

MAPPING THE FUTURE OF TECHNOLOGICAL INNOVATIONS

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REGROUP

REBUILDING GOVERNANCE AND
RESILIENCE OUT OF THE PANDEMIC



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Culminating more than a decade of crisis in Europe, the Covid-19 pandemic has opened an important window of opportunity for institutional and policy change, not only at the “reactive” level of emergency responses, but also to tackle more broadly the many socio-political challenges caused or exacerbated by Covid-19. Building on this premise, the Horizon Europe project REGROUP (*Rebuilding governance and resilience out of the pandemic*) aims to: 1) provide the European Union with a body of actionable advice on how to rebuild post-pandemic governance and public policies in an effective and democratic way; anchored to 2) a map of the socio-political dynamics and consequences of Covid-19; and 3) an empirically-informed normative evaluation of the pandemic.



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Abstract

This Foresight paper discusses the application of future studies and strategic foresight in legislative processes, particularly concerning digitalization in post-pandemic Europe. The paper highlights the imperative for laws to be designed for the future - and the rights of future generations - to safeguard intergenerational justice and international solidarity. The analysis begins with an exploration of the challenges and opportunities that digitalization presents in a Europe recovering from COVID-19, which has significantly accelerated technological adoption across various sectors. It examines how laws can be designed to embrace these developments while ensuring societal resilience to future crises. Providing a concise overview of future studies and strategic foresight, the paper identifies gaps and blind spots in EU policy-making that can be filled by integrating foresight studies into policy-making structures.

The paper proposes institutionalization strategies and advocates for an ethical framework, suggesting 'digital humanism' as a value foundation to guide future-orientated policy decisions. This framework is aimed at ensuring that legislative measures not only address present issues but are also adaptable and considerate of future societal needs. The contribution ends with a presentation of proposals for institutionalizing strategic foresight, advocating for a value-driven approach anchored in digital humanism.

Keywords: Digitalization, digital literacy, Strategic foresight, Future studies, Policy-making processes

Introduction

It is the task of the legislature to address existing and future challenges for society. In theory, the solution to present problems seems simple: The challenge arises, solutions are determined, so legislation is enacted to meet the particular challenge. But future problems pose a bigger challenge: What are they? When should they be confronted? How should they be solved?

Courts, social organizations and politicians are becoming increasingly aware of the fact that, in addition to short-term reactions to current problems, future, cross-generational and intergenerational challenges must be addressed in a resilient way. This applies to all challenges of the 21st century, such as the effects of the climate change, migration, identity politics and especially digitalization.¹ In this context, the “Klimabeschluss”, the Climate Verdict, of the German Federal Constitutional Court² is a milestone. Within this much-discussed ruling, the court states that there is an intergenerational obligation of the state towards its citizens to protect nature, the environment and the climate, as this is the only way to protect their civil liberties and fundamental rights.

But how can we anticipate the future? In order to be able to master short- and/or long-term challenges ahead well, we first have to get a picture of the present, analyze what the future should look like and which tools and other solutions are necessary to solve future challenges.³ The field of future research and strategic foresight is of particular importance here. It is intended to strengthen resilience in dealing with new developments and thus prepare society, the economy and politics for future challenges.⁴ Future studies and strategic foresight are interlinked in their common goal of understanding and shaping the future. While future studies are more academic, focusing on the analysis and exploration of possible and preferable futures, strategic foresight is the application of this knowledge in a strategic context. It involves using the insights gained from future studies to inform the decision-making process, ensuring that strategies are robust, forward-looking, and aligned with future possibilities and challenges. Together, they form a comprehensive approach to navigating the uncertain future, making it essential for effective and resilient policy-making.

1. Approving: Kai Unzicker and Charlotte Freihse, “Blick voraus: Die Zukunft der digitalen Öffentlichkeit und die Herausforderungen für die Demokratie“, 21 September 2023 <<https://www.bertelsmann-stiftung.de/de/unsere-projekte/upgrade-democracy/projektnachrichten/foresight-prozess-gestartet>> accessed 31 March 2024.

2. German Federal Constitutional Court, Decision of the First Senate of 24 March 2021, Ref. 1 BvR 2656/18.

3. Minor enquiry by the CDU/CSU parliamentary group, Current status of the Federal Government’s initiatives to (co-)shape the future, p. 1.

4. Philine Warnke and others, „Studie zur Institutionalisierung von Strategischer Vorausschau als Prozess und Methode in der deutschen Bundesregierung, 2021 <<https://www.isi.fraunhofer.de/de/competence-center/foresight/projekte/studie-zur-institutionalisierung-von-strategischer-vorausschau-a.html>> accessed 31 March 2024.

This paper seeks to harness the power of strategic foresight and future studies. A comprehensive analysis of future directions is carried out for the area of digitalization. This area, which is particularly dynamic and has been bringing disruptive changes to all our lives for a number of years, will be analyzed in more detail. In particular, the COVID-19 pandemic has been a catalyst for technological progress, which can be seen, for example, in online meetings in the workplace, in government or health care with online document requests or e-prescriptions, and also in the school or court environment with the increased use of digital tools. These changes are still being felt today. However, in order to actively shape the future and at the same time be more resilient to future health, climate, military or other crises, this paper seeks to develop proposals for the use of digital tools and strategies in a post-pandemic Europe.

To achieve this objective, this paper first analyses the challenges and opportunities of digitalization in post-pandemic Europe (II.). This is followed by an analysis of how the law can meet these challenges and the specific challenges faced by legislative processes (III.). After this, a brief summary of the theoretical as well as historical background of future studies and the strategic foresight approach will be given (IV.). The aim and significance for future challenges of this subject area while incorporating them into policy making structures are then highlighted (V.1). In addition, the existing use of strategic foresight and future studies at EU and member state level is presented (V.2 and V.3). In a final step, recommendations are made how these processes can be institutionalized and which ethical framework should be used to provide a framework for strategic foresight processes (VI.).

Technological challenges and opportunities for the medium- and long-term in post-pandemic Europe

The COVID-19 pandemic has not just been a health crisis. It has also shown where our social, economic, political and legal coexistence poses challenges, but also opportunities.⁵ These challenges and opportunities, which our global society faces in the medium and long term, are therefore presented in an overview and described in more detail using examples. This serves as a basis for subsequently developed methods and solutions for these challenges and opportunities in the digital age. The following topics were selected by the authors as the most important challenges for the medium- and long-term⁶

5. Antonio López Peláez and others, “Working in the 21st Century. The Coronavirus Crisis: A Driver of Digitalisation, Teleworking, and Innovation, with Unintended Social Consequences”, *Information* 2021, 12 (377).

6. World Economic Forum Global Risks, *Global Risks Report 2024* <<https://www.weforum.org/publications/global-risks-report-2024/digest/>> accessed 31 March 2024.

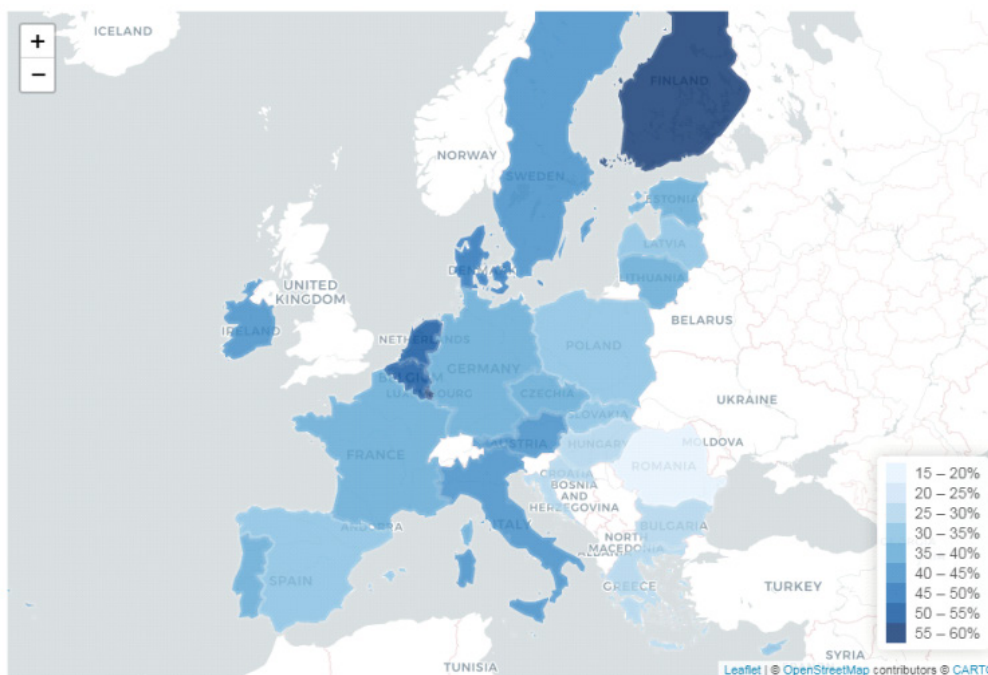
on the basis of the World Economic Forum Global Risks⁷ and the Foresight Analysis of the European Strategy and Policy Analysis System (ESPAS).

