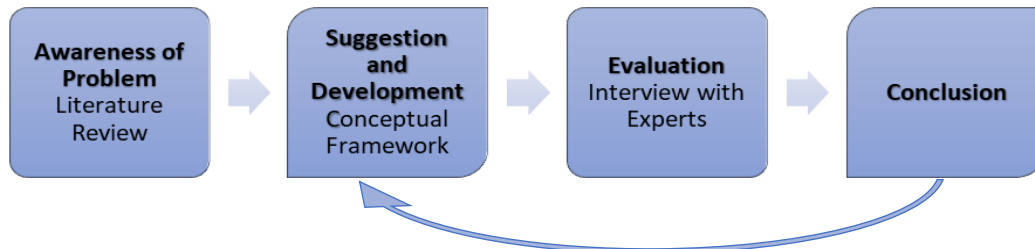

Figure 3: DSR Strategy

Awareness of Problem: The analytic literature review established awareness of the problem for the concept of democracy, information systems and the technologies that can serve democracy directly. Several common problems of democracies and information systems solutions were identified and analyzed.

A literature review is a process of getting to know what is already known in the research area about a specific field and get expertise on it. It is based on a researcher reading and understanding of the work of others in the same field. (Bryman, 2012) The main purpose of the literature review is to identify what is already known about this area and what concepts and theories those are relevant to this area. Moreover to identify what research methods and research strategies have been employed in studying this area and to identify if there are any unanswered research questions in this area. (Bryman, 2012)

Suggestion and Development:

- First, compare and categorize information systems technologies according to which democratic problem they can solve.
- Second, create a paired conceptual framework to categorize and map each democracy problem with each information systems platform or technology to create a typology between the problems of democracy found and the corresponding information systems solutions.

Evaluation: Interviews with experts will be carried out using semi-structured questions allowing to focus directly on the relevant issues. The main goal of these interviews is to evaluate and validate the conceptual framework and the typology between the problems of democracy and the corresponding information systems solutions according to the experts' opinion and try to improve it. There were 9 experts interviewed on the current situation of the e-democracy and information systems. These interviews provided a range of different opinions and views to help validate the proposed framework and to enable a deeper understanding of the main research question.

The processes of data collection and data analysis are part of this stage and allow the researcher to identify relationships and patterns in the collected data. There are two approaches to data collection and qualitative analysis. One focuses more on the use of existing theory to organize the data analysis and build up a theory. The other one collects data for the exploratory purpose and to understand in

which issues to concentrate on, for the theory to emerge from the process of data collection and analysis.

Data collection: This study used a comprehensive literature review to define categories and subcategories of paired problems of democracy and information system which resulted in the creation of the paired conceptual framework. This paired conceptual framework was used as a base for the interviews and was evaluated, validated and improved with each interview. Semi-structured questions were prepared and asked during the interview. Some questions that might not be relevant to the interviewed experts were omitted and the order of the questions asked depended on the flow of the conversation. The responses of the expert were recorded in audio and written notes were taken.

Table 1: Experts Profile

Profile	Level of education	Current Profession	Year of experience in E-government	
			Academic	Practice
Expert advisor of the special secretery of e-government in greece	PhD	Academic – Professor assistance	7	3
Responsible for IS at a municipality. E-government services	PhD student	Software engineer e-government		20
E-government Consulate	Master	Sells director specialized in e-government segment		18
President of the Portuguese Association for the Development of the Information Society and eGov development	PhD student	Consulting partner for e-government		43
Former Director General of the DG Informatic	PhD	International consultants and E-government		40
Researcher for e-government integrability	PhD	Researcher e-governance.	8	
Senior Researcher and Project Manager at the Information Systems Laboratory of the same department, working on European and National funded research and pilot application projects	PhD	Project manager for e-government integrability	7	
Works for the Greek Parliament	Master	IS and E-government		14
Works for the Greek Parliament	Master	Computer Analyst		30

Data Analysis: For this study, the type of data collected is qualitative data with non-numeric data or no quantified data. According to Saunders (Saunders, Lewis, & Thornhill, 2009) there is no standard procedure for analyzing qualitative data. However, we can group these data into three main types of processes: summarizing of meaning, categorization of meaning and structuring of meaning using narrative. Moreover, Miles and Huberman discussed also those three processes to analyze data

(Miles & Huberman, 1994). This type of research requires that data be classified and analyzed using conceptualization. The collected data needs to be summarized, grouped or categorized, restructured or identified by the relationships between categories as a narrative to support a meaningful analysis (Saunders et al., 2009). The process of analyzing the data is a continuous process that generates new categories and reorganizes the data (Kvale, 1996).

This study uses a combination of the following processes proposed by Saunders (Saunders et al., 2009) to support the data collection:

- Summarizing of meaning: The expert is audio-recorded and then transcribed. After the process of transcribing finishes, the process of summarizing of meaning starts. This process involves summarizing the key points of the interview. Summarizes long statement into smaller meaningful phrases (Kvale, 1996).
- Categorization of meaning: This process involves at first two activities: developing categories and attaching those categories in a meaningful way to the data (Saunders et al., 2009). Next it involves the activity of unitizing data, that allows attaching the collected data to the suitable category that have been already devised. Strauss and Corbin (Corbin, Strauss, & Strauss, 2008) proposed three main sources to derive designations for those categories: at first utilizing terms that emerge from the collected data, second based on the terms used by the responders and at last derived from terms used in the literature. All those categories represent information that is conceptually interesting or rare to researchers, information that was expected to be found before the study and information that was not expected to found before the study (Creswell, 2013).

  Categorizing the meanings can be done by using two sources: either from data collection or by complete literature review. In this study the typology between the found problems of democracy and the corresponding information systems solutions was created from a complete literature review. This emergent typology was guided by the purpose of the study as specified in the research objectives but allowed for new important issues to be added from the empirical data analysis. Then the collected data was analyzed to find any new insight for the research. The categories and the sub-categories of the problems of democracy and categories and the sub-categories of the corresponding information systems solutions must have a meaningful relation. This will help to indentify emerging analytical links between those categories and the interpretation of the data (Corbin et al., 2008).

- Structuring of meaning using narrative: This process involves extracting meaning from the data and reaching a conclusion. It starts with the qualitative data analysis and ends with the answering of the research question and reaching the research objectives. There are many approaches to generate meaning from the data, such as noting patterns, themes and clustering (Miles & Huberman, 1994). In this study the noting patterns and themes were used. The process started by noticing recurrent patterns and themes that were pulled together from the interviews with the experts. After the process of matching the data finished, the analysis of the data will follow to see what we have in the data and generate new ideas for the study.

Conclusion: Sum up and present the results of this study, analyze the limitations and possible future work.

4. CONCEPTUAL FRAMEWORK

4.1. ASSUMPTIONS

4.1.1. Democracy Assumptions

From the above literature review, one can conclude that the main problems of democracy are fairness and transparency, the influence of big money and that the individual desires for profit manipulates the democratic process and the public sector. As a result, it is obvious the imperfection of the current political systems, and as an extension the representative democracies. It is common to see our representatives act for their self-interests and be accused of corruption. People are not motivated to participate in such unfair political system and wish for a more direct and fair democracy. The lack of participation will only increase as people realize the problems. Especially the youth is getting upset because they cannot see a fair future. Although, the lack of education and the right to access democracy and be informed about it has its difficulties, and this happens because of the inefficiency of government to serve the citizens, as descripted in the table 1 and in more details in chapter 2.1.3 Challenges and Problems of Democracy. The introduction of information systems and the internet come as a solution to those problems because there are several technologies that can be used to serve the needs and ideas of democracy today.

Table 2: Problems of Democracy

Problems of Democracy					
Not being fair	**The problem of transparency**	**The imperfection of the representative political system**	**Inefficient government services**	**Lack of participation**	**Lack of education**
No equal distribution of influence	Globalization and democracy capitalism	The imperfection of the representation of social groups	Inefficient bureaucratic processes	Lack of participation of the young people	The citizens
Not all voices are being heard	Influence of big money	The tyranny of the majority, which does not protect the minorities and human rights	Expensive cost for public services and processes	Lack of participation of people in general	The representatives
There are not equal rights to access democracy	Corruption				
	Public services				

4.1.2. Technology Assumptions

Drawing from the literature review, a set of main clauses can be established on the specific contribution of technologies for components of democracy. I, therefore, establish a number of basic categories of technological instruments and how they can be applied to foster democracy. Hence, emerged seven basic categories of technological instruments with the most important of all the Internet and the access to it. The introduction of the Web 2.0 and social media brought a strong impact on the society, on the way people interact and communicate with each other and how they are interacting with the decision-making process and with the governments.

Moreover, the ubiquity of information changes the way people access the information and knowledge by making them more knowledgeable in a faster and easier way. The internet helps all voices to be heard and use them to support the civil society, encouraging the participation and especially the participation of the young people. It increases and supports the deliberative democracy and the freedom of speech, resulting in fairer government. Electronic voting and artificial intelligence promise protection and security from corruption and unfair behaviors from the governments and politicians. They offer fairer and more transparent decision-making process, plus better services for everyday routines, as descripted in table 3 and in more details in chapter 2.2.6 Technology serving Democracy directly.

