

Artificial Intelligence and Citizen Participation in Governance: Opportunities and Threats

Nadia LAHDILI*

Murat ÖNDER**

Israel Nyaburi NYADERA***

Abstract: This study seeks to develop a research agenda by looking at the nexus between citizen participation and artificial intelligence (AI). Existing studies have focused more on conceptual, explanatory, and practice-driven aspects of AI and overlooked the lessons, opportunities, and threats that emerge from AI's increased yet complex application in citizen participation processes. Given that AI has the possibility of positively or negatively influencing citizens' participation in governance processes and the high cost of adopting AI-related technologies, this paper considers it important to examine its potential threats and opportunities. To achieve this objective, the study will look at how the use of AI can enhance the participation of citizens in governance activities. The authors argue that there is great potential in enhancing citizen participation in policymaking by deploying AI technologies such as chatbots and machine learning algorithms. This will also impact policymakers' response to citizens' needs by gathering information and recording data, processing information, answering citizens' queries, etc. The study however points to

* Dr., Department of Political Science and Public Administration, Ankara Yıldırım Beyazıt University, Ankara, Türkiye, nadias.works@gmail.com, orcid id: <https://orcid.org/0000-0002-2059-6118>

** Prof. Dr., Faculty of Economics and Administrative Sciences, Boğaziçi University, Istanbul, Türkiye, murat.onder1@bogazici.edu.tr, orcid id: <https://orcid.org/0000-0001-8300-862X>

*** Dr., Senior Researcher/ Lecturer, National Defence College, Karen, Kenya, inyadera@ndu.ac.ke, orcid id: <https://orcid.org/0000-0002-0432-6935>

Makale Geliş Tarihi: 19.09.2023

Makale Kabul Tarihi: 23.09.2024

threats such as inadequate computer literacy, cyber-attacks, data privacy, and civil liberties, the cost of adopting AI technologies, and inadequate personnel as having the potential to undermine the successful application of AI in citizen participation processes.

Keywords: Artificial intelligence, citizen participation, democracy, government, policymaking.

Yapay Zeka ve Yönetişimde Vatandaş Katılımı: Fırsatlar ve Tehditler

Öz: Bu çalışma, vatandaş katılımı ve yapay zeka (YZ) arasındaki bağı inceleyerek bir araştırma gündemi geliştirmeyi amaçlamaktadır. Mevcut çalışmalar daha çok YZ'nin kavramsal, açıklayıcı ve uygulama yönlerine odaklanmış ve YZ'nin vatandaş katılım süreçlerinde artan ancak karmaşık uygulamalarından ortaya çıkan dersleri, fırsatları ve tehditleri göz ardı etmiştir. YZ'nin vatandaşların yönetim süreçlerine katılımını olumlu veya olumsuz yönde etkileme olasılığı ve YZ ile ilgili teknolojileri benimsemenin yüksek maliyeti göz önüne alındığında, bu makale potansiyel tehditleri ve fırsatları incelemenin önemli olduğunu düşünmektedir. Bu amaca ulaşmak için çalışma, YZ kullanımının vatandaşların yönetim faaliyetlerine katılımını nasıl artırabileceğine bakacaktır. Araştırmacılar, chatbotlar ve makine öğrenimi algoritmaları gibi YZ teknolojilerini kullanarak vatandaşların politika yapımına katılımını artırma konusunda büyük bir potansiyel olduğunu savunmaktadır. Bu YZ teknolojileri aynı zamanda politika yapıcılarının bilgi toplama, verileri kaydetme ve bilgileri işleyeme ile vatandaşların ihtiyaçlarına yanıt vermesini de etkileyecektir. Ancak bu çalışma, yetersiz bilgisayar okuryazarlığı, siber saldırılar, veri gizliliği ve sivil özgürlükler, YZ teknolojilerini benimsemenin maliyeti ve yetersiz personel gibi tehditlerin, YZ'nin vatandaş katılım süreçlerinde başarılı bir şekilde uygulanmasını engelleme potansiyeline sahip olduğunu da işaret etmektedir.

Keywords: Yapay zeka, vatandaş katılımı, demokrasi, hükümet, politika oluşturma

Introduction

In a rapidly transformative world, new technologies are omnipresent in human lives and quotidian interactions. Great powers are racing to acquire the latest innovations for financial gains, global visibility, and leadership, waging “technology wars” to survive in the digital world. AI is one thriving field, with the impact being “more than anything in the history of mankind” (Russell, 2021). Global spending on AI systems will rise from \$85.3 billion in 2021 to more than \$204 billion in 2025, as companies use AI as part of their “digital transformation initiatives” and hope to remain competitive in the digital economy. In terms of overall investment across all industries, automated customer service agents and sales process recommendation and automation are the two most prominent use cases (IDC, 2021). Equally, AI literature is catching more and more scientific attention. Reis and colleagues (2020: 2) conducted a preliminary search in July 2020 on AI literature, and identified 351,362 scientific documents, with the AI scientific trio being led by the United States, China, and the United Kingdom.

Computer scientists projected in the 1960s and 1970s that “within a decade we would see machines that could think like humans” (Castro and New, 2016: 2). While this prophetic optimism did not happen at the time, recent

advancements in AI cannot be overlooked. Scholars such as Helbing (2019a: 25) opine that “computers will surpass the capacity of the human brain before 2030 and the capacity of all human brains before 2060”. Algorithms can help people make better decisions by overcoming human limitations like “bounded rationality” and “information processing” (Vogl et al., 2019). Notwithstanding the role of AI in assisting stakeholders to make decisions more rigorously, its irresponsible use may generate discriminatory practices and some of its features may breach privacy laws.

This paper is primarily concerned with the role of AI in citizen participation for several reasons. First, it is argued that democracy is at crossroads with a reconceptualization of narratives in the age of technologies that have created (digital) spaces for interactions, coupled with discussions on digital citizenship, fake news, deteriorating trust in political institutions, and the rise of citizen power in the governance systems. Second, there is a need to explore the relationship between the algorithmic turn and democracy, defined as the “central and strategic role of data processing and automated reasoning in electoral processes, governance, and decision-making” (Gurumurthy and Bharthur, 2018: 40). Third, the emergence of AI technologies is an incontestable reality, raising questions on how they will shape societies’ governance systems and democratic profiles. Unlike the traditional model of public administration where citizens are sole receivers of public services, and the New Public Management model in which citizens are treated as “clients”, digital era governance (Vogl et al., 2019) and co-governance model emphasize that citizens are “stakeholders” who can potentially influence the policymaking, hence, the need to include them in the process.

In line with these concerns, one might ask whether AI will undermine or sustain democratic institutions. This sets a quest for studies on the effects and prospects of AI technologies in government and their impact on political institutions and democracy. Another reason is an attempt to generate further literature on AI governance studies. For instance, Wirtz and colleagues (2020) argue that the literature offers “limited answers to the question of how to achieve political governance in the European Union through AI.”

The study explores whether AI increases democracy and citizen participation or reduces it, by examining AI applications, opportunities, and threats. It raises the following question: *What role does AI play in citizen participation?* Answering this question will enable us to understand the applications of AI in citizen participation and the prospects of AI-based technologies in democracy. For this purpose, this article is organized as follows: First, the conceptual framework provides definitions of AI and citizen participation. Next, the article discusses the applications of AI in citizen participation, to answer the question: “How does citizen participation benefit from AI-based systems?” Then, the article seeks explanations for the opportunities and challenges of AI-based technologies in citizen participation, to

answer the question: “How good and/or how bad AI can be (and perhaps is) on citizen participation?” Finally, the article looks at the prospects of AI in citizen participation, by looking at the future of citizen participation in the age of AI.

Background of the Study: Artificial Intelligence and Citizen Participation

There is great potential in using AI in governance. Data analytics can positively impact policymaking practices (Gil-Garcia et al., 2018; Hagen et al., 2019; Simonofski et al., 2021). Large volumes of data can be processed using AI technologies, and patterns can be found, at the problem identification stage. Analysis of publicly available data can yield significant input for governments. When formulating policies, AI can accelerate analysis, by quickly revealing insights, when governments need to predict the anticipated costs and benefits of policy options. Citizens will be able to anticipate the potential effects of a policy since they will have a greater knowledge of the issues. In addition, AI can help identify potential flaws or cases of fraud in a policy as well as expedite the assessment of what needs to change (Höchtel et al., 2016: 158-163; Patel et al., 2021).