Digitalization of work and education

It is evident that digitalization affects each and every one of us in our everyday lives. This becomes particularly clear when one looks at the changes in working life and education in the last decade(s). The ongoing changes have to be described as complex, multidimensional and context-dependent in these areas.⁸

This is particularly evident in the area of teleworking, as can be seen in the chart below, because teleworking requires employees to be technically equipped and encouraged to use digital tools and learn digital skills:

Figure 1: Teleworking in Europe as a result of the coronavirus crisis.



Source: Antonio López Peláez and others, “Working in the 21st Century.”, Information 2021, 12 (377).

The number of people working from home during the COVID-19 pandemic increased from 3% to 40% on average in Europe. In some EU countries, such as Finland and Luxembourg, the proportion was well over 50%. Similar results can be seen in the field of

7. ESPAS, “Foresight within the EU institutions: The ESPAS analysis so far” <[https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659272/EPRS_BRI\(2020\)659272_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2020/659272/EPRS_BRI(2020)659272_EN.pdf)> accessed 31 March 2024.

8. Jonathan Pratschke and Enrica Morlicchio, “Social Polarisation, the Labour Market and Economic Restructuring in Europe: An Urban Perspective” Urban Studies 2012, 49 (1891).

public service work.⁹

The sharp increase in teleworking exposes a large number of people to the risks associated with this form of work. These include a possible greater professional isolation and the loss of social relationships with colleagues and supervisors, less organizational commitment on working days entirely from home, a possible deterioration in the work-life balance due to the difficulty of drawing boundaries between work and leisure and other physical as well as mental health issues.¹⁰

In addition, more fundamental questions arise within the context of digitalization and work: Technical support systems, for example in the field of robotics,¹¹ impact the reality and actual existence of jobs. Certain jobs are particularly at risk and all workers need to adapt to new life situations.¹² In the past, low- and medium-skilled workers have been particularly vulnerable to mechanical displacement, but the extent of digitalization suggests that entire occupational groups may be at risk,¹³ even if there lies opportunity in all risks.

In the field of education, the COVID-19 pandemic was also a catalyst for the digitization of education processes around the world in order to maintain school operations when contact restrictions made face-to-face teaching impossible.¹⁴ But this radical switch to distance learning and digital schooling also had its downsides as not every student was able to access and use digital media competently. In addition, social inequalities became more apparent due to limited access and limited individual support for weaker students.¹⁵

9. Caroline Fischer and others, “Resilience through digitalisation: How individual and organisational resources affect public employees working from home during the COVID-19 pandemic”, *Public Management Review* 2023, 25 (808).

10. Marta Juchnowicz and Hanna Kinowska, “Employee Well-Being and Digital Work during the COVID-19 Pandemic”, *Information* 2021, 12 (293); Antonio López Peláez and others, “Working in the 21st Century. The Coronavirus Crisis: A Driver of Digitalisation, Teleworking, and Innovation, with Unintended Social Consequences”, *Information* 2021, 12 (377).

11. Jari Kaivo-oja and others, “Futures of robotics. Human work in digital transformation”, *International Journal of Technology Management* 2017, 73 (176).

12. Wolfgang Schroeder and others, “Shaping Digitalization - Industry 4.0 - Work 4.0 - Regulation of the Platform Economy” 2017, p. 5 <<https://library.fes.de/pdf-files/id/13934.pdf> > accessed 31 March 2024.

13. Peter Ittermann and Jonathan Niehaus “: Industrie 4.0 und Wandel von Industriearbeit. Überblick über Forschungsstand und Trendbestimmungen”, p. 33 et seqq, in: Hartmut Hirsch-Kreinsen and others, „Digitalisierung industrieller Arbeit“, 2015.

14. See for the effects in China: Marina Glushenkova and Margherita Zagato, “Effect of COVID-19 on digitalization of higher education. A tale of one business school”, *Journal of University Teaching & Learning Practice* 2023, 20 (6); for effects in UK: Laura Louise Nicklin and others, “Accelerated HE digitalisation: Exploring staff and student experiences of the COVID-19 rapid online-learning transfer”, *Education and Information Technologies* 2022, 27 (7653).

15. For a broad overview in Europe see Inka Bormann and others, “COVID-19 and its effects: On the risk of social inequality through digitalization and the loss of trust in three European education systems” *European Educational Research Journal* 2021, 20 (610); Ksenia Skobeltsina, “Education Systems Management in Critical Situations: Potential Risks of Digitalization”, p. 739 et seqq., XIV International Scientific Conference “INTERAGROMASH 2021” 2021.

Polarization and political climate change

However, these changes in the everyday lives of individuals also pose challenges for society, politics and the economy. A particularly serious one is described as societal polarization, which the World Economic Forum Global Risks ranks among the top 3 in the area of existing short-term global risks and 9th in terms of long-term (10-year period) global risks.¹⁶ Generally speaking, polarization refers to a serious conflict that leads to a split into different camps because there are great similarities and strong identification potential within a camp and major differences between the camps.¹⁷ Political polarization is seen as the splitting of political camps due to major political differences, such as the classic conflict between left-wing and right-wing parties, which has reached a maximum in the USA precisely because of the two-party system. This can also be applied to the social dimension of a society. Here, a few strongly alienated groups with opposing positions and a strong sense of community face each other.¹⁸

In Europe, in certain metrics polarization is growing and is often represented as a substantial societal challenge, even though the concrete evidence of the impact on polarization beyond certain topics - like gendered speech and support for asylum seekers - is weak. The COVID-19 pandemic as a serious global crisis has led to polarization, particularly in the political arena, as populist parties took advantage of a challenging societal situation.¹⁹ However, the severity of this challenge is increased by the fact that it is linked to and influences many other risks that are ranked as very serious. These include, in particular, challenges posed by technological innovation, such as misinformation and disinformation, cyber insecurity, censorship, surveillance and many others.²⁰

Particularly in the area of new media and communication platforms, such as Instagram, Facebook and TikTok, there is a strong scientific discussion about the polarization effect of social media since 2012.²¹ Polarization is compounded by effects such as fake news, echo chambers as well as targeted misinformation and disinformation.²² Although this is

16. World Economic Forum Global Risks, Global Risks Report 2024, Perception Survey 2023-2024, Figure D <<https://www.weforum.org/publications/global-risks-report-2024/digest/>> accessed 31 March 2024.

17. Joan Esteban and Debraj Ray "On the Measurement of Polarization" *Econometrica* 1994, 62 (819).

18. Annemarije Oosterwaal and René Torenvlied, "Politics Divided from Society? Three Explanations for Trends in Societal and Political Polarisation in the Netherlands" *West European Politics*, 2010, 33 (258).

19. Beate Küpper and Luca Váradi, "Polarization in Europe: Positioning for and against an open and diverse society", CHAMPION PROJECT 2021 <https://www.firstlinepractitioners.com/wp-content/uploads/2021/07/01_Kuepper_Varadi.pdf> accessed 31 March 2024.

20. World Economic Forum Global Risks, Global Risks Report 2024, Perception Survey 2023-2024, Figure D <<https://www.weforum.org/publications/global-risks-report-2024/digest/>> accessed 31 March 2024.

21. For a systematic review see Emily Kubin and Christian von Sikorski, "The role of (social) media in political polarization: a systematic review", *Annals of the International Communication Association* 2021, 45 (188).