Table 3: Technologies

Technologies						
Web 2.0	**Internet of things / Ubiquitous Computing**	**Electronic voting**	**Artificial Intelligence**	**Systems Integration / Inter-Operability**	**Distribution of Information**	**GIS applications**
Forums, discussion boards	Automatic meters	E-voting	Big data analysis, Cognitive services	Web services, data standards	RSS feeds	Geographic information systems
Social Networks		I-voting	Textual data, Automated sentiment analysis	Public key infrastructure, smart identity cards	Portals/ websites/knowledge sharing tools	
Wikis, collaborative platforms, knowledge sharing tools			Anomalies detection, Fraud detection		Emails lists	
Blogs, Micro-blogging					Mobile Computing	
Participative budgeting platforms					Blockchain Technologies	
					Peer to Peer networks	

This will allow to create a paned analysis with the main goal of building a typology model, as described in the chapter below. Ultimately, this conceptual framework with contributing to an important improvement in public policy towards enhancing the quality of democracy and the level of citizen engagement. Thus, it can be used as a consistent guideline for all levels of governments for a pragmatic use, allowing the governments to offer better services to the citizens and become more efficient by improving the quality of life and the decision-making process for the public good.

4.2. DEVELOPING THE CONCEPTUAL FRAMEWORK

4.2.1. Framework

In the above conceptual framework problems of democracies are paired with relevant IS platforms or solutions. It shows the typology between the problems of democracy found and corresponding the information systems solutions.

Technology		Platform/Solution	Not being fair — No equal distribution of influence	Not being fair — Not all voices are being heard	Not being fair — There are not equal rights to access Democracy	Transparency — Globalization and Democracy Capitalism	Transparency — Influence of Big Money	Transparency — Corruption	Transparency — Public services	Representative system — The imperfection of the representation of social groups	Representative system — The tyranny of the majority, which does not protect the minorities and human rights	Inefficient govt — Inefficient bureaucratic processes	Inefficient govt — Expensive cost for public services and processes	Lack of — participation of the young people	Lack of — participation of people in general	Lack of education — The citizens	Lack of education — The representatives
Technologies	Web 2.0	Forums, discussion boards	1a	1a	1a				1b	1c	1c			1d	1d	1e	1e
		Social Networks	1a	1a	1a				1b	1c	1c			1d	1d	1e	1e
		Wikis, collaborative platforms, knowledge sharing tools	1a	1a	1a				1b	1c	1c			1d	1d	1e	1e
		Blogs, Micro-blogging	1a	1a	1a				1b	1c	1c			1d	1d	1e	1e
		Participative budgeting platforms	1a	1a	1a				1b	1c	1c			1d	1d	1e	1e
	Internet of things / Ubiquitous	Automatic meters				2a	2a	2a	2a			2b	2b				
	Electronic voting	E-voting	3a	3a	3a				3b	3c	3c			3d	3d		
		I-voting	3a	3a	3a				3b	3c	3c			3d	3d		
	Artificial Intelligence	Big data analysis, Cognitive services	4a	4a	4a	4b	4b	4b	4b			4c	4c				
		Textual data, Automated sentiment	4a	4a	4a	4b	4b	4b	4b			4c	4c				
		Anomalies detection, Fraud detection	4a	4a	4a	4b	4b	4b	4b			4c	4c				
	Systems Integration / Inter-Operability	Web services, data standards				5a	5a	5a	5a			5b	5b				
		Public key infrastructure, smart identity cards				5a	5a	5a	5a			5b	5b				
	Distribution of Information	RSS feeds	6a	6a	6a				6b	6c	6c	6d	6d	6e	6e	6f	6f
		Portals/ websites/knowledge sharing tools	6a	6a	6a				6b	6c	6c	6d	6d	6e	6e	6f	6f
		Emails lists	6a	6a	6a				6b	6c	6c	6d	6d	6e	6e	6f	6f
		Mobile Computing	6a	6a					6b	6c	6c	6d	6d	6e	6e	6f	6f
		Blockchain Technologies	6a		6a			6b	6b	6c	6c	6d	6d	6e	6e		
		Peer to Peer networks	6a	6a	6a				6b	6c	6c	6d	6d	6e	6e	6f	6f
	GIS applications	Geographic information systems				7a	7a	7a				7b	7b				

Table 4: Conceptual Framework

4.2.2. Justification

In this chapter, the main clauses of the conceptual framework are explained in detail and how they pair with the democratic problems to shape the typology model. It shows the relationship between the found problems of democracy and the corresponding information systems, plus their use. Aiming to help governments and public policies to enhance the quality of democracy and the level of citizen engagement. More examples are describing in chapter 2.2.6 Technology serving Democracy directly.

To begin with, the first and one of the most important technologies is the Web 2.0., in more details:

1) Web 2.0 can be used to solve the problems of:
   a. Not being fair.
      All tools provided by the web 2.0 promote an equal participation of everyone willing to participate and contribute with their ideas in the democratic processes.
   b. The problem of transparency.
      Tools from the web 2.0 allow a far greater degree of transparency over how a consensus was reached, as all contributions are archived and accessible for anyone to examine. It is especially useful for providing an easy access to matters of public records, such as the actions of public services. At last, they offer greater transparency and better public services since the access to the correct information is easier and friendlier.
   c. The imperfection of the representative political system.
      As the tools from the web 2.0 allow for the participation of all interested parties, the representation of every interested party should match and can be measured by how many people actually participate in the discussion of the issues.
   d. Lack of participation.
      Through the use of forums, discussion boards, social networks, wikis, collaborative platforms, knowledge sharing tools, blogs, micro-blogging and participative budgeting platforms participation can be increased and allows to provide better and cheaper access to democracy for all. It increases collaboration between citizens and public and supports the idea of open source government and direct decision-making process. In addition, the representative can use the web 2.0 to gather information about what people need and the public opinion.
   e. Lack of education.
      Not all participants have the same level of education and understanding of issues, however, if people are allowed to freely exchange opinions and arguments one can expect that at a significant number of voters will be swayed by well-formed arguments of people who actually have a deep understanding of the subjects being discussed. Citizens can use it to educate themselves and be informed about the major issues of their countries.
2) Internet of things / Ubiquitous Computing can be used to solve the problems of:
   a. The problem of transparency.
      The heavy use of information technology will generate a huge amount of records that can be used to audit existing bureaucratic processes and communications. This will result in more transparent processes.
   b. Inefficient government services.

With a continuous stream of data provided by various system and the exchange of information between systems, it is possible to provide better and faster information for bureaucratical decision-making processes.

3) Electronic voting can be used to solve the problems of:

   a. Not being fair.

   Through the use of electronic and internet voting, it is possible to provide a platform where all interested parties can express their views.

   b. The problem of transparency.

   Through the use of a voting platform, it is possible to have an auditable record of who voted and in whom, resulting in added transparency in the decision-making process.

   c. The imperfection of the representative political system.

   As all parties can cast their votes one can assume that all interested parties are adequately represented. Moreover, it allows the government to survey the general opinion of the population in a fast and efficient way at any time.

   d. Lack of participation.

   An electronic voting system increases participation because citizens can vote from everywhere, even from their homes via a user-friendly environment.

4) Artificial Intelligence can be used to solve the problems of:

   a. Not being fair.

   An artificial intelligence, if implemented correctly, is not biased and bases its decision only on the data provided. This data-driven decision-making process should allow for better and fairer decision in the everyday routines.

   b. The problem of transparency.

   An artificial intelligence is not subject to the same corruption as a human and will apply the set of defined rules in a consistent way. Any decision made can be traced back to the set of rules and all decision should be able to be replicated assuming the same data and the same set of rules are used. If the rules are published any citizen knows why a certain decision was made and provides a fully transparent decision-making process.

   c. Inefficient government services.

   Artificial intelligence is orders of magnitude faster than humans in analyzing and applying a set of rules to reach a decision. This could provide nearly instantaneous bureaucratical processes.

5) Systems Integration / Inter-Operability can be used to solve the problems of:

   a. The problem of transparency.

   The ability for the various system to work together requires the use of common data formats. Common data formats allow citizens or data scientists to independently analyze data and reach their own conclusions. The ability to independently replicate results or analyze data is a fundamental requirement to implement transparent systems.

   b. Inefficient government services.

   Governmental services usually have independent information systems that don't talk to each other and require citizens to go retrieve needed records from other services in paper. This is highly inefficient and time-consuming. Today it is possible to connect information systems of different governmental services so that they exchange information and provide citizens a better

service. It is also possible to automate most of the bureaucratical processes through the use of online platforms, allowing easy and quick access to most governmental services.

6) Distribution of Information can be used to solve the problems of:

a. Not being fair.

Various tools for the distribution of information allow people to be informed about issues and to have a fairer access to relevant information for decision-making processes. The ability to subscribe to be informed about issues people are interested makes the access to information fairer.

b. The problem of transparency.

Having tools to distribute information increases the number of people informed about what is happening, which makes processes more transparent as there are more people watching what is happening.

c. The imperfection of the representative political system.

As information about processes gets distributed more people get informed, which makes them more aware of processes where they need to represent their interest.

d. Inefficient government services.

By leveraging tools for the distribution of information it is possible to keep governmental employees aware of important information that they require to be more efficient at their job. Moreover, obtaining feedback is an important tool to improve efficiency in governmental services.

e. Lack of participation.

The participation increases if the processes directly affect the interest of people. Therefore, if people are informed of processes, they have an interest in, then they will participate.

f. Lack of education.

Distribution of information through the use of tools, such as knowledge sharing tools, is a key factor in educating people.

7) GIS applications can be used to solve the problems of:

a. The problem of transparency.

The use of geographical information systems allows people to visualize information. This intuitive way of looking at information makes it easier to see incorrect information and interpret it. Since it is easier understand information in a visual way, it is likely that more people look at it, which also makes it more transparent.

b. Inefficient government services.

The use of GIS applications in governmental services allows information to be represented and displayed in a more understandable format. The use of maps can improve the quality of several different services in the public sector.

