

## **D3.1 – White Paper: The Futures of Digital Democracy**

WP3 – Task 3.1

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## Executive Summary

This deliverable outlines four potential futures or scenarios of digital democracy. These scenarios illustrate how digitalisation could impact society and democratic governance. The method is storytelling, namely the construction of four realist science fiction scenarios that aim at providing food for thought about what a future digital society could look like and what digital futures are desirable and undesirable. Methodologically, this white paper combines the Scenario Development Technique from the UN Strategic Foresight Guide with STEEP Analysis (**S**ocio-Cultural, **T**echnological, **E**conomic, **E**nvironmental, and **P**olitical). The Scenario Development Technique, on the one hand, involves identifying drivers of change and placing them in a two-by-two matrix. STEEP, on the other hand, is a systemic, macro-level approach that goes beyond the analysis of individuals (micro-level) and organisations (meso-level) by focusing on major societal dimensions. The macro-environmental dimensions it focuses on are as follows: (1) sociocultural factors (S), (2) technological factors (T), (3) economic factors (E), (4) ecological factors (E), and (5) political and legal factors (P).

This combination enabled the development of four scenarios examining the impact of digital technologies across these dimensions. The scenarios diverge along two axes. The vertical axis represents the mode of societal organisation and political power (authoritarianism versus democracy). The horizontal axis represents the mode of governance and citizen engagement (representation versus participation). The four scenarios are as follows:

### **Scenario 1: Representative Digital Authoritarianism**

Representative digital authoritarianism depicts a totalitarian regime that leverages technology for absolute control. A single-party dictatorship eliminates dissent via propaganda and mass surveillance. Digital technology is an instrument for surveillance and control in a state-monopoly capitalist system. There are no worker rights, environmental protection is neglected, and there is a priority on fossil fuels and unrestricted profit maximisation.

### **Scenario 2: Participatory Digital Authoritarianism**

Participatory digital authoritarianism is a softer form of autocracy with a democratic facade. This pseudo-democracy allows limited debate but suppresses dissent via social pressure and propaganda. Digital technologies are used as means of pseudo-participation that formally embrace democratic processes but, via a variety of mechanisms, support pro-regime interests. There is a social scoring system in place that favours compliant behaviour, while the minimally regulated capitalist economy is dominated by regime-aligned oligopolies.

### **Scenario 3: Representative Digital Democracy**

Representative digital democracy combines representative democracy and a regulated economy via digital tools. Elected representatives are the key actors in a political system that tries to combine elections with various mechanisms of citizen deliberation and participation. Digital tools are introduced in a supportive role to augment the political process and make governance more open, transparent, and accountable. Strong data protection and the regulated use of digital technology play a central role in digital society.

### **Scenario 4: Participatory Digital Democracy**

Participatory digital democracy revolves around a highly citizen-centric society that encourages critical thinking, discourse, and participation. Technology also follows a human-first approach. It is open-source and designed openly to invite participation. There is a mixed economy in which public, co-operative, and non-profit enterprises play a key role. There is a dynamic variety of forms of deliberative and participatory digital democracy, including, for example, digital participatory budgeting, online citizen assemblies, and non-commercial digital platforms (public service Internet, platform co-operatives, FLOSS: free, libre, and open source software, etc.).



# 1. Introduction

This white paper presents four scenarios of digitalisation and society with a special focus on the impacts of these developments on (digital) democracy. Methodologically, we combine the scenario technique and STEEP analysis in order to conceptualise four scenarios for the future of democracy in a digitalised society, as well as five societal dimensions of each scenario.

“The purpose of a White Paper is to launch a debate with the public” (European Union 2025). This means that white papers have a specific role in the public sphere, namely to contribute to public debate. This white paper aims to contribute and provide food for thought to the public debate on the future of digital society and digital democracy.

Given that society is a non-deterministic, complex system, we cannot predict how societies will look in 5, 10, 20, 50, or more years. “when systems are far from equilibrium, when they are bifurcating, small fluctuations can have great effects. This is one of the main reasons that the outcome is so unpredictable. [...] in times of crisis and transition, the freewill factor becomes central. The world of 2050 will be what we make it. This leaves full rein for our agency, for our commitment, and for our moral judgment” (Wallerstein 1998, 64). Wallerstein writes that “which choice the participants collectively will make” about society’s future “is inherently unpredictable” (Wallerstein 2004, 77). In 2000, we did not know that the COVID-19 pandemic would break out in 2020, Russia would invade Ukraine in 2022, or that ChatGPT would be launched in 2022 and become one of the most popular apps and Internet platforms.

Given the complexity and openness of the world, we do not know what digital societies will look like in 2050. We do not know if there will be a society by then, what societies will be democratic or undemocratic, and what roles digital technologies will play. Writing about digital society in 2050 is therefore not easy. Therefore, we have chosen fiction, or, to be more precise, realist science fiction, as a method for writing about the future of digital society and digital democracy. We present four science fiction scenarios of how digital societies could look in 2050. The method we employ is storytelling, namely the construction of four realist science fiction scenarios that aim at providing food for thought about what a future digital society could look like and what digital futures are desirable and undesirable. Fiction is “imaginative literature” (Williams 1984, 134). The beauty of fiction is that it presents stories that allow us to think about and imagine potential worlds and potential futures, and to thereby anticipate potential desirable and undesirable futures and think about what kind of (digital) society we want to live in and do not want to live in. Science fiction allows us to think about the immediate presence by engaging with potential (digital) futures.

What is science fiction? The science fiction writer Isaac Asimov gave the following definition: “Science fiction is that branch of literature which deals with a fictitious society, differing from our own chiefly in the nature or extent of its technological development” (Asimov 1954, 167). “SF texts imagine futures or parallel worlds premised on the perpetual change associated with modernity” (Luckhurst 2005, 3), especially changes having to do with science and technology. Science fiction is a form of fiction that draws on the existing knowledge and imaginative extrapolation of science and technology to explore the consequences for human beings and their societies. Given that utopias and dystopias play an important role in science fiction, the



question of digital democracy is a well-suited theme for science fiction storytelling. This paper explores digital democracy and digital authoritarianism with the help of science fiction storytelling.

## 2. Democracy and Authoritarianism

Fung and Wright (2003) distinguish between two forms of governance: top-down governance and participatory democracy. They introduce this differentiation as part of a classification of governance models:

*"In top-down governance structures decisions are made by actors at the peak of an organizational structure and then imposed on lower levels; in participatory governance, decisions involve substantial direct involvement of actors from the bottom tiers. [...] A shift of governance from the top-down adversarial to the participatory collaborative form involves the delegation of power from higher to lower levels of governance and to a broader array of participants" (Fung and Wright 2003, 261, 265).*

We base one dimension, namely the x-axis, of our scenario analysis on Fung and Wright and distinguish between representative and participatory forms of governance. In representative forms of governance, there is a group of decision-makers who decide on behalf of the population what should be done. In participatory forms of governance, there are mechanisms that engage affected individuals and groups living in society into decision-making processes that govern their lives.

The second dimension of our scenarios, the y-axis, concerns the basic mode of society's organisation. We here draw a distinction between democracy and authoritarianism, democratic and authoritarian societies.

One starting point for concepts of autocracy is Aristotle's typology of politics (Aristotle and Lord 2013, books 4 & 5). He distinguishes between good and bad forms of politics, where one person (monarchy, tyranny, etc.), a few people (aristocracy, oligarchy, etc.), and many rule (polity, democracy, etc.). The basic distinction of political systems Aristotle established is the one between the rule by one person, the few, and the many.

### 2.1 Democracy

Democracy has different dimensions. It is an idea and a set of principles ("democratic"), a group of people ("democrats", citizens, etc.), a type of action ("democratising", "democratic practices", "struggles for democracy", etc.), and an institution and system ("democracy"). Taken together, this means that democracy is not static but a dynamic process in which humans, based on a set of constitutional democratic principles, engage in practices that result in decisions that are binding for all and represent the collective will of those participating.

Understandings of democracy have in common that they conceive of democracy as the self-government of human beings (see, for example, Crick 2002, Dahl 2006, and Held 2006). Democracy is opposed to monarchies (rule by a single monarch), oligopolies and aristocracies

(rule of the few), as well as dictatorships and tyrannies (rule through violence and terror). Democracy is not just a means for minimising domination but also an attempt to minimise the rule by violence.

In modern societies, citizens who hold the citizenship of a particular nation-state have been conceived as the subjects of democracy. Nation-states continue to be important organisational forms of politics. However, societies have become more transnational and, besides local, regional, and national characteristics, also feature supranational organisations, transnational communication networks, and transnational flows of money, goods, power, humans, data, and knowledge. Societies are today both national and transnational. Therefore, we need to think of politics and democracy as operating at various organisational levels.

The concept of democracy itself is broadly contested. Consequently, when defining democracy, scholars differentiate between its various concrete manifestations and abstract conceptions, i.e. models of democracy. A model of democracy is a specification of the general features of democratic systems as well as the clarification of what features are central in a particular model (see Macpherson 1977 and Held 2006). There is a variety of models of democracy. In our own approach, we identify six models of democracy: (a) constitutional democracy, (b) representative democracy, (c) direct democracy, (d) deliberative democracy, (e) participatory democracy, and (f) pluralist democracy (Fuchs 2025). Currently existing democracies often combine different models and dimensions of democracy.

In the model of constitutional democracy, there is a stress on the importance of constitutions that protect civic and human rights and democracy's central feature. Representative democracy emphasises the election of political representatives who govern society through free, fair, regular, universal, equal, secret, and transparent elections as democracy's central feature. In direct democracy, referenda and citizens' initiatives, where citizens directly decide and vote on key societal topics, are central features. In deliberative democracy, open, inclusive, egalitarian, non-manipulative, non-coercive political debates in the public sphere are democracy's key feature. Deliberative democracy stresses the importance of political communication within democratic institutions, between citizens, and between governments and citizens, which includes aspects such as citizen-to-citizen debates, a pluralist media and news reporting landscape (news media diversity), social movements and a vivid civil society, and parliamentary debates. In participatory democracy, the self-management of organisations, democracy beyond elections, and the mobilisation of resources that enable democracy are democracy's key aspects. Pluralist democracy emphasises the plurality of parties, political groups, political ideas, political voices, political visibility, political interests, and taking minority interests seriously as democracy's key features.

We define digital democracy as the use of digital media in the practice of democracy. It refers to the digital mediation of democracy. Digital democracy has three encapsulated symbolic dimensions: the production and sharing of democratic information (digital democratic information), democratic communication (digital democratic communication), and the co-creation of democracy (digital democratic co-production). Models of democracy, together with the affordances and features of digital technology, enable models of digital democracy. They include constitutionalist digital democracy, representative digital democracy, direct digital democracy,

pluralist digital democracy, deliberative digital democracy, and participatory digital democracy. Therefore, scenarios of future societies and the future of (digital) democracy need to think of what role each of the five types of (digital) democracy plays or does not play in the analysed scenario.

## 2.2 Authoritarianism

In academic discourse, the notion of authoritarianism was developed in the 1920s, 1930s, and 1940s by authors such as Wilhelm Reich, Erich Fromm, Theodor W. Adorno, and Franz L. Neumann (Adorno et al. 1950; Fromm 1936 & 1941/2001, 1942/2001, 1984; Neumann 1944/2009; Reich 1933/1972). They wanted to understand how Nazism worked and how it managed to appeal to a large number of citizens. Their starting point was the individual's personality, which is why they spoke of the "authoritarian personality" (Adorno et al. 1950). The authoritarian personality has to do with the influence of authoritarian fathers, families, bosses, and politicians on the individuals' psyche and on society. But authoritarianism has, for these authors, not been a purely individual phenomenon. Rather, they argued that it extends from the individual to society, which is why they spoke of the "authoritarian society" (Reich 1933/1972, 21; Fromm 1955/1991, 148), "the authoritarian system" (Fromm 1942/2001, 18), the "authoritarian structure of society" (Neumann 1944/2009, 150), or the "authoritarian order" (Neumann 1944/2009, 128).

Authoritarianism has to do not just with dictatorship but also violence, namely, "the passion to destroy life and the attraction to all that is dead, decaying, and purely mechanical" (Fromm 1973/1997, 6). Authoritarian societies love the "act of dismemberment" (329), "to destroy for the sake of destruction" (186), and "to tear apart living structures" (329). Authoritarian societies are what Fromm (1973/1997) calls 'necrophilic societies'. They are not resilient and life-affirming but have a love for death and destruction. There has been empirical research on how to measure right-wing authoritarianism (see, for example, Adorno et al. 1950, Altemeyer 1981, and Melen 1993).

For these classical authors, studying authoritarianism required an interdisciplinary approach that brings together the fields of political economy, sociology, ideological critique, and psychology in order to understand the various levels of authoritarianism and their interaction. Therefore, it is an important insight from classical studies of authoritarianism that understanding this phenomenon requires an interdisciplinary approach.

Also in contemporary academic discourse, there are approaches that understand authoritarianism as a type of society (for example, Fuchs 2018a, Giroux 2015, and Wiatr 2019). Fuchs stresses that authoritarianism includes psychological, political, economic, and cultural-ideological elements and has a variety of organisational levels: "[It] can take place at the level of the individual, group, institution or society as a whole" (Fuchs 2018a, 58)

In the debate on authoritarianism, there is the widespread assumption that we have been witnessing the return of authoritarianism in society in the context of multiple crises. Therefore, terms such as the new authoritarianism (Giroux 2015 and Wiatr 2019), third wave of

autocratisation (Lührmann & Lindberg 2015), post-democracy (Crouch 2004), late fascism (Toscano 2023), neoliberal fascism (Giroux 2019), new fascism (Traverso 2019), or post-fascism (el-Ojeili 2018, Tamás 2000) have been created.

Authoritarianism has an ambivalent relationship to the media. It tends to question and repress critical and independent media, oppose media plurality, and use media as a tool of propaganda. Given that media today is largely digital and media is an aspect of the public sphere, as part of discussions of new authoritarianism, concepts and analyses of digital authoritarianism have also emerged.

New authoritarian forces have used the internet and social media as means of propaganda, disinformation, and information warfare (see European External Action Service 2023, 2025). In the light of foreign information manipulation and interference (FIMI), the European Commission has advanced plans for the European democracy shield and advancing digital sovereignty (Special Committee on the European Democracy Shield 2025).