22. Caroline Böck and Martin Müller, "Empfehlungssysteme im Regelungsbereich des DSA" *Zeitschrift für Digitalisierung und Recht* 2023 (284).

not uncontroversial in the literature²³, research increasingly suggests that, under some metrics, social media at least contributes to social and political polarization and that research should focus on how social media can still become an “ideal public sphere” and at least mitigate the effects of existing polarization.²⁴

The World Economic Forum Global Risks Report has also recognized the dangers of misinformation and disinformation: In terms of short-term risks, these are ranked number 1 in the digital age when considering the severity of global risks. In the long term (10-year period), they are ranked fifth. Only the immediate effects of climate change, such as extreme weather events and natural resource shortage, were categorized as an even more serious challenge.²⁵

Cyber security

In addition to issues related to increasing polarization, cybercrime and related cyber insecurity represent a particularly serious global risk in both the short and long term.²⁶ In the private sector, this is reflected by the technical fact that digitalization within companies is accompanied by the use of high-performance IT systems in cloud systems and, in certain sectors, highly efficient algorithms that use and store a lot of data at the same time (big data).²⁷ Moreover, the rapid digitization of work during the COVID-19 pandemic was not accompanied by staff sensitivity to cyber security challenges, inadequate protection of critical and sensitive information, a lack of budget and cybercrime experts and, finally, a lack of cybersecurity guidelines adapted to each company.²⁸ The commercial benefit of big data is of particular interest not only to a company itself, but also to third parties. All of that makes companies more vulnerable in more places than

23. Pablo Barberá, “Social Media, Echo Chambers, and Political Polarization”, p. 44 in: Nathaniel Persily and Joshua A. Tucker, “Social Media and Democracy: The State of the Field, Prospects for Reform”, 2020.

24. Caroline Böck and Martin Müller, “Empfehlungssysteme im Regelungsbereich des DSA” Zeitschrift für Digitalisierung und Recht 2023 (284); Emily Kubin and Christian von Sikorski, “The role of (social) media in political polarization: a systematic review”, Annals of the International Communication Association 2021, 45 (188); Swapan Deep Arora and others, “Polarization and social media: A systematic review and research agenda” Technological Forecasting and Social Change 2022, 183 Article 121942; Sandra Gonzalez-Bailn and others, “Asymmetric ideological segregation in exposure to political news on Facebook” Science 2023, 381 (397).

25. World Economic Forum Global Risks, Global Risks Report 2024, Perception Survey 2023-2024, Figure E <<https://www.weforum.org/publications/global-risks-report-2024/digest/>> accessed 31 March 2024. Note: A precise analysis of the effects of disinformation and misinformation in a societal as well as political context will be carried out by the University of Groningen team as part of the REGROUP project by mid-2025.

26. World Economic Forum Global Risks, Global Risks Report 2024, Perception Survey 2023-2024, Figure E <<https://www.weforum.org/publications/global-risks-report-2024/digest/>> accessed 31 March 2024.

27. Wolfgang Schroeder and others, “Shaping Digitalization - Industry 4.0 - Work 4.0 - Regulation of the Platform Economy” 2017, p. 5 <<https://library.fes.de/pdf-files/id/13934.pdf>> accessed 31 March 2024.

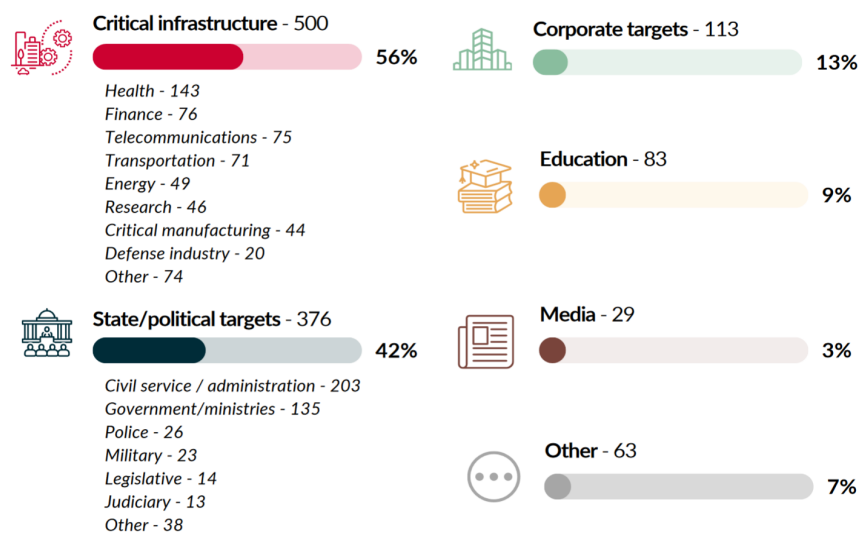
28. Iva Tasheva, “Cybersecurity post-COVID-19: Lessons learned and policy recommendations”, European View 2021, 20 (140); ENISA, “Cybersecurity for SMEs - Challenges and recommendations” 2021 <<https://www.enisa.europa.eu/publications/enisa-report-cybersecurity-for-smes>> accessed 31 March 2024.

before, when processes were analogue rather than cloud-based and big data was not stored in bulk in one place.

The outbreak of the war of aggression by Russia in Ukraine has particularly intensified this situation for companies, but also for countries and especially the critical infrastructure sector, such as the health sector in 2022 and 2023. The cyber activity balance from 2023, provided by the EuRepoC project²⁹ for all publicly reported cases of cyberattacks, shows a particularly striking overview of which sectors were affected in 2023:

Figure 2: Number of cyber operations by targeted sector in 2023.

Note: individual cyber incidents may target multiple sectors and sub-sectors.



Source: Jakob Bund and others, EuRepoC Cyber Conflict Briefing “2023 Cyber Activity Balance”

Both the severity and the frequency of incidents have multiplied. This is particularly seen in the area of ransomware incidents by cybercriminals:³⁰ The number of publicly known cyber incidents has increased almost 10-fold since 2020³¹ and obviously the number of unreported cyber incidents will be much higher. It seems very likely that this trend will continue, precisely because so much money and research is being invested in the disruptive technology of quantum computing, which offers a way to bypass all existing security systems.³² The EU is already trying to minimize these risks with a comprehensive cybersecurity strategy and to enable European society to deal with the

29. For more details on the project see <<https://eurepoc.eu/>> accessed 31 March 2024.

30. ENISA, “ENISA - Threat landscape 2023”, p. 6 <<https://www.enisa.europa.eu/publications/enisa-threat-landscape-2023>> accessed 31 March 2024.

31. See the dashboard of the EuRepoC project at <<https://eurepoc.eu/dashboard/>> accessed 31 March 2024.

32. Jagpreet Kaur and K.R. Ramkumar, “The recent trends in cyber security: A review”, Journal of King Saud University - Computer and Information Sciences 2022, 34 (5766).

problem of cyber insecurity in a resilient manner.³³

Global resources and climate change

Yet by far the greatest global risk of the next 10 years³⁴ but ever further, climate change and its effects, will also be influenced by digitalization, both positively and negatively. The direction of this influence will depend on the ability of legislators to implement policies that are effective, attractive and supportive of innovation, especially in the industry and energy sector. It has been shown that the markets do not regulate the effects of climate change and the release of harmful emissions themselves, which is why legislation is required.³⁵

Recently, even the European Court of Human Rights, in its groundbreaking ruling on the Swiss “climate seniors”³⁶, has stated the obligation of legislators to actively promote climate protection and eliminate the negative consequences of climate change. In concrete terms, Switzerland needs to implement more measures, as it and other legislators are empowered to do so in order to safeguard the life, health and well-being of living people and future generations. The ruling will have a strong political and legal signaling effect because of the reputation and importance of the Court in the Council of Europe. It remains to be seen how other courts will also impose active obligations on states to protect the climate, as this case can be categorized as a precedent for further climate lawsuits.

The industry and energy sector are of particular importance. This is because in 2021 the industrial sector was the second largest emitter of greenhouse gases after the energy sector and next to domestic transport.³⁷ However, it should be noted that industry is dependent on the energy sector. The industry and energy sector accounted for almost half of all greenhouse gas emissions in 2021.³⁸ Although the EU has already taken many measures to reduce all greenhouse gases in these sectors, there is still a lot of potential.

33. For further details: Annegret Bendiek and others, “The EU and the Peaceful Settlement of Cyber Disputes: The Goals, Tools and Normative Framework of EU Cyber Policy” in Tsagourias and others (eds.), *The Peaceful Settlement of Inter-State Cyber Dispute* (forthcoming 2024).

34. World Economic Forum Global Risks, *Global Risks Report 2024, Perception Survey 2023-2024*, Figure E <<https://www.weforum.org/publications/global-risks-report-2024/digest/>> accessed 31 March 2024.

35. David Popp and others, “Chapter 21 - Energy, the Environment, and Technological Change” in *Handbook of the Economics of Innovation*, Vol. 2 2010 (873).

36. ECtHR, Judgement of 9 April 2024, *Verein Klimaseniorinnen Schweiz and Others v. Switzerland*, Application no. 53600/20.

37. Read more about how climate change affects global industry and supply chains: Bundesministerium für Umwelt, “Globale Wirtschaft, globale Umweltfragen” 2021 <<https://www.bmuv.de/jugend/wissen/details/globale-wirtschaft-globale-umweltfragen>> accessed 31 March 2024.