5. RESEARCH FINDINGS

5.1. INTRODUCTION

This chapter presents the summary of the findings for this research study and evaluation according the experts' opinion. It is divided intro five sections, the first section is an overview of the presented conceptual solutions, including a discussion concerning the theoretical contribution of this research. It is followed by a revised framework and the presentation of the advantages and disadvantages of this work and finished with conclusions of the main findings of this study.

5.2. THE CONCEPTUAL SOLUTIONS

5.2.1. Overview

All experts strongly agreed that information systems can help to foster democracy in all aspects, no doubt on that. They said it is the only way to evolve for the future and solve all the suggested democratic problems. Although some of them said that even if information systems can help democracy, we should be very careful of how and who is using them and the intentions of those people. A very common problem is their use to manipulate results and opinions. The technology helps a lot to improve democracy and public service and spread good information to the citizens. Moreover, all the experts have used information systems for e-government processes and to implement solution for the citizens.

5.2.2. Emerging problems of Democracy

All the experts agreed that the categorization of the above problems of democracy are valid and that they are the most important. The importance of the problems depends of the society, for example in Greece transparency is one of the most crucial problems. There might be other priorities depending on the political situation of each country. Plus, the experts from Greece believe that lack of education and participation is the root cause of the rest of the problems. Others believed that the lack of transparency and the imperfection of the representative political system are the most important and everything start from that.

Questioned if any important problem of democracy was missing from the above table, most of the experts said no but two of them mentioned the problem of accountability and its importance in fighting for transparency. Another missing problem mentioned was the lack of trust. An important issue that generates the lack of participation of young people.

The experts believe that main limitation of democracy today is the representative political system and the current application of democracy. The citizens are not sufficiently involved in the political system. We are far from the direct democracy we would like to be. The citizen as a person and as a voice should somehow be connected to the decision-making process. Moreover, the problem of transparency and mainly the corruption of the people and systems decreases the overall participation. There is a growing feeling that government is inefficient and that they don't provide the services they should. The citizens

do not see enough return for their paid taxes. To conclude, in the below table can see the revised problems of democracy after the evaluation of the experts.

Problems of Democracy						
Not being fair	The problem of transparency	The imperfection of the representative political system	Inefficient government services	Lack of participation	Lack of education	Lack of Trust
No equal distribution of influence	Globalization and democracy capitalism	The imperfection of the representation of social groups	Inefficient bureaucratic processes	Lack of participation of the young people	The citizens	**Public sector**
Not all voices are being heard	Influence of big money	The tyranny of the majority, which does not protect the minorities and human rights	Expensive cost for public services and processes	Lack of participation of people in general	The representatives	**Political system**
There are not equal rights to access democracy	Corruption					
	Public services					
	Accountability					

Table 5: Revised Problems of Democracy

5.2.3. Information Systems

All the experts agreed that the categorization of the above information systems technologies is valid. However, some very important technologies were missing, such as open data. Without open data we cannot ensure the fairness of the systems and services, neither fight for transparency. There was a single opinion that suggested the addition of the Internet of Things, simulations technologies and chat bots for public services.

5.2.3.1. Web 2.0

According to expert's opinion the Web 2.0 and their sub-categories can help democracy and solve the suggested problems. Only one expert said that he does not believe that web 2.0 will solve any of the suggested problems, but perhaps it can help to mitigate them, in some cases he believes that web 2.0 can make the problems worse, for instance, in the American elections and the theoretical interference of the Russian government. On the other hand, people can express their feeling about specific issues and free press allows you to compare opinions. Social media related technologies have improved the possibilities of communicating with your community but it can also be abused.

According to the experts, crowd funding platforms for e-government purposes have been designed to make processes faster and easier by matching the most relevant problems of the people with governmental funding by incentivising active participation of the people, since their opinion can be heard. People want to participate but they do not have a channel to express their voices. On the other hand, we must be careful with the source of the information and it is very important to give valid opinions. It is good to participate in a constructive way and to not destroying what it is being done.

They believe that participative budgeting platforms are growing not only in city halls, but it is a concept that is gaining momentum. It is a starting point to get people to believe in electronic voting, but adoption has been slow mainly due to the average person not being fluent with the use of technology and lack of marketing of the concept. However, the concept is very interesting because it really drives the participation of your citizens in the democratic processes and in the decision making. Citizens should be able to participate online in the public discussion. However, it is important to be able to identify who is participating as this prevents abuse and leads to better contributions, as every participant can be held responsible for what he has contributed.

To conclude, the majority of the experts believe that the Web 2.0 technologies can solve also the problem of inefficient government services because it makes the processes of the public sector less bureaucratical and people can use it to report issues. Public services can use the feedback to improve themselves.

Main advantages of Web 2.0 technologies:

- Participation and accessibility.
- Speed.
- Multiple to multiple connectivity, another channel to reach massive people, massive recipience of information beside TV and radio.
- Interactivity, not only passive recipience but they can interact with each other.
- Gives the opportunity to the citizen be part of the decision.
- Great impact to the transparency and corruption.
- Find easily solution to problems.
- The power, they empower people in a way that was very difficult to imaging before, it is a huge power that each of us is given.

Main disadvantages of Web 2.0 technologies:

- Overload of Information
- Lack of structure, difficult to analyse information exchanged for a specific area of interest on web 2.0 environments.
- With power come responsibility, fake news, the difficult to separate the significant post from the insignificant post, what is opinion and what is objective opinion.

- Security, the more open we make a system the more people can connect to something, the more users can have access to a document, information or data, the more you need to increase the security of this information. It just creates another problem.

5.2.3.2. Internet of things / Ubiquitous Computing

According expert's opinion the Internet of things / Ubiquitous Computing and their sub-categories can help democracy and solve the suggested problems. For instance, we can use them to automate several public services processes and information dissemination processes. The citizen will have to deal with less complicate process and the quality will be ensured. Moreover, this will have a positive impact in the problem of transparency too. Their main goal is to automate decisions by measuring everything everywhere, so data is available for decisions.

Main advantages of Internet of things / Ubiquitous Computing technologies:

- Helps a lot in the efficient of the government systems.
- Helps a lot in improving services for example services related with health systems and rescue systems, accidents, traffic.

Main disadvantages of Internet of things / Ubiquitous Computing technologies:

- Drawback the sense of control, problem of big brother vs efficiency.
- Avoid non-democratic decisions and non-constitutions decision.
- Security.
- Protection of personal data.

5.2.3.3. Electronic voting

According expert's opinion electronic voting can help democracy and solve the suggested problems. Electronic voting brings strong challenges and opportunities for e-government to increase participation by making people believe their vote is important.

Main advantages of Electronic voting technologies:

- Helps with the geographical concerns because many people do not vote just because they cannot visit the voting places. It gives them the flexibility in place and time to cast their vote.
- Helps with the costs of elections.
- Helps the environment because of saving the paperwork.
- All voices will have been heard, because we can do it from whatever device you want.

Main disadvantages of Electronic voting technologies:

- Security.
- Protection of personal data.
- Problem of authentication, there is always a doubt, it was true? It was well done? It was well controlled? Are all people well authenticate in the platform?

5.2.3.4. Artificial Intelligence

According to expert's opinion artificial intelligence and its sub-categories can help democracy and solve the suggested problems. The artificial intelligence capabilities are fundamental, and they can solve all the problems of authentication. We can design programs that can help and can act immediately and can detect fraud. We can measure people sentiment and how they feel about what government want to do or have done. It will ensure and deal with the lack of participation.

Main advantages of Artificial Intelligence technologies:

- With AI we are coming to the age of personalize services we do not need a portal. To have a kind of personal assistance.

Main disadvantages of Artificial Intelligence technologies:

- Protection of personal data.
- There are not tools yet that can analyse all this data and its capabilities, to make better decisions.
- Who is using these technologies, how and what are their intentions?
- Not sure if it will reduce the costs.

5.2.3.5. Systems Integration / Inter-Operability

According expert's opinion systems integration and inter-operability technologies can help democracy and solve the suggested problems. It is one of the most fundamental technologies together with AI and distribution of information for implementing e-government solutions. It is the biggest challenge of e-government today, to connect the government to government and to connect government to citizen. Those technologies can increase the efficient of government services with just one click. It will help citizens see the value for money in government services and that could increase participation. As an extension, they can ensure transparency and fairness of the systems and people.

Main advantages of Systems Integration / Inter-Operability technologies:

- Enable government to government integration.
- They lead to open data, avoiding corruption and improvement in the decision-making process.
- Gives you the security of your decision.

Main disadvantages of Systems Integration / Inter-Operability technologies:

- They need to be built well to avoid security and privacy problems.
- Security of this connection and interconnection.
- Protection of personal data.
- Just make sure that people have equal opportunities to access the systems.

5.2.3.6. Distribution of Information

According to expert's opinion distribution of information technologies can help democracy and solve the suggested problems. It is the future for trust and security. With open data and blockchain capabilities many things can change for the best. All experts agreed that the two concepts can change the way we think, feel and behave in online processes and services. The participation will be increased because people will trust and not be afraid to use all those services the e-government has to offer. Transparency will be part of our culture and an everyday habit. It can be the future for all problems, governments will gain trust of the citizens, the fraud will be less and easier to detect.

Main advantages of Distribution of Information technologies:

- They have the advantage that they make the information accessible and they give power to the people.
- Governments gain the trust of the citizens.
- It a kind of democratization because everybody can see and access everything.

Main disadvantages of Distribution of Information technologies:

- The Government does not have the correct tools and data sets for the tool to be applied correctly and efficiently.
- They need to be built well to avoid security and privacy problems.
- Protection of personal data.