In the light of the digitalisation of authoritarianism context, authors have spoken of digital authoritarianism (Gosytonyi 2023, Maerz 2024, Pearson 2024, and Roberts and Oosterom 2024), digital autocracy (Frantz, Kendall-Taylor, and Wright 2020 and Sinpeng and Koh 2022), digital populism (Bartlett, Birdwell & Littler 2011 and Gerbaudo 2024), digital fascism (Degeling 2024, Demír 2025, Fielitz and Marcks 2019, and Fuchs 2022), and networked authoritarianism (Mackinnon 2011). It has also been debated whether it is better to speak of digital populism or digital authoritarianism (Fuchs 2018b and Gerbaudo 2018). "I suggest that we redescribe DA [digital authoritarianism] as any situation where digital technologies systematically promote authoritarian politics" (Pearson 2024, 13). "Digital authoritarianism is broadly defined as a set of digital practices which are aimed at harming democracy" (Maerz 2024, 210). "Classical fascism used stormtroopers and monopolised, state-controlled broadcast media (such as the Volksempfänger). Contemporary fascism, among other means, uses troll armies and social media in order to attack defined enemies. Classical fascism was strictly organised top-down based on the leadership principle. Contemporary fascism fetishises the leader and more combines fascist leadership with networked, decentralised organisation" (Fuchs 2022, 321).

Such approaches have in common that they understand digital authoritarianism as the use of digital media in the practice of democracy. It refers to the digital mediation of authoritarianism. Digital authoritarianism has three encapsulated symbolic dimensions: the production and sharing of authoritarian information (digital authoritarian information), authoritarian communication (digital authoritarian communication), and the co-creation of authoritarianism (digital authoritarian co-production).

Scenarios that analyse potential futures of democracy, society, and technology should think of what role (digital) authoritarianism and/or democratic resilience against (digital) authoritarianism play.

### 3. Writing About the Future

The cultural theorist Raymond Williams (1978/2010) distinguishes between eight ways of writing about the future. Table 1 shows his typology. He identifies four different story types that either have an optimistic (utopian) or a pessimistic (dystopia) character, which results in a total of eight different types of how to tell stories about the future.

	Utopia	Dystopia
<b>Paradise and hell</b>	<b>Paradise:</b> "a happier life is described as simply existing elsewhere"	<b>Hell:</b> "a more wretched kind of life is described as existing elsewhere"
<b>Externally altered world</b>	<b>External Utopias:</b> "a new kind of life has been made possible by an unlooked for natural event;"	<b>External Dystopias:</b> "a new but less happy kind of life has been brought about by an unlooked for or uncontrollable natural event"
<b>Willed Transformation</b>	<b>Human-Centred Utopias</b> "a new kind of life has been achieved by human effort"	<b>Human-Centred Dystopias:</b> "a new but less happy kind of life has been brought about by social degeneration, by the emergence or re-emergence of harmful kinds of social order, or by the unforeseen yet disastrous consequences of an effort at social improvement"
<b>Technological Transformation</b>	<b>Technological Utopias</b> "a new kind of life has been made possible by a technical discovery."	<b>Technological Dystopias</b> "the conditions of life have been worsened by technical development."

Table 1: Raymond Williams' (1978/2010, 95) typology of ways of writing about the future

Williams identifies eight ways of writing about the future. He distinguishes between utopias and dystopias, stories about and descriptions of a better and a worse world. In addition, he distinguishes descriptions of future society according to the type of transformation that has taken place. First, some stories play in completely different worlds (for example, on another planet), and these are often highly unrealistic and fantastic in that they are either perfect worlds without problems or nightmares. He calls these scenarios "paradise" and "hell". There is often no trace of contemporary power structures in such stories. Second, there are stories in which a natural disaster or radical event has completely transformed society. Examples are earthquakes, volcanic eruptions, or floods. Third, there are descriptions of a future society in which humans have wilfully transformed society. Fourth, there are futures where the application of science and technology has fundamentally altered life. Combining the four types of transformation and

the two moral political economies (utopia, dystopia) as criteria of distinction results in eight types of writing about the future.

Williams has a particular interest in human-centred and technological utopias and dystopias. For us, the combination of both is of special interest. The technological dimension is interesting for us because we are writing about digital futures. Human-centredness is important because we are interested in writing about the future of human society on Earth. Therefore, there are no extraterrestrial beings such as Martians in our scenarios, and we focus on life on Earth and not on other planets. Human-centred stories also allow us to focus on potential futures of contemporary power structures. In our scenarios, power structures continue to exist but have been altered by humans wilfully as the outcome of certain social struggles. Therefore, our scenarios are manifestations of the lower part of table 1 that focuses on human-centred utopias and dystopias as well as technological utopias and dystopias. Our digital futures scenarios ask what happens when we combine the technological and the human-centred storytelling with the question of how the futures of digital society could look.

For Erik Olin Wright, real utopias are neither fantasies of the impossible nor fetishisations of pragmatism. Rather, real utopias are “utopian ideals that are grounded in the real potentials of humanity, utopian destinations that have pragmatically accessible waystations, utopian designs of institutions that can inform our practical tasks of muddling through in a world of imperfect conditions for social change” (Wright 2003, viii). Our scenarios are real utopias and real dystopias. They are possible futures grounded in the real positive and negative potentials of contemporary digital society.

## 4. Methodology

### 4.1 The Scenarios Technique

We are using the scenarios technique as a method for thinking about the future of (digital) democracy. What are scenarios?

*“Scenarios are provocations to broaden our understanding of how the future may evolve, which allows us to prepare not for one but multiple ways the future might unfold. In the foresight process, scenarios are generated by identifying emerging drivers of change that may affect the future” (UN Futures Lab 2023b, 1).*

The critical uncertainties method is one method for developing scenarios: “Four distinct scenarios are framed by placing two prioritised highly-critical and highly-uncertain trends or drivers of change on a two-by-two matrix. The two axes represent the two extremes of the two drivers of change” (UN Futures Lab 2023b, 1). We use this method for identifying four scenarios.

## 4.2 Four Scenarios of Digital Futures

Combining the two axes of governance (representation vs. participation) and societal organisation (authoritarianism vs. democracy) results in the model visualised in Figure 1. Its four quadrants represent four scenarios for the future of digital society.

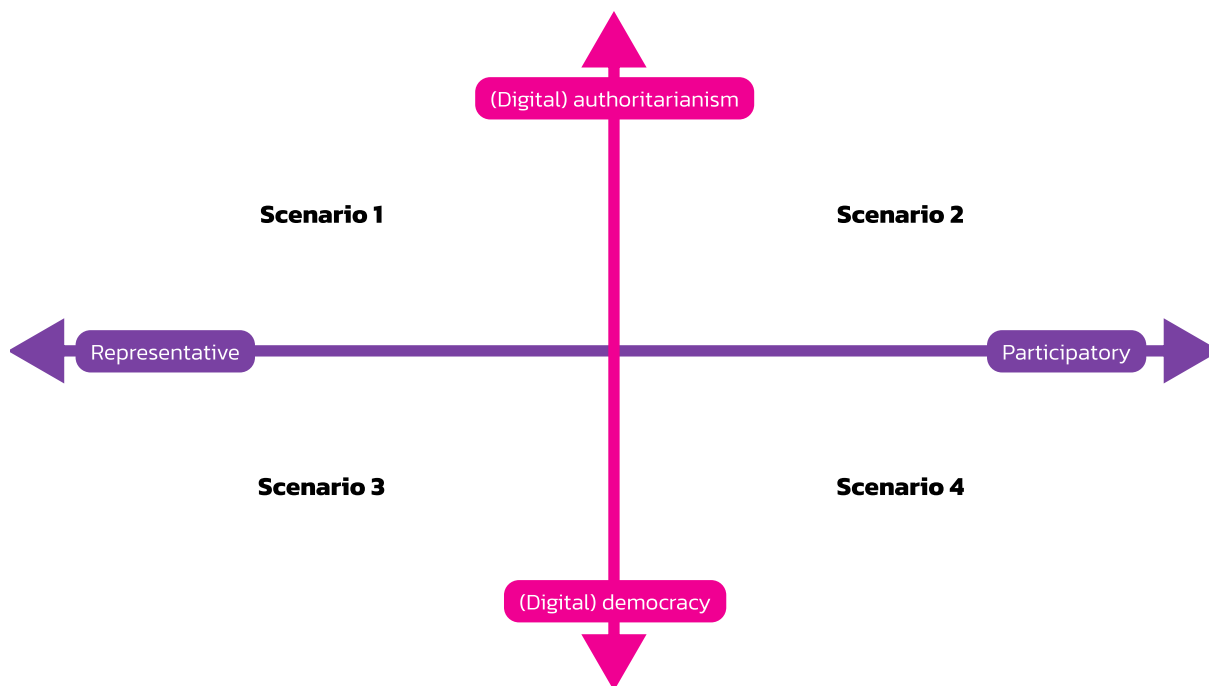


Figure 1: Four scenarios for digital society's future

The four scenarios have the following names:

- Scenario 1: Representative Digital Authoritarianism
- Scenario 2: Participatory Digital Authoritarianism
- Scenario 3: Representative Digital Democracy and Society
- Scenario 4: Participatory Digital Democracy and Society.

Representative digital authoritarianism is a dictatorship with a strong leader and a one-party system that claims to represent the people's interests and uses digital technologies as a means of control. Participatory digital authoritarianism is a dictatorial system ruled by a strong leader. It is characterised by a democratic facade that uses digital technologies for organising plebiscites to retain citizens' approval of the regime. Via digital media, citizens are co-opted and asked to participate in a dictatorship. Representative digital democracy and society is a system where digital technologies are used for e-government, open governance, and e-voting. Participatory digital democracy and society is a system where digital technologies are used for various forms of citizen engagement in politics and society.

## 4.3 The STEEP Approach

The STEEP approach can be used to analyse various societal aspects of the identified scenarios (UN Futures Lab 2023b, 5). STEEP is a method for systematically analysing "trends, forces, and



changes” in society (Fisher, Wisnewski, and Bakker 2020, 36). It was first introduced by Francis J. Aguilar (1967). STEEP is a systemic, macro approach that goes beyond the analysis of individuals and organisations by focusing on major societal dimensions. The macro-environmental factors it focuses on are as follows: “(1) sociocultural factors, (2) technological factors, (3) economic factors, (4) ecological factors, and (5) political and legal factors” (Fisher, Wisnewski, and Bakker 2020, 37-38). STEEP stands for the initials of these five dimensions. Table 2 gives an overview of these five aspects.

Factors	Description	Considerations
<b>Sociocultural factors</b>	Sociocultural factors capture societies’ cultures, norms, beliefs, and behaviours, as well as demographic shifts in population distribution.	<ul style="list-style-type: none"> <li>• Health care</li> <li>• Education (childcare, early child care, school system, universities)</li> <li>• Worldviews</li> <li>• Sports</li> <li>• Worldviews, religion, Ideological issues and concerns</li> <li>• Social relations (family life, personal life, etc.)</li> <li>• Lifestyle, consumer culture, and fashion trends</li> <li>• Population growth and segmentation</li> <li>• Age distribution</li> <li>• Media system</li> </ul>
<b>Technological factors</b>	Technological factors account for technological change, including the emergence of new technologies that may disrupt a firm or industry.	<ul style="list-style-type: none"> <li>• Technology maturity</li> <li>• Emergent technology developments</li> <li>• Pace of technological change</li> <li>• Research funding and focus</li> <li>• Licensing and patenting norms and regulations</li> <li>• Dominant technologies</li> <li>• Organisation of technological progress</li> </ul>
<b>Economic factors</b>	Economic factors account for shifts in economic indicators and trends, and the impact of those indicators and trends on a firm and industry.	<ul style="list-style-type: none"> <li>• Ownership</li> <li>• Working conditions</li> <li>• Gross domestic product growth rates</li> <li>• Interest rates</li> <li>• Employment levels</li> <li>• Price stability (inflation and deflation)</li> <li>• Currency exchange rates</li> </ul>

		<ul style="list-style-type: none"> <li>• Income distribution</li> <li>• Role of monopolies and economic concentration</li> </ul>
<b>Ecological factors</b>	Ecological factors concern broad environmental issues, including the environment, global warming, and sustainable economic growth.	<ul style="list-style-type: none"> <li>• Consumer preferences and demands for sustainable products and services</li> <li>• Environmental regulation and incentives</li> <li>• Access to sustainable resources (e.g., natural resources)</li> </ul>
<b>Political and legal factors</b>	Political and legal factors account for the processes and actions of government and for changes in relevant laws, regulations, policies, and incentives.	<ul style="list-style-type: none"> <li>• Industry laws and regulations</li> <li>• Political party policies and power distribution</li> <li>• Civil society</li> <li>• Public debates, public opinion, the public sphere</li> <li>• Citizens' ability to influence political decisions</li> <li>• Voting rates and trends</li> <li>• Social movements</li> <li>• Power and focus of regulatory agencies</li> </ul>

Table 2: Dimensions of the STEEP analysis approach (further elaboration of table 6.1 in Fisher, Wisniewski, and Bakker 2020, 6.1)

The dimensions of society that the STEEP method defines can also be found in social theories. For example, the systems theorist Wolfgang Hofkirchner argues that society consists of the ecosphere, the technosphere, and the sociosphere. "The technosphere is the sphere in which means are produced, that is, in which human beings are active in innovating and applying scientific-technological tools in the course of social life. A means is a medium, in that it mediates between the starting point and the desired result, regardless of what sort of action is involved. An infrastructure of tools, methods and capabilities which comprise the overall forces of the socially living humans is the base of human systems. Technology is to augment the actors that take the role of productive forces in that they produce something when they aim at something. [...] The ecosphere is the sphere in which ways are produced, that is, in which human beings work, in other words, where they use their tools, methods and capabilities to adapt nature to themselves in order to survive and construct an umwelt, where they objectify the life-support conditions of nature and appropriate nature to assure them of life support.[...] The sociosphere as a whole is the sphere in which goals are produced. It's the sphere in which human beings perform social actions. Here they constitute what makes sense to them and realise it." (Hofkirchner 2006, 15-16).

The sociosphere can be further subdivided into the economy, the political system, and culture. This distinction can be found in the works of various social theorists, such as Pierre Bourdieu (1986), Anthony Giddens (1984), and Jürgen Habermas (1985a, 1985b).

“The economy is a system in which humans in particular relations of production create use-values that satisfy human needs. [...] In the political system, humans take collective decisions that govern and regulate society. Culture is the system whereby the human being is reproduced, which entails the reproduction of mind and body” (Fuchs 2020, 55). While economy and politics have relatively clear definitions in most social theories, culture “is one of the two or three most complicated words in the English language” (Williams 1983, 87). While many approaches to culture define the latter as the realm of ideas that they separate from the material world, Raymond Williams argues that culture is itself material (Williams 1980/2020). This means that ideas have a material system they are part of. For example, ideas produced by the human brain are based on the human body. Therefore, we understand culture as the system where the human mind and body are reproduced, which implies that the health care system and sports are part of culture, just like universities and education.