38. European Environment Agency, “EEA greenhouse gases - data viewer” <<https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>> accessed 31 March 2024.

In order to achieve the goal of climate neutrality under the EU's Green Deal³⁹, technological innovations therefore play a fundamental role.⁴⁰ This also includes digitalization. For example, digital technologies are already being used to forecast the weather and predict impending weather disasters. They are an essential part of weather forecasting.⁴¹ Digital tools are also of particular importance in the agricultural sector. These include digital information systems, production plans, technological maps, and other data for the agricultural enterprise.⁴² In the long term, in order to be more resilient in the face of growing food shortages, quantum computing will help to optimize crops and agricultural yields.⁴³

In addition, digital innovation is necessary on a global level to enable energy sovereignty in the long-term. While this may seem disconcerting at first glance, researchers have found that data science can enable the evolution of energy systems by increasing the efficiency of the system and optimizing the planning to reduce the cost of the system and the damage to the environment.⁴⁴ In the electricity sector, machine learning tools could revolutionize electric power systems with better forecasting, planning as well as improving system operations.⁴⁵ Digital innovations in the field of decentralized and transactive elective power systems as well as the impact of vehicle electrification and autonomy on global decarbonization are being discussed. It is always emphasized that this must be achieved through effective policy and oversight, as otherwise the opposite effects may occur.⁴⁶

Disruptive technological innovations: GenAI and Quantum technologies

The discussed challenges in the mid- and long-term are influenced by the development of disruptive technologies, such as generative AI (GenAI) and Quantum technologies.

39. Further details on the Green Deal <https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en> accessed 31 March 2024.

40. David Popp and others, "Chapter 21 - Energy, the Environment, and Technological Change" in Handbook of the Economics of Innovation, Vol. 2 2010 (873); Wilson Nwankwo and others, "Climate Change and Innovation Technology: A Review", Technology Reports of Kansai University 2020, 63 (383).

41. Martine G. de Vos and others, "Open weather and climate science in the digital era", Geoscience Communication 2020, 3 (191).

42. Karina R. Mukhamedova and others, "Digitalisation of Agricultural Production for Precision Farming: A Case Study" Sustainability 2022, 14 (14802).

43. Chrysantos Maraveas and others, "Harnessing quantum computing for smart agriculture: Empowering sustainable crop management and yield optimization", Computers and Electronics in Agriculture 2024, 218 (108680).

44. Kyle Bradbury, "How Data Science Can Enable the Evolution of Energy Systems", p. 73 in Varun Sivaram, Digital Decarbonization, 2018.

45. Kyle Bradbury, "How Data Science Can Enable the Evolution of Energy Systems", p. 76 in Varun Sivaram, Digital Decarbonization, 2018.

46. See for further details: Varun Sivaram, Digital Decarbonization, 2018.

The latest developments of GenAI and their impact on the short and long term must be taken into account, particularly with regard to the risks described above in the area of polarization and misinformation. On 15 February 2024, the company OpenAI introduced a new tool based on GenAI: SORA⁴⁷, with which one can create videos from text instructions. Obviously, such technology has a significant potential for misuse in terms of misinformation as this allows deceptively genuine video material to be created in a matter of seconds, which can spread Deepfakes and misinformation globally. Such technologies jeopardize the integrity of existing information ecosystems.⁴⁸ The societal implications are also unprecedented: In terms of democracy and public opinion, such technologies can be misused to manipulate electoral processes by unsettling voters due to different representations of content and preventing them from making informed voting decisions, though there is scant concrete evidence pointing to the effect of generative AI on opinion-forming processes. This also lowers the public's trust in news portals, which in turn can undermine the loyalty of various social groups. This loss of trust can even relate to legitimate news content from media organizations and journalists, as verification of the content is not possible or possible only to a limited extent.⁴⁹

In addition to GenAI, the field of quantum technologies also exemplifies disruptive innovation. Unlike the former, quantum technologies are still emerging and are therefore more likely to bring about mid- or long-term structural changes in society, politics, science and business.⁵⁰ In addition, countries with less developed technology and fewer financial resources face immense access problems during development and at a later stage when such technology is already in use since the technology is very expensive and complex.⁵¹

Especially in the area of cyber security quantum technology has to be considered: The quantum cryptography brings a new dimension to cryptographic algorithms.⁵² This has advantages, as the systems are designed to be secure and cyber security can be fully guaranteed. However, it also opens up new dimensions of decryption, which is why malicious groups are already stealing and storing encrypted information in order to use

47. See <<https://openai.com/sora>> accessed 31 March 2024.

48. Mohamed R. Shoaib and others, "Deepfakes, Misinformation, and Disinformation in the Era of Frontier AI, Generative AI, and Large AI Models" International Conference on Computer and Applications (ICCA) 2023, (1); Emilio Ferrara, "GenAI against humanity: nefarious applications of generative artificial intelligence and large language models" Journal of Computational Social Science 2024.

49. Mohamed R. Shoaib and others, "Deepfakes, Misinformation, and Disinformation in the Era of Frontier AI, Generative AI, and Large AI Models" International Conference on Computer and Applications (ICCA) 2023, (1); Emilio Ferrara, "GenAI against humanity: nefarious applications of generative artificial intelligence and large language models" Journal of Computational Social Science 2024.

50. Tina Dekker and Florian Martin-Bariteau, "Regulating Uncertain States: A Risk-Based Policy Agenda for Quantum Technologies" Canadian Journal of Law and Technology 2022, 20 (179).

51. Zeki C Seskir and others, "Democratization of quantum technologies" Quantum Science and Technology 2023, 8 (024005).

52. Jagpreet Kaur and K.R. Ramkumar, "The recent trends in cyber security: A review", Journal of King Saud University - Computer and Information Sciences 2022, 34 (5766).

it in a time of quantum decryption.⁵³ It is expected that through the use of quantum technology, all mathematical cryptographic algorithms currently used to secure and authenticate all digital information and systems can be fully decrypted. Quantum computers could decrypt this algorithm by being able to solve the underlying mathematical problems, such as factoring large numbers.⁵⁴ This not only poses a risk to the privacy of individuals, but also threatens the functioning of the (critical) infrastructure of entire countries.

Nevertheless, quantum technologies have a number of advantages that are particularly important in the healthcare sector. Quantum computing will make it possible to analyze very large data sets in a short space of time, as well as to model certain gene structures and thus develop individual therapy options for individual patients, for example in the field of cancer research.⁵⁵

It is not far-sighted to hope that such technologies will be banned or not researched further due to the major risks involved.⁵⁶ Therefore it is necessary from a legislative, political and regulatory perspective to monitor the development of disruptive technologies and steer them through legislation, ethical guidelines or risk mitigation programs and ongoing monitoring.⁵⁷ Due to the rapid changes in these technologies, these solutions need to be developed quickly in detail in order to nip potential misuse in the bud and at the same time pave the way for future technologies. The EU's AI Act goes in this direction. Of particular note is the fact that provisions regarding the impact of GenAI have been added in the legislative process.⁵⁸

Normative challenges

Yet legislation alone will not be able to change these challenges. In addition to effective and innovation-friendly regulation, other factors are of particular importance, such as the will of industry and society to address the challenges ahead, as mentioned above. Nevertheless, the law lays the foundations. Therefore, this chapter takes a closer look at the basic principles and circumstances under which law must be created in order to

53. Douglas Stebila, "The Current Status of Post-Quantum Cryptography" (2 March 2021) at 07m00s, online:

YouTube <<https://www.youtube.com/watch?v=kXXUOzExDd0>> accessed 31 March 2024.

54. Tina Dekker and Florian Martin-Bariteau, "Regulating Uncertain States: A Risk-Based Policy Agenda for Quantum Technologies" *Canadian Journal of Law and Technology* 2022, 20 (179).

55. Keshav Kaushik and Adarsh Kumar, "Demystifying quantum blockchain for healthcare" *Security and Privacy* 2022, 6 (e284).

56. Tina Dekker and Florian Martin-Bariteau, "Regulating Uncertain States: A Risk-Based Policy Agenda for Quantum Technologies" *Canadian Journal of Law and Technology* 2022, 20 (179).

57. Emilio Ferrara, "GenAI against humanity: nefarious applications of generative artificial intelligence and large language models" *Journal of Computational Social Science* 2024.

58. On the state of play of the legislative process, see <<https://digital-strategy.ec.europa.eu/en/policies/regulatory-framework-ai>> accessed 31 March 2024.

enable society to deal with the challenges described above in a resilient way. Essentially, three challenges are identified and examined in more detail that need to be taken into account when developing legal solutions for technological innovations.