Artificial Intelligence

The history of AI is a dynamic and diverse concept that first appeared in the 1950s in the seminal work “Computing Machinery and Intelligence” by Alan Turing. The paper set concepts about the feasibility of programming an electronic computer to behave intelligently and includes a description of a famous imitation game (Jones, 2008: 3). Wang (2019: 9) asserts that the Turing Test is “intuitively appealing” and has been widely taken as the definition of AI by the public. However, within the field, most projects do not aim at pretending to be human beings.”

On the conceptual definition of AI, the article argues, along with other researchers that there isn’t a conclusive definition of AI (Valle-Cruz et al., 2019: 93; Wang, 2019; Reis et al., 2020: 2), with a plurality of definitions being “either too inclusive or too sector-specific” (Kritikos, 2019: 1-2). Hence, “AI can be defined by what AI researchers do” (Grosz et al., 2016: 13). Likewise, the phases of AI systems’ lifespan, which encompass research, design, development, deployment, and use, are characterized differently depending on the fields to which they apply (Zuiderwijk et al., 2021).

Wirtz and colleagues (2019: 3-4) assert that to get a “basic” understanding of AI, it is necessary to define “intelligence” as “an explicit term before applying intelligence to machines and describing the compound concept artificial intelligence”, with features of both “machine-based systems and human-like intelligent behavior” being fundamental to AI definitions. Intelligence refers to “a set of properties of the mind, such as the ability to plan, solve problems, and reason... the ability to make the right decision given a set of inputs and a variety

of possible actions” (Jones, 2008: 1), and to “the capacity of an information-processing system to adapt to its environment while operating with insufficient knowledge and resources” (Wang, 2019: 17). Several researchers have defined intelligence based on “fidelity to human performance”, in comparison to an “abstract, formal definition of intelligence called rationality”. Likewise, some view intelligence to be an internal attribute of mental processes and reasoning, while others focus on (exterior) intelligent behavior (Russell, 2021: 19).

AI is defined differently in each discipline, within its focus (Önder, 2020), and henceforth, multidisciplinary. Different disciplines namely mathematics, statistics, economics, computer science, philosophy, experimental psychology, biology, neuroscience, linguistics, and such, contributed concepts and techniques to AI such as cognitive computing, predictive analytics, etc. (Russell, 2021). Software-based techniques include “artificial neural networks, evolutionary computation, fuzzy logic, intelligent systems, multi-agent systems, natural language processing (NLP), expert systems, learning classifier systems, automatic learning, deep learning, data mining, text mining, and sentiment analysis”, and hardware-based techniques namely “robotics, autonomous cars, artificial vision, and virtual reality” (Valle-Cruz et al., 2019: 93-94; Eager et al., 2020: 17).

Tinholt and colleagues (2017: 2-3) classify AI solutions based on levels of consciousness into (1) “*reactive automators* aimed at process automation, based on the rule-based programming, to monitor, analyze and act”; (2) “*adaptive assistants* combine both the consciousness levels of reactive automators and contextual sensitivity, to interact, remember and anticipate, and adapt to new circumstances and learn from previous experiences, by which AI solutions become more valuable, in providing predictive analysis with more accuracy”; and (3) “*autonomous imaginers* have the “emotional awareness”, “moral reasoning” and “reactive imagination”, by which AI systems evolve from repetitive and contextualized systems into independent ones to feel, make morally driven decisions and create new things autonomously”.

Some AI programs attempt to simulate the emotions and personalities of humans (Valle-Cruz et al. 2019: 93). AI can also be organized into (1) “systems that think like humans”; (2) “systems that act like humans”; (3) “systems that think rationally”; and (4) “systems that act rationally” (Russell, 2021). If we synthesize these classifications, we can find that AI systems can perform tasks like humans can do, from thinking to acting based on “rationality”. Conversely, expecting an AI system to behave “exactly” like a human, is excessively “anthropocentric for non-human intelligence” because human behaviors are influenced not just by intellectual abilities and systems, but also by biological, evolutionary, and cultural circumstances (Wang, 2019: 9-10). Table 1 provides a summary of the different aspects of AI.

Table 1. Various aspects of AI

The aspect of AI Technology	The task of AI Technology	Consciousness Evolutionary Stages	Example of AI Systems/Solutions
<i>Monitor</i>	Gather information and record (key) data	Reactive automators	Automated CCTVs and Internet of Things sensors
<i>Analyze</i>	Process information, detect patterns, and recognize trends		Algorithms and big data analytics
<i>Act</i>	Carry out tasks and start specific processes		Password resetting and order placements
<i>Interact</i>	Listen, read, talk, write and respond to users of the AI solution	Adaptive assistants	Use of the social welfare sector
<i>Remember</i>	Store and find information		Cloud software and data crawlers
<i>Anticipate</i>	Recognize (preemptively) patterns		Predictive maintenance or policing heat maps (forecast where and when the next crimes are likely to occur)
<i>Feel</i>	Recognize, analyze, and respond to human emotions	Autonomous imagimators	Applications that understand our mood
<i>Moralize</i>	Integrate morality into decision-making processes		Weighing multiple moral perspectives and consequences
<i>Create</i>	Send orders to itself and start processes from the beginning		Artificial painters and musicians

Source: Tinholt et al. 2017: 2.

Citizen Participation

Citizen participation is an umbrella concept referring to the involvement of citizens in political activities and policymaking process through different forms of participation (Verba et al., 1972, 1978, 1995). It can be defined as “actions and initiatives by citizens, civic groups and organizations that lead to policy changes and influence governance decisions at various levels” (Citizen Participation

Forum, 2021). Examples include paying taxes¹, voting in elections, volunteering, online activism, attending public meetings, city councils, etc. Participation is vital to the democratic process (Arnstein, 1969; Barnes and Kaase, 1979; Dahl, 1994; Fuchs and Klingemann, 1995; Nabatchi and Leighninger, 2015; Theodorakis and Van Deth, 2018), and provides individuals with “an opportunity to influence and hold ownership of public decisions”, and “establishes a sense of community, builds trust, and generates new approaches to solving complex public issues” (Denhardt et al., 2009; Bryson et al., 2013: 25-26; Loeffler and Bovaird, 2018).

The equation of democracy is determined by rights and duties. Analysis of the citizens-state relationship is defined by a contemporary governance discourse that is shifting toward more open, transparent, inclusive, and participatory governance. Likewise, participation, from the citizens’ lens, is a form of self-expression. Hence, this relationship transcends from treating citizens merely as taxpayers and clients, to “critical” and “shapers” of policies that affect their lives, especially considering the rise of the third sector in creating partnerships between the public and private sectors or what can be described as a multi-stakeholder participation model.

Three arguments promote the increase of citizen participation: First, the post-modern discourse theory claims that contemporary socio-economic conditions make people’s participation in public policies possible. Second, citizens’ dissatisfaction with traditional hierarchical bureaucracies has stimulated interest in participatory methods. Third, the rise of state-citizens interaction could be explained by the pursuit of the democratic ideal (Moynihan, 2003). It appears that a greater emphasis has recently been placed on citizen participation, which benefits and allows citizens to exercise their [democratic] right to have a say in the formulation of public policies. The outcomes of participation transcend giving citizens a voice and agency in policymaking, to benefiting the state by enabling better governance, improving the government-citizen relationship, increasing institutional trust, and providing a better allocation of resources. Therefore, participation enables individuals to become active members who have a better understanding and sense of their community and contribute to its well-being.

Citizen participation can be studied based on three aspects: First, information sharing or exchange defines participation as “the active engagement of the partners and customers in sharing ideas, committing time and resources, making decisions, and taking action to bring about the desired development objective” (Mohammed, 2013: 122). The focus of information exchange is “primarily on engagement” rather than on “power differences” among stakeholders (Brown, 1982). Stakeholders encompass groups, organizations, and

¹ Paying taxes is not only considered a form of a conventional citizenship act but also a citizen participation activity. The OECD’s 2010 report on “Citizen-State Relations: improving governance through tax reform” argues that taxation is a catalyst for more responsive and accountable governments and engages taxpayers-citizens in public life.

individuals who can influence or be influenced by policy decisions (Quick and Bryson, 2016: 158) or have a claim on an entity's attention, resources, and outputs.