In the section that follows, we outline some (but due to lack of space and time, not all) aspects of society’s six dimensions with respect to four scenarios of a potential future digital society.

## 5. Digital Futures: Four Scenarios

### 5.1. STEEP-S: Socio-Cultural Digital Futures

#### Scenario 1: Authoritarian Digital Culture – Representative Digital Authoritarianism’s Culture

The regime’s overall goal in education is to instil belief in the dominant ideology and suppress critical thinking. Therefore, the government uses digital technologies as propaganda tools and means of thought control. Teachers at all levels of education must be committed members of the ruling party. An e-learning platform and e-books are used in all school classes. The regime strictly controls and filters material published on the platform and in e-books. Critical educational content is prohibited and does not exist. Most of the content consists of the regime leader’s speeches, writings, and ideas.

Educational opportunities are determined by the political commitment of children’s families to the regime. Only children of highly committed parents are allowed to attend university. Others must take up non-academic jobs. There is no free access to university education. In universities and research centres, there is no academic freedom. The topics of research and teaching are strictly defined top-down by the Ministry of Education. The minister of science, education, and digital affairs is also the owner and CEO of one of the country’s major tech companies. A lot of public funding is channelled into his private pockets via the purchase of educational technologies and content.

University education and research are especially focused on STEM subjects (natural sciences, technology, engineering, and mathematics). The humanities and social sciences are seen as

useless and as harbouring the danger of fostering critical thinking. Therefore, these fields were outlawed and replaced by half a semester where students focus on studying the history and main principles of the dominant ideology. Former researchers and teachers of the humanities and social sciences are labelled 'enemies of the state', dismissed and sent to labour camps. Those who complied with the new regime now work in its propaganda institutions.

Digital culture features hardware such as computers, laptops, tablets, as well as software and online platforms that are all developed by the minister of science, education, and digital affairs' corporation. All communication is monitored, filtered, and censored.

In hospitals, doctors conduct genetic analyses of infants' blood, which results in a genetic score. The regime considers those with a low score to be ethically inferior. Such infants are killed. Citizens have brain interfaces and implanted medical nanorobots that scan their bodies and transmit live data on their health status to the Ministry of Health. Thereby, each individual has a health score. Those with high scores have privileges; those with low scores are punished. There is a fitness ideology that defines the ideal citizen as economically productive and militarily combat-ready. Those who do not fulfil these two ideals are publicly denounced as "parasites". People who object to these practices are deemed "traitors to the fatherland".

## **Scenario 2: Participatory Authoritarian Digital Culture – Participatory Digital Authoritarianism's Culture**

The regime's goal in the realm of education is to indoctrinate children, young people, and adult learners. Digital learning is defined as participatory e-learning where the learners take an active role in selecting learning materials. However, the core curriculum and learning tasks are pre-defined and shaped by the dominant ideology. Materials that are critical of the regime and dominant ideas exist and are also present in education. However, teachers and the school system constantly frame critical thought, books, and other content negatively as "woke". Pupils and students who support critical ideas are not punished by legal rules such as the ban from the educational system. Rather, there is a kind of social control where critical people become outsiders who are socially shunned by others. This social control by isolation results in self-censorship and voluntary ideological submission (hegemony).

There are various e-learning platforms, digital materials, and e-books available on the market. However, the state subsidises alt-right learning platforms and publishers who focus on e-books that share the dominant ideology. Therefore, schools and universities have cheap or free access to these platforms and e-books, while platforms and e-books that are ideologically independent and foster critical thinking are expensive. There is a kind of market control of education. The vast majority of schools and universities adopt the ideologically aligned platforms and materials.

In universities, all research can be conducted and taught, so there is formal academic freedom. However, public funding is first and foremost directed to research projects and researchers whose academic knowledge aligns with the dominant regime. Other research and teaching are tolerated but are much less financially viable due to a lack of funding, have low visibility, and

little impact on society. The social sciences and humanities exist in many universities, but their share of the overall budget is deliberately kept extremely low.

In health care, there are private/public partnerships between the state and a few large health care corporations that control the pharmaceutical market and operate large hospitals. The owners of these corporations are ideologically aligned with the ruling party. There are also other smaller pharmaceutical companies and health care organisations that, however, hardly receive public funding. In medical research, there is public funding, especially for corporate research undertaken by biotechnological corporations whose owners are ideologically aligned with the ruling party. Other medical research is not prohibited but receives little to no public funding.

There is a platform for crowdsourcing medical care work to volunteers. Such work includes, for example, elderly care, childcare, palliative care, or supportive care. Ideologically, the regime presents this outsourcing of health and care work from paid care and medical employees to unpaid citizens as the democratisation and communalisation of the health and care system via digital technologies that enable participatory care. The government presents this participatory care initiative as a new form for strengthening social cohesion and local community ties. The actual motivation is the ideological conviction that health care should, to a large degree, be privatised.

### **Scenario 3: Representative Digital Culture - Representative Digital Democracy and Society's Culture**

There is a dual goal of the educational system: learners should be educated for the job market and enabled to become reflective and responsible citizens. Pupils and students use traditional and digital means of learning – printed books and e-books, pens, pencils, and paper, as well as tablets, learning apps, learning games, and e-learning platforms. Either entire cities or schools decide how they use parts of their budgets to give their students and teachers access to electronic materials and technologies. There is a market for educational technologies where many companies and organisations are active, but that is dominated by a smaller number of private companies. There are experiments with non-commercial and FLOSS (free, libre and open-source software) e-learning platforms and publishing that, however, have a marginal character.

There is freedom of academic teaching and research. However, STEM fields receive a much larger share of funding and budgets than the social sciences and humanities. In universities, digital technologies are widely used for e-learning and the publishing of books and articles (e-publishing). There is a rivalry between private for-profit publishers and software developers in the higher education market and not-for-profit initiatives, journals, publishers, and tech providers (e.g. FLOSS software development projects such as Moodle), where the former dominate.

The electronic patient record and health IDs constitute the major digital project in the healthcare sector. The goal is to improve the flow of information between health care providers in order to improve patient care, optimise diagnostics, and reduce administrative and medical costs. AI analyses the electronic patient record and provides recommendations to citizens

based on their medical records. Health care providers foster gamification via a health gaming platform where users obtain benefits for documenting that they engage in sports, eat healthily, and practice a healthy and sustainable lifestyle.

## **Scenario 4: Participatory Digital Culture – Participatory Digital Democracy and Society’s Culture**

The main goal of the educational system is to empower democratic citizenship and learners’ capacities to think and act critically. Schools and universities have curricula with defined goals. Pupils and students are encouraged to participate in selecting learning methods. Learning is more flexible in terms of pupils’ and students’ individual choices. Schools are organised in a more participatory manner, with key decisions taken by co-determination bodies comprising learners, parents, and teachers. For example, they elect the school’s management.

Nurseries, schools, and universities are adequately and publicly funded; therefore, there is no shortage of resources and personnel. As a consequence, teachers are able to provide sufficient support for learners. There are experiments with digital participatory budgeting in schools and universities, in which educational institutions allocate a share of the budget to projects suggested by learners. Thereby, students and pupils practice democracy as part of their everyday learning environment.

Schools regularly use e-books and e-learning platforms. The dominant model in educational media and technologies is non-commercial and not-for-profit. In this context, FLOSS (free, libre and open-source software) e-learning platforms and software, not-for-profit educational and academic open-access publishers (so-called diamond open access), as well as educational platform co-operatives play an important role. Supported by digital technologies, learning has become more participatory and more social, so that pupils and students are encouraged to work more in teams that produce content for learning purposes. There are experiments with sharing such content with others so that peer engagement is encouraged.

There is freedom of academic teaching and research. In universities, the social sciences and humanities are now receiving a greater amount of funding and are being integrated into other degree programmes. This means that all students, including those studying STEM subjects, now have the opportunity to learn about society, democracy, sustainable development, (in)justice, philosophy, and history. Thereby, the STEM subjects become more aware of societal problems.

Digital technologies are used in universities mainly for e-learning and e-publishing of books and articles. Digital education resources, such as e-learning platforms, e-books, journals, databases, and software, are not-for-profit and open source by default. Not-for-profit diamond open-access publishers are the dominant actors in academic publishing. The use of FLOSS software has become more important in universities than reliance on expensive proprietary software licences.

Health care is now organised around the principle of patient-centred care, allowing doctors to take adequate time to discuss health issues and treatment options with patients and their close ones. Patients are empowered to become informed participants in conversations with doctors and decisions concerning their health, while recognising that doctors are the experts. There are electronic patient records and health IDs to improve the flow of information between health care providers, make health information available to patients, and support the conversations between patients and doctors. The digital patient record includes a function that allows patients to record observations about their well-being and to comment on the entries that doctors make. Overall, the health care system is more deliberative and participatory than in former times. This does not mean that all patients become their own doctors, but that there is a more patient-focused health care system and more informed discussion between doctors and patients.

## 5.2. STEEP-T: Future Digital Technologies

All scenarios have to do with future uses of technologies. Here is a list of ten types of technologies that we see as defining the future technological landscape:

1. Environmental technologies:  
Technologies that humans use in order to use natural resources in particular ways, energy generation, food production, agriculture and farming, water and waste management, technologies for environmental sustainability, digital infrastructures, green computing, etc.
2. Health technologies:  
Wearable technologies, technological implants, genetic and bio technologies, medication to diagnose, treat, prevent, or relieve symptoms of diseases and health conditions, surgical techniques and machines, care technologies, reproductive technologies, palliative technologies, robotic and minimally invasive surgery, Artificial Intelligence for diagnostics and treatment, personalised medicine through genomics, telemedicine and remote patient monitoring via wearable devices, 3D bioprinting for tissue, virtual medicine
2. etc.
3. Social media and streaming platforms:  
User-generated content, entertainment and culture platforms (music, film, audio-visual content, podcasts, etc.), video platforms, live streaming platforms, messaging technologies, wikis, microblogs, video and photo sharing platforms, e-learning technologies, etc.
4. News and journalistic technologies:  
Newspapers, magazines, newsletter platforms (Substack, Medium, Table Media, etc.), investigative journalism technologies: OSINT (open source intelligence), fact-checking technologies, news aggregators (Ground News, The European Correspondent), algorithmic news aggregation (Google News, Ground News), expert-based news aggregation (The European Correspondent, , community-driven news and information aggregation (Digg, Reddit), etc.
5. Artificial intelligence and automation technologies:



Generative AI, AI assistants, smart technologies, virtual and augmented reality technologies, robots, drones, self-driving vehicles, natural language processing (NLP) technologies, etc.

6. Political information technologies:

News and journalistic technologies, political information technologies, political communication and debate technologies, technologies of civic engagement, digital activism, e-participation technologies, civic tech, open governance technologies, online deliberation technologies, social scoring technologies, security and surveillance technologies, etc.

7. Mobility technologies:

Public transport technologies, personal transport technologies, space technologies, logistics, delivery technologies, drones: unmanned aerial vehicles (UAVs) & unmanned maritime vehicles (UMVs), drone swarms, self-driving vehicles, urban air mobility (UAM), micromobility (e-scooter, e-bikes, future of the bicycle, etc.), streets and transport ways, smart city technologies, space travel technologies, life on other planets, terraforming technologies, etc.

8. Smart city and home technologies:

Smart home, smart city, smart energy management, intelligent traffic systems and management, digital urban planning, urban green spaces, urban security and surveillance technologies, urban social scoring technologies, digital village technologies, global village technologies, etc.

9. Data technologies:

Big data, small data, computational social science, data analytics, digital humanities, digitalisation projects, personalisation technologies, public service algorithm, data and server farms, cloud data platforms, Internet of Things, etc.

10. Computing hardware and software:

Quantum computing, open-source software, free software, proprietary software, semiconductors, smart phones, smart screens (tablets, television, etc.), GPUs and CPUs, standards, materials, future computing, etc.

## **Scenario 1: Authoritarian Digital Technology – Representative Digital Authoritarianism's Technology**

In scenario 1, there is a strong focus on the development of surveillance and control technologies, big data technologies, and dataveillance (big data-based surveillance). Privacy-enhancing technologies have been prohibited by law, and all data protection legislation has been abolished. Big tech corporations control research and technology development. The digital giants' CEOs and owners are not just managers but also politicians who are committed to the ruling regime's ideology. Three big tech companies dominate research and development. The owner of company one is also the minister of science, education and digital affairs. The owner of corporation two is the Minister of Security and Defence. The owner of corporation three is the Minister of Economic, Cultural, Social, and Financial Affairs. Corporation 1 controls the educational sector, where all nurseries, schools, universities, and research organisations are part of one big company. Corporation 2 holds a monopoly in the arms, security and defence industries. Corporation 3 is the only company in the e-commerce, media, entertainment, cultural,

finance, manufacturing, and health industries. There is a close alignment between monopolist corporations and the state. Society is a state monopolist (digital) capitalism. The dominant companies are government-aligned corporations, which means that the owners of the dominant corporations play key roles in the government that rules in a dictatorial manner.

## **Scenario 2: Participatory Authoritarian Digital Technology – Participatory Digital Authoritarianism’s Technology**

In scenario 2, there is a focus on the development of a wide variety of digital technologies with a focus on entertainment and consumer technologies, as well as citizen engagement technologies. All technology development is based on public/private partnerships. The state is a multi-party system with governance mechanisms that privilege the power of the ruling party, which uses digital technologies to cement its power and weaken the opposition. There is a creeping form of totalitarianism and fascism. The economy consists of private for-profit companies as well as state-controlled companies that control some key critical infrastructures. The ruling party’s key functionaries and the dominant corporations’ CEOs are ideologically aligned and cooperate in the form of public/private partnerships, especially in the development and organisation of (fake) news media, digital platforms, e-voting and e-participation technologies, and (dis)information. Together, they play a key role in the manipulation of public opinion.

## **Scenario 3: Representative Digital Technology – Representative Digital Democracy and Society’s Technology**

In scenario 3, there is a focus on developing a wide variety of digital technologies that are regulated by laws focused on privacy, data, and consumer protection. The goal is to make a large range of digital public services and digital consumer services available to everyone. There is a dual digital economy. On the one hand, large for-profit tech companies are developing and operating digital consumer services. On the other hand, new publicly owned digital companies have emerged that focus on the development of digital public services. Digital public services aim at fully digitalising representative democracy’s institutions, such as parliaments, elections, public services, municipal administration, health care, education, etc. Digital technologies are used for opening up governance to a variety of stakeholders, including citizens, civil society, and industry, and making representative democracy more based on citizens’ inputs and the co-creation of public policies and services.