Democracy and fundamental rights

In the context of fundamental rights, it can be seen that over the last decade new actors have emerged that have a particular influence on how we exercise fundamental rights, such as freedom of expression under Art. 11 (1) CFR. The large digital companies, including Google, Meta, X and Apple, influence many consumer choices made in our every-day life. They own and exercise control, not just through software, for example on social platforms, but also through hardware, such as sea cables or server capacities for cloud services.⁵⁹ This becomes evident at the amount of transcontinental data traffic. Sea cables amount to 90% of such traffic.⁶⁰

As a result of these possibilities of influence, digital companies have amassed substantial power vis-à-vis private individuals.⁶¹ Social platforms have a strong influence on democratic participation opportunities in the digital sphere due to the design of the underlying algorithms and the design of their terms and conditions (T&Cs).⁶² In order to contain this position of power, it is necessary to rethink how fundamental rights protect individual interests and societal values - and against whom. Traditionally, fundamental rights are rights individuals exercise against states. But as private actors have become more powerful in society, dogmatic approaches to hold them accountable have proliferated.⁶³ National solutions, such as the German⁶⁴ one, are the first step, but it is obvious that there is a need for progressively recognizing a horizontal effect of fundamental rights at the international level.⁶⁵

In recent years, the EU has taken several steps towards the right direction through

59. Matthias C. Kettemann and Caroline Böck, "The Rights We Have Are Always On - Respecting, Protecting and Implementing Human Rights in the Age of Digital Transformation 30 Years after the Vienna Declaration and Programme of Action" (forthcoming 2024).

60. Christian Bueger and others, "Security threats to undersea communications cables and infrastructure - consequences for the EU, In- Depth Analysis for the European Parliament commissioned by the Sub-Committee on Security and Defense", 2022, <[https://www.europarl.europa.eu/thinktank/en/document/EXPO_IDA\(2022\)702557](https://www.europarl.europa.eu/thinktank/en/document/EXPO_IDA(2022)702557)> accessed 31 March 2024.

61. Christian Bueger and Tobias Liebetrau, "Critical Maritime Infrastructure Protection: What's the trouble?" 155 *Marine Policy* 2023, 105772.

62. João Pedro Quintais and others, "Using Terms and Conditions to apply Fundamental Rights to Content Moderation" 24 *German Law Journal* 2023, pp. 1 et seqq.

63. See e.g.: "Guiding Principles on Business and Human Rights - Implementing the United Nations „Protect, Respect and Remedy“ Framework", 2011, p. 13 et seqq., HR/PUB/11/04.

64. For more detail see: Tobias Mast, „AGB-Recht als Regulierungsrecht“, *JuristenZeitung* 2023, p. 287 et seqq.

65. Matthias C. Kettemann and Caroline Böck, "The Rights We Have Are Always On - Respecting, Protecting and Implementing Human Rights in the Age of Digital Transformation 30 Years after the Vienna Declaration and Programme of Action" (forthcoming 2024).

the Digital Strategy. The EU's Digital Services Act (DSA), Digital Markets Act (DMA) and Artificial Intelligence Act (AIA) introduce new obligations, with an emphasis on transparency and compliance. A central norm is Art.14 (4) DSA that sets the obligation for digital platform companies to uphold fundamental rights in their moderation processes. The DMA, characterized by competition law, outlaws practices of digital companies that eliminate competition between the platforms. Lastly, the AIA will be setting rules that uphold human dignity while preventing the discriminatory practices of AI systems.⁶⁶

Taken as a whole, these legislative acts are part of an important comprehensive package of regulatory approaches. Combining disclosure, transparency and procedural obligations as well as risk assessment seem to be a sensible strategy for the future in this area.⁶⁷

Due to constant further development, however, it must always be reviewed whether new legal acts are needed to curb the negative developments of technical innovations. This applies in particular to the disruptive technologies of GenAI and quantum technologies. Due to the disruptive nature and far-reaching consequences of these technologies, consideration must always be given to how the laws can be designed in a particularly sustainable, resilient and human rights friendly way so that they can continue to remain relevant in the long term. In this context, the question also arises as to whether legislative processes should be adapted, at least in part, so that they can achieve this. The authors open up possible proposals in the following sections.

Enforcement and oversight

Existing law, however, especially the acts within the EU's Digital Strategy, can only be effective if they are effectively enforced through state authorities, judicial review, as well as the digital companies themselves. A change of the law alone is therefore not always enough⁶⁸ to bring to all people the full enjoyment of the opportunities that the digital decade brings.⁶⁹

This hypothesis can be demonstrated by the introduction of equality rights: Initially, the movement demanded the abolition of discriminatory unequal treatment (between men and women) through state action. In the 19th century, Anne Knight called for “the

66. Cf. in more detail Martin Müller and Matthias C. Kettemann, “European Approaches to the Regulation of Digital Technologies”, in: Hannes Werthner and others (eds.), *Introduction to Digital Humanism* (Vienna 2024), pp. 631-634.

67. Matthias C. Kettemann and Caroline Böck, “The Rights We Have Are Always On - Respecting, Protecting and Implementing Human Rights in the Age of Digital Transformation 30 Years after the Vienna Declaration and Programme of Action” (forthcoming 2024).

68. In the context of gender equality: Elisabeth Holzleithner, “Emanzipatorisches Recht - Über Chancen und Grenzen rechtlicher Geschlechtergleichstellung”, *Juridikum* 2010, S. 10.

69. European Commission, “European Digital Rights and Principles” <<https://digital-strategy.ec.europa.eu/en/policies/digital-principles>> accessed 31 March 2024.

complete, radical abolition of all the privileges of sex, of race, of birth, of rank, and of fortune”.⁷⁰ Following this, normative changes were made over the years, resulting in a formal equality under the law, which must first be guaranteed by the state and then also by private actors.⁷¹ But the development did not stop there. Rather, it became increasingly clear that, in addition to formal equality, real equality is needed, which can only be achieved through appropriate subsidies and direct claims that tie in with disadvantageous characteristics and thus remove existing hurdles. One example of this is quota arrangements.⁷² In this context, the strategy of Gender Mainstreaming has been developed, which calls for active consideration of gender equality issues when setting standards and implementing political measures. This process is institutionalized in the EU in accordance with Art. 8 TFEU, for example through gender equality officers⁷³ and exemplifies the need for further mechanisms, such as stringent enforcement and oversight as well as the promotion of social sensitivity in order to bring about an actual change in the real sphere.

This hypothesis can also be applied to the challenges and opportunities described above in the context of digitalization. It can also be empirically demonstrated that effective enforcement and oversight in the form of institutionalization and governance can lead to a faster and better introduction of new technologies, but can also slow it down under certain circumstances if such a need exists.⁷⁴ This shows that political decision-makers can steer the course of digitalization.

The effective enforcement of these legal acts in the future therefore ensures the effective exercise of our rights and is of immense importance in the years to come. This requires sufficient trained personnel, constant monitoring and compliance and adequate financial resources. The latter is particularly important in order to fulfil the first criteria. It should be the aim of the EU to have the best experts in the supervisory authorities to enforce the laws so that the rights of EU citizens can be adequately protected.

Tragedy of the horizon

Finally, another major challenge facing the creation of law is the so-called “tragedy

70. Anne Knight, *Diary, Knight Papers, Friends House, London* referenced in Bonnie S. Anderson, “The lid Comes off: International Radical Feminism and the Revolution of 1848”, 10 *MWSA Journal* 1998, p. 2.

71. Susanne Baer, „Frauen und Männer, Gender und Diversität: Gleichstellungsrecht vor den Herausforderungen eines differenzierten Umgangs mit Geschlecht“ in: Arioli, *Wandel der Geschlechterverhältnisse*, pp. 21 et seqq.

72. Elisabeth Holzleithner, “Emanzipatorisches Recht - Über Chancen und Grenzen rechtlicher Geschlechtergleichstellung”, *Juridikum* 2010, S. 9.

73. Elisabeth Holzleithner, “Emanzipatorisches Recht - Über Chancen und Grenzen rechtlicher Geschlechtergleichstellung”, *Juridikum* 2010, S. 9.