Second, the level of inclusiveness in policymaking refers to participation as “the organized efforts to increase control over resources and regulative institutions in given social situations, on the part of groups and movements of those hitherto excluded from such control” (Mohammed, 2013: 122). This can be manifested in political or civic organizations to “invent spaces” for citizens to participate in the policymaking process. This characteristic can also be studied in the inclusion of the excluded (vulnerable) groups, to empower and get them involved in the decisions affecting their lives (Murrell, 1990; Cornwall, 2002).

Third, the application of influence and control is an aspect of participation that embodies “a process through which stakeholders influence and share control over development initiatives, decisions and resources which affect them” (Ondik, 2003: 1). This characteristic represents the top of the rungs (third level) of Arnstein's (1969) Ladder of Citizen Participation and represents citizen power manifested in partnership, delegated power, and citizen control. This characteristic of participation embodies both influence and control, seen as a form of power that stakeholders exercise. Hence, this implies the availability of and accessibility to spaces where citizens can effectively participate (Goetz and Gaventa, 2001). Kristina Reinsalu, Programme Director of e-Democracy at e-Governance Academy (eGA), states that governments do not exclusively exercise power; rather, policies and choices are developed with the participation of citizens and the third sector, and this is the fundamental principle of open governance (Plantera, 2020).

Participants can help policymakers and the public become more informed and build a broader vision of issues by offering new knowledge, and different perspectives, ensuring that scarce resources are distributed more fairly, and solving policy problems through an inclusive policy approach (Loeffler and Bovaird, 2018). Indeed, promoting democracy and citizen participation is a “fundamental stance” in post-positivist thinking; a more participatory policy process supports the development of “more effective and competent” citizens, who are better “problem-solvers” and capable of establishing “constructive relationships” with other people who are working on diverse aspects of complex matters, as well as contributes to building social capital (Fung and Wright, 2003; Howlett et al., 2020: 32-33).

Research Approach: A Systematic Review

The research approach of this study can be classified into three phases:

Phase 1

In phase 1, the study was framed by the research questions and objectives which also informed the nature and type of literature to be used. The goal of

interrogating existing literature was to first identify the trend, topics, and thematic areas of concern for researchers in the field of AI and governance. In addition, a review of existing literature also provided invaluable insight into methodological, conceptual and theoretical frameworks used by other researchers to understand AI and governance. This information was useful in helping position this study in the existing literature. In this phase, the review of existing literature was guided by questions such as what is the qualitative and quantitative literature on AI and citizen participation? What are the contributions and main objectives of existing studies, which theoretical frameworks have emerged (new or modified) as well as the definitions of key concepts in AI and citizen participation?

Phase 2

In this phase, we focused on identifying relevant literature that will be included in this research. To achieve this goal, we used the inclusion/exclusion criteria presented in Table 2. The search was limited to academic publications (mainly journal articles, policy reports, conference proceedings, and books). To identify the most relevant studies, we limited our scope to publications in specific disciplines mainly decision sciences, business studies, public administration, policy sciences, and political science. Scopus and the Web of Science (WoS) were used to conduct this search.

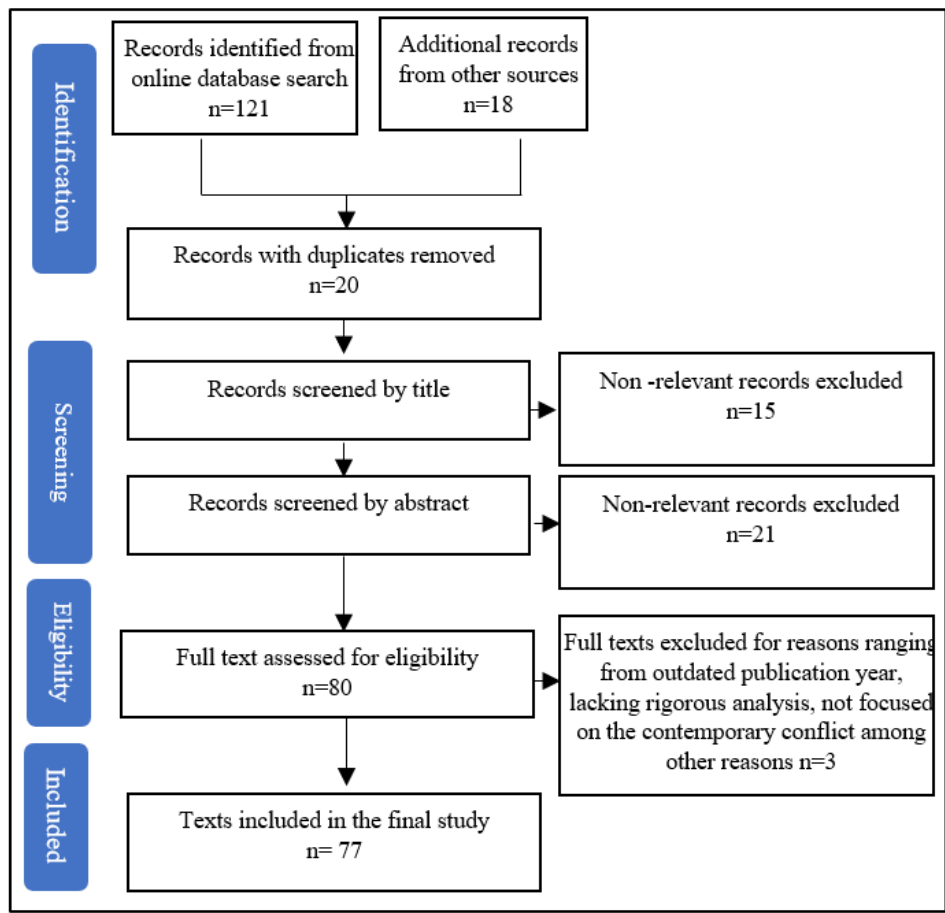
Table 2. Search words used in the Scopus and WoS databases.

Database	Search titles/keywords/terms
Scopus, WoS, University Library, Digital	"Artificial intelligence", "Artificial intelligence and public administration"
Government Reference Library,	"unsupervised learning", "public governance", "public policy", "robotics", "machine learning", "citizen participation", "political participation and artificial intelligence", "civic participation", "artificial intelligence and democracy", "government", "policymaking", "artificial intelligence and governance", "artificial intelligence and citizen participation", "artificial intelligence and policymaking", "big data and participation", "participation and AI applications", "AI applications in voting", "benefit of AI in governance", "threats of AI in governance"

From the WoS, we were able to focus our search on literature that fall under the following disciplines, political science, public administration, management, economics, communication, engineering, multidisciplinary sciences, library/information science, international relations, and telecommunications. In the WoS, we deliberately ignored disciplines that would have produced a high

volume of technical studies on AI such as computer science, medicine, engineering, and physics whose content may have not been related to our area of study. These studies were also cross-checked on Google Scholar. After the search, a total of 145 articles and 19 reports were identified and after duplicates and less relevant articles and reports were removed, we remained with 77 sources (see Figure 1).

Figure 1. PRISMA inclusion and exclusion criteria



Source: Developed by the authors from the study

Phase 3

In phase three, we examined the information from academic and government sources with the aim of (1) establishing the nature, opportunities, and challenges that AI has particularly on citizen participation. (2) We also explored benefits and challenges facing citizens in their efforts to participate in governance issues. To

this end, we were able to identify current strengths and weaknesses of AI in citizen participation. However, the findings show that the integrating AI in citizen participation processes is not only likely to increase given the rapid changes and advancements in information and communication technologies but also the merits of AI on citizen participation is likely to outweigh its demerits. Therefore, in this phase we coined a number of recommendations and offer possible future prospects of AI and citizen participation that policy makers and academicians can take into account in their planning and research agenda.

In this article, we adopt the three scenarios approach proposed by Barber (1998). Despite the scarcity of AI-based technologies models in studies on the use of AI in governance, this study adopts the three-scenario model which illustrates the relationship between AI-based technologies and democracy to help us understand how good and/or how bad AI can be on citizen participation. This scenario-based explication is useful to approach the opportunities and threats of deploying AI in governance.