## **Scenario 4: Participatory Digital Technology – Participatory Digital Democracy and Society’s**

In scenario 4, there is a focus on developing a wide variety of privacy-enhancing, democratic, environmental, and societally sustainable and human-centred digital technologies. In the digital economy, we find for-profit digital corporations, platforms and digital co-operatives that are not-for-profit organisations managed and controlled by their workers and users, and public service media organisations that are independent from the state, profit interests, and ideologies. Not-for-profit public and commons-based organisations together play an important role

in the digital economy. There are public/commons partnerships where organisations such as Wikipedia and public service media such as the BBC and ARD co-operate in the development and provision of digital services and platforms. There is a strong focus on developing e-participation technologies that enable meaningful citizen participation in matters of public concern. Participation goes beyond trivial matters such as what colour park benches should have. Some structures enable citizen participation. E-participation routinely takes on hybrid online/offline forms.

### 5.3. STEEP-E: Digital Economic Futures

#### Scenario 1: Authoritarian Digital Economy – Representative Digital Authoritarianism’s Economy

This scenario features an unregulated capitalist economy. The majority of economic resources are privately owned, except for critical infrastructure, which is state-owned. Three large corporations centralise and monopolise markets. All other companies in the country are subsidiaries of one of these corporations, forming a network of subsidiaries. The three owners of these corporations are part of the ruling regime. Their companies are exempt from corporate taxes. The owner of the corporation holding a monopoly in the realm of the educational sector is the Minister of Science, Education and Digital Affairs. The owner of the second monopoly company that controls the arms, security and defence industries is the Minister of Security and Defence. The owner of the third monopoly company, which controls the e-commerce, media, entertainment, cultural, finance, manufacturing, and health industries and is the largest national employer, is the minister of economic, cultural, social and financial affairs. This ministry also oversees all labour affairs.

The social security system has been weaponised to guarantee loyalty to the regime: Only members of the ruling party have access to state-provided healthcare, unemployment benefits, pensions and other social insurance schemes. Alternative forms of ownership, such as cooperatives, have been prohibited, as have labour organisation and collective bargaining via unions and worker councils. Any independent trade union is illegal, and the only existing “union” is a state-controlled entity designed solely to enforce productivity quotas. Citizens are dependent on the state or the three corporations and their subsidiaries for employment; therefore, to survive, people must align themselves ideologically with the regime.

In this scenario, society is a fascist state monopoly capitalism where there is a close alignment between state power and corporate power. Both the state and the economy are ruled by a political-economic elite in a totalitarian manner. The ruling party has declared that class relations no longer exist because everyone is united by pride in nationhood. Nationalism ideologically distracts attention from the existence of deep class divisions, where severe wealth disparities exist between a small elite who control the economy and the majority of people who are forced to live in poverty if they do not join the ruling party. There is no minimum wage regulation due to the regime’s strict anti-migration policies. There is a severe labour shortage due to the regime’s anti-immigration policy, which is why the standard working week has been increased from 40 to 50 hours without a wage increase.

Just like political protests, strikes, and unionising have been outlawed. Attempts to collectively organise labour are severely punished. Labour is highly controlled and monitored. Big data systems are used primarily as a control mechanism, including close digital surveillance of workers. The state uses artificial intelligence to predict dissenting behaviour and to counter it through ideological manipulation and criminal prosecution directly. Forms of repression and punishment include withdrawal of access to social security and deportation to labour camps for ideological re-education and brainwashing. There is the death penalty for attempts to organise strikes or unionise workers. The working conditions for the general masses in these big corporations are precarious. Those who are not party members suffer from low wages and are stripped of worker rights. Only party members benefit from a sufficient salary and other benefits.

In the digital economy, algorithms, software, and other digital content (music, videos, animations, images, etc.) are proprietary and controlled by the big three digital corporations. These three capitalist corporations together control and own all Internet platforms. There are no alternative platform models to totalitarian digital capitalism. The latter is controlled solely by three digital corporations that are also fully politically aligned with the regime.

The platform economy has become the primary avenue for service provision. Retail and on-location businesses have been abolished; therefore, groceries and products for general use must be ordered via online platforms that are directly and indirectly owned by the three corporations. This leads to the state having access to the buying and consumption patterns of citizens since the corporations are obliged to share such data with the main ministries (the Ministry of Science, Education, and Digital Affairs, the Ministry of Security and Defence, and the Ministry of Economic, Cultural, Social, and Financial Affairs). These then analyse the given data to enforce a kind of social scoring system. This scoring system is central to the regime's monitoring and surveillance efforts. The social scoring system works as a baseline for a state-mandated app, which is preinstalled on every device the citizens use and automatically connected to their social security number. Citizens are forced to use this one app, as the app is the only avenue to participate in society. It integrates payments, social media, transportation, food orders, health services and other government services.

Society is highly unequal in terms of income and wealth distribution. This inequality has been further worsened by the use of robotics and AI for large-scale labour automation, including not just the manufacturing sector but also highly qualified professional labour. This has led, on the one hand, to growing unemployment and, on the other hand, to the extension of precarious routine jobs. This leads to top-down social stratification, as artificial intelligence serves as a barrier. This barrier widens the gap between the rich and the poor and keeps a large part of the population trapped in precarious working conditions.

Universities, education, arts and culture, media, and journalism are important intellectual realms of society where new ideas and political resistance have often originated. Therefore, totalitarian regimes have often exerted special forms of repression and control in these sectors. In our scenario, generative AI is used for large-scale automation of workers in these intellectual sectors so that lots of work is done by generative AI systems that produce books, artworks,

news, movies, songs, video games, advertisements, podcasts, and other cultural products. AI culture is a propaganda tool because the AI systems are programmed in a way so that they only produce culture that propagates the regime's ideology, as well as tabloid entertainment that is depoliticised. The workforce in cultural companies, such as news production, consists, on the one hand, of AI-driven state-controlled robot workers (such as AI journalists), and on the other hand, of highly loyal party members who have proven that they support the regime's ideology.

## **Scenario 2: Participatory Authoritarian Digital Economy – Participatory Digital Authoritarianism's Economy**

In this scenario, the state merely provides the framework for economic activity, keeping regulation to a minimum. Too much regulation in labour, consumer, and environmental protection, as well as oversight of financial transactions and progressive taxation, is said to undermine economic growth. This lack of adequate regulation has led to monopolisation and a high level of ownership concentration in the economy. Small businesses and co-operatives (self-managed companies that are owned and managed by those who work in them) are not outlawed, but cannot compete with large corporations and are therefore again and again forced out of the market either by going bankrupt or by becoming subsidiaries of the dominant monopolies via mergers and acquisitions.

The ruling party maintains a transactional relationship with the few private corporations that dominate the economy because it is financially dependent on them. In return, the government implements economic policies that benefit the corporations and the wealthy. Income is taxed at a flat rate of 15%, which benefits the wealthy and has deepened the gap between the rich and the poor. Company profits are taxed at a rate of 5 per cent for small and medium enterprises. Large corporations are exempt from corporation tax, thereby increasing the centralisation of the economy. There is a minimum wage, which is, however, only slightly above the poverty line. The ruling party is strictly anti-immigration. Its policies in this regard have led to a severe labour shortage, which the government has attempted to address by raising the standard working week from 40 to 45 hours without increased pay.

There are both private and public services across social care, healthcare, education, and public transport. Public services are often underfunded. This means that many citizens have to rely on private insurance to cover their financial well-being and retirement benefits, as they are dependent on private companies for social security. On the other hand, private insurance and service companies are publicly subsidised.

There is freedom of association, including the freedom to form trade unions. However, trade unions are often defamed in the media, and the state runs campaigns against them. As a consequence, the idea of unionisation is rather unpopular. Corporate employers operate their own healthcare funds, schools, grocery stores, transport services, and apartment complexes, which employees can access as long as they comply with the working conditions. These services are better funded and maintained than government-operated services and are therefore seen as the better alternative.

In the digital economy, algorithms, software, and other digital content (music, videos, animations, images, etc.) are predominantly proprietary. Large digital corporations control such resources. Creative Commons and other non-commercial forms of digital organisation exist, but are a niche phenomenon because the state subsidises the big digital corporations. As a consequence, the corporate digital giants dominate the Internet. Ninety-five per cent of all Internet infrastructure and platforms are owned and operated by three big tech corporations. There are alternative models, such as platform co-operatives, but they are small, rather unknown, and not widely used.

The economic infrastructure relies on gamification and nudging. Gamification works to ensure regime-friendly participation by managing and coercing economic behaviour that benefits the state. There is a social scoring system operated via apps. Participation is voluntary. Citizens document various behaviours via the app and receive scores for regime-friendly behaviour and behaviour that the regime assesses positively. There are no negative scores. Those with high scores receive benefits that others do not obtain. The regime uses artificial intelligence to assess the documented forms of behaviour. It is designed to nudge citizens toward behaviour and choices sanctioned by the state. Citizens are nudged to perform activities and other forms of unpaid labour to be rewarded and to maintain or increase their social score.

Consuming goods from state-loyal/aligned brands boosts the social score, and buying from unapproved outlets lowers it. A higher score grants citizens privileges such as access to better jobs, lower loan interest rates, cheaper housing, lower grocery prices, and faster public services. The result is that many citizens engage in labour and activities that the government desires without using physical violence to bring about this behaviour. Rather, digital gamification is used as a subtle form of social coercion to incentivise citizens to engage in regime-friendly behaviour and avoid political activities such as speaking out against the government, the autocratic societal system, engaging in protests, etc. The social scoring system increases inequalities. Citizens with higher scores enjoy better living conditions and are held in high regard. They are seen by society as having earned their wealth in the proper way. Consequently, citizens with a lower score are held responsible for their own poverty and social downfall. This further encourages state-friendly behaviour by promoting an illusion of attainable wealth, which is directly coupled with the desired conformist patterns.

Generative AI systems are not centrally controlled. Everyone can use such systems. The dominant news and entertainment corporations share the ruling party's ideology, which is why the dominant generative AI systems are designed to create hyper-personalised propaganda to nudge citizens into greater alignment with the prevailing political regime.

Robotics and artificial intelligence are organised through the market, so companies are free to use or not use them as tools of automation. The manufacturing sector is widely automated. In the realms of professional knowledge work, which requires higher education, some companies make large-scale use of generative AI systems to create news, books, artworks, movies, songs, video games, advertisements, podcasts, and other cultural products and to replace cultural workers. In contrast, others merely use generative AI to augment the labour of professional workers. Highly automated media and culture companies tend to align with the government's



ideology. Their labour costs are lower than those of more labour-intensive cultural companies that use AI to merely augment and not automate professional knowledge work. The highly automated cultural companies also have higher productivity than others. As a consequence, they dominate the cultural markets. The news and information content they produce is strongly supportive of the government. In addition, there are lots of tabloid entertainment programmes. The more labour-intensive media and cultural companies produce high-quality news, educational content, and culture. However, because these companies do not dominate the market, their content reaches only a small share of the population, while the majority ignore it.

### **Scenario 3: Representative Digital Economy – Representative Digital Democracy and Society's Economy**

In this scenario, the state acts as a mediator between private business and labour organisations. It regulates the economy through measures that define working conditions, workplace security, minimum wages, working time standards, consumer protection, environmental protection, etc. The state provides a legal framework for representatives of capital and labour to negotiate wage increases and working conditions.

Unions and worker councils are essential parts of the economy. Furthermore, worker co-operatives play a certain role in the economy as an alternative form of ownership. There is a mixed economy where 60 per cent of the workforce is employed in private for-profit companies, 20 per cent are public sector workers, 10 per cent work in the non-profit third sector, and 10 per cent in worker co-operatives. The state supports self-management by financially subsidising the creation of cooperatives and labour-managed firms. This state support takes the form of a special legal status for co-operatives and third-sector organisations. Co-operatives pay slightly lower corporation tax than for-profit companies. They do not pay corporation tax insofar as they have a defined public purpose. Examples are charities or organisations that aim to advance the social good. Such legal measures are seen as a long-term effort to strengthen democracy by expanding it to the economic sphere.

The state is a classical welfare state that allocates a significant proportion of its annual budget to public and social security services, particularly health service infrastructure, unemployment benefits, pension and retirement funds, universal childcare, state schools, public transport, and housing subsidies for low-income households. This is made possible by progressive taxation of wealth and income. The top marginal income tax rate is 60 per cent. It is applied to income above 500,000 Euros. Financial transactions are strictly regulated and taxed at a higher rate than income from labour. The government views a high degree of wealth and income inequality as a threat to democracy. It has therefore pledged to reduce the wage gap between the highest and lowest incomes in all industries to a ratio of 1:20 within the next 20 years. Furthermore, it provides every citizen with a starting stipend of 50,000 euros upon turning 18 and helps school and university graduates set up socially responsible small businesses and cooperatives. This is part of the state's initiative to promote and support social entrepreneurship and financial independence.



The digital economy is a regulated digital capitalism. In this economy, algorithms, software, and other digital content (music, videos, animations, images, etc.) take on both proprietary and common forms. The proprietary digital economy dominates, but the digital commons play an important role. In terms of ownership, the digital economy therefore consists of private for-profit digital companies, not-for-profit public digital service companies, and not-for-profit platform and digital co-operatives. The second type of digital company operates in niches such as public companies in e-voting, e-government, e-health, and other digital public services. Platform co-operatives are especially active in certain creative and service industries (open-access publishing houses, image-sharing platforms, music streaming, freelance platforms, ride-hailing platforms, food-delivery platforms). In such industries, worker ownership aims to increase wages relative to classical for-profit platform corporations such as Uber, Deliveroo, Fiverr, Upwork, TaskRabbit, Guru, Shutterstock, Spotify, etc., which retain a significant share of each transaction and turn those commission fees into profits.

The state regulates the digital economy in the form of privacy and data protection legislation, minimum wages for platform workers agreed upon at the transnational level, the legal support of the creation of (digital) labour unions, the closing of tax loopholes that in former time enables transnational digital corporations to avoid paying corporation tax, the enforcement of anti-trust laws, requiring platforms to remove illegal content immediately and to explain to users how the utilised algorithms work, etc.