74. Claudio Baccianti and others, “Digitalisation, institutions and governance, and diffusion: mechanisms and evidence” ECB Working Paper Series No. 2675, July 2022, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4152775 > accessed 31 March 2024.

of horizon”. The term originates from the field of environmental protection and was coined in 2021 by Mark Carney, then Governor of the Bank of England, in a speech.⁷⁵

Economic and policy actors think primarily in terms of limited periods, but the challenges we are facing, such as climate change, need long-term solutions that go beyond the horizon of most individuals, instead of short-term solutions driven by immediate necessities.⁷⁶ In terms of political cycles in the EU, this means the following: At the beginning of the parliamentary term, politicians try to implement many ideas, but mainly to tackle current problems. Over time, however, from the point of view of political leadership, the question of re-election arises. The focus shifts. This affects the legislative process and, therefore, the creation of the law. The necessity of long-term solutions has been stated by the German Constitutional Court lately within the famous “Klimabeschluss” (climate change decision)⁷⁷, in which the court stated that intergenerational solutions are needed with regard to climate change, which now require lawmakers to enact laws that have a long-term impact and benefit, according to Art. 20 lit. a German Basic law.

What is thus missing while enacting new laws at the moment is the long-term foresight and studies of the future. The upcoming crises, as well as the ongoing and past crises of recent years, cannot be met within short periods. Rather, global solutions designed for a long-term solution need to be developed.

Answer: Future studies and strategic foresight

As already shown by examples, the law alone cannot answer the challenges mentioned above. More global and, in particular, interdisciplinary solutions are needed that are thought of in the long term. The progressive disciplines of Future studies and Strategic foresight, which will be examined in more detail in the following part, can provide the impetus for this.

Brief history and aim of the future studies

The field of future studies in today’s understanding is not new. The field evolved in the 1930s, but has changed and emerged⁷⁸ since then: First scholars started to predict the

75. See his speech at <<https://www.bis.org/review/r151009a.pdf>> accessed 31 March 2024.

76. Bob Frame and others, “Views from nowhere, somewhere and everywhere else: The tragedy of the horizon in the early Anthropocene” 10 *Anthropocene Review* 2022, pp. 524 et seqq.

77. German Constitutional Court, Decision of 24 March 2021, Ref. no. 1 BvR 2656/18.

78. Simone Di Zio, “Exploring the research dynamics of futures studies: An analysis of six top journals”, 153 *Futures* 2023, 103232.

future and were trying to map different futures⁷⁹ as well as shaping desired futures⁸⁰ on global, economic or individual level. Nowadays, Future studies can be defined as a field that systematically develops certain possible, probable as well as preferable futures in light of arising challenges or opportunities.⁸¹ Today, Future studies are not focused on building one “perfect” future, but rather develop different alternatives for policy-makers and societal actors.⁸²

Strategic foresight should be considered as belonging to Future studies as it describes the process after shaping the desired futures, which means it tries to understand and learn from possible futures. This process is aimed at making decisions that lead to the desired future that has been worked out while the identified risks and challenges do not materialize.⁸³ Strategic foresight translates these desired futures into tangible policy structures in the private and public sectors that set the firm’s, nation’s or administrative future.⁸⁴

The two scientific fields have arisen from the need for new mechanisms to deal with the growing uncertainty associated with political and business decision-making. The aim of the disciplines is to work out various possible future options and their effects and then to plan a risk-minimizing way of how the selected desired future can be achieved in a sustainable and resilient way.⁸⁵

Finally, it should be noted that the interest and increased research in these two fields is due to the fact that policymakers and companies have recognized their potential. A very popular example in the private sector is Shell. This company had already sought expert advice in 1973 after the oil price shock to restructure the company.⁸⁶ However, the end of apartheid was also influenced by future studies: In 1991, several well-known South-Africans met with Experts and Future Thinkers from the Shell case and worked out various scenarios about the future of South Africa, which on the one hand depicted

79. Wendell Bell, “The Foundations of Futures Studies Human Science for a New Era: History Purposes, and Knowledge”, 1996; Peter Saul, “This way to the future”, 6 *Journal of Future Studies* 2001, pp. 107 et seqq.

80. Aria Spinelli, “Shaping Desired Futures”, 2013; Robert J. Lempert, “Shaping the Next One Hundred Years: New Methods for Quantitative, Long-Term Policy Analysis”, 2003.

81. Sohail Inayatullah, “Futures Studies: Theories and Methods”, p. 37, 2013 <https://www.meta-future.org/uploads/7/7/3/2/7732993/futures_studies_theories_and_methods_published_version_2013_with_pics.pdf> accessed 31 March 2024.

82. Ibid.

83. Jon Iden and others, “The nature of strategic foresight research: A systematic literature review”, 116 *Technological Forecasting and Social Change* 2017, p. 96.

84. Riccardo Vecchiato, “Strategic foresight: matching environmental uncertainty”, 24 *Technology Analysis & Strategic Management* 2012, p. 783.

85. Haridimos Tsoukas and Jill Shepherd, “Introduction: Organizations and the Future, From Forecasting to Foresight”, Chapter One in H. Tsoukas and J. Shepherd (eds.), “Managing the future: Foresight in the knowledge economy”, pp. 1 et seqq.

86. Peter Saul, “This way to the future”, 6 *Journal of Future Studies* 2001, p. 108.

the future with the apartheid system and on the other hand allowed for new ideas without this system.⁸⁷ Lawmakers have become increasingly interested in these fields, especially in recent years after the COVID-19 pandemic, which have been strongly marked by crises, and attempts are being made to incorporate the two areas into policy-making structures.⁸⁸

Conceptual and theoretical framework

Until now, no single theoretical framework within this field of studies has been developed.⁸⁹ We can, however, extract foundational concepts from past research.

In theory, there are various approaches to understanding possible futures:⁹⁰

- The first approach is finding or carrying out empirical social sciences studies in the area in which one wants to analyze possible futures, which means this approach has a predictive character.
- The second approach has an interpretative character, which means one tries to understand different types of futures and describes them. This does not mean a prediction of these futures, but rather a neutral presentation of these futures.
- In the third approach, an attempt is made to critically question possible futures by showing which advantages and disadvantages a particular future will bring with it and which methodology will be the one that prevails in the respective future.
- A fourth approach within this field of studies has a more participatory character. Several stakeholders out of different disciplines come together and try to shape their own future, based on their own knowledge and values.

From a conceptual point of view, different pillars and conditions need to be met in order to develop a desired future and build a clear, effective and strategic way to achieve this future. The conceptual framework - explained in the following - is based on the

87. In more detail: Jenny Beery and others, “The Mont Fleur Scenarios - What will South Africa be like in the year 2002? with a new introduction by Mont Fleur facilitator, Adam Kahane” <<https://exed.annenberg.usc.edu/sites/default/files/Mont-Fleur.pdf>> accessed 31 March 2024.

88. Bob Frame and others, “Views from nowhere, somewhere and everywhere else: The tragedy of the horizon in the early Anthropocene” 10 *Anthropocene Review* 2022, pp. 524 et seqq.; already: Sohail Inayatullah, “Futures Studies: Theories and Methods”, p. 41, 2013 <https://www.meta-future.org/uploads/7/7/3/2/7732993/futures_studies_theories_and_methods_published_version_2013_with_pics.pdf> accessed 31 March 2024.

89. Sohail Inayatullah, “Futures Studies: Theories and Methods”, p. 37, 2013 <https://www.meta-future.org/uploads/7/7/3/2/7732993/futures_studies_theories_and_methods_published_version_2013_with_pics.pdf> accessed 31 March 2024.

90. Ibid. with further evidence.

findings of the successful “Mount Fleur”-scenario⁹¹ in the political context as well as on theoretical research by Sohail Inayatullah.⁹² Both conceptual frameworks are based on two different pillars and follow the fourth approach with a participatory character that seems to be the most apt in policy fields, which will be explained in detail below.

The first pillar is the composition and the approach of the team members:

- They need to be diverse and well-informed representatives of all stakeholder groups that are involved in the issues discussed. The aim is to build an inclusive and imagination-enriching environment with a common ground from all different perspectives where ideas and thoughts are listened to and discussed in a respectful and trustful environment.
- The persons involved need to be well-respected and credible and need to have a key role within their stakeholder group so that their decisions made in the process will be accepted.
- This is especially true for the people who lead the conversations. They should be seen as “advocates” of the process and not as leaders who set a certain direction or goal and lead the process towards it. Accordingly, they must be accorded a neutral attitude.
- Thirdly, the persons involved need to be open-minded, constructive and willing to find a constructive plan for the future.