Table 3. Three scenarios of AI-based technologies

Scenario	Pangloss Scenario	Jeffersonian Scenari	Pandora Scenario
Definition	AI is a projection of present attitudes and trends.	AI can carry “all virtues” to societies and enhance democracy.	AI can carry “all evils” to societies and weaken democracy.
Uses of AI-based Technologies	Market forces realize an ideal technological society; they promote “new technologies in the paths of corporate efficiency, consumer entertainment, and media communications”, but they are unsure what they can accomplish for “civic communication, political education, and electoral efficiency”.	Allow marginalized individuals to participate in the democratic process; engage voters and assist them in becoming more knowledgeable about important political topics; raise people’s voices and ensure that their concerns are addressed by politicians; Auditing for transparency, among other things.	Facilitates information and communication centralized control; fakes vocal political support on social media; spreads deceptive messages to create the perception of popular support; manipulates citizens during election campaigns; strengthens “filter bubbles”, etc.
Psychological moods	Posture of complacency	Posture of hope	Posture of caution

Source : Barber (1998: 576-584); Savaget et al. (2019: 370).

Table 3 depicts three scenarios of AI-based technologies and their relationship to democracy within the scope of technological possibility: (1) the Pangloss scenario, based on “complacency and a projection of prevailing attitudes and trends”; (2) the Jeffersonian scenario, which affirms “the positive uses of new technology in nurturing modern democratic life, and AI positively impacts democracy”; and (3) the Pandora scenario, which examines “the dangers of technological determinism, and detrimental consequences on democracy” (Savaget et al., 2019: 370). The Pandora scenario can also be comprehended by the idea of a “digital power grab”, which is “simple to carry out and irreversible” (Helbing, 2019a: 29).

People are divided between, what we might call “AI optimists” who view AI as a “blessing” in our society and an opportunity to ease our lives, and “AI pessimists” who are skeptical about AI technologies and advocate for “caution”, where “devices will eventually think faster than humans and get rid of the slow humans to run companies more efficiently” (Helbing, 2019a: 26). AI systems could “learn, replicate, and possibly exceed human-level performance in the full breadth of cognitive and intellectual abilities” (Agarwal, 2018: 918). For instance, language recognition, preference analysis, and spam filtering are proving to be smarter than humans (CPI, 2017: 5). However, in evolving environments, there isn’t [yet] a system with all logical, learning, and problem-solving abilities (Köylü and Önder, 2017), and AI “still “falls short” of human cognitive abilities” (Taeihagh, 2021: 139).

Based on the three scenarios and how AI-based technologies are deployed, it can be argued that AI is a double-edged sword. As Barber (1998: 575) claims: “technology will always be with us, for better or worse, and that our fate will be determined by how we use or abuse it.” Governments, on the one hand, can deploy AI systems to “improve public policies and affairs, reducing the number of (front) officers, cases of maladministration, corruption, irrational decisions, as well as raise the efficiency of auditing or internal processes” (Savaget et al., 2019: 374). To benefit all parties, AI policies, frameworks, and regulations need to be based on standards, ethical principles, and societal values (Wirtz et al., 2019: 6).

Findings and Analysis

Applications of Artificial Intelligence in Citizen Participation

Based on the conceptual framework, we define AI in citizen participation as “the application of AI techniques in governance systems, and communication between policy actors and stakeholders in the process of policymaking.” These techniques include machine learning algorithms, data mining, reasoning, information storage, and retrieval, censoring, artificial neural networks, intelligent agents, genetic algorithms, speech and handwriting recognition, robotics, etc. (CPI, 2017: 6; Valle-Cruz et al., 2019: 92; Russell, 2021).

We observe that AI can make the workplace safer (EP, 2021). Generally, automation applications and robotics can rescale and speed up tasks (Agarwal, 2018: 919). Likewise, sensors and automated CCTVs help in reporting and monitoring information, which constitutes the AI database that can be used in different areas such as health, transportation, security, education, agriculture, environment, energy, etc. (Castro and New, 2016: 8-35). Hence, software and hardware are used to automate organizations' activities and procedures (Valle-Cruz et al., 2019: 92).

AI systems are also evolving as more data is made available and computer power surges. There exists a variety of AI applications in diverse sectors, with the potential of enhancing public services, monitoring urban infrastructure, traffic lights, subway use, waste disposal, and energy delivery (Köylü and Önder, 2017; Henman, 2020: 210-213; Önder, 2020; EP, 2021). Likewise, a big potential for AI exists in the public sector, by "assisting in making policy decisions, detecting fraud, planning new infrastructure projects, answering citizens' queries, and adjudicating bail hearings" (Martinho-Truswell, 2018). AI is also expected to impact democracy, by providing data-based monitoring, accessing high-quality information, and combating disinformation. Besides, it can help foster diversity and openness, by decreasing the danger of bias and depending on analytical data (EP, 2021). Thus, there are different AI applications in diverse domains, with opportunities to consider various AI applications in public institutions (Önder and Saygılı, 2018: 648).

Using AI to assist government decision-making will give significant potential for public institutions and policymakers to obtain greater economic and social benefits (Zuiderwijk et al., 2021). Castro and New (2016) assert that AI can assist organizations in making better decisions, developing innovative products and services, and increasing efficiency to generate economic and social value namely the ability of algorithms to reduce inconsistency and (social) bias in human decision-making. This supports the idea that AI processing capacity outperforms human capabilities and improves service delivery outcomes. Furthermore, AI has been shown to improve human accuracy, reduce manpower, organize complicated tasks through expert analysis, alter service delivery, decrease delivery inefficiencies, and improve citizen services and policymaking (Valle-Cruz et al., 2019: 93-94; Zuiderwijk et al., 2021). Organizations will be able to improve their workforce's capabilities through "AI and cognitive computing by processing and learning from large amounts of disparate data across heterogeneous systems in near real-time and interacting with humans through natural language processing" (Desouza, 2018: 11). The balance between expertise and AI-assisted data analysis is becoming more prominent in the political roadmap because data analysis becomes less efficient without intelligent decision support systems (IDSS) (Reis et al. 2020: 10).

Castro and New (2016: 4-5) developed a typology of AI applications to compare different AI applications. Chatbots and machine learning algorithms,

which make up digital platforms, are among the viable AI-based technologies in citizen participation. According to Gartner, by the end of 2021, both consumers and businesses will have spent \$3.5 billion on virtual personal assistants (VPAs); by 2025, 50% of skilled professionals will use a virtual assistant daily (Afshar, 2021). Machine learning algorithms and other AI systems can help in the identification of patterns in a dataset and the development of prediction models that specialists can train and test to evaluate the accuracy of answers supplied. Additionally, experts will provide the correct answer in circumstances where the system gets it wrong, which will then be used by the system in future iterations, to improve accuracy (Desouza, 2018: 15-16).

Examples of AI applications used in citizen participation

Chatbots: The chatbot refers the user to a live agent (Desouza, 2018: 11-16), which involves a high level of design expertise (Henman, 2020: 211). Ribeiro (2016) asserts that chatbots have proven their ability to “reduce complexities, augment self-service and scale.” Organizations use chatbots to manage enormous amounts of citizen communication, handle complex policies and legislation, and improve communication between citizens and governments. For example, “Emma” is a chatbot deployed by the US Citizenship and Immigration Services to handle citizens’ inquiries, ease users’ website browsing, and obtain information. Organizations deploy chatbots to assist citizens in the form of FAQs (Vashisht, 2017), such as “SIGMA”, used by the Portuguese Agency for Administrative Modernization. Via chatbots, large citizen groups can raise their concerns, demands and influence public decision and policymaking in a faster and timely manner. Chatbots reduces transaction cost for accessibility and speed and volume. Effective use of chatbots might dramatically affect voting preference.