Digital technologies have two major applications: public administration and private businesses. The state develops its own digital technologies for digital public services and open governance. Thereby, there is a public professional digital media workforce that involves researchers, software engineers, designers, etc. The most popular digital public services are the electronic tax return, the electronic health card, and the electronic town hall, an app that enables citizens to directly communicate with elected representatives and government and public administration to provide information to citizens.

The development and use of artificial intelligence, robotics, big data, and ever newer digital technologies are, on the one hand, market-driven and on the other hand state-regulated. Given that the economy develops faster than legislation, the state's regulatory capacities tend to lag behind technological innovations. New technologies tend to remain unregulated for some time after their emergence and diffusion.

Robotics and artificial intelligence are used to automate processes. Digital automation not only affects manufacturing and low-skilled service jobs but has also, with the diffusion of generative AI into the economy, affected high-skilled professional knowledge work. The state's Automation Act regulates digital automation. It requires companies that introduce an automated system or robotic system that is expected to make ten or more jobs superfluous or that affects more than ten per cent of the total workforce to carry out an Automation Impact Assessment (AIA) 120 days before the introduction of that system. The assessment is submitted to the Department of Labour, which can request amendments to the planned use up to 45 days before the start. Employees, work councils, and unions can submit opinions to the Department about the effects the new system could have. Such submissions are considered alongside the

AIA. In cases of concern, the Department of Labour often acts as a conflict arbitrator, mediating the resolution process between representatives of both the employer and employees.

## **Scenario 4: Participatory Digital Economy – Participatory Digital Democracy and Society’s Economy**

In this scenario, democracy is not limited to the formal political system but extended to the economy. The result is a mixed economy consisting of different models, including worker co-operatives, not-for-profit third sector organisations, public service companies, as well as private for-profit companies. Co-operatives account for 30 per cent of all employees, third sector organisations for 20 per cent, public service companies for 30 per cent, and private companies for 20 per cent. This means that the not-for-profit sector is dominant.

In co-operatives, decisions are made co-operatively so that workers are at the same time decision-makers and managers who elect management for operational matters. Public service organisations tend to be large, which requires the delegation of decision-making power. Managers are elected by the workforce for specific terms. In third sector organisations and private companies, elected work councils play an important role and are part of the executive board, where they represent worker interests. In economic partnerships, the dominance of private/public partnerships has been replaced by public/commons partnerships involving state companies and not-for-profit organisations.

The state plays an active part in the economy as an employer in the public sector economy, regulating markets, providing the legal framework for economic democracy, managing economic and financial crises, and legally defining overall goals such as the UN Sustainable Development Goals. The economy’s primary goal is to satisfy human needs rather than to maximise private profits. The management of societal resources, such as labour and means of production, is organised and determined by members of society via democratic institutions.

State legislation defines a minimum wage that guarantees everyone a decent life. Housing market prices are regulated, and housing involves a significant degree of affordable council homes (flats and houses) and housing co-operatives, which is a regulatory measure against exploding housing prices. Thanks to increased productivity, the working week has been reduced to four days and 32 hours, with full wage compensation, and the long-term goal of reducing it even further. Tax and wage legislation has resulted in a significant reduction in poverty and socio-economic inequalities, which, in turn, has had a positive effect on crime. The state makes large investments in public education, which has doubled the share of the population that has completed a university degree. The increase in available time, educational levels, and equality has had positive effects on democracy, as more citizens now regularly engage in public political debates, civil society action, and participatory democratic politics such as participatory budgeting. Democracy has thereby become stronger and more dynamic.

In the digital economy, algorithms, software, and other digital content (digital music, videos, animations, images, etc.) are predominantly licensed under Creative Commons and open-source licenses. The digital commons dominate over proprietary digital content. The digital

economy consists of for-profit digital corporations, platforms and digital co-operatives that are not-for-profit organisations managed and controlled by their workers and users, and public service media and Internet organisations that are independent from the state, profit interests, and ideologies. Not-for-profit digital organisations dedicated to advancing the digital public sphere and digital democracy have successfully challenged the monopoly power of US and Chinese digital giants such as Alphabet (Google and YouTube), Meta (Instagram, Facebook, and WhatsApp), ByteDance (TikTok), Amazon, and Apple. Public service Internet platforms have emerged as a global co-operation of public service media organisation such as BBC, ARD, ZDF, PBS, France Télévisions, RTVE, RAI, etc. which form a global consortium that has developed successful Internet platforms such as a public service online video sharing and streaming platform that competes with Alphabet's YouTube and commercial video and television streaming platforms such as Netflix, Amazon Prime, and Disney+. Public service Internet platforms are especially active in the audiovisual sector, while platform co-operatives dominate services that process lots of personal data, such as instant messaging, social networking, online shopping, locational services, online search, etc. This means that public service Internet platforms have challenged the power and dominance of YouTube, Netflix, Amazon Prime, Disney+, and Spotify; and platform co-operatives have challenged the power and dominance of Instagram, Facebook, TikTok, Amazon, Google, Uber, Deliveroo, and WhatsApp. The corporate digital giants continue to exist, but in many countries, they are no longer the dominant platforms. In the realm of hardware production where commercial actors continue to play an important role, public/cooperative partnerships have resulted in successful joint ventures that manufacture computing hardware such as mobile phones, laptops, desktop computers, consoles, printers, etc. that is energy-efficient, environmentally sustainable, upgradeable and reuseable (green computing), and developed and assembled by workers who are paid a fair wage.

Robotics has been used to automate many forms of menial labour. For example, the jobs of toilet cleaners, refuse collectors, and sewer and wastewater divers have disappeared. Such waste management labour is carried out by robots under human supervision. There are upskilling programmes so that those who lose their jobs do not become unemployed but instead undergo paid reskilling into higher-qualification jobs, so that they normally earn higher wages than before. This has given workers who previously performed such labour the opportunity to pursue advanced education in the humanities, social sciences and natural sciences. As a result, technological and scientific advancements are more widespread, since deep engagement in intellectual activities is no longer the privilege of those with sufficient resources.

In the realm of care labour, robots are used to carry out physical labour such as carrying people and objects. There is a societal agreement underpinned by legislation that the social dimension of care and educational work is not automated. This means that there are no robotic nurses, medical doctors, teachers, psychotherapists, childcare workers, elderly care workers, palliative care workers, etc. Educational and care workers are well paid and have lower standard working hours than others, which incentivises more people to enter and remain in these professions. Educational and care workers make use of AI systems and professional social networks to obtain scientific information and advice on specific care questions.

Generative AI has the capacity to foster large-scale automation of highly-qualified knowledge workers such as journalists, teachers, researchers, judges, lawyers, architects, designers, artists, consultants, media and entertainment workers (singers, actors and actresses, theatre performers, film directors, screenwriters, novelists, voice actors, photographers, composers, etc.) medical doctors, psychotherapists, etc. The reason is that generative AI can simulate highly qualified knowledge work, including tasks that require a high level of inventiveness and creativity. In our scenario, society has actively chosen not to automate highly skilled jobs by generative AI-driven systems, intelligent robots, or other systems. The reason is that robots and AI systems do not have emotions, feelings, intelligence, judgment, morality, ethics, self-consciousness, empathy, compassion, semantics, understanding, meaning-making capacity, intentions, or the capacity to anticipate the future. They act merely based on software programmes, algorithms, and databases. AI agents and robots are fully instrumental and have a technological logic. In our scenario, a law prohibits the automation of such jobs. In professional knowledge work, workers and companies use AI to augment and support, but not to replace, creative knowledge labour. Knowledge workers utilise AI systems as support and augmentation of their work, but reject the idea that their jobs can and should be fully automated.

## 5.4. STEEP-E: Digital Ecological Futures

In 2024, there were the following sources and shares of world electricity production: nuclear 30%, fossil fuels 60%, coal 34%, gas 22%, oil 2.5%, renewable energy 31%, hydroelectricity 15%, wind 8%, solar 6% (EIA 2025).

Because of planned obsolescence and hardware companies' branding strategies, lots of e-waste is generated. In 2014, there were on average 6.4 kg of annual e-waste per capita of the world population; this amount rose to 7.3 kg per capita in 2019 and 7.8 kg in 2022; it is projected that it will further increase to 9 kg per capita in 2030 (Baldé et al. 2024). Running the Internet and data networks consumes about 4-8% of world energy production (De Decker 2015 & Malmmodin et al. 2023)

### Scenario 1: Authoritarian Digital Ecology – Representative Digital Authoritarianism's Ecology

In this scenario, there is a big focus on fossil fuel generation and use. The ruling regime sees climate change as a hoax and something natural that has not resulted from societal development and industrialism. It supports the oil and gas industry, which dominates energy production and is controlled by one big private corporation. Nuclear energy is also pivotal to the regime, and the nuclear industry is solely controlled by another big private corporation. The fossil industry provides 80 per cent of the national electricity production. The coal industry accounts for 30 per cent of electricity production, oil for 30 per cent as well, and gas for 20 per cent. The nuclear power industry produces 20 per cent of electricity.

The regime views renewable energy sources as part of a "green ideology" that it rejects. Therefore, renewable energy production was outlawed, and all green energy companies were dissolved. All wind turbines were dismantled with the argument being that they disfigure the

environment. The death penalty was introduced to counter the promotion of green energy production as well as attempts to privately create such energy sources. As a consequence of these policies, climate change further intensifies, along with it the frequency of natural disasters such as tsunamis, hurricanes, flooding, extreme heat waves, water scarcity, etc..

There is no awareness of the problem of e-waste. Hardware companies and the regime promote excessive consumerism, resulting in very short lifespans for hardware such as computers, mobile phones, and tablets. In our scenario, the average annual e-waste per capita amounts to 50 kg. Attempts to create green computing devices with reusable hardware components were abolished and outlawed.

Given that the regime in this scenario is a highly repressive and militarised surveillance society where massive amounts of personal data are generated, analysed for identifying enemies of the state, and forever stored in data centres, there is a massive amount of fossil and nuclear energy that digital networks consume. They account for 35 per cent of the overall electricity consumption.

In the realm of transport, public transport was abolished because the regime is hostile towards anything based on public ownership. The society in our scenario is car-centred. The private car is the main means of transport. There are also privately owned self-driving taxis that one can rent.

## **Scenario 2: Participatory Authoritarian Digital Ecology – Participatory Digital Authoritarianism’s Ecology**

In this scenario, there is a variety of electricity sources, including nuclear, fossil, and renewable energy. The government favours nuclear and fossil energy, which is why it provides public funding to companies in these two sectors. Because of public funding, the prices of nuclear energy, coal, oil, and gas are low, while renewable energy is very expensive.

E-waste continues to be a major environmental problem that is connected to the unsustainable character of the digital economy, which is, like today, dominated by large transnational US and Chinese hardware and software corporations. Green computing and electric cars are promoted as far as they enable new possibilities for corporations’ profit generation as part of green capitalism. Green capitalism based on renewable for-profit energy exists alongside hyper-industrial fossil capitalism based on fossil for-profit energy.

The government does not deny that climate change exists or that it is a societal problem. It propagates technical measures such as carbon dioxide removal (CDR) and solar radiation management (SRM) as the two main methods for tackling the climate crisis. Such technologies are organised by private businesses seeking to yield profit. Furthermore, it uses the emissions trading system (cap and trade scheme) as a way to disincentivise limitless fossil fuel use and emissions.

In the realm of transport, there are privatised public means of transport, such as trains, buses, and tramways, in big cities with relatively high prices. The car is an important means of transport, especially in rural areas where there continues to be a lack of public means of transport, in order to save investment costs.

### **Scenario 3: Representative Digital Ecology – Representative Digital Democracy and Society's Ecology**

In this scenario, there is a variety of energy sources. Climate change is acknowledged as a major societal problem that requires countermeasures to reduce fossil fuel and energy production. The state provides public funding to green energy production, which is primarily a domain operated by private companies. There are experiments with new forms of the environmental economy, such as green energy co-operatives. The state is one of the actors in renewable energy production. There is a small number of public companies in the energy sector that are focused on pushing solar and wind power. To do so, the government brings a certain amount of land into public ownership via eminent domain, to be used for wind turbines and solar panels operated by public energy companies.

In electricity production, renewable energy is dominant and accounts for 60 per cent of all generated electricity. Nuclear energy accounts for 25 per cent of the electricity produced. There are investments and research endeavours into trying to make nuclear energy safer by transitioning from nuclear fission towards nuclear fusion. Fossil energy continues to exist but continuously reduces its share of total energy and electricity production.

Transport is a mixture of public and private transport. There are investments into developing and updating the public means of transport, especially trains, electric buses, undergrounds, and tramways. There are public subsidies for the e-mobility industry. Electric vehicles operated as private and public means of transport are continuously becoming more important and cheaper. In urban areas, ride-sharing is widely available through companies that offer the use of shared e-bikes, e-scooters, and e-cars. Such shared e-mobility services are offered both by private companies and public transport companies. They offer pay-per-ride as well as subscription services at a flat rate.

### **Scenario 4: Participatory Digital Ecology – Participatory Digital Democracy and Society's Ecology**

In this scenario, climate change is seen as a major societal problem, and there are lots of efforts for trying to bring about a carbon-free economy that is socially equitable and benefits all citizens. Renewable energy has become by far the dominant form of energy. 90 per cent of all produced energy and electricity stems from renewable energy sources. Sustainable energy production is considered as being a major public concern.

The environmental economy is dominated by public and co-operative energy companies that focus on the generation of wind power, solar energy, and hydroelectricity. At the communal, regional, and national levels, there are public energy companies. They are publicly owned and



operated and have the defined public remit of advancing the production of green energy that is widely available and highly affordable.

Green energy co-operatives are operated at the municipal level. They are owned collectively by all households living in the municipality. The defined goal of energy co-operatives is to fully base energy production on renewable sources and make it available to and affordable for everyone. The co-operative is a self-managed democratic organisation where the households that are members of the co-operative and the workers elect the management that is accountable to the community of members and workers. The basic investment of such an energy co-operative is provided by the municipality, which invests a certain amount of money per household. Thereby, each household becomes a member of the co-operative. The invested money is used for creating solar panels and wind turbines on local land that the municipality owns. The produced green energy is partly consumed locally and partly sold on the energy market. The energy co-operatives operate as not-for-profit organisations. When surplus revenues are generated, they are paid out as a co-operative dividend to the members (households and workers), not in the form of money but energy cost discounts. The households that are members of the co-operative commit to buy their energy from the co-operative.

Energy co-operatives cooperate with each other (co-operation of energy co-operatives) and with the public energy sector (public/co-op energy partnerships) with the goal of making green energy widely available to everyone at affordable prices.