The second pillar is the process itself. It must be well-structured and the different phases of the process need to be clearly separated from each other in order to achieve a precise and structured result that is acceptable to all parties. The different stages of the process are as follows:

- The first stage must be there to construct or map possible futures without rating.
- The second stage should be there to shape the desired future with rating the results of the first step. Within this stage of the process, the different opportunities and challenges of the desired future need to be anticipated. This should be achieved by looking ahead, but also by looking back.
- Lastly, an action plan or a roadmap needs to be planned through strategic foresight. This step requires a concrete timetable of the future with a short-, medium- and long-term plan. It is important to analyze how the various areas that are necessary to achieve the desired future are interlinked and mutually dependent.

91. Jenny Beery and others, “The Mont Fleur Scenarios - What will South Africa be like in the year 2002? with a new introduction by Mont Fleur facilitator, Adam Kahane” <<https://exed.annenberg.usc.edu/sites/default/files/Mont-Fleur.pdf>> accessed 31 March 2024.

92. Sohail Inayatullah, “Futures Studies: Theories and Methods”, 2013 <https://www.meta-future.org/uploads/7/7/3/2/7732993/futures_studies_theories_and_methods_published_version_2013_with_pics.pdf> accessed 31 March 2024 with further evidence.

Since the future cannot be forecasted with one hundred percent probability, creating alternatives is very important in this part of the process.

Overall, there are several methods available in this field in order to face different opportunities or challenges. Firstly, one has to examine whether a qualitative, a quantitative or a mix method is most suitable. Secondly, one has to look at the time span, e.g. so-called war games should be used for short-term decisions, megatrends as well as horizon scanning should be used for medium-term issues and scenarios should be used for long-term future shaping.⁹³

Benefits and incorporation into the EU's policy-making structures

This chapter brings together the previously gained insights into the opportunities and challenges of digital technologies, legal challenges and theoretical foundations of Future studies and Strategic foresight. In order to follow on from the previous chapter, the first step in this section is to describe in more detail the benefits of incorporating Future studies and Strategic foresight into the EU's and the Member States Policy Structures. In a second step we will show how Future studies and Strategic foresight on EU and member states level are already incorporated. This will be examined in order to be able to make recommendations on how these processes can be used more effectively within the EU in the following chapter.

Benefits of incorporating future studies and strategic foresight into policy-making

Future studies and strategic foresight are not universal remedies. These methods must also be subject to certain rules and, in particular, be comprehensible if they are to be used effectively and sensibly in a free and democratic constitutional state. This is precisely where the difficulty of these study fields lies. The fact that there are no standardized methods and recognized working techniques makes it difficult to follow democratic processes. In particular, this means that the various techniques must be based on recognized fundamental and human rights as a common set of values. A methodological limitation also serves to avoid any pitfalls, such as questions regarding the measurement of results and budget issues. However, it is important to remember that the processes

93. For more theoretical detail see the work of: Bruno Jacobsen and Irmeli Hirvensalo, "9 Foresight Analysis Methodologies Successful Companies Use to Stay Ahead" <<https://www.futuresplatform.com/blog/9-foresight-methodologies-successful-companies-use-stay-ahead>> accessed 31 March 2024.

must remain flexible, multi-perspective and agile. Nevertheless, the benefits of these methods outweigh the disadvantages, which are explained in more detail below.

Strategic foresight allows entities to anticipate significant changes and trends not only in the environment, in technology, society, and economy, but also in the political context. By understanding potential changes, policymakers can devise strategies that are proactive, ensuring that they are ahead of the curve in addressing future challenges and opportunities. As outlined above, Future studies and Strategic foresight allow for far-sighted, multidisciplinary and strategic decisions that produce intended consequences and guide the challenges, instead of confronting their manifestations selectively and acutely, and thus perhaps not achieving the best possible effect.⁹⁴

Engaging in Foresight analysis also helps identify potential risks and uncertainties that could impact strategic objectives.⁹⁵ This early identification enables the development of contingency plans, reducing the vulnerability to future shocks and stresses. It transforms uncertainty from a liability into an asset, allowing for better risk management and resilience building.⁹⁶

On the positive side, future studies often reveal emerging opportunities that can be seized if identified early enough. By understanding the trajectory of technological advancements and societal shifts, policymakers can foster innovation that aligns with future needs and expectations, driving economic growth and social progress.⁹⁷

The positive potential of Future studies and Strategic foresight in the political context, can be demonstrated in practical terms by the effective outcome of the “Mount Fleur scenario”. Next to this, the (potential) benefits of these topics are also evident when dealing with several topics, such as Climate Change or the use of digital tools, that are subject in today’s (digital) mass media. Many of the issues and challenges that have been described before were already discussed in the 60s of the last century in the field of Future studies. However, no political actors were involved in these discussions, so the discourse remained purely scientific.⁹⁸ Especially due to the COVID-19 pandemic and Russia’s war in Ukraine, this has changed since those crises have reminded all individu-

94. Carolina Facioni, “Why the World Needs Futures Studies: A Social and Methodological Challenge”, 8 Athens Journal of Mediterranean Studies 2022, pp. 223 et seqq.

95. Sohail Inayatullah, “Futures Studies: Theories and Methods”, 2013 <https://www.meta-future.org/uploads/7/7/3/2/7732993/futures_studies_theories_and_methods_published_version_2013_with_pics.pdf> accessed 31 March 2024 with further evidence.

96. Douglas K.R. Robinson, “Policy lensing of future-oriented strategic intelligence: An experiment connecting foresight with decision making contexts”, 169 Technological Forecasting and Social Change 2021, 120803.

97. Jennifer M. Gidley, “The Future: A Very Short Introduction”, 2017, Chapter 3.

98. Carolina Facioni, “Why the World Needs Futures Studies: A Social and Methodological Challenge”, 8 Athens Journal of Mediterranean Studies 2022, pp. 223 et seqq.

als to imagine the future in unprecedented ways.⁹⁹

As shown above, the crises we are facing today are multidimensional, have a disruptive character and need - more or less - solutions on an international level. The particular importance of such fields of study, which have an imaginary character, also lies, as already mentioned, in the polarization which is a serious challenge in the medium and long-term of the digital age. The COVID-19 pandemic in particular has shown that scientific findings were ignored or actively presented as untrue if they did not coincide with personal and political preferences.¹⁰⁰ Both studies are therefore of particular importance in this context.

The EU, as a unique supranational organization with a special relationship between its Member States, plays a vital role in tackling these challenges with Foresight. A reenactment of the General Data Protection Regulation's Brussels Effect¹⁰¹ would be possible and desirable, where other lawmakers have adopted similar approaches, e.g. the UK with its Online Safety Act 2023¹⁰² or the APAC region.¹⁰³ This effect can help to spread strategic solutions on a global level that can tackle the effects of the beforementioned challenges while supporting the opportunities we are facing in the digital age.

Future studies and strategic foresight on EU level

Strategic foresight started within the EU under the presidency of Jacques Delors in the 1980s. For a couple of years, now, the two disciplines have come more deeply into focus at EU level. Firstly, Future studies and strategic foresight capabilities were built, with the establishment of the Megatrends Hub in 2016 and the Competence Centre on Foresight in 2018 through the Joint Research Centre (JRC).¹⁰⁴

In 2019, the EU appointed the current Vice-President of the European Commission, Maroš Šefčovič, as the first member of the EU College of Commissioners responsible for strategic foresight and the EU Commission integrated the field into its better regulation

99. Bob Frame and others, "Views from nowhere, somewhere and everywhere else: The tragedy of the horizon in the early Anthropocene" 10 *Anthropocene Review* 2022, pp. 524 et seqq.

100. Sheila Jasanoff, "Humility in the Anthropocene" in Anna M. Agathangelou and Kyle D. Killian, "Time, Climate Change, Global Racial Capitalism and Decolonial Planetary Ecologies", 2022.

101. Anu Bradford, "The Brussels Effect: How the European Union Rules the World", OUP 2020.

102. Cf. <https://bills.parliament.uk/bills/3137>. Different to the DSA, the Act contains "chat control" provision which may violate human rights law following ECtHR, Judgment of 13 February 2024, no. 33696/19, *Podchasov v. Russia*, see Thomas Claburn, "European Court of Human Rights declares backdoored encryption is illegal", https://www.theregister.com/2024/02/15/echr_backdoor_encryption.

103. Agne Kaarlep and others, "Platform Regulation in APAC and the EU: A Comparative Overview", <https://www.techpolicy.press/platform-regulation-in-apac-and-the-eu-a-comparative-overview>.