Machine Learning Algorithms: Martinho-Truswell (2018) asserts that the most anticipated application of AI use is machine learning, which may be “better, cheaper, faster, or more accurate than humans in fulfilling tasks that involve lots of data, complicated calculations, or repetitive tasks with clear rules.” Helbing (2019a: 26) also contends that algorithms are getting closer to human abilities and can solve problems that were exclusively being solved by human [brain] before technological advancement, through probabilistic, supervised, and unsupervised learning algorithms (Jones, 2008: 171-172; CPI, 2017: 7-9). However, since algorithms depend on data, and its availability is critical because systems must learn by forming associations between concepts and elements in databases, hence, their ability to learn will be limited if there aren’t enough datasets, availability, and intake (Desouza, 2018: 15; Tinholt et al., 2017: 6).

Opportunities and Challenges of AI-powered Citizen Participation

Adopting AI in public administration and with extension democratic processes is an important transformation that is likely to shape government delivery of services as well as citizens' engagement and participation in public affairs in the coming decades. Such transformation is likely to have both positive and/or negative impacts depending on how AI will be used and the underlying intention for its adoption. Despite this dilemma, the more evident challenges facing/attributed to traditional citizen participation methods and approaches justify the rethinking of new and even sustainable ways of engaging with members of the public in various engagements. Traditional modalities of public engagement have in many ways been characterized by a one-way flow of information from the government to the citizens. However, the shift towards efforts to deliberately embrace multi-stakeholder or community-based participation in public processes calls for the adaptation of innovative techniques of promoting citizen participation.

This is where the use of AI becomes important and even necessary given its benefits and potential to enhance interaction between the government and the citizens. This study has identified a number of benefits AI can add onto citizen participation.

(1) AI applications create “unprecedented mechanisms for civil society to process underutilized datasets and explore participatory mechanisms that influence political activities” (Savaget et al., 2019: 374).

(2) As seen in the work of Schippers (2020: 33) who opines that “we gain from AI-driven communication systems that connect people, enhance public debate, and make information flow more easily.” Therefore, by promoting increased citizen participation, platforms such as CitizenLab16 and civic tech strive to make policymaking more inclusive, responsive, and participatory, and improve the capacity of public institutions and governance systems (Maciulienė and Skarzauskiene, 2019: 246; Reis, 2020: 4).

(3) AI has the potential to significantly improve and transform the public sector and administration, both in its workplace and workforce, as well as help establish a new role while giving [new] legitimacy to governments.

(4) Proponents of AI such as Wirtz et al. (2019: 1) have observed that by incorporating AI into the public administration system, we can benefit from “replicating, scaling, speeding, and outperforming some activities beyond human capabilities” which in turn not only facilitate service delivery but also enhance citizen participation.

(5) AI-based technologies are providing a link to connect, and/or break barriers between citizens and their government, through diverse applications such as

chatbots and digital platforms (Savaget et al., 2019: 370). Besides, engaging with public data has enabled governments, under Open Government Partnerships, to disclose data that can be simplified by AI for easy consumption by members of the public.

(6) Furthermore, AI brings with it several advantages including the ability to accurately obtain data, allow for the creation and digitization of data, enable the processing and learning of and from big data, ability to collect and store quality data as well as the possibility to provide accurate predictive analysis.

(7) As a result, citizen participation will be enhanced since governments are able to manage huge amounts of citizens' inquiries and not only respond to them in a timely manner but also enable them to make better evidence-based decisions. For public servants, we are able to see them capable of organizing complex tasks geared toward better service delivery.

(8) In the end, these benefits promote civic participation, and increase public trust in the government due to transparency and accountability, there will be increased diversity and openness, while governments can also be able to engage citizens while addressing complex societal issues. This will have an impact on political awareness as well as on building political confidence.

While these benefits and opportunities will continue to be felt even further as advancements and access to technology increase, there are weaknesses and threats that can arise from relying on AI for not only political but also social, economic, and cultural participation. This study has identified challenges such as:

(1) There are human attributes that cannot be replaced by AI these include creativity, lateral thinking, and empathy that can help restore trust and communication.

(2) AI can engender a negative effect when "governments or powerful elites utilize new technologies for standardization, control or repression." Savaget et al. (2019: 370). Some examples of such usage include filter bubbles and bots used during elections as well as activities such as mass surveillance through facial recognition cameras and phone tapping.

(3) There is also the possibility of commercialization of citizens' data and digital information to commercial organizations which are interested to use such information for their own objectives. Already there are traces of such threats given the Cambridge Analytica scandal where "psychological profiles of hundreds of millions of citizens to manipulate people's voting behaviors" (Helbing 2019b: vi). Even more disturbing is the increased and widespread deliberate use of AI to manipulate public opinion during elections. For example, according to a study by Polonski (2017a, 2017b) the 2016 U.S. presidential election and the 2017 UK general election reveal that AI was "systematically misused to manipulate citizens". This has led to serious doubts over the

transparency and fairness in elections perhaps explaining growing cases of post-election violence in democratic societies such as the US and Brazil.

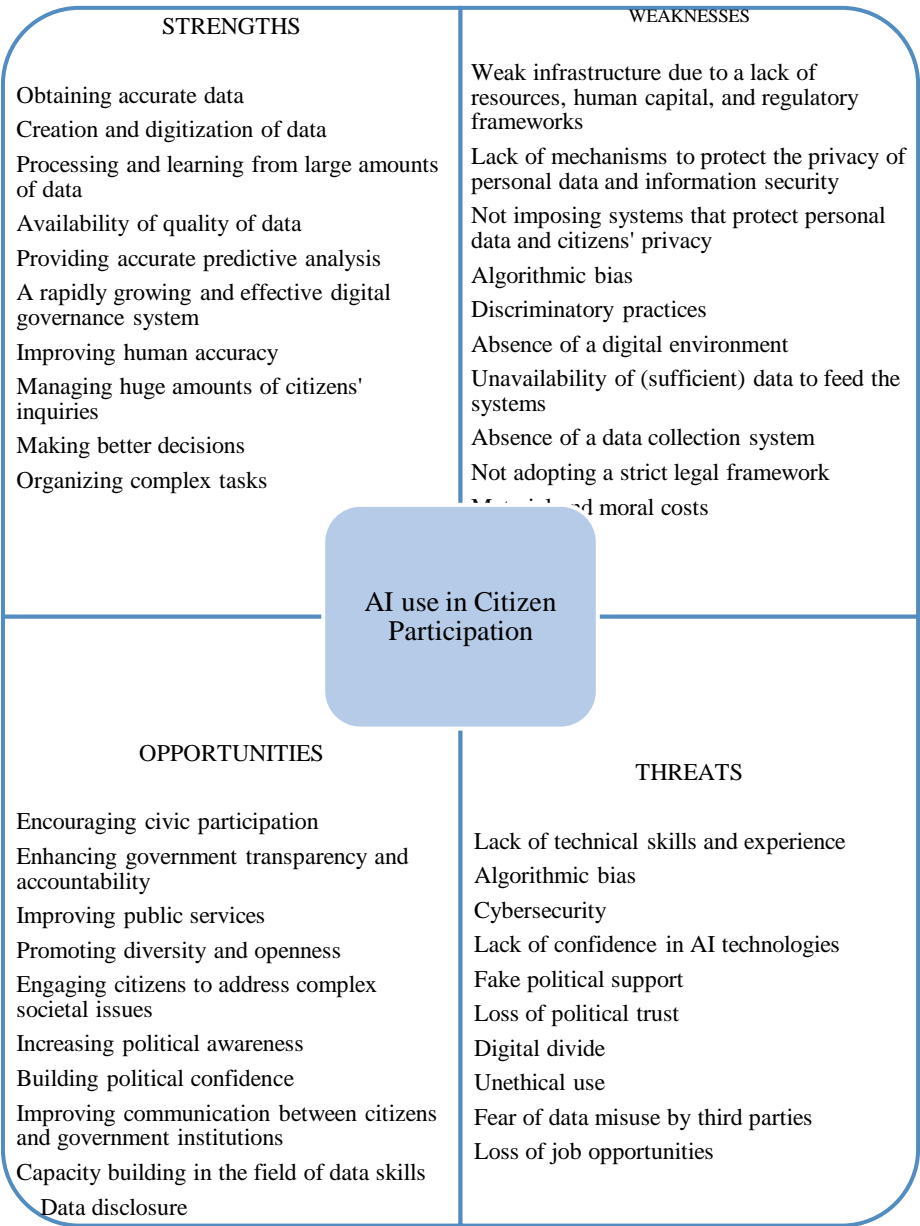
(4) Some scholars are also raising concerns over the uncertainty and unpredictability of AI given the possibilities of “algorithmic bias” which instead of addressing human bias could further worsen the situation since it will be difficult to hold anyone accountable.