Given that there is widespread environmental awareness and consciousness, society is capable of containing the escalation of environmental problems. Climate change is significantly slowed down by coming closer to a carbon-free economy. Nature is better preserved and less polluted. Human-made natural disasters have become much less frequent.

There is a move away from the inbuilt obsolescence of digital devices. Many software and hardware companies are now not-for-profit co-operatives that reject greenwashing and engage in the advancement of true social and environmental sustainability. As a consequence, green computing devices have become common, which have reusable parts and updatable hardware components. The amount of annual e-waste has been significantly reduced to an average of 1 kg per capita. Almost all e-waste can be recycled and is documented.

There is a move from the capitalist big data economy towards the co-operative small data economy. Data management is highly decentralised. Platforms and devices are privacy-friendly by design, which means that they use data minimisation by default. They do not store massive amounts of private data for corporate and state purposes, but only store the data that is necessary for operating devices. Lots of data is stored locally on users' devices and is, based on transparent and meaningful informed consent, shared with selected other users. The amount of data and meta-data generated is reduced by half. The size of data centres decreases significantly. As a consequence, operating green digital devices, platforms, and networks consumes less energy than before. In addition, the vast share of the required energy stems from renewable sources.



In our scenario, there is a public transport offensive. Public transport is operated by public and co-operative not-for-profit companies, which makes transport cheap and affordable. Where possible, public transport is freely available. There is a general requirement to make public transport as affordable as possible. Public transport is one of the pioneers in the use of green means of transport. It predominantly utilises electric vehicles (trains, buses, tramways) powered by renewable energy sources. Private cars continue to be used, but their share in the total transport flows has declined, and they are all based on renewable energy sources.

The urban/rural transport divide has been significantly reduced by large public investments into the public transport infrastructure, where not just existing infrastructure was modernised but also a large amount of new public transport infrastructures was created in rural areas. Thereby, public transport has also become widespread based on dense rural public transport networks with frequent connections.

E-bikes, e-scooters, and e-cars are widely offered as common means of transport that can be rented for free or at a small fee. Such services are operated by both public transport companies and transport co-operatives that are not-for-profit organisations. Users of such e-vehicles register with their personal data, and the usage is monitored in order to avoid that the publicly shared vehicles are stolen or deliberately damaged.

## 5.5. STEEP-P: Digital Political Futures

### Scenario 1: Authoritarian Digital Politics – Representative Digital Authoritarianism's Politics

In this scenario, the political system is a classical one-party dictatorship that has outlawed all opposition and has executed or imprisoned all critics and opponents. The political system is based on violence and terror as general political principles. There is a charismatic leader who rules society as a dictator. There are no elections. The political system is a one-party system led by one person. Three big tech corporations control the economy. The CEOs of these three corporations are personally and politically closely aligned with the dictator and key political functionaries in the totalitarian system. The dictator is a rich former CEO of a large oil company. He sees the ideal society as a CEO monarchy where a CEO rules the state in an absolute manner and organises many of its aspects like a corporation. While educational, welfare and social services are largely privatised, the state has a very active repressive role in organising inner and outer defence, especially surveillance, control of citizens, censorship, policing, prisons, the military, and secret services.

There are no news media organisations that report critically on the government. They were all dissolved after the ruling party took power. Critical journalists and critical news media's editors were either imprisoned or executed. The corporation that is owned and run by the CEO, who is also the minister of economic, financial, social, and cultural affairs, holds monopolies in the economic fields of e-commerce, entertainment, culture, finance, manufacturing, and health. It owns all television and radio stations, cinemas, newspapers, and the major entertainment and news-oriented Internet platforms. There is a private news and entertainment monopoly. The

focus is, on the one hand, a strong focus on tabloid news and entertainment. News programmes take on a tabloid character. They scandalise, simplify, spread fake news and misinformation, use lots of colour images and very little text, and continuously construct scapegoats that are presented as enemies of society. They are propaganda machines. Attempts to publish factual news and critical opinions are violently repressed by the police and secret services.

There is a large-scale surveillance of all public life with the help of CCTV cameras and facial recognition technologies. Surveillance drones patrol the skies and monitor citizens from above. Mobile devices and smart technologies have become embedded in the human body so that every citizen can constantly be tracked and monitored. There is a citizen scoring system where algorithms based on large-scale citizens' surveillance score all citizens. Those who actively support and promote the ruling party and ideology in all aspects of everyday life are rewarded with high scores. The algorithms lower the score for behaviour such as idleness, conversations critical of the dominant ideology and party, accessing prohibited information that is critical of the dictatorship, attempts to organise meetings, events, or campaigns that could result in criticism of the system, etc.

There are neural interfaces that monitor the thoughts of all citizens. Therefore, negative citizen scores are also assigned for critical ideas and thoughts that are not aligned with the dominant ideology. The citizen score ranges on a scale between 0 and 100. Those who have scores above 95 are rewarded with free holidays at a seaside resort, monetary payments, and free luxury goods such as expensive cars. 50 is a critical threshold. Those whose score drops below 50 are classified as absolute enemies of the state and society who deserve capital punishment. The rule of law does not exist. There are no trials, not even show trials. When a citizen's score drops below 50, there is an automatic execution system that results in the killing of the citizen and his or her family. The execution methods are unknown in advance and are constantly enhanced and made ever more horrible. They include, for example, robotic and drone-based firing squads, detonating brain chips, the release of toxic chemicals from implants, public hangings, and live-streamed beheadings. A particularly feared execution method is the nightmare method.

The neural interfaces that are implanted into all human brains are capable of scanning dreams, whereby they scan citizens' nightmares and identify their worst fears. In the nightmare method of execution, a personalised method of killing is developed that makes the affected individual's worst nightmare and fear become reality.

## **Scenario 2: Participatory Authoritarian Digital Politics – Participatory Digital Authoritarianism's Politics**

In this scenario, digital technologies are widely used, presented by the government as democratic participatory innovations that, however, in reality, stepwise make society more illiberal, undemocratic, and dictatorial. The government incentives/encourages citizens to become active members/collaborators in spreading pro-government discourse. This can involve state-funded creators or influencers promoting favourable messages or engaging with users to promote the government. Political influencers who are critical of the government exist and are not

censored. However, government positions are much more visible in the public sphere than critical voices. Pro-government influencers are well-paid by government programmes, while critical political influencers tend to be precarious digital workers who lack the resources necessary for gaining large attention in the digital public sphere.

Digital plebiscites play an important role in the political system. The ruling party presents the political system as highly democratic and participatory. The government decides on what topics plebiscites are held and how its questions are formulated. Citizens decide using an e-voting app. The questions are often formulated in a biased manner. Plebiscites are accompanied by government propaganda campaigns in favour of certain options so that there is no fair representation of different opinions in the public sphere. An example is the introduction of the death penalty and the deportation of all immigrants who do not hold the national citizenship.

The government held two digital plebiscites on these topics, justifying them with the claims that violent crime had exploded dramatically and immigrants were responsible for major social problems. Before the two votes, the president hosted a popular daily online talk show with phone-in possibilities. He presented manufactured cases of violent crimes allegedly committed by immigrants and asked citizens to phone in and voice their opinions. The talk show team preselected only xenophobic callers supportive of the government position, who were then put live on air. There was always one pseudo-critic who argued against the president, utilising poor arguments that were easily dismantled by the president. The pseudo-critic was in fact always a functionary of the ruling party disguised as an ordinary citizen. Thereby, the regime created the impression of an open debate that in fact was highly manipulated. Government opinion was furthermore supported by fake opinion poll results that were invented but presented to the public as credible research.

Participatory digital democracy is tokenistic and limited to trivial matters at the national level. For example, the government used a crowdsourcing app asking citizens to submit poster designs for public campaigns praising the president and his party. This crowdsourced political public relations campaign made sure that critical poster designs could be submitted, but were never selected. The campaign was merely an exercise in political propaganda disguising itself as participatory democracy.

News media that publish critical voices on the government in their opinion sections exist and are not censored. However, there is a range of state-controlled media and private government-friendly media that receive a large amount of press funding. Critical media do not receive such public funding, which is why they can only employ a few journalists and have problems investing in outreach activities. Consequently, there is a wide range of news media in the public sphere, but the latter is strongly dominated by pro-government reporting. Government-friendly media are dominated by light entertainment programmes. News is almost exclusively tabloid news organised as infotainment with a strong pro-government bias.

### Scenario 3: Representative Digital Democracy – Representative Digital Democracy and Society's Politics

This scenario is based on a representative democracy that uses digital technologies for engaging citizens in the form of open governance. The government has invested lots of public money into the development of e-voting technologies. As a result, a new e-voting app was developed and introduced at the national and local levels. The app combines blockchain technology and cryptography in order to make e-voting compatible with the demands for privacy, security, transparency, and scalability. The e-voting system respects four key design principles of e-voting: voter privacy (secrecy of the ballot), election security (the cast votes are not altered, the voting system is accessible and operational, votes are genuine and verified), procedural transparency (the voting process is transparent to the public and the voters, the results can be audited by experts and laypersons), and scalability (the voting system can handle a large number of votes and can operate over a longer time period).

The government created an open data portal where all government data and documents are published and maintained. There are tools that visualise the data and provide summaries in textual and visual formats to citizens. The government release a transparency report on all of its activities, budget spending, and contracts. The government is highly transparent and accountable. There is a public performance dashboard where citizens can, in an easy manner, display to what extent the government has achieved defined objectives.

Mechanisms of open governance have strengthened public debate and citizen-to-government communication. They result in debates and recommendations, not in citizens' direct formulation or voting on policies. This means that the political system is a representative democracy engaging citizens via new technologies and not a direct democracy where citizen decisions replace elected representatives.

The government regularly organises town hall meetings, policy dialogues, and citizen juries online and offline in order to obtain citizens' inputs on policy questions, organise exchanges between government officials and citizens, and gather feedback. Policy dialogues take place online and offline. They are informal debates between the government, citizens, civil society, businesses, and other stakeholders. Citizen juries invite randomly selected citizens and groups to review and discuss policy questions and formulate policy recommendations. They take place online and offline. Town hall meetings are online, offline, and hybrid meetings where the government directly connects to and discusses policy issues with citizens.

US and Chinese digital giants that operate major Internet platforms (Alphabet's Google and YouTube; Meta's Instagram, Facebook, and WhatsApp; ByteDance's TikTok; Elon Musk's X; the video streaming platforms Netflix, Amazon Prime and Disney+) dominate the digital media landscape. Alternatives include several not-for-profit Internet platforms and platform co-operatives that, in comparison to the digital giants, have a small number of active users. Public service media organisations are focused on broadcasting. They have media players such as the BBC iPlayer and Internet presences on US and Chinese social media platforms, but do not operate their own Internet platforms. The main measure taken against fake news, disinformation,

and misinformation spread on social media platforms that dominate the digital media world is regulation. Especially, data protection laws for safeguarding privacy are used in order to force corporate Internet platforms to respect users' privacy. The overall situation of the digital media world is that there are a handful of Internet platforms that control the vast share of Internet visits, which are regulated by national and regional data protection laws that are partly ignored by the platforms.

QTube (Q standing for Questions) is the parliament's own YouTube-like platform that supports Prime Minister's Questions (PMQs). PMQs is a session of the House of Commons held every Wednesday at noon where the British Prime Minister answers questions posed by members of parliament. The way PMQs has been communicated to the public via the media changed over the years since it was introduced on July 18, 1961 (The Independent 2011): The earliest media practice for covering the event was that journalists sat in the audience and took notes by hand. In 1978, a BBC radio broadcast of PMQs was introduced, and in 1989, televised coverage began. Today, British citizens can also watch PMQs over the Internet on the BBC iPlayer and as live or archived broadcasts on various websites, which gives them more spatio-temporal flexibility and makes PMQs not just a national, but a global political event.

In our scenario, the government implemented the QTube platform that is based on an idea first introduced by Christian Fuchs (2014) as part of the UK House of Commons Speaker's Commission on Digital Democracy. In its report on digital democracy, the Speaker's Commission on Digital Democracy characterised QTube as an idea designed to "help to increase the accountability of Ministers to the public"; it recommended that "The House of Commons should experiment with new ways of enabling the public to put forward questions for ministers" (Speaker's Commission on Digital Democracy 2015, 46).

The British Parliament did not introduce QTube. In our scenario, the idea was taken up and introduced by parliament in order to enhance citizen-to-parliament communication and make representative democracy more deliberative via digital communication.

In our scenario, the parliament adopted QTube together with Prime Minister's Questions. It works the following way:

- Parliament operates its own video-sharing platform that is specifically designed for PMQs.
- From Wednesday after PMQs ends until Sunday evening, citizens can upload user-generated short videos to the platform. Each video asks one question to the Prime Minister. The videos can be generated and uploaded by single citizens or groups of citizens who engage in producing them, e.g. as part of community centres, school classes, university modules, political debate clubs, etc.
- Letting users create short videos for PMQs is not just a concrete practice in citizen-centred politics and political citizen engagement, but an incentive for citizens and groups of citizens to be creative: Some of the videos are quite basic, whereas others are artistic, and again others use excerpts from videos that show current political events that are reused and re-mixed in various ways. Images, news bites, sounds, art, etc, are likely used in creative and unpredictable ways.

- There is a fixed maximum duration of each video. Videos that are longer than the maximum time cannot be uploaded and are automatically rejected by the electronic system.
- On Monday and Tuesday, the system closes the upload possibility and goes into the voting mode. All uploaded videos are presented in a user-friendly way on QTube, and citizens can vote on them. Voting could either work in such a way that each IP address in the UK has one vote and is technically excluded from further votes, or that citizens are enabled to vote by registering with their personal data and can log into the system, which allows them to cast one vote each.
- Content that violates human rights or propagates authoritarianism is not put to a vote.
- The videos that achieve the highest number of votes win the selection process. There is a fixed number of user-generated videos per week of around 3-5, which is selected this way.
- The citizens whose videos are selected are invited to be present at PMQs and to sit in one of the front benches.
- The user-generated questions are broadcast on a large screen in the parliamentary chamber. The videos are intermixed with the regular questions asked by MPs.

QTube's overall effect is that parliamentary debates are enhanced by citizen voices. Representative democracy has become more based on deliberative digital democracy.

## **Scenario 4: Participatory Digital Democracy – Participatory Digital Democracy and Society's Politics**

In this scenario, there is a participatory democracy where citizens play a key role in political decision-making. Democracy is not limited to the political system but extends to society and its various aspects, such as the workplace, education, and culture. There are general elections at the municipal, national, and regional levels where councils and parliaments are elected. This representative system of democracy is one part of the political system that interacts with a second part that is strongly based on a combination of participatory and deliberative democracy.