5.2.3.7. GIS applications

According to expert's opinion GIS application can help democracy and solve the suggested problems. They suggest that GIS application and systems can solve additional democratic problems such as, not being fair. For example, building systems that use ubiquity computing, mobile technologies, geographical information systems and their interconnectivity to provide workflow that follows the decision-making processes and enables citizens to participate. In that sense GIS applications help with the problem of not being fair because with these types of systems people can vote on a topic related to a location or point of interest and be part of the decision-making process. Moreover, they explained that these applications help also with the lack of education, because such a system or a service allows you to find information about a specific point of interest as you pass and informs you about related governmental decisions. These applications can be used for fraud detection, security and fairness, for instance the records of the ownership of properties in fundamental for the ministry of agriculture. Police and the ministry of health already uses them too.

Main advantages of GIS application:

- It is open.
- It is a good example of interconnected.

Main disadvantages of GIS application:

- It is existing but in the most cases it is not been used, yet.
- Not connected with other systems.

To conclude in the below table, we can see the new emerging information system technologies from the evaluation of the experts.

Technologies						
Web 2.0	Internet of things / Ubiquitous Computing	Electronic voting	Artificial Intelligence	Systems Integration / Inter-Operability	Distribution of Information	GIS applications
Forums, discussion boards	**Sensors**	E-voting	Big data analysis, Cognitive services	Web services, data standards	RSS feeds	Geographic information systems
Social Networks		I-voting	Textual data, Automated sentiment analysis	Public key infrastructure, smart identity cards	Portals/ websites/knowledge sharing tools	
Wikis, collaborative platforms, knowledge sharing tools			Anomalies detection, Fraud detection		Emails lists	
Blogs, Micro-blogging					Mobile Computing	
Participative budgeting platforms					Blockchain Technologies	
					Peer to Peer networks	
					Open Data	

Table 6: Revised Technologies

5.3.5.3 NEW FRAMEWORK

To sum up, this is the new framework after the evaluation and valuations of the experts.

Technology	Not being fair: No equal distribution of influence	Not all voices are being heard	There are not equal rights to access Democracy	Transparency: Globalization and Democracy Capitalism	Influence of Big Money	Corruption	Public services	Accountability	Representative system: The imperfection of the representation of social groups	The tyranny of the majority, which does not protect the minorities and human rights	Inefficient bureaucratic processes	Expensive cost for public services and processes	Lack of participation of the young people	Lack of participation of people in general	Education: The citizens	The representatives	Trust: Public sector	Political system
Web 2.0 — Forums, discussion boards	x	x	x				x	x	x	x	x	x	x	x	x	x		
Social Networks	x	x	x				x	x	x	x	x	x	x	x	x	x		
Wikis, collaborative platforms, knowledge sharing tools	x	x	x				x	x	x	x	x	x	x	x	x	x		
Blogs, Micro-blogging	x	x	x				x	x	x	x	x	x	x	x	x	x		
Participative budgeting platforms	x	x	x				x	x	x	x	x	x	x	x	x	x		
IoT / Ubiquitous Computing — Sensors				x	x	x	x	x			x	x					x	x
Electronic voting — E-voting	x	x	x				x	x	x	x				x	x	x		
I-voting	x	x	x				x	x	x	x				x	x			
Artificial Intelligence — Big data analysis, Cognitive services	x	x	x	x	x	x	x	x			x	x					x	x
Textual data, Automated sentiment	x	x	x	x	x	x	x	x			x	x					x	x
Anomalies detection, Fraud detection	x	x	x	x	x	x	x	x			x	x					x	x
Systems Integration / Inter-Operability — Web services, data standards				x	x	x	x	x			x	x					x	x
Public key infrastructure, smart identity cards				x	x	x	x	x			x	x					x	x
Distribution of Information — RSS feeds	x	x	x				x	x	x	x	x	x	x	x	x	x		
Portals/ websites/knowledge sharing tools	x	x	x				x	x	x	x	x	x	x	x	x	x		
Emails lists	x	x	x				x	x	x	x	x	x	x	x	x	x		
Mobile Computing	x	x	x				x	x	x	x	x	x	x	x	x	x		
Blockchain Technologies	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Peer to Peer networks	x	x	x				x	x	x	x	x	x	x	x	x	x		
Open Data	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
GIS applications — Geographic information systems	x	x	x	x	x	x	x	x			x	x			x	x	x	x

Table 7: Revised Conceptual Framework

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5.4. ADVANTAGES AND DISADVANTAGES OF THE CONCEPTUAL FRAMEWORK

According to the expert's opinion this is a good, challenging and well written framework, that can strongly contribute in the academic and e-government world. It is strong and clear. By analysing all those indicators and issues we can understand the value of each one and understand how democracy and IS work together and how important that relationship is. It gives the opportunity to understand how technology can be used and is related with the problems of democracy and helps people that are designing public policies and government tools to understand how to stimulate and coordinate the intervention of the technology in society. This is a way to match problems with possible solutions/tools.

Advantages:

- Gives 360 degrees view about where we should go, what should be do, what should we try with specific issues.
- Helps to select the right combination of tools to be used to solve specific paradigms of democracy. Combine different technologies to a specific problem.
- To link the policy makers with the IT gaps.
- Gives usage for the IT for the technologies.
- It is a challenge.
- Gives the opportunity of the two-dimensional analysis.

On the other hand, they mention the following disadvantages:

Disadvantages:

- We should be able to relate the importance of the different tools with the different problems.
- Priority and cause grouped.
- As all frameworks it is not complete.

5.5. SOME CONCLUSIONS

All the experts argue that the best and ideal objective can be reached by combining the proposed technologies for better result. Alone they can have a small impact but together they can solve most of the problems and lead to a perfect solution. For example, blockchain technology combined with AI technology can help to some security issues. People will be more willing to participate and not be afraid to use and trust the public services. Many considerations mentioned the security of those technologies and of how they will be used and who will be using them. Argued that the open data is a very important technology or as some mention a policy. It allows to correct the systems with openness, trust and transparency. On the other hand, some explained that the openness in general can be in both dimensions because it can be characterized as problem of democracy as long as IS solution with open data. Whatever is on the internet can be accessed by anyone for any purpose.

6. CONCLUSION

According to this study and the above discussion there is no doubt that information systems can help to foster democracy in all aspects. As mentioned above the limitations of democracy today are many, and the imperfection of the current political systems is obvious. People are not motivated to participate in such unfair political system and wish for a more direct and fair democracy. The introduction of information systems technologies and the Internet come as a strong solution to those problems because together they can provide the security and trust people need. They give access to people to more open, trusted and transparent political systems and as an extension public service. People trust more the public sector and the governments, and as a result participate more, and the fear of corruption is being eliminated. As a result, all the objectives of this research study were fulfilled, and the main research question can be answered in a strong positive manner.

The conceptual solutions are recommended to be used as guidance in developing new practical solutions for the future. Several suggestions for further development have been made as we can see in the following list:

- Include research investigating the disadvantages of IS to democracy and see them together.
- Better analysis of the combination of the technologies is specific applications. For example, e-voting it is an application with many combined technologies.
- Can be used as a risk assessment by showing the advantages and disadvantages of technologies and what their consequences can be.
- Too much oriented to the present and not anticipating the future, related with the AI and robotics, that they will change the social system, with employment, the influence on decision making, the fake news that they will be create not from the human but from machinery.

7. BIBLIOGRAPHY

Adams, J. (2001). *Essential Guide to Qualitative Methods in Organizational Research*. Lawbook Exchange.

Aghekyan, E., Dunham, J., Repucci, S., & Tucker, V. (n.d.). Freedom in the World 2017 Populists and Autocrats: The Dual Threat to Global Democracy. Retrieved from https://freedomhouse.org/sites/default/files/FH_FIW_2017_Report_Final.pdf

Aitamurto, T. (n.d.). "Santa's Little Helpers: Wikidemocracy in Finland - Ominvoimin. Retrieved from https://web.archive.org/web/20160107053420/http://ominvoimin.com/santas-little-helpers-wikidemocracy-in-finland/

Aken, J. E. van. (2004). Management Research Based on the Paradigm of the Design Sciences: The Quest for Field-Tested and Grounded Technological Rules. *Journal of Management Studies*, *41*(2), 219–246. https://doi.org/10.1111/j.1467-6486.2004.00430.x

Albert Guérard. (1969). *France: A Modern History*. Univ of Michigan Pr; Revised, Enlarged edition (June 1, 1969).

Andrew, A. M. (2008). Cybernetics and e-democracy. *Kybernetes*, *37*(7), 1066–1068. https://doi.org/10.1108/03684920810884414

Andrew Chadwick. (2013). E-democracy. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/topic/e-democracy

Andrew Chadwick. (2016). E-government. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/topic/e-government

Anttiroiko, A.-V., & Ari-Veikko. (2003). Building strong e-democracy: the role of technology in developing democracy for the information age. *Communications of the ACM*, *46*(9), 121. https://doi.org/10.1145/903893.903926

Archard, D. (2005). *Isaiah Berlin: Liberty, Pluralism, and Liberalism -. Perspectives on Politics*. https://doi.org/10.1017/S1537592705240495

ASchumpeter, J. (2003). *Capitalism, Socialism and Democracy*. Routledge.

Atkinson, Robert D.; Castro, D. (2008). Digital Quality of Life. *The Information Technology and Innovation Foundation*, 137–145. Retrieved from http://www.itif.org/files/DQOL-14.pdf

Bakardjieva, M. (2009). Subactivism: Lifeworld and Politics in the Age of the Internet. https://doi.org/10.1080/01972240802701627

Barman, R. (2014). E-GOVERNMENT AND E-GOVERNANCE : A CONCEPTUAL FRAMEWORK. *International Journal of Social Science & Interdisciplinary Research*, *3*(12), 6–7.