(5) Then there is a combination of other challenges that are likely to affect different societies disproportionately. These include a lack of technical skills and experience especially among developing countries, cybersecurity threats that will require huge investments to stop, the challenge of the digital divide within and across generations as well as possibilities of unethical use.

(6) These can further be compounded by other weaknesses of AI such as weak infrastructure due to a lack of adequate resources, poor regulatory frameworks, lack of mechanisms and capacity to protect the privacy of personal data and information security, inadequate and in(sufficient) data to feed the systems due to weak absence of a data collection system as well as deliberate efforts not to provide relevant information to help citizens make informed decisions. In other words, the government could avail the public what they want the citizens to see or access.

Our findings, therefore, illuminate the huge benefits that AI can bring to citizen participation but it is important to acknowledge that AI will not be a solution fix-it-all option. In fact, AI is still a philosophy and technology that is evolving and doing so in a very rapid manner. It will therefore be prudent to examine aspects of AI that have a positive impact on citizen participation and efforts to limit its negative impacts should continue at all times. Figure 2 below gives a summary of the opportunities and challenges that AI might have on citizen participation.

Figure 2. An Analysis of AI use in Citizen Participation



Source: Developed by the authors.

Conclusion: Future Prospects of AI in Citizen Participation

The prospects of AI in our societies depend on several issues to be addressed by scholars and practitioners. Despite AI development, this article highlights “the lack of a clear definition of AI”, besides, given that AI is an open-ended concept (Kritikos, 2019), policymakers find it challenging to forecast what AI systems will be capable of accomplishing in the near future, as well as by what methods technology will develop. Besides, this article excludes debates on the digital divide (Norris, 2001; Van Deursen and Helsper, 2015), when discussing the application of AI-based technologies in citizen participation activities.

Citizen participation has gained increasing importance in the public sector, policy-making processes, and official legislative agendas. The development and dissemination of new information and communication technologies have also given a powerful stimulus for implementing or enhancing participatory instruments and strategies, also through the growing use of artificial intelligence to increase citizens' direct participation and their involvement in policy-making and decision-making processes at various levels. AI can thus act in parallel and in support of citizen participation, which is based on numerous processes of public engagement that can lead to dialogue and collaboration with public administrations, as well as citizen engagement, which involves citizens in the strategic planning and implementation decision-making of services, particularly digital ones.

AI tools are increasingly attracting the attention of public administrations as a way to improve the quality and effectiveness of their citizen engagement actions. For example, chatbots are revolutionizing centuries-old communication between administrations and citizens, offering a new model of proximity and immediacy. By being able to establish a dialogue with chatbots and having any consultation resolved directly, we generate more citizen confidence and eliminate their discomfort when they feel that they are not being heard by the administration. Sentiment analysis tools are an example of the application of artificial intelligence that can be very useful for highlighting topics of special interest to citizens. Predictive analysis gives us enough information to proactively act before and during excellent decision-making and adaptive management processes. Auditing artificial voice with automatic speakers is already being used in some processes. To this end, it is essential that tools be developed that allow us to guarantee, with reasonable security and precision, the identification of the person offering their voice in the process, in addition to recording the sequence of operations.

Many researches have demonstrated the potential of different AI tools to increase government transparency, streamline time-consuming public feedback processes, and provide community members with meaningful data about the response of their governments to their concerns and suggestions. There is already a diversification of available tools that are strategically deployed in use cases in

different countries around the world, offering information on the advantages and limitations of their deployment. Several case studies will be referenced in this chapter in the belief that they provide information, not only on the opportunities posed by AI for these uses of citizen participation, but also on the expected final results as an inescapable point of democratic vindication.

It is important that AI provides assistance because AI application in public management highlights relevant actors, outdated old practices, and provides technical support. Governments that opt for participation hold that responsiveness fosters political realism and the transformation of social structures that foster community involvement. Government holds a position in civil society that, as the voice of the people, it is the duty of the government, to the extent possible, to address the grievances of the members of its community. Furthermore, public consultation can also be facilitated by the application of AI tools in everyday life.

Despite their benefits, AI-based technologies pose undeniable threats to societies. People's physical safety, privacy, economic structures, democratic governance, and fairness are all at risk. The increased usage of AI-based algorithmic decision-making without involving human judgment or due process might reinforce social stereotypes and intensify racial and gender biases (Huq, 2019; Kritikos, 2019; Latonero, 2018: 9-11; Henman, 2020: 213-214). Manheim and Kaplan (2019: 109) stress that the most significant social cost of AI is distrust in and control over our democratic institutions. As seen from the use of political bots, manipulation can engender unfavorable consequences on participation, when citizens realize that they do not have [full] control over the decisions they make, or that they are being manipulated without prior knowledge.

Given such cases, AI technologies risk undermining fair elections if they are used to deceive voters and promote extremist narratives on a systematic basis. At the same time, AI's usage in politics "isn't going away anytime soon, and politicians and their campaigns simply can't afford to lose it, especially when the outcomes serve politicians' interests and desires." Politicians should, however, commit to using AI "ethically and judiciously" to guarantee that their efforts to persuade voters do not jeopardize democracy because democracy "depends on free and fair elections in which citizens may vote without fear of being manipulated" (Polonski, 2017b).

Schippers (2020) claims that concerns about AI applications and democratic politics, transcend worries over electoral interference, in citizens' relationships with their fellow citizens, elected representatives, and government institutions. The shift from human to machine-generated decision-making challenges the principles of transparency and accountability (Kritikos, 2019: 2-3; Schippers, 2020: 33; Henman, 2020: 215; Taeihagh, 2021: 140-141), due to the unpredictability of AI systems. All machine learning algorithms contain some level of "statistical bias that causes incorrect decisions" (Latonero, 2018: 8). The

main question posed vis-à-vis accountability is when computers make decisions, or damage is caused by an AI device/system, who is held responsible for that decision or damage? Matthias (2004) asserts that until we are willing to accept robots as legal persons with rights and obligations, “someone else” must be held responsible for their actions.

AI systems are becoming more complex, with risks and interconnectedness with other systems growing up, demanding the development of effective AI governance policies (Taeihagh, 2021: 143). Hence, new approaches to foreseeing and managing AI’s unforeseen and/or undesirable outcomes are necessary, through the adoption of new consensus standards to assess AI, as well as the introduction of new governance structures that can offer a greater amount of accountability over the design and use of AI (Bollier, 2019; Jobin et al., 2019). Manheim and Kaplan (2019: 160) suggest proper governance of data input to ensure it is “vast, varied, and accurate”. Besides, adaptive approaches can achieve several advantages, among which engaging the public to highlight concerns that policymakers may not be considering, as well as developing solutions to tackle risks of significant disruption from AI-based systems (Linkov et al., 2018).

The impact of AI on the future of democracy and citizen participation will depend on how it is developed, deployed, and regulated. Policymakers, researchers, and citizens alike need to carefully consider the potential risks and benefits of AI and work to ensure that it is used in ways that support, rather than undermine, democratic values and institutions. AI governance should take a multi-stakeholder approach, bringing together many stakeholders to explore governance methods that minimize the threats and potential shortcomings while also being adaptable to cultural diversity (Gasser and Almeida, 2017). For (digital) citizen participation to be transparent and meaningful, “accessibility to policymakers and citizens throughout the entire process” need to be guaranteed (Arana-Catania et al. 2021), provide the provision of explanations and increase the disclosure of information by AI systems’ developers (Jobin et al., 2019: 391). For instance, the Brazilian government approved the Information Access Law in 2011, making open data mandatory for all government institutions. As a result, institutional structures based on the use of open data to enhance democratic participation and combat corruption have emerged (Savaget et al., 2019: 373).