Participatory, deliberative and constitutional democracy are combined, which means that public political debates and citizen engagement are encouraged and supported under the premise that they have to respect human and civil rights guaranteed by a democratic constitution. All local councils have introduced participatory services, including participatory budgeting. Free and open-source platforms such as Decidim and Consul are widely used as tools for municipal digital participatory budgeting. Participatory budgeting fuses online and offline debates and participation. There is a strong focus on developing citizens' (e-)participation skills, practising participation, and learning participation by doing it. Routinely, a share of twenty per cent of the local budget is used for (e-)participatory budgeting. (e-)participation is meaningful, which means proposals are suggested and discussed that make a difference to citizens' lives and are not tokenistic. This means that the so-called park bench problem, where citizen engagement is limited to trivial matters such as what colour park benches should have, is avoided.



The government has introduced structural reforms that are intended to support participatory and deliberative democracy. The working week was reduced from 40 to 32 hours with full wage compensation, which has freed up time for citizens outside of labour time. Four additional annual public holidays, so-called Democracy Days, were introduced. On these days, there are special democratic events all over the country, such as citizen assemblies, town hall meetings, and neighbourhood forums where hot political topics are debated. The public budgets for education at all levels were significantly increased, a measure that was combined with educational reforms so that political and democratic education was introduced as a subject in all secondary schools. There is a wide variety of adult education possibilities, including the opportunity for adults who have been active in working life for some time to combine work with higher education. The general approach is that the government tries to combine reforms that bring about good living conditions with offers and opportunities for political debate, citizen engagement, and educational opportunities.

There is a vivid civil society with a wide range of civil society and non-government organisations dedicated to social and democratic issues. A network of tech activists and civil society groups, including Wikipedia and the free and open-source movement, has developed and operates civic tech technologies that enhance deliberative and participatory digital democracy. A variety of democracy-enhancing tools are available. The Digital Democracy App is a hub that links to and combines such digital democracy tools. The Digital Democracy App is a free software tool organised by Wikipedia and continuously improved by a network of developers and citizens. It is independent of capital, government, and ideology. Its features include Democracy Forums, a popular citizen-to-citizen communication tool where citizens debate on a variety of issues at the local and translocal level. There are also online petition tools and organisational tools supporting social movements and citizens' campaigning. The Digital Democracy App has together with structural reforms helped to bring about a vivid democratic public sphere.

The FactCheckApp was introduced and is widely used by citizens. It is operated by a network of independent fact-checking organisations. The FactCheckApp automatically imports all parliamentary speeches and debates, as well as public statements of politicians and public opinion influencers (for example, lobbyists, corporate public relations, social media influencers, etc.). The app utilises a combination of AI-based fact-checking algorithms and a network of highly educated independent fact-checkers and journalists, who have secure employment conditions, for checking the correctness of such public statements. Reports on public statements are published together with fact-checking reports. There is a wide public interest in and the adoption of the app. When factually incorrect information is discovered, those making the claims are invited to respond. The response, respectively, the information that there is no response, is published next to the fact-checking report.

Society's dynamic public sphere has also brought about a structural transformation of the media landscape. Public service media and not-for-profit citizen media and media co-operatives have become more important. For-profit entertainment and news media continue to exist, but they are of less interest, and there is less presence of tabloid media that is sensationalist, privilege entertainment over news and education, simplifies, and is politically biased. There is entertainment in the media, but it is now less important, so that professionally produced news,

documentaries, educational, and art programmes are more important. Quality media outweighs tabloid media. Public service media are well funded by a licence fee paid by households and companies, independent from governments, corporations, and ideology, and digital innovators creating new digital information services that appeal to all citizens, including the younger generation. The transformed media landscape and public sphere have managed to significantly reduce the amount of fake news, echo chambers, disinformation, misinformation, deep fakes, algorithmic politics, digital authoritarianism, online hatred, AI-generated propaganda, etc. The emergence of a variety of public service Internet platforms and platform co-operatives has resulted in a significant reduction of the interest in and the influence and power of the former big digital tech and media monopolists, such as Alphabet/Google, Meta/Facebook, TikTok/ByteDance, Amazon, Apple, Netflix, Disney, etc.

Public service media have introduced Club 2.0, a popular deliberative digital democracy tool that is a digital version of a format introduced by the Austrian Broadcasting Corporation (ORF), Austria's public service broadcaster, in 1976. It was broadcast regularly until 1995. In the UK, a similar format was called After Dark and was broadcast on Channel 4 and the BBC.

Club 2 was an open-ended, uncensored live debate programme that became known for its fearless approach to controversial issues and outspoken guests. Each episode unfolded as a live studio discussion with no predetermined time limit, allowing conversations to develop naturally and without interruption. The programme's format was deliberately simple yet distinctive: there was no studio audience, only a single moderator and a small group of four to eight diverse guests gathered in a relaxed, living room setting. This intimate atmosphere encouraged honest, spontaneous, and often heated exchanges that made Club 2 one of the most provocative and engaging programmes on television. Club 2 was a public sphere and deliberative democracy in action, supported by public service media. The rise of reality TV put more emphasis on entertainment and drove back such formats.

Media reform, combined with a strong public support of public service media, brought about the introduction of Club 2.0, the digital renewal of Club 2. Figure 2 visualises how Club 2.0 works.

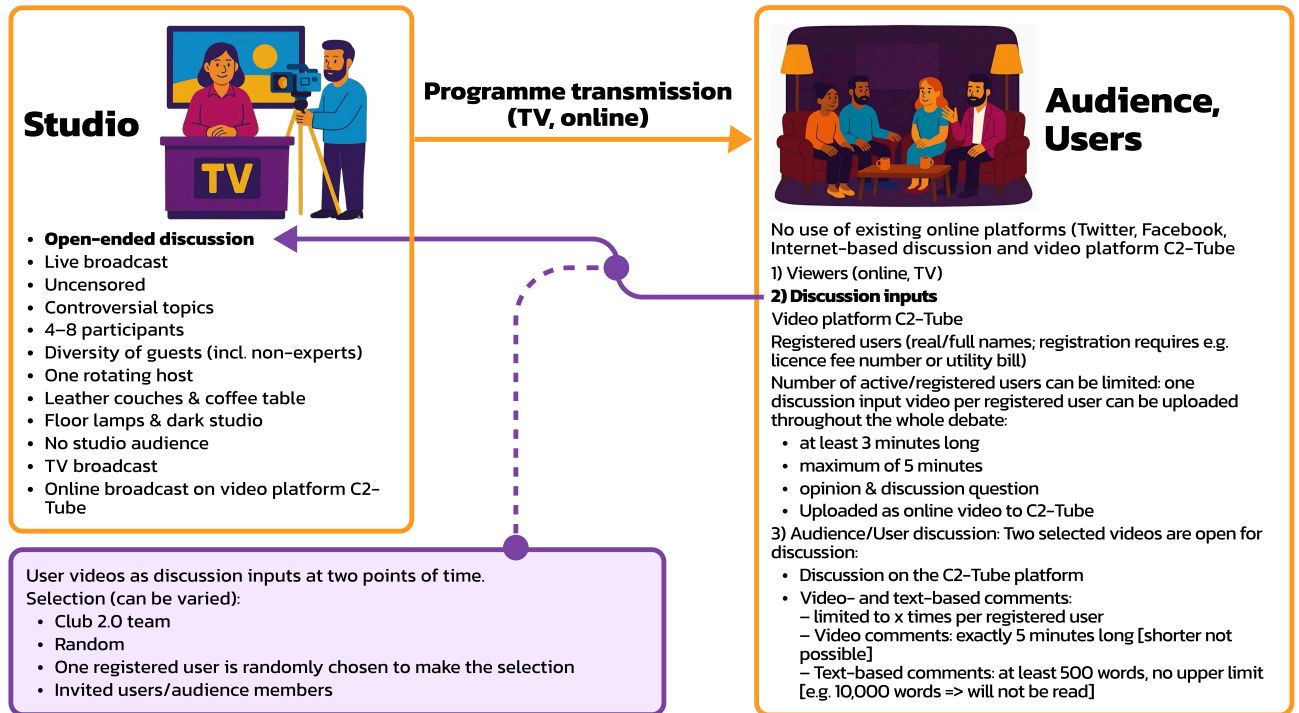


Figure 2: The concept of the Club 2.0 platform, a public service Internet platform for deliberative and participatory digital democracy

*“Club 2.0 uses and extends the traditional principles of Club 2. The television broadcast is based on the tried and tested Club 2 rules, which are crucial to the quality of the format. Club 2.0 broadcasts are open-ended, live, and uncensored. [...] Club 2.0 is a cross-medium that combines live television and the Internet, [...] Club 2.0 is broadcast live online via a video platform. [...] Club 2.0 [...] [uses] its own online video platform [...]: C2-Tube allows viewers to watch the debate online and via a range of technical devices. [...] It is possible for users to generate discussion inputs and for these to be actively included in the programme. This characteristic is linked to a non-anonymous registration of users on the platform. [...] User-generated discussion inputs should preferably have a video format. [...] At certain times during the live broadcast, a user-generated video is selected and shown as input for the studio discussion. In such videos, users formulate their opinions on the topic and can also introduce a discussion question. In a two- to three-hour discussion, about two to three such user-generated inputs could be used. It is inevitable that a selection mechanism will be used to decide which user-generated videos will be shown in the live broadcast. There are several ways to do this, such as random selection, selection by the production team, selection by a registered user determined at random, selection by a special guest, etc. [...] Club 2.0 allows users to discuss the programme topic with each other. The discussion can take place during and/or after the live broadcast. The selected videos that function as discussion inputs can be released for discussion on C2-Tube. [...] Club 2.0 is integrated into educational institutions where people*

*learn and create knowledge together by elaborating discussion inputs and collective positions and producing them in video form. This requires that the topics of certain Club 2.0 programmes are known somewhat in advance. This can be achieved by publishing a programme of topics. Groups of users can prepare videos together, which they can upload to the platform on the evening of the relevant Club 2.0 programme as soon as the upload option is activated. [...] Club 2.0 is a Club 2 in the age of the Internet and digital platforms. Club 2.0 is a manifestation of the democratic digital public sphere. It combines elements of deliberative and participatory democracy" (Fuchs 2024, 379-382).*

Club 2.0 relies on fact-checking software to provide context to the presented opinions of the guests and the submitted videos of the audience members.

The public sphere and deliberative democracy are vivid and have been enhanced by a series of democratic innovations. For example, there is the regular use of citizen assemblies, where randomly selected citizens deliberate and make recommendations on public issues. They meet both online and offline.

Deliberative polling is used in politics. It is a method of public opinion research that combines random sampling with in-depth deliberation to understand what people would think about an issue if they were better informed and had time to discuss it with others. There is a random sample of citizens who are surveyed on a particular topic. They receive balanced briefing materials outlining different sides of the issues. The citizens are invited to meet for one day and discuss the topic in a structured manner. The discussion is continued online for another week. There is also expert input and participation. After the discussion, participants are surveyed again to see how their opinions have changed. The results are published and widely debated in the media, public events, and parliament.

There is a constant development of and experimentation with new forms of digital democracy, such as online citizen assemblies, digital town halls, digital citizen juries, deliberative polling, local councils and neighbourhood platforms, e-participation platforms, etc. Government and civil society together have created a culture where there is a strong focus and interest in digital democratic innovations. An important guiding principle is that digital democracy is organised and practised as online/offline hybrids so that citizens can build trust face-to-face and democracy becomes less anonymous. Digital participation is supported by face-to-face meetings and events.

## 6. Conclusion: Four Future Scenarios for Digital Society

### Scenario 1: Representative Digital Authoritarianism

This scenario depicts a repressive dictatorship where culture is dominated by the ruling ideology – education, media, and art serve as propaganda tools and critical thought is banned. Digital technology is instrumentalised for surveillance and control: advanced dataveillance, implanted sensors and brain interfaces constantly monitor citizens. The economy is state-monopolised and capitalist: a few party-aligned tech conglomerates dominate all industries with no worker rights or alternative ownership. Environment policy is neglected – fossil fuels and nuclear power are embraced, renewable energy is outlawed, and e-waste is rampant under endless consumerism. Politically, a single-party headed by a strongman rules with absolute power; elections and dissents are eliminated and terrorised, and digital authoritarianism turns technology into a means to control the populace.

### Scenario 2: Participatory Digital Authoritarianism

Here, a pseudo-democratic culture allows limited debate but stigmatises dissent – state propaganda and social pressure (“woke virus”) suppress critical voices even as citizens feel superficially free to speak. The regime uses digital platforms for controlled engagement: citizens vote in tightly managed, propagandised plebiscites and online polls. The economy is largely capitalist with minimal regulation: oligopolies and public/private-partnerships enrich regime-aligned corporations, while social scoring and gamified apps nudge citizens into regime-friendly behaviours. Ecologically, the state funds nuclear and fossil infrastructure (often as crony deals) and only tokenistically backs “green” projects for profit, leading to continued climate harm. In politics, a veneer of democracy hides authoritarianism: digital plebiscites and e-voting exist but are rigged to legitimise the ruling party, exemplifying how plebiscitary democracy can serve a charismatic autocrat.

### Scenario 3: Representative Digital Democracy

In this scenario, a pragmatic culture values education for both jobs and citizenship – learners use a mix of traditional and digital tools in schools, and media is diverse but largely driven by private platforms. Technology is regulated to strengthen governance: e-government, e-voting and open-data platforms make public services transparent and responsive, protected by strong privacy and data laws. The economy is a mixed welfare capitalism: unions and co-operatives exist alongside private firms, with progressive taxation and public services that aim to reduce inequality. Ecology is a public priority – the state invests in renewables (public wind and solar companies) and regulates industry to cut emissions, moving steadily toward carbon reduction. Politically, representative democracy prevails: elected bodies govern, while citizens contribute through digital consultations, town halls, and transparency portals. Digital democracy tools

enhance accountability (e.g. online participatory budgeting or platforms like QTube), yet power remains with elected representatives.