BBC NEWS. (2008). Head to head: African democracy. Retrieved December 12, 2017, from http://news.bbc.co.uk/2/hi/africa/7671283.stm

Bendix, R., & Lipset, S. M. (1957). Political Sociology. *Current Sociology*, *6*(2), 79–99. https://doi.org/10.1177/001139215700600201

Bertot, J. C., Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency: E-government and social media as openness and anti-corruption tools for societies.

https://doi.org/10.1016/j.giq.2010.03.001

Bishop George. (2015). Polls Can Create an Illusion of Public Opinion. Retrieved December 12, 2017, from https://www.nytimes.com/roomfordebate/2015/11/30/does-polling-undermine-democracy/polls-can-create-an-illusion-of-public-opinion

Bohman, J. W. R. (1999). *Deliberative Democracy: Essays on Reason and Politics*. *Political Theory* (Vol. 109). https://doi.org/10.1086/233928

Boucher, P., Nascimento, S., & Kritikos, M. (2017). *How blockchain technology could change our lives*. Brussels. Retrieved from http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/581948/EPRS_IDA(2017)581948_EN.pdf

Brian Cooley. (2017). Dumb license plates are about to get smart. Retrieved January 31, 2018, from https://www.cnet.com/roadshow/news/dumb-license-plates-about-to-get-smart/

Bryman, A. (2012). *Social research methods*. *OXFORD University Press*. https://doi.org/10.1017/CBO9781107415324.004

Bulgacs, S. (2013). The first phase of creating a standardised international innovative technological implementation framework/software application. *International Journal of Business and Systems Research*, *7*(3), 250. https://doi.org/10.1504/IJBSR.2013.055312

Caldow, J. (2004). e-Democracy: Putting Down Global Roots. Retrieved from http://www-01.ibm.com/industries/government/ieg/pdf/e-democracy putting down roots.pdf

Caplan, B. (2005). From Friedman to Wittman: The Transformation of Chicago Political Economy. *Econ Journal Watch*, *2*(1), 1–21. Retrieved from https://econjwatch.org/file_download/63/2005-04-caplan-com.pdf?mimetype=pdf

Carter, A., & Stokes, G. (2002). *Democratic theory today : challenges for the 21st century*. (S. G. Carter April, Ed.) (1st ed.). Polity Press.

Cartledge, P. (2001). *Spartan reflections*. University of California Press. Retrieved from https://books.google.pt/books?id=JgFlxZ14hkoC&redir_esc=y

Charles de Secondat baron de Montesquieu. (1793). *The Spirit of Laws, Charles de Secondat baron de Montesquieu*. (F. Wingrave, Ed.) (5th ed.). Universidade de Michigan.

Chung-pin Lee, Kaiju Chang, F. S. B. (2011). Testing the Development and Diffusion of E-Government and E-Democracy: A Global Perspective. *Public Administration Review*, *71*, 444–454.

CIRI Human Rights Data Project. (2013). *HUMAN RIGHTS IN 2011: THE CIRI REPORT*. *CIRI Human Rights Data Project*. Retrieved from http://www.humanrightsdata.com/2013/08/human-rights-in-2011-ciri-report.html

Cohen, J. (2003). Deliberation and democratic legitimacy. *DEBATES IN CONTEMPORARY POLITICAL PHILOSOPHY. An Anthology*, 342–360. https://doi.org/10.4324/9780203986820

Coleman, S. (2008). *Doing IT for Themselves: Management versus Autonomy in Youth E-Citizenship*. (W. Lance Bennett., Ed.). The MIT Press. https://doi.org/10.1162/dmal.9780262524827.189

Copley Caroline. (2017). Merkel fears social bots may manipulate German election. Retrieved December 12, 2017, from https://www.reuters.com/article/us-germany-merkel-socialbots/merkel-fears-social-bots-may-manipulate-german-election-idUSKBN13J1V0

Corbin, J. M., Strauss, A. L., & Strauss, A. L. (2008). *Basics of qualitative research : techniques and procedures for developing grounded theory* (3rd ed.). Sage Publications.

Creswell, J. W. (2013). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. *Research design Qualitative quantitative and mixed methods approaches* (4th ed.). Sage Publications. https://doi.org/10.1007/s13398-014-0173-7.2

Cudd, A. E., & Scholz, S. J. (n.d.). *Philosophical perspectives on democracy in the 21st century*. Retrieved from http://ndpr.nd.edu/news/philosophical-perspectives-on-democracy-in-the-21st-century/

Dahl, R. A. (1991). *Democracy and Its Critics* (New Ed edi). Yale University Press.

Damrosch, L. (2007). *Jean-Jacques Rousseau: Restless Genius*. Mariner Books.

Daniel O'Maley. (2016). The Internet of Things. *Journal of Democracy*, *27*(3), 176–80. Retrieved from https://www.journalofdemocracy.org/article/internet-things

David Garson Jones, G. (2006). *PUBLIC INFORMATION TECHNOLOGY AND E-GOVERNANCE: MANAGING THE VIRTUAL STATE IMPLEMENTING AND MANAGING E-GOVERNMENT: AN INTERNATIONAL TEXT*. *Jones and Bartlett* (Vol. 85). Retrieved from http://library.uwp.ac.id/digilib/files/disk1/13/--publicadmi-605-12-12.pdf

David Romano. (2015). A Very Different Ideology in the Middle East. Retrieved May 20, 2017, from http://www.rudaw.net/english/opinion/29012015

Davis, C. J., Bowers, J. S., & Memon, A. (2011). Social Influence in Televised Election Debates: A Potential Distortion of Democracy. *PLoS ONE*, *6*(3), e18154. https://doi.org/10.1371/journal.pone.0018154

Democracia en Red. (n.d.). DemocracyOS - Change the Tool. Retrieved April 21, 2017, from http://democracyos.org/

Disch, L. (2006). Nadia Urbinati 2006 . Representative Democracy : Principles and Genealogy ., (2), 232–236. Retrieved from http://redescriptions.fi/media/uploads/yearbooks/2007/Disch_review_2007.pdf

Duff, A. S. (2005). Social Engineering in the Information Age. *The Information Society*, *21*(1), 67–71. https://doi.org/10.1080/01972240590895937

Dunn, J. (1994). *Democracy: The Unfinished Journey, 508 BC to AD 1993* (1st ed.). Oxford University Press.

Dutch government. (2018). Blockchain-projects. Retrieved April 17, 2018, from https://www.blockchainpilots.nl/home-eng

E-Government Academy. (2016). *e-Governance in Practice*. *E-Government Academy*. Retrieved from http://ega.ee/wp-content/uploads/2016/06/e-Estonia-e-Governance-in-Practice.pdf

Ed Dowding and team. (n.d.). Represent. Retrieved May 16, 2017, from https://represent.me/

European Commission. (2016). *eGovernment in Estonia*. Retrieved from https://joinup.ec.europa.eu/sites/default/files/inline-files/eGovernment in Estonia - February 2016 - 18_00_v4_00.pdf

EUROPEAN COMMISSION. (2016). *EU eGovernment Action Plan 2016-2020 - Accelerating the digital*

transformation of government. Brussels.

European Global Navigation Satellite Systems Agency. (2018). Galileo is the European global satellite-based navigation system. Retrieved January 31, 2018, from https://www.gsa.europa.eu/european-gnss/galileo/galileo-european-global-satellite-based-navigation-system

Fehér, F. (1990). *The French Revolution and the birth of modernity*. University of California Press.

Fierlbeck, K. (2008). *Globalizing democracy : power, legitimacy and the interpretation of democratic ideas*. Manchester University Press.

Francis Fukuyama, F. H. (U. S. . (2004). Democracy's Century: A Survey of Global Political Change in the 20th Century. *Freedom House*, 4. Retrieved from https://freedomhouse.org/reports/century.html

Frey, L., & Frey, M. (2004). *The French Revolution*. Greenwood Press.

Gaycken Sandro. (2016). The new power of manipulation. Retrieved December 12, 2017, from http://www.dw.com/en/the-new-power-of-manipulation/a-36074925

George Crowder. (2003). *Isaiah Berlin: Liberty, Pluralism and Liberalism*. Retrieved from http://berlin.wolf.ox.ac.uk/lists/onib/crowder/IBVPREL2003.pdf

Georgios Mavropalias. (n.d.). *The Blueprint of E-Democracy*. Scribd. Retrieved from https://www.scribd.com/document/171741980/The-Blueprint-of-E-Democracy

Gimmler, A. (2001). Deliberative democracy, the public sphere and the internet. *Philosophy & Social Criticism*, *27*(4), 21–39. https://doi.org/10.1177/019145370102700402

Gorton, W. A. (2016). Manipulating Citizens: How Political Campaigns' Use of Behavioral Social Science Harms Democracy. *New Political Science*, *38*(1), 61–80. https://doi.org/10.1080/07393148.2015.1125119

Graeme Auld, C. U. (2017). The review of policy research. *Policy Studies Organization*, *34*(6).

Gregory, D. (1985). *The ungovernable rock : a history of the Anglo-Corsican Kingdom and its role in Britain's Mediterranean strategy during the Revolutionary War, 1793-1797*. Fairleigh Dickinson University Press.

Grinin, L. E. (2004). *The Early State, Its Alternatives and Analogues*. (and A. V. K. Leonid E. Grinin, Robert L. Carneiro, Dmitri M. Bondarenko, Nikolay N. Kradin, Ed.). Uchitel' Publishing House.