If the purpose of AI is to facilitate people’s life by serving their interests and enhancing democratic values, then firm regulations protecting personal data and privacy have to be enforced. This is deemed to provide people with trust in the online setting (Manheim and Kaplan, 2019: 167-168). The example of the European Union’s General Data Protection Regulation (GDPR) described as “the toughest privacy and security law in the world” (Wolford, 2020), and based on a framework of control, consent, transparency, and accountability, shows how firm regulations lead big companies’ approach and behavior. AI developers need to consider liberty, privacy, responsibility, judicial transparency, and respect for

human dignity not as an “ethical preference”, but as essential values to respect and enhance (Latonero, 2018: 14; Manheim and Kaplan, 2019: 181).

Direct democracy seems still distant even with AI and recent high-tech developments. However, AI, big data, and machine learning are expected to reduce transaction costs to a great extent day-by-day, to provide faster and more accurate, robustly designed, and analyzed ready data for policymakers, managers, and citizens. Therefore, we advocate for the use of AI in governance because of its impact on promoting: transparency, inclusiveness, accuracy, accountability, speed, and accessibility. AI will simplify the system of participation by opening policymaking to citizens and enhancing relationships with other stakeholders (this enhanced relationship can impact positively the citizen-government relationship by fostering public trust and communication). With the application of AI in governance, citizens are more likely to be significant stakeholders who can influence the policy process. We might have more autonomous and advanced applications to enhance political civic and public policymaking. While routine work will be carried out by autonomous systems, a significant portion of future jobs will be on monitoring, human factors will not fade away. Conversely, human beings will be more important in policy making process than before in the future, since they will spend more time on more on governance philosophy and wisdom as Plato, Aristotle, al-Farabi, and Ibn-Rushd contemplated years before. Rather than representative democracy, direct citizens’ participation in governance in every stage of the policymaking process via AI might be possible and faster than expected in the future.

References

- Afshar, V. (2021). AI-powered virtual assistants and the future of work. ZDNet. <https://www.zdnet.com/article/ai-powered-virtual-assistants-and-future-of-work/>
- Agarwal, P.K. (2018). Public Administration Challenges in the World of AI and Bots. *Public Administration Review*, 78(6), 917-921.
- Arana-Catania, M., Van Lier, F., Procter, R., Tkachenko, N., He, Y., Zubiaga, A., and Liakata, M. (2021). Citizen Participation and Machine Learning for a Better Democracy. *Digital Government, Research and Practice*, 2(3).
- Arnstein, S. (1969). A ladder of Citizen Participation. *Journal of the American Institute of Planners*, 35(4), 216-224.
- Barber, B.R. (1998). Three Scenarios for the Future of Technology and Strong Democracy. *Political Science Quarterly*, 113(4), 573-589.
- Barnes, S.H. and Kaase, M. (1979). *Political Action: Mass Participation in Five Western Democracies*. California: Sage.
- Bollier, D. (2019). *Artificial Intelligence and the Good Society: The Search for New Metrics, Governance, and Philosophical Perspective*. Washington, DC: The Aspen Institute.

- Brown, L.D. (1982). "Interface Analysis and the Management of Unequal Conflict." In *Conflict Management and Industrial Relations*, edited by G. Bomers and R. Peterson, 60-78. Boston: Kluwer-Nijhoff.
- Bryson, J.M., Quick, K.S., Slotterback, C.S., and Crosby, B.C. (2013). Designing citizen participation processes. *Public Administration Review*, 73(1), 23-34.
- Castro, D. and New, J. (2016). *The Promise of Artificial Intelligence. Center for Data Innovation*. <https://www2.datainnovation.org/2016-promise-of-ai.pdf>
- Citizen Participation Forum. (2021). Citizen Participation Index: Methodology. <https://index.fgu.bg/en/methodology.html>
- Cornwall, A. (2002). *Making Spaces, Changing Places: Situating Participation in Development*. Institute of Development Studies, Working Paper 170. Brighton, Sussex: IDS.
- CPI (Center for Public Impact) (2017). *Destination unknown: Exploring the impact of Artificial Intelligence on Government, Working Paper*. <https://www.centreforpublicimpact.org/ai-government-working-paper/>
- Dahl, R. (1994). A democratic dilemma: System effectiveness versus citizen participation. *Political Science Quarterly*, 109(1) 23-34.
- Denhardt, J., Terry, L., Ramirez Delacruz, E., and Andonoska, L. (2009). Barriers to Citizen Engagement in Developing Countries. *International Journal of Public Administration*, 32(14), 1268-1288.
- Desouza, K.C. (2018). *Delivering Artificial Intelligence in Government: Challenges and Opportunities*. IBM Center for The Business of Government.
- Eager, J., Whittle, M., et al. (2020). *Opportunities of Artificial Intelligence*. European Parliament. [https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652713/IPOL_STU\(2020\)652713_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652713/IPOL_STU(2020)652713_EN.pdf)
- EP (European Parliament) (2021). *Artificial Intelligence: Threats and Opportunities*. <https://www.europarl.europa.eu/news/en/headlines/society/20200918STO87404/artificial-intelligence-threats-and-opportunities>
- Fuchs, D. and Klingemann, H.D. (1995). "Citizens and the State: A Changing Relationship?" In *Citizens and the State*, edited by H.D. Klingemann and D. Fuchs, 1-23. Oxford: Oxford University Press.
- Fung, A. and Wright E.O. (2003). *Deepening Democracy Institutional Innovations in Empowered Participatory Governance. The real utopias project IV*. London: Verso.
- Gasser, U. and Almeida, V.A.F. (2017). A Layered Model for AI Governance. *IEEE Internet Computing*, 21(6), 58-62.
- Gil-Garcia, J.R., Pardo, T.A., and Luna-Reyes, L.F. (2018). "Policy analytics: Definitions, components, methods, and illustrative examples." In *Policy analytics, modelling, and informatics*, edited by J.M. Gil-Garcia, T.A. Pardo, and L.F. Luna-Reyes, 1-16. Cham: Springer.

- Goetz, A.M. and Gaventa, J. (2001). *Bringing Citizen Voice and Client Focus into Service Delivery*. IDS, Working Paper 138. Brighton, Sussex: IDS.
- Gurumurthy, A. and Bharthur, D. (2018). Democracy and the Algorithmic Turn. *Sur - International Journal on Human Rights*, 15(27), 39-50.
- Hagen, L., Keller, T.E., Yerden, X., and Luna-Reyes, L.F. (2019). Open data visualizations and analytics as tools for policy-making. *Government Information Quarterly*, 36(4), 101387.
- Helbing, D. (2019a). "Machine Intelligence: Blessing or Curse? It Depends on Us!" In *Towards Digital Enlightenment Essays on the Dark and Light Sides of the Digital Revolution*, edited by D. Helbing, 25-39. Cham: Springer.
- Helbing, D. (2019b). "Preface." In *Towards Digital Enlightenment*, In *Towards Digital Enlightenment*, v-viii.
- Henman, P. (2020). Improving Public Services Using Artificial Intelligence: Possibilities, Pitfalls, Governance. *Asia Pacific Journal of Public Administration*, 42(4), 209-221.
- Höchtel, J., Parycek, P., and Schöllhammer, R. (2016). Big data in the policy cycle: Policy decision making in the digital era. *Journal of Organizational Computing and Electronic Commerce*, 26(1-2), 147-169.
- Howlett, M., Ramesh, M., and Perl, A. (2020). *Studying Public Policy: Principles and Processes*, 4th edition. Ontario: Oxford University Press.
- Huq, A.Z. (2019). Racial equity in algorithmic criminal justice. *Duke Law Journal*, 68(6), 1043-1134.
- IDC (International Data Corporation) 2021. *Investment in Artificial Intelligence Solutions Will Accelerate as Businesses Seek Insights, Efficiency, and Innovation, According to a New IDC Spending Guide*. <https://www.idc.com/getdoc.jsp?containerId=prUS48191221>
- Jobin, A., Ienca, M., and Vayena, E. (2019). The global landscape of ethics guidelines. *Nature Machine Intelligence*, 1(9), 389-399.
- Jones, T.M. (2008). *Artificial Intelligence: A Systems Approach*. Hingham, MA: Infinity Science Press LLC.
- Köylü, M. and Önder, M. (2017). Karmaşıklık Kuramı ve Kamu Yönetiminde Uygulanması: Yalova Kent İçi Ulaşım Hizmetlerinin Dijital Modelleme ve Simülasyonu [Complexity Theory and Application in Public Administration: Digital Modeling and Simulation of Yalova City Transportation Services]. *The Journal of Faculty of Economics and Administrative Sciences*, 22, Special Issue on Kayfor, 15, 1707-1726.
- Kritikos, M. (2019). *Artificial Intelligence ante portas: Legal and ethical reflections*. Scientific Foresight Unit (STOA), European Parliamentary Research Service.
- Latonero, M. (2018). *Governing Artificial Intelligence: Upholding Human Rights and Dignity*. Data and Society.