## Scenario 4: Participatory Digital Democracy and Society

This scenario imagines a highly active civic culture: schools and communities emphasise critical thinking and co-determination, and a vibrant civil society and media commons flourish. Technology is human-centred and open: privacy-enhancing infrastructures, civic-tech apps, and commons-based digital platforms empower genuine citizen engagement (e.g. online deliberation and fact-checking tools). The economy is democratised: a majority of enterprises are public, co-operative or nonprofit, worker self-management is the norm, automation is used to eliminate menial labour (with guaranteed retraining), and wealth is widely shared. Ecologically, society is committed to sustainability – almost all energy is renewable and managed by public/co-op utilities, e-waste is minimised through reuse, and digital networks run on green power. In politics, participatory and deliberative democracy reigns: elected governments exist, but many decisions emerge from informed citizens' assemblies, participatory budgeting and constant online/offline dialogue. This lively digital democracy underscores how collective self-government and technology can co-evolve, making governance transparent, inclusive and constitutionally grounded.

These four scenarios are based on the STEEP-driven scenario framework for digital democracy (the user's text) and informed by research on digital authoritarianism and digital democracy, which highlight how technology can either empower citizens or entrench autocracy. Table 3 and Figure 3 summarise key features of the four scenarios.

Dimension	Scenario 1: Representative Digital Authoritarianism	Scenario 2: Participatory Digital Authoritarianism	Scenario 3: Representative Digital Democracy	Scenario 4: Participatory Digital Democracy & Society
<b>Culture</b>	Propaganda, indoctrination, censorship, ideology of obedience	Pseudo-pluralism, social pressure, "woke" scapegoating	Mixed culture: free but commercialised public sphere	Critical, inclusive, creative civic culture and media commons
<b>Technology</b>	Surveillance tech, brain interfaces, dataveillance	Public/private partnerships for controlled engagement	E-government, e-voting, open-data transparency	Commons-based civic tech, privacy-enhancing tools, FLOSS ecosystems
<b>Economy</b>	State monopolies aligned with the regime; no worker rights	Crony capitalism; oligopolies; gamified citizen control	Regulated welfare capitalism with unions & co-ops	Democratic mixed economy: co-ops, commons, fair automation
<b>Ecology</b>	Fossil fuel dominance; outlawed renewables; extreme pollution	Fossil/nuclear subsidies; tokenistic greenwashing	Public-private green energy transition; renewables growing	Fully renewable, public/co-op energy system; green digital infrastructure
<b>Politics</b>	Digital totalitarianism, no elections, terror & censorship; one-party dictatorship; total surveillance; leader rule	Managed plebiscitary autocracy with digital legitimisation; controlled participation via manipulated plebiscites	Accountable representative democracy with open governance; representative democracy with digital transparency	Deep participatory & deliberative democracy with empowered citizens; participatory & deliberative democracy combining online/offline participation

Table 3: Four future scenarios for digital society



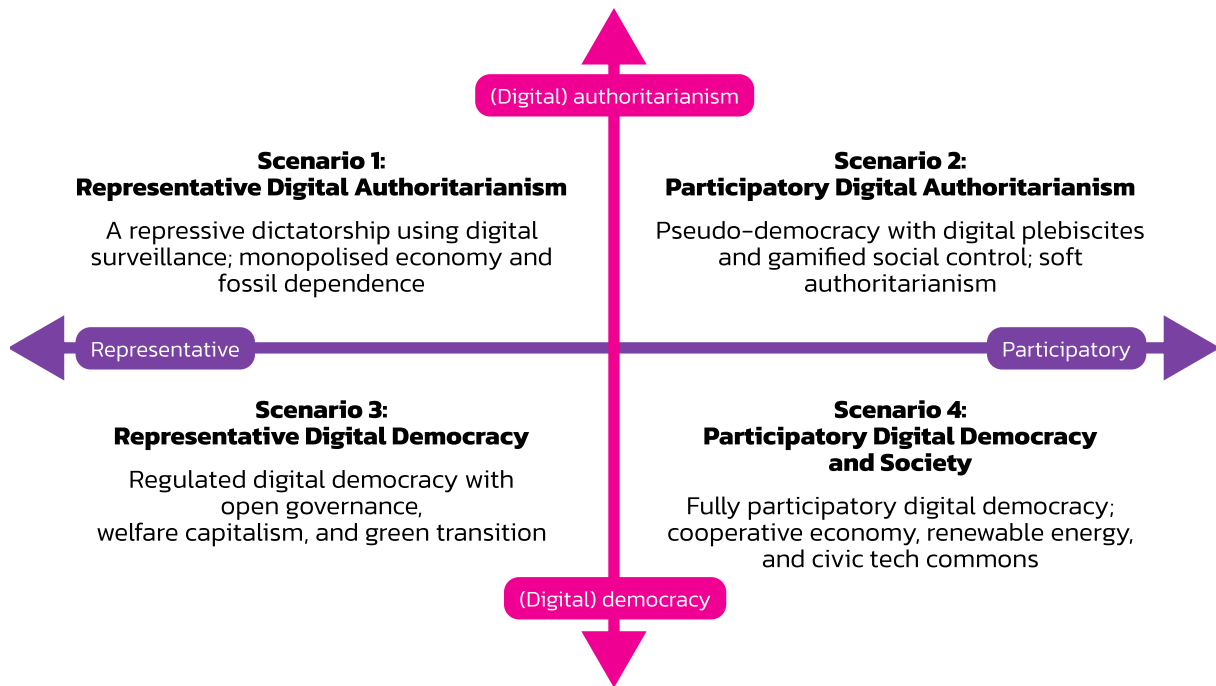


Figure 3: Four future scenarios for digital society

## Bibliography

- [illegible]

- European External Action Service. 2025. *3rd EEAS Report on Foreign Information Manipulation and Interference Threats: Exposing the Architecture of FIMI Operations*. Brussels: EEAS.
- European External Action Service. 2023. *1st EEAS Report on Foreign Information Manipulation and Interference Threats: Towards a Framework for Networked Defence*. Brussels: EEAS.
- European Union. 2025. White Paper. [https://eur-lex.europa.eu/EN/legal-content/glossary/white-paper.html?utm\\_source=chatgpt.com](https://eur-lex.europa.eu/EN/legal-content/glossary/white-paper.html?utm_source=chatgpt.com) (accessed on 20 November 2025).
- Fielitz, Maick and Holger Marcks. 2019. *Digital Fascism: Challenges for the Open Society in Times of Social Media*. [https://escholarship.org/content/qt87w5c5gp/qt87w5c5gp\\_no-Splash\\_cfd533213b94bd55da882f6f1940753e.pdf](https://escholarship.org/content/qt87w5c5gp/qt87w5c5gp_no-Splash_cfd533213b94bd55da882f6f1940753e.pdf)
- Fisher, Greg, John Wisniewski, and Rene Bakker. 2020. *Strategy in 3D: Essential Tools to Diagnose, Decide, and Deliver*. Oxford: Oxford University Press.
- Frantz, Erica. 2018. *Authoritarianism. What Everyone Needs to Know*. Oxford: Oxford University Press.
- Fromm, Erich. 1984. *The Working Class in Weimar Germany*. Leamington Spa: Berg.
- Fromm, Erich. 1973/1997. *The Anatomy of Human Destructiveness*. London: Pimlico.
- Fromm, Erich. 1955/1991. *The Sane Society*. London: Routledge
- Fromm, Erich. 1942/2001. *The Fear of Freedom*. Abingdon: Routledge.
- Fromm, Erich. 1936. Sozialpsychologischer Teil. In *Studien über Autorität und Familie*, 77-135. Lüneburg: zu Klampen.
- Fuchs, Christian. 2024. *Social Media: A Critical Introduction*. London: Sage. Fourth edition.
- Fuchs, Christian. 2022. *Digital Fascism*. Abingdon: Routledge.
- Fuchs, Christian. 2020. *Communication and Capitalism: A Critical Theory*. London: University of Westminster Press. <https://doi.org/10.16997/book45>
- Fuchs, Christian. 2018a. Authoritarian Capitalism, Authoritarian Movements and Authoritarian Communication. *Media, Culture & Society* 40 (5): 745-753.
- Fuchs, Christian. 2018b. *Digital Demagogue. Authoritarian Capitalism in the Age of Trump and Twitter*. London: Pluto.
- Fuchs, Christian. 2014. *QTube – Citizen-Generated Videos for Questions to the Prime Minister. An Idea Submitted to the Speaker's Commission on Digital Democracy*. [https://www.parliament.uk/globalassets/documents/speaker/digital-democracy/Digi026\\_Christian\\_Fuchs.pdf](https://www.parliament.uk/globalassets/documents/speaker/digital-democracy/Digi026_Christian_Fuchs.pdf)
- Fung, Archon and Erik Olin Wright. 2003. Countervailing Power in Empowered Participatory Governance. In *Deepening Democracy*, edited by Archon Fung and Erik Olin Wright, 259-289. London: Verso.
- Gerbaudo, Paolo. 2024. Digital Populism. In *Research Handbook on Populism*, edited by Yannis Stavrakakis and Giorgos Katsambekis, 506-515, Cheltenham: Edward Elgar.

- Gerbaudo, Paolo. 2018. Social Media and Populism: An Elective Affinity? *Media, Culture & Society* 40 (5): 745-753.
- Giddens, Anthony. 1984. *The Constitution of Society. Outline of the Theory of Structuration*. Cambridge: Polity Press.
- Giroux, Henry A. 2015. *Dangerous Thinking in the Age of New Authoritarianism*. New York: Routledge.
- Gosytonyi, Gergely. 2023. *Censorship from Plato to Social Media*. Cham: Springer.
- Habermas, Jürgen. 1985a. *The Theory of Communicative Action. Volume 1: Reason and the Rationalization of Society*. Boston, MA: Beacon Press
- Habermas, Jürgen. 1985b. *The Theory of Communicative Action. Volume 2: Lifeworld and System: A Critique of Functionalist Reason*. Boston, MA: Beacon Press.
- Held, David. 2006. *Models of Democracy*. Third edition. Cambridge: Polity.
- Hofkirchner, Wolfgang. 2006. Towards a Post-Luhmannian Social Systems View. *Proceedings of the XVI World Congress of Sociology*. Durban: ISA. [https://www.academia.edu/106129199/Towards\\_a\\_Post\\_Luhmannian\\_Social\\_Systems\\_View](https://www.academia.edu/106129199/Towards_a_Post_Luhmannian_Social_Systems_View)
- Lührmann, Anna and Staffan I. Lindberg. 2015. A Third Wave of Autocratization is Here: What is New About It? *Democratization* 26 (7): 1095-1113.
- MacKinnon, Rebecca. 2011. China's "Networked Authoritarianism". *Journal of Democracy* 22 (2): 32-46.
- Macpherson, C. B. 1977. *The Life and Times of Liberal Democracy*. Ontario: Oxford University Press.
- Maerz, Seraphine F. 2024. The Internet and Autocratization. In *The Routledge Handbook of Autocratization*, edited by Aurel Croissant and Luca Tomini, 209-221. Abingdon: Routledge.
- Malmmodin, Jens A. et al. 2023. ICT Sector Electricity Consumption and Greenhouse Gas Emissions – 2020 Outcome. *Telecommunications Policy* 48 (3), <https://doi.org/10.1016/j.tel-pol.2023.102701>
- Meloen, William F. 1993. The F Scale as a Predictor of Fascism: An Overview of 40 Years of Authoritarianism Research. In *Strength and Weakness: The Authoritarian Personality Today*, edited by William F. Stone, Gerda Lederer and Richard Christie, 47-69. New York: Springer.
- Neumann, Franz. 1944/2009. *Behemoth: The Structure and Practice of National Socialism, 1933-1944*. Chicago, IL: Ivan R. Dee.
- Pearson, James S. 2024. Defining Digital Authoritarianism. *Philosophy & Technology* 37, <https://doi.org/10.1007/s13347-024-00754-8>
- Reich, Wilhelm. 1933/1972. *The Mass Psychology of Fascism*. London: Souvenir Press.

- Roberts, Tony and Marjoke Oosterom. 2024. Digital Authoritarianism: A Systematic Literature Review. *Information Technology for Development*, <https://doi.org/10.1080/02681102.2024.2425352>
- Sinpeng, Aim and Youngjoon Koh. 2022. Journalism in the Age of Digital Autocracy: A Comparative ASEAN Perspective. *Journal of ASEAN Studies* 10 (2): 247–262.
- Speaker's Commission on Digital Democracy. 2015. *Open Up! Report of the Speaker's Commission on Digital Democracy*. London: UK Parliament. [https://webarchive.parliament.uk/20190701125957mp\\_/https://digitaldemocracy.parliament.uk/documents/Open-Up-Digital-Democracy-Report.pdf](https://webarchive.parliament.uk/20190701125957mp_/https://digitaldemocracy.parliament.uk/documents/Open-Up-Digital-Democracy-Report.pdf)
- Special Committee on the European Democracy Shield. 2025. Findings and Recommendations. [https://www.europarl.europa.eu/doceo/document/EUDS-DT-771957\\_EN.pdf](https://www.europarl.europa.eu/doceo/document/EUDS-DT-771957_EN.pdf)
- Tamás, Gáspár Miklós. 2000. On Post-Fascism. *East European Constitutional Review* 9: 48-5.
- The Independent. 50 years of PMQs. *The Independent Online*, 17 July 2011. <http://www.independent.co.uk/news/uk/politics/50-years-of-pmqs-2314966.html>
- Toscano, Alberto. 2023. *Late Fascism*. London: Verso.
- Traverso, Enzo. 2019. *The New Faces of Fascism*. London: Verso.
- UN Futures Lab. 2023a. *UN Strategic Foresight Guide: Horizon Scanning* New York: United Nations.
- UN Futures Lab. 2023b. *UN Strategic Foresight Guide: Scenario Development*. New York: United Nations.
- Wallerstein, Immanuel. 2004. *World-Systems Analysis. An Introduction*. Durham, NC: Duke University Press.
- Wallerstein, Immanuel. 1998. *Utopistics. Or Historical Choices of the Twenty-First Century*. New York: The New Press.
- Wiatr, Jerzy J., ed. 2019. *New Authoritarianism. Challenges to Democracy in the 21<sup>st</sup> Century*. Opladen: Verlag Barbara Budrich.
- Williams, Raymond. 1983. *Keywords. A Vocabulary of Culture and Society*. New York: Oxford University Press.
- Williams, Raymond. 1980/2020. *Culture and Materialism*. London: Verso.
- Williams, Raymond. 1978/2010. Utopia and Science Fiction. In *Tenses of Imagination: Raymond Williams on Science Fiction, Utopia and Dystopia*, 95-112. Bern: Peter Lang.
- Wright, Erik Olin. 2003. Preface: The Real Utopias Project. In *Deepening Democracy*, edited by Archon Fung and Erik Olin Wright, vii-viii. London: Verso.



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