Gross, F., & Dahl, R. A. (1957). A Preface to Democratic Theory. *American Sociological Review*, *22*(1), 118. https://doi.org/10.2307/2088784

Gustaf Arrhenius. (2011). Democracy for the 21th Century : Research Challenges, (August 2011).

Gutmann, A., & Thompson, D. F. (Dennis F. (2004). *Why deliberative democracy?* Princeton University Press.

Hayes, H., & Sharma, O. (2003). A DECADE OF EXPERIENCE WITH A COMMON FIRST YEAR PROGRAM FOR COMPUTER SCIENCE , INFORMATION SYSTEMS AND INFORMATION TECHNOLOGY MAJORS *. *Journal of Computing Sciences in Colleges*, *18*(3), 217–227.

Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). DESIGN SCIENCE IN INFORMATION SYSTEMS

RESEARCH. *Design Science in IS Research MIS Quarterly*, *28*(1), 75–105. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.103.1725&rep=rep1&type=pdf

Highland Youth. (n.d.). Highland Youth. Retrieved January 27, 2018, from https://www.highlifehighland.com/youth/getheard/

Hilbert, H. M. (2009). The Maturing Concept of E-Democracy: From E-Voting and Online Consultations to Democratic Value Out of Jumbled Online Chatter. *Journal of Information Technology & Politics*, *6*, 87–110. https://doi.org/10.1080/19331680802715242

Hilbert, M. (2003). DIGITAL PROCESSES AND DEMOCRATIC THEORY: Dynamics, risks and opportunities that arise when democratic institutions meet digital information and communication technologies. Retrieved from http://www.martinhilbert.net/democracy.html

Hirschmann, N. J. (2009). *Gender, Class, and Freedom in Modern Political Theory*. Princeton: Princeton University Press.

Information- analytical centre (IAC). Russian Space Agency. (n.d.). Information analytical centre of GLONASS and GPS controlling. Retrieved January 31, 2018, from https://web.archive.org/web/20111020035436/http://www.glonass-ianc.rsa.ru/en/

J. Manuel Feliz-Teixeira. (2012). *The Perfect Time for the Perfect Democracy? Physics, Modelling & Simulation* (Vol. 11). Retrieved from https://paginas.fe.up.pt/~feliz/e_poster4_wiki-law-government.pdf

Jafarkarimi, H., Sim, A., Saadatdoost, R., & Hee, J. M. (2014). The Impact of ICT on Reinforcing Citizens' Role in Government Decision Making. *International Journal of Emerging Technology and Advanced Engineering*, *4*(1), 642–646. Retrieved from http://www.ijetae.com/files/Volume4Issue1/IJETAE_0114_109.pdf

Jain Palvia, S. C., & Sharma, S. S. (n.d.). E-Government and E-Governance: Definitions/Domain Framework and Status around the World. Retrieved from http://www.iceg.net/2007/books/1/1_369.pdf

James A. O'Brien. (2003). *Introduction to information systems: essentials for the E-business enterprise* (11th Editi). Boston, MA: McGraw-Hill.

Jensen, M. J., Danziger, J. N., & Venkatesh, A. (2007). Civil Society and Cyber Society: The Role of the Internet in Community Associations and Democratic Politics. https://doi.org/10.1080/01972240601057528

Jeong, C. H. @ I. (2007). *Fundamental of development administration*. Scholar. Retrieved from https://books.google.pt/books/about/Fundamental_of_Development_Administratio.html?id=S oJRAQAACAAJ&redir_esc=y

John D. Sutter, C. (2012). The OPEN Act as an experiment in digital democracy. *CNN*. Retrieved from http://edition.cnn.com/2012/01/18/tech/the-open-act-as-an-experiment-in-digital-democracy/index.html

John Stuart Mill. (1913). *On Liberty: The philosophical work that changed society for ever Harriman Economics Classics*. (Harriman House Limited, Ed.).

Johnston, D. M. (2008). *The historical foundations of world order : the tower and the arena*. Martinus Nijhoff Publishers.

Jordan Robertson, Michael Riley, and A. W., & Juan Arredondo. (2016). How to Hack an Election Andrés Sepúlveda rigged elections throughout Latin America for almost a decade. He tells his story for the first time. Retrieved December 12, 2017, from https://www.bloomberg.com/features/2016-how-to-hack-an-election/

KARIMI, J. (1988). Strategic Planning for Information Systems: Requirements and Information Engineering Methods. *Journal of Management Information Systems*. Taylor & Francis, Ltd. https://doi.org/10.2307/41432885

Khan, S. (2016). *Leadership in the digital age – A study on the effects of digitalisation on top management leadership*. Retrieved from https://su.diva-portal.org/smash/get/diva2:971518/FULLTEXT02.pdf

Klewes, J., Popp, D., & Rost-Hein, M. (2017). *Out-thinking Organizational Communications: The Impact of Digital Transformation*. (J. Klewes, D. Popp, & M. Rost-Hein, Eds.). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-41845-2

Korab-Karpowicz, W. J. (2010). *A History of Political Philosophy: From Thucydides to Locke*. New York: Global Scholarly Publications.

Kroenke, D. M. (2008). *Experiencing MIS* (6 edition). Upper Saddle River, NJ: Prentice Hall.

Kurt A. Raaflaub, Josiah Ober, Robert Wallace, Paul Cartledge, C. F. (2007). *Origins of Democracy in Ancient Greece*. University of California Press.

Kvale, S. (1996). *Interviews : an introduction to qualitative research interviewing* (1st ed.). Sage Publications.

Landemore, H. (2007). Is representative democracy really democratic ? Interview of Bernard Manin and Nadia Urbinati. Retrieved from http://www.booksandideas.net/IMG/pdf/20080327_manin_en.pdf

Lape, S. (2009). *Reproducing Athens: Menander's Comedy, Democratic Culture, and the Hellenistic City*. Princeton University Press.

Lawrence R. Jacobs, U. of M. (2001). Commentary: Manipulators and Manipulation: Public Opinion in a Representative Democracy. *American Journal of Political Science*, *40*, 1361–1374.

Leighninger, M. (2011). Citizenship and governance in a wild, wired world: How should citizens and public managers use online tools to improve democracy? *National Civic Review*, *100*(2), 20–29. https://doi.org/10.1002/ncr.20056

Lijphart, A. (1999). *Consensual Democracy*. Retrieved from http://www.consensualdemocracy.com/

Livesey, J. (2001). *Making democracy in the French Revolution*. Harvard University Press.

Lynn Hunt, Thomas R. Martin, Bonnie G. Smith, Barbara H. Rosenwein, R. P. H. (2008). *The Making of the West: Peoples and Cultures, Vol. 1: To 1740* (3rd ed.). Boston and New York: Bedford/St. Martin's.

Mancini, P. (2017, December 6). "Wiki" Democracy Begins In Argentina. *HuffPost*. Retrieved from https://www.huffingtonpost.com/pablo-mancini/wiki-democracy-begins-in-_b_934331.html

McNitt, K. A. (2008). *The Effect of the Internet on the Civic Engagement and Voting Behavior of Young Americans*. Retrieved from http://lib.dr.iastate.edu/rtd

Meltzer, A. H., & Richard, S. F. (1981). A Rational Theory of the Size of Government. *Source Journal of Political Economy*, *89136119*(5), 914–927. Retrieved from http://www.jstor.org/stable/1830813

Merkel, W. (2013). Is there a crisis of democracy? Can we answer the question? Retrieved from http://www.democracybarometer.org/Papers/Merkel_2013_APSA.pdf

Merriam Webster. (n.d.). Definition of Consensus. Retrieved May 16, 2017, from https://www.merriam-webster.com/dictionary/consensus

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis : an expanded sourcebook*.

Mossberger, K., & Jimenez, B. (2009). CAN E-GOVERNMENT PROMOTE CIVIC ENGAGEMENT? A study of local government websites in Illinois and the College of Urban Planning and Public Affairs. Retrieved from https://ipce.uic.edu/interior/egovtfinalreport2009.pdf

Nam, T. (2012). Dual effects of the internet on political activism: Reinforcing and mobilizing. *Government Information Quarterly*, *29*, S90–S97. https://doi.org/10.1016/j.giq.2011.08.010

Net Democracy Foundation. (2013). Net Democracy Foundation - Year 2013. Retrieved May 16, 2017, from https://www.slideshare.net/santisiri/net-democracy-foundation-year-2013

Neto, M. D. C. (2017). *Introduction in Business Intelligences*.

Nicusa. (2006). *Expanding eGovernment Every Day*. Retrieved from http://media.govtech.net/custompubs/NIC0806/PCIO06_NIC_TLP_screen.pdf

Norris, P. (2000). The Worldwide Digital Divide: Information Poverty, the Internet and Development. London: John F. Kennedy School of Government Harvard University Cambridge. Retrieved from https://pdfs.semanticscholar.org/acff/d927594b58b81f18ec9f27c64ff9b2ad452e.pdf

Ober, J. (2008). *Democracy and knowledge : innovation and learning in classical Athens*. Princeton University Press. Retrieved from https://books.google.pt/books?id=nQVeaO4vJZoC&redir_esc=y

Orçamento Participativo. (n.d.). OPP. Retrieved May 16, 2017, from https://opp.gov.pt/

Organisation for Economic Co-operation and Development. (2003). *Promise and Problems of E-Democracy: Challenges of Online Citizen Engagement*. Paris. Retrieved from http://www.oecd.org/governance/digital-government/35176328.pdf

Palmer, R. R. (Robert R., & Colton, J. (1978). *A history of the modern world*. Knopf.