- Linkov, I., Trump, B., Poinssatte-Jones, K., and Florin, M.V. (2018). Governance strategies for a sustainable digital world. *Sustainability*, 10(2), 440.
- Loeffler, E. and Bovaird, T. (2018). "From Participation to Co-production: Widening and Deepening the Contributions of Citizens to Public Services and Outcomes." In *The Palgrave Handbook of Public Administration and Management in Europe*, edited by E. Ongaro and S. Thiel, 403-424. London: Palgrave Macmillan.
- Maciulienė, M. and Skarzauskienė, A. (2019). Building the capacities of civic tech communities through digital data analytics. *Journal of Innovation and Knowledge*, 5(4), 244-250.
- Manheim, K. and Kaplan, L. (2019). Artificial Intelligence: Risks to Privacy and Democracy. *Yale Journal of Law and Technology*, 21, 106-188.
- Martinho-Truswell, E. (2018). *How AI Could Help the Public Sector*. Harvard Business Review. <https://hbr.org/2018/01/how-ai-could-help-the-public-sector>
- Matthias, A. (2004). The Responsibility Gap: Ascribing Responsibility for the Actions of Learning Automata. *Ethics and Information Technology*, 6(3), 175-183.
- Mohammed, A.K. (2013). Civic Engagement in Public Policy Making: Fad or Reality in Ghana? *Politics and Policy*, 41(1), 117-152.
- Moynihan, D.P. (2003). Normative and Instrumental Perspectives on Citizen participation. *American Review of Public Administration*, 33(2), 164-188.
- Murrell, J. (1990). *Political Analysis*. New York: Pitman.
- Nabatchi, T. and Leighninger, M. (2015). *Citizen participation for 21st Century Democracy*. New Jersey: John Wiley.
- Norris, P. (2001). *Digital divide: Civic engagement, information poverty, and the Internet worldwide*. Cambridge: Cambridge University Press.
- Önder, M. and Saygılı, H. (2018). Yapay Zekâ ve Kamu Yönetimine Yansımaları [Artificial Intelligence and the Reflections on Public Administration]. *Türk İdare Dergisi*, 90(487), 629-668.
- Önder, M. (2020). Yapay Zekâ: Kavramsal Çerçeve [Artificial Intelligence: Conceptual Framework]. In *Yapay Zeka Stratejileri ve Türkiye* [Artificial Intelligence Strategies and Turkey]. *ULISA* 2(2), 3-10.
- Ondik, R. (2003). *Participatory Approaches to National Development Planning*. The World Bank.
- Patel, K., Manetti, M., Mendelsohn, M., Mills, S., Felden, F., Littig, L., and Rocha, M. (2021). *AI Brings Science to the Art of Policymaking*. BCG. <https://www.bcg.com/publications/2021/how-artificial-intelligence-can-shape-policy-making>
- Plantera, F. (2020). *Citizens and Governments as Partners for a Vibrant Democracy*. <https://www.opengovpartnership.org/stories/citizens-and-governments-as-partners-for-a-vibrant-democracy/>

- Polonski, V. (2017a). *How Artificial Intelligence Conquered Democracy*. The Conversation. <https://theconversation.com/how-artificial-intelligence-conquered-democracy-77675>
- Polonski, V. (2017b). *Artificial Intelligence Has the Power to Destroy or Save Democracy*. Council on Foreign Relations. <https://www.cfr.org/blog/artificial-intelligence-has-power-destroy-or-save-democracy>
- Quick, K.S. and Bryson, J.M. (2016). "Citizen participation." In *Handbook in Theories of Governance*, edited by C. Ansell and J. Torbing, pp. 158-169. Cheltenham and Massachusetts: Edward Elgar Publishing.
- Reis, J., Santo, P., and Melão, N. (2020). Artificial intelligence research and its contributions to the European Union's political governance: Comparative study between member states. *Social Sciences*, 9(11), 1-17.
- Ribeiro, R. (2016). *Are Chatbots in State IT's Future?* StateTech. <https://statetechmagazine.com/article/2016/11/are-chatbots-state-its-future>
- Russell, S. (2021). The history and future of AI. *Oxford Review of Economic Policy*, 37(3), 509-520.
- Savaget, P., Chiarini, T., and Evans, S. (2019). Empowering Political Participation through Artificial Intelligence. *Science and Public Policy*, 46(3), 369-380.
- Schippers, B. (2020). Artificial Intelligence and Democratic Politics. *Political Insight*, 11(1), 32-35.
- Simonofski, A., Fink, J., and Burnay, C. (2021). Supporting policy-making with social media and e-participation platforms data: A policy analytics framework. *Government Information Quarterly*, 38(3), 101590.
- Skarzauskiene, A. and Maciuliene, M. (2020). Mapping International Civic Technologies Platforms. *Informatics*, 7(4), 46.
- Taeiagh, A. (2021). Governance of Artificial Intelligence. *Policy and Society*, 40(2), 137-157.
- Theocharis, Y. and Van Deth, J.W. (2018). *Political Participation in a Changing World: Conceptual and Empirical Challenges in the Study of Citizen Engagement*. New York: Routledge.
- Tinholt, D., Enzerink, S., Sträter, W., Hautvast, P., and Carrara, W. (2017). *Unleashing the potential of Artificial Intelligence in the Public Sector*. Capgemini Consulting.
- Valle-Cruz, D., Ruvalcaba-Gomez, E.A., Sandoval-Almazan, R., and Criado, J.I. (2019). A Review of Artificial Intelligence in Government and its Potential from a Public Policy Perspective. *20th Annual International Conference on Digital Government Research* (dg.o 2019), June 18-20, 2019, Dubai, United Arab Emirates.
- Van Deursen, A.J.A.M. and Helsper, E.J. (2015). The Third-Level Digital Divide: Who Benefits Most from Being Online? *Communication and Information Technologies Annual*, 10, 29-52.

- Vashisht, M. (2017). *How is Artificial Intelligence Changing the Public Sector?* ISHIR. <https://www.ishir.com/blog/4662/artificial-intelligence-changing-public-sector.htm>
- Verba, S. and Nie, N.H. (1972). *Participation in America: Political Democracy and Social Equality*. New York: Harper and Row.
- Verba, S., Nie, N.H., and Kim, J. (1978). *Participation and Political Equality: A Seven-Nation Comparison*. New York: Cambridge University Press.
- Verba, S., Schlozman, K.L., and Brady, H.E. (1995). *Voice and Equality: Civic Voluntarism in American Politics*. Cambridge: Harvard University Press.
- Vogl, T.M., Seidelin, C., Ganesh, B., and Bright, J. (2019). *Algorithmic Bureaucracy: Managing Competence, Complexity, and Problem Solving in the Age of Artificial Intelligence*. SSRN. <https://ssrn.com/abstract=3327804>
- Wang, P. (2019). On Defining Artificial Intelligence. *Journal of Artificial General Intelligence*, 10(2), 1-37.
- Wirtz, B.W., Weyerer, J.C., and Geyer, C. (2019). Artificial Intelligence and the Public Sector: Applications and Challenges.” *International Journal of Public Administration*, 42(7), 596-615.
- Wirtz, B.W., Weyerer, J.C., and Sturm, B.J. (2020). The Dark Sides of Artificial Intelligence: An Integrated AI Governance Framework for Public Administration. *International Journal of Public Administration*, 43(9), 818-829.
- Wolford, B. (2020). *What is GDPR, the EU’s new data protection law?* GDPR. <https://gdpr.eu/what-is-gdpr>
- Zuiderwijk, A., Chen, Y., and Salem, F. (2021). Implications of the use of artificial intelligence in public governance: A systematic literature review and a research agenda. *Government Information Quarterly*, 38(3), 101577.