Paul Collier. (2009). Five myths about elections' power to change nations. Retrieved December 12, 2017, from http://www.washingtonpost.com/wp-dyn/content/article/2009/11/06/AR2009110601906.html

PEOPLE'S ADMINISTRATION - mainstream UK party for reform to Direct Democracy. (n.d.). Direct Democracy. Retrieved January 26, 2018, from http://www.paparty.co.uk/

Perry, M. S. (2015). Four Dimensions of Democracy. *Essays in Philosophy*, *16*(1), 3–25. https://doi.org/10.7710/1526-0569.1518

Perry, W. L., McInnes, B., Price, C. C., Smith, S. C., & Hollywood, J. S. (2013). *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations*. https://doi.org/10.1214/07-EJS057

Petrik, K. (2009). Participation and e-Democracy How to utilize Web 2.0 for policy decision-making. In

The Proceedings of the 10th International Digital Government Research Conference. Puebla, Mexico. Retrieved from https://ai2-s2-pdfs.s3.amazonaws.com/5ecf/7584a553ec1607818b9a6f358bf8ab38ff4e.pdf

Petrik, K. (2010). Deliberation and collaboration in the policy process: A web 2.0 approach. *JeDEM-EJournal of EDemocracy and Open …*, *2*(1), 18–27. Retrieved from http://www.jedem.org/index.php/jedem/article/view/14

Pettinger, T. G. (2013). People who shaped democracy. Retrieved October 22, 2017, from www.biographyonline.net

Pia Mancini. (2014). Pia Mancini: How to upgrade democracy for the Internet era | TED Talk | TED.com. Retrieved April 21, 2017, from https://www.ted.com/talks/pia_mancini_how_to_upgrade_democracy_for_the_internet_era

Piraten Partei. (2013). Piratenpad. Retrieved May 20, 2017, from https://www.piratenpad.de/

Polack, J. (2009). PLANNING A CIS EDUCATION WITHIN A CS FRAMEWORK. *Journal of Computing Sciences in Colleges*, *25*(2), 100–106.

Pomeroy, S. B., & Rogers D. Spotswood Collection. (1999). *Ancient Greece : a political, social, and cultural history*. Oxford University Press. Retrieved from https://books.google.pt/books?id=INUT5sZku1UC&redir_esc=y

Popper, K. R. (Karl R. (2003). *The Open Society and Its Enemies: The Spell of Plato*. Routledge.

Portugal Participa. (n.d.). Portugal Participa. Retrieved May 16, 2017, from http://www.portugalparticipa.pt/

Portuguese Republic. (n.d.-a). e-fatura. Retrieved February 1, 2018, from https://faturas.portaldasfinancas.gov.pt/home.action

Portuguese Republic. (n.d.-b). Portal das Finanças. Retrieved February 1, 2018, from http://www.portaldasfinancas.gov.pt/at/html/index.html

PUBLIC, R.-B., & FOR, P. S. (2011). Promoting Youth Civic Engagement, (November). Retrieved from http://www.cssp.org/policy/papers/Promoting-Youth-Civic-Engagement.pdf

René Peralta. (2016). Electronic voting. In *Britannica*. Retrieved from https://www.britannica.com/topic/electronic-voting

Reporters Without Borders. (2017). *The World Press Freedom Index 2017*. *Reporters Without Borders*. Retrieved from https://rsf.org/en/world-press-freedom-index

Richard Hooker. (1997). The Radical Revolution. Retrieved from https://web.archive.org/web/19990203212816/http://www.wsu.edu/~dee/REV/RADICAL.HTM

Rienks, R. (2015). *Predictive Policing: Taking a Chance for a Safer Future*.

Riley, P. (n.d.). THE GENERAL WILL BEFORE ROUSSEAU, *6*(4), 485–516. Retrieved from https://www.jstor.org/stable/pdf/190994.pdf?refreqid=excelsior%3A5c2a3ebb417035f8fc17b1b411b3425a

Robert A. Dahl. (2017). Democracy. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/topic/democracy

Robinson, E. W. (1997). *The first democracies : early popular government outside Athens*. F. Steiner. Retrieved from https://books.google.pt/books?id=T1kfcobFRSMC&redir_esc=y

Rose, W. R., & Grant, G. G. (2010). Critical issues pertaining to the planning and implementation of E-Government initiatives. *Government Information Quarterly*, *27*, 26–33. https://doi.org/10.1016/j.giq.2009.06.002

Ross, E. (2016). Apps for democracy – open data and the future of politics | Media Network | The Guardian. Retrieved May 16, 2017, from https://www.theguardian.com/media-network/2016/aug/19/apps-for-democracy-open-data-and-the-future-of-politics

Rowinski, D. (2015). Survey: 1 In 6 Internet Users Own A Smartwatch Or Fitness Tracker. Retrieved May 16, 2017, from https://arc.applause.com/2015/01/12/survey-1-6-people-smartwatch-fitness-tracker/

Russell Meiggs. (2015). Cleisthenes of Athens. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/biography/Cleisthenes-of-Athens

Ryan Craggs. (2013). *World Freedom Index 2013: Canadian Fraser Institute Ranks Countries*. *Huffington Post*. Retrieved from https://www.huffingtonpost.com/2013/01/09/world-freedom-index-2013_n_2440620.html

Saglie, J., & Vabo, S. I. (2009). Size and e-Democracy: Online Participation in Norwegian Local Politics. *Scandinavian Political Studies*, *32*(4), 382–401. https://doi.org/10.1111/j.1467-9477.2009.00235.x

Sanjay Acharya, M. A. (2014). ITU releases annual global ICT data. Retrieved May 16, 2017, from http://www.itu.int/net/pressoffice/press_releases/2014/68.aspx#.WRtO1WjyuJi

Santos, V. (2017). *Architectures for Information Technology Building a New Information System - part 4 Architectures for Information Technology Syllabus*.

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research Methods for Business Students*. *Research methods for business students* (5th ed.). Pearson Education. https://doi.org/10.1007/s13398-014-0173-7.2

Seifert, J. W., & Chung, J. (2009). Using E-Government to Reinforce Government–Citizen Relationships Comparing Government Reform in the United States and China. *Social Science Computer Review*, *27*(1). https://doi.org/10.1177/0894439308316404

Seymour Drescher. (2017). Alexis de Tocqueville. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/biography/Alexis-de-Tocqueville

Sharma, Urmila & Sharma, S. K. (2006). *Western Political Thought*. Washington: Atlantic Publishers.

Slater Dan, L. A. W. (2017). Was the 2016 U.S. election democratic? Here are 7 serious shortfalls. Retrieved December 12, 2017, from https://www.washingtonpost.com/news/monkey-cage/wp/2017/01/12/was-the-2016-u-s-election-democratic-we-see-7-serious-shortfalls/?utm_term=.b35fa3e1348e

Somin Ilya. (2014). What No One Talks About During Election Season: Voter Ignorance. *Forbes Opinion*. Retrieved from https://www.forbes.com/sites/realspin/2014/11/03/what-no-one-talks-about-during-election-season-voter-ignorance/#afbb4a1a4946

Speech, E. C.-. (2018). Speech by Commissioner Gabriel on building the European digital economy

and society at the DLD conference. In *European Commission*. Munich. Retrieved from http://europa.eu/rapid/press-release_SPEECH-18-390_en.htm

Staufenberg Jess. (2016). Political cyberhacker Andrés Sepúlveda reveals how he digitally rigged elections across Latin America. Retrieved December 12, 2017, from https://www.independent.co.uk/news/world/americas/political-cyberhacker-andres-sepulveda-reveals-how-he-digitally-rigged-elections-across-latin-a6965161.html

Stefan Schultz. (2010). "Peak Oil" and the German Government: Military Study Warns of a Potentially Drastic Oil Crisis. Retrieved December 12, 2017, from http://www.spiegel.de/international/germany/peak-oil-and-the-german-government-military-study-warns-of-a-potentially-drastic-oil-crisis-a-715138.html

Stephen D. Tansey. (1995). *Politics: The Basics*. London: New York : Routledge.

Stevenson, C. S. and A. (2003). *Oxford Dictionary of English* (2nd editio). Oxford: Oxford University Press.

Terry Buckley. (2010). *Aspects of Greek History 750–323BC: A Source-Based Approach*. *Routledge*. Retrieved from https://books.google.pt/books?id=PV-OAgAAQBAJ&hl=pt-PT

The Department of Economic and Secretariat, F. of the U. N., & (UNDESA). (2007). E-Participation and E-Government: Understanding the Present and Creating the Future. *United Nations*. Retrieved from http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN026527.pdf

The Economist. (2008). The road to e-democracy. *The Economist*. Retrieved from http://www.economist.com/node/10638222

The Editors of Encyclopædia Britannica. (2016). Lycurgus. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/topic/Lycurgus-Spartan-lawgiver

The Etherpad Foundation. (n.d.). Etherpad. Retrieved May 16, 2017, from http://etherpad.org/

The National Archives. (n.d.-a). Citizenship 1625-1789. Retrieved December 11, 2017, from http://www.nationalarchives.gov.uk/pathways/citizenship/rise_parliament/citizenship2.htm

The National Archives. (n.d.-b). Struggle for democracy. Retrieved December 11, 2017, from http://www.nationalarchives.gov.uk/pathways/citizenship/struggle_democracy/getting_vote.htm

Theodore John Cadoux. (2017). Solon. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/biography/Solon

Tim Davies. (n.d.). Open Data Services. Retrieved May 16, 2017, from http://www.opendataservices.coop/

Tolbert, C. J., Mossberger, K., Tolbert, C. J., & Mossberger, K. (2006). The Effects of E-Government on Trust and Confidence in Government. *Wiley*, *66*(3), 354–369.

Tom Sorell. (2017). Thomas Hobbes. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/biography/Thomas-Hobbes#toc275880

Toni G.L.A. van der Meer, D. G. and S. R. (2014). e-Democracy: Exploring the Current Stage of e-Government. *JOURNAL OF INFORMATION POLICY*, *4*(2014), 489–506.

Treano Paul. (2016). Why democracy is wrong. Retrieved May 20, 2017, from

http://web.inter.nl.net/users/Paul.Treanor/democracy.html

Tremblay Pinar. (2017). In run-up to referendum, Turks can say anything but "no." Retrieved December 12, 2017, from https://www.al-monitor.com/pulse/originals/2017/02/turkey-referendum-erdogan-tone-policing-backfires.html

Tucker, A., Deek, F., Jones, J., Hayden, C., School, H., Mccowan, D., … Verno, A. (2003). A Model Curriculum for K–12 Computer Science: Final Report of the ACM K–12 Task Force Curriculum Committee.

United States government. (n.d.). Official Guide to Government Information and Services | USAGov. Retrieved May 19, 2017, from https://www.usa.gov/

Ushahidi. (2008). Ushahidi. Retrieved May 16, 2017, from https://www.ushahidi.com/

Vaishnavi, V., Kuechler, B., & Petter, S. (n.d.). DESIGN SCIENCE RESEARCH IN INFORMATION SYSTEMS. Retrieved from http://desrist.org/desrist/content/design-science-research-in-information-systems.pdf

Vladimir Zwass. (2016). Information Systems. In *Encyclopædia Britannica*. Encyclopædia Britannica, inc. Retrieved from https://www.britannica.com/topic/information-system

Vragov, R., & Kumar, N. (2013). The impact of information and communication technologies on the costs of democracy. *Electronic Commerce Research and Applications*, *12*(6), 440–448. https://doi.org/10.1016/j.elerap.2013.06.003

Webster, F. (2004). *Theories of the information society*. Routledge. Retrieved from https://www.routledge.com/Theories-of-the-Information-Society-4th-Edition/Webster/p/book/9780415718790

Whitehouse.gov. (2013). Report to Congress on the Benefits of the President's E-Government Initiatives - Fiscal 2012, (July 14, 2013). Retrieved from http://www.whitehouse.gov/sites/default/files/omb/assets/egov_docs/fy12_e-gov_benefits_report.pdf

World Economic Forum. (2015). Digital Transformation. Retrieved January 18, 2018, from http://reports.weforum.org/digital-transformation/

YOURDON, I. (1993). *YOURDON Systems Method : model-driven systems development* (1st ed.). Yourdon Press.

8. APPENDIX A

Title of Study: What is the impact of Information Systems on democracy promotion and the role in decision-making process

Study Subjects

You are being invited to participate in this research about the role of information systems and social media in democratic activities and how information systems can be a part of core democratic processes and contribute to finding solutions for some of the problems democracies faces today. It is important for you to understand why the research is being done and what it will involve. Please take your time to read the following information carefully. Please ask if there is anything that is not clear or if you would like to have more information. Thank you for reading this.

What is the purpose of this study?

This study aims to contribute to a better understanding of modern democracy and how democracy can be shaped by information systems solutions. We discuss the role of information systems and social media in democratic activities and how information systems can be a part of core democratic processes and contribute to finding solutions for some of the problems democracies face today. The main question being: how is democracy fostered by the introduction of information systems and the existing information systems platforms today?

What will happen during the Interview?

You will be asked to evaluate the following framework (Table 1) with your knowledge and expertise in the research field. For this purpose, you will be asked to answer several questions about your opinion on the proposed framework. The interview will take place at a location of your preference or via skype at an agreed time scheduled at a convenient time. The whole interview will take approximately 40 minutes to complete and will be recorded, with your permission. The recorded interview and information will only be used for academic purposes and will be treated as with confidential.

You will also be asked if your name can be added to the roster of interviewees or if your contribution should be kept anonymous. Any provided information will not be quoted directly, so that it can't be attributed to a participant.

The personal information collected about you in the beginning of the interview is only for discerning patterns in the data collected and could never be used to identify you personally. All data collected will be kept and accessed only by the researcher and the supervisor of this research and will never be made available for other parties or be made public.

Will my participation in this study be kept confidential?

All information obtained relating to this study will be treated as privileged and confidential. All information will be anonymous so that you cannot be identified, except by a single Participant Identification Form, which will be saved electronically on a password protected computer. The results obtained from this study will be kept for possible use in future studies, whereby all personal data will be

deleted in three years from the time completion of the research.

What will happen to the results of the study?

The findings will be available in the form of a report, which will be included in a thesis that forms part of a Master's degree. Furthermore, it is also likely that the researcher will write a scientific paper based on the findings of this study, and this paper will be published in professional journals or at conferences.

Contact for further information

For further information, please contact:

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Yours sincerely,

Maria Anastasiadou

9. APPENDIX B

This study aims to contribute to a better understanding of modern democracy and how democracy can be shaped by information systems solutions. We discuss the role of information systems and social media in democratic activities and how information systems can be a part of core democratic processes and contribute to finding solutions for some of the problems democracies face today. The main question being: how is democracy fostered by the introduction of information systems and the existing information systems platforms today?

Demographics

1) Name.
2) Level of education.
3) Profession.
4) Years of expertise in the field of IS and public sector or democracy.
5) What are your daily job responsibilities?

General

1) Do you think that technology / IS can improve democracy? Why?
2) Do you think that technology / IS can improve the decision-making process? Why? How?
3) Do you think that technology / IS can improve the efficiency of the public sector? Why? How?
4) Can you describe the main IS you use in your department? Why?

Democracy

1) Do you think that the above categories of democratic problems are valid? Why?
2) Can you suggest possible corrections on categories of democratic problems? Why?
3) Do you think that those problems of democracy are the most important?
4) According to your opinion, is there missing any important problem of democracy from the above table?
5) IS which of the following democratic problems can improve? Why?
6) According to your opinion what in the main limitations of Democracy today?

Information Systems

1) Which of those technologies are you familiar with?
2) Do you think that the above categories of technologies are valid? Why?
3) Can you suggest possible correction on categories of technologies? Why?

Web 2.0

1) Do you think that Web 2.0 technologies can help democracy to become better? Why and How?
2) According to your opinion, which of the following problems of democracy can Web 2.0 technologies improve?Why? Can you give an example?
3) According to your opinion what in the main advantages of Web 2.0 technologies?
4) According to your opinion what in the main disadvantages of Web 2.0 technologies?
5) Do you think is missing any democratic problem that Web 2.0 technologies can improve?

Internet of things / Ubiquitous Computing

1) Do you think that Internet of things / Ubiquitous Computing technologies can help democracy to become better? Why and How?
2) According to your opinion, which of the following problems of democracy can Internet of things / Ubiquitous Computing technologies improve?Why? Can you give an example?
3) According to your opinion what in the main advantages of the Internet of things / Ubiquitous Computing technologies?
4) According to your opinion what in the main disadvantages of the Internet of things / Ubiquitous Computing technologies?
5) Do you think is missing any democratic problem that Internet of things / Ubiquitous Computing technologies can improve?

Electronic voting

1) Do you think that Electronic voting technologies can help democracy to become better? Why and How?
2) According to your opinion, which of the following problems of democracy can Electronic voting technologies improve?Why? Can you give an example?
3) According to your opinion what in the main advantages of Electronic voting technologies?
4) According to your opinion what in the main disadvantages of Electronic voting technologies?
5) Do you think is missing any democratic problem that Electronic voting technologies can improve?

Artificial Intelligence

1) Do you think that Artificial Intelligence technologies can help democracy to become better? Why and How?
2) According to your opinion, which of the following problems of democracy can Artificial Intelligence technologies improve?Why? Can you give an example?
3) According to your opinion what in the main advantages of Artificial Intelligence technologies?
4) According to your opinion what in the main disadvantages of Artificial Intelligence technologies?
5) Do you think is missing any democratic problem that Artificial Intelligence technologies can improve?

Systems Integration / Inter-Operability

1) Do you think that Systems Integration / Inter-Operability technologies can help democracy to become better? Why and How?
2) According to your opinion, which of the following problems of democracy can Systems Integration / Inter-Operability technologies improve?Why? Can you give an example?
3) According to your opinion what in the main advantages of Systems Integration / Inter-Operability technologies?
4) According to your opinion what in the main disadvantages of Systems Integration / Inter-Operability technologies?
5) Do you think is missing any democratic problem that Systems Integration / Inter-Operability technologies can improve?

Distribution of Information

1) Do you think that Distribution of Information technologies can help democracy to become better? Why and How?
2) According to your opinion, which of the following problems of democracy can Distribution of Information technologies improve?Why? Can you give an example?
3) According to your opinion what in the main advantages of Distribution of Information?
4) According to your opinion what in the main disadvantages of Distribution of Information?
5) Do you think is missing any democratic problem that Distribution of Information technologies can improve?

GIS applications

1) Do you think that GIS systems can help democracy to become better? Why and How?
2) According to your opinion, which of the following problems of democracy can GIS systems improve?Why? Can you give an example?
3) According to your opinion what in the main advantages of GIS systems?
4) According to your opinion what in the main disadvantages of GIS systems?
5) Do you think is missing any democratic problem that GIS systems can improve?
6) Do you think is missing any democratic problem that Geographic information systems can improve?
7) According to your opinion and level of expertise, what are the main disadvantages of the suggested framework? Why?
8) According to your opinion and level of expertise, what are the main advantages of the suggested framework? Why?
9) Can you suggest possible correction on the current model? Why?

Any other comment or suggestion for future development in general?

Thank you very much!