104. For more detail see: Suzana Elena Anghel, "The use of strategic foresight in Commission impact assessments: Existing practices and the way forward" 2024, p. 2.

guidelines and toolbox.¹⁰⁵ Within these guidelines it is marked that Strategic foresight should be taken into account when appropriate and severe policy decisions are at stake, but there is no obligation to use or justify the non-utilization of these methods.¹⁰⁶ The Commission is currently using several methods of the ones mentioned above: Based on the work of the JRC experts, the Commission is now monitoring 14 megatrends in various fields, such as governance, migration and social inequality.¹⁰⁷

Another objective of the Commission in this area is to produce a Strategic foresight Report that looks at certain future challenges and opportunities and identifies priorities for future developments.¹⁰⁸ For the preparation of this report, the Commission is working closely with various partners, such as Member States, external experts, ESPAS, which is an inter-institutional pilot project bringing together and coordinating the Foresight strategies of nine EU bodies as well as institutions,¹⁰⁹ and the Competence Centre on Foresight as a part of the EU Policy Lab. The aim is to support better EU policy-making by presenting different futures and making recommendations on how to achieve certain desired futures, in particular how and which EU authorities should work together within the strategic foresight and future studies processes.¹¹⁰

In addition, the stated goal of the “new” Strategic foresight area is to strengthen cooperation between the EU member states in this area. In the first EU Strategic foresight Report from 2020, the need to create a so-called EU-wide Strategic foresight Network was therefore determined and then implemented in practice. This is structured in two parts: On the one hand, the current Vice-President of the European Commission meet once a year with the “Ministers for the Future,”¹¹¹ appointed by him for an informal meeting to elaborate future topics. This is underpinned by the work of a network of certain senior officials from national authorities, who meet at least twice a year, cooperate in thematic working groups and also prepare the conclusions from the ministerial meeting. Concerning new disruptive technologies, such as Ai and quantum technologies, the EU Commission has approved a recommendation to conduct risk assessments in these

105. Ursula von der Leyen, “President von der Leyen’s mission letter to Maroš Šefčovič” of 10 September 2019 <https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight_en#next-steps> accessed 31 March 2024.

106. Suzana Elena Anghel, “The use of strategic foresight in Commission impact assessments: Existing practices and the way forward” 2024, pp. 3 et seqq.

107. <https://knowledge4policy.ec.europa.eu/foresight/tool/megatrends-hub_en> accessed 31 March 2024.

108. <https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight_en#next-steps> accessed 31 March 2024.

109. <<https://espas.eu/about.html#LegalBasis>> accessed 31 March 2024.

110. Ursula von der Leyen, “President von der Leyen’s mission letter to Maroš Šefčovič” of 10 September 2019 <https://commission.europa.eu/strategy-and-policy/strategic-planning/strategic-foresight_en#next-steps> accessed 31 March 2024.

111. A current list of the designated members can be found here <https://commission.europa.eu/document/download/69fea923-a600-4194-824d-965f04519986_en?filename=ministers_future_2024_5.pdf> accessed 31 March 2024.

areas together with member states to anticipate their societal and economic impact.¹¹²

In a technical context, reference should also be made to the Panel for the Future of Science and Technology (STOA) of the European Parliament. Even though this panel is not explicitly assigned to the area of Strategic foresight, it can still be classified as such. The STOA was established in 1988 on a permanent basis and has always been intended to conduct scientific and technological option assessment. For the European Parliament it was clear that, as a lawmaker, it is necessary to understand the technological and scientific processes on the basis of reliable, independent and accessible information in order to create effective laws as innovation is the driver of the economy and therefore leads to economic growth.¹¹³

In its current form, the STOA is composed of 27 members, who in turn are appointed by various committees of the Parliament.¹¹⁴ The meetings of the STOA are open to the public and EU parliamentarians, although only the members are entitled to vote. For the current legislative period the STOA has three thematic priorities, which are also part of the previously identified challenges and opportunities: These are Artificial intelligence and other disruptive technologies, The Green Deal and Quality of Life. These topics are developed on the basis of the state of the art/science as well as societal, ethical, legal and economic challenges. The work of the STOA consists of working through these issues in full, then holding meetings with the parliamentarians and presenting to them the lessons learned. These meetings are a fundamental part of the legislative process, cf. Art. 1 STOA Rules. In addition, Member States are encouraged to promote such panels at state level as well.¹¹⁵

Future studies and strategic foresight on member state level

On member state level, there are several notable initiatives in this field within the policy making structures of the countries. With regard to strategic foresight in relation to science and technological innovations, reference should be made in particular to various European technology assessment institutions. In terms of their working methods, these are comparable to the STOA, established at EU level. They also serve the national parliaments.

112. European Commission, Press release of 3 October 2023 <https://defence-industry-space.ec.europa.eu/commission-recommends-carrying-out-risk-assessments-four-critical-technology-areas-advanced-2023-10-03_en> accessed 31 March 2024.

113. <<https://www.europarl.europa.eu/stoa/en/about/history-and-mission>> accessed 31 March 2024.

114. A current list of the designated members can be found here <https://www.europarl.europa.eu/cmsdata/280249/STOA%20Panel%20horizontal_original.jpg> accessed 31 March 2024.

115. <<https://www.europarl.europa.eu/stoa/en/about/history-and-mission>> accessed 31 March 2024.

By now at least 9 member states of the EU have introduced such an assessment program: Austria, Spain and Catalonia, Finland, France, Germany, Greece, Luxembourg, Netherlands and Sweden. They have joined forces with the STOA and the EFTA states Norway and Switzerland, with Great Britain as well as other third countries to form the European Parliamentary Technology Assessment (EPTA).¹¹⁶ The members develop accounts and reports related to the social, economic and environmental impact of science and technology. Current topics include, but are not limited to, GenAI, forensic technology and prenatal supplements.¹¹⁷ The aim is for the findings to become an “integral part of policy consulting in parliamentary decision-making processes”.¹¹⁸ The method of operation amounts to the holding of citizen panels, stakeholder meetings, workshops as well as expert consultations in future-driven fields.¹¹⁹ The work of these institutions can therefore be assigned to the field of Future studies and Strategic foresight, even if this is not explicitly stated, as was previously the case in the field of STOA.

Technology assessment in the member states is therefore primarily, although not necessarily, controlled by cooperation with the EU. Nevertheless, the individual institutions have their own way of working. This paper refers to the Austrian concept as an example. The objectives, the working methods and the scientific outputs of the Austrian “Institute for Technology Assessment” (ITA) are comparable to the previously mentioned statements.¹²⁰ Recently, the ITA has also been seen as a driver of Austrian strategic foresight and, hence, the cooperation between the ITA and the Austrian Parliament is being strengthened. Every six months, the ITA submits monitoring reports on the latest developments to parliamentarians and also answers individual questions that arise in the parliamentary opinion-forming process. This is intended to facilitate the need for regulation and options for action for parliamentarians.¹²¹ Since mid-2023, the ITA has been working closely with the German Institute for Technology Assessment and is jointly advising the two countries on strategic foresight and technical development.¹²²

Overall, it can be seen in this chapter that for some years now there has been a clear trend towards strategic foresight in general and, in particular, technology assessment has become more and more popular from the point of view of national and European lawmakers. However, the output in the European area is not necessarily included in the policy making process, which on the one hand means flexibility, but on the other hand can also mean a lack of engagement with the work of the strategic foresight institu-

116. <<https://eptanetwork.org/>> accessed 31 march 2024.

117. See a full list of the projects at <<https://eptanetwork.org/index.php/database/projects>> accessed 31 March 2024.

118. <<https://eptanetwork.org/about/about-epta>> accessed 31 March 2024.

119. Ibid.

120. <<https://www.oeaw.ac.at/ita/das-ita/ueber-uns>> accessed 31 March 2024.

121. <https://www.parlament.gv.at/aktuelles/pk/jahr_2022/pk1329> accessed 31 March 2024.

122. Interview with Eva-Maria Himmelbauer by Denise Riedlinger, “Politics between innovation and disinformation” 32 TATuP - Zeitschrift für Technikfolgenabschätzung in Theorie und Praxis / Journal for Technology Assessment in Theory and Practice 2023, pp. 69 et seqq.

tions. Especially since the field is still new at the policy level and has the character of a pilot project at the EU level, the processes are not mature yet and, in some cases, need to be institutionalized.

Conclusions and Recommendations

Summarizing the findings so far, it can be stated that, due to the nature of the challenges and opportunities we - as a global community - are heading towards, future-looking research such as strategic foresight and future studies are indispensable, as they make it possible to identify potential futures in advance and at the same time to develop strategies to be able to react effectively to the effects of these futures and actively work towards them. When courts now routinely, as seen in the German Federal Constitutional Court's Klimaschutzbeschluss and the European Court of Human Rights judgement in Klimaseniorinnen, oblige states to act now to safeguard the rights of future generations, knowing what the future holds, what challenges emerge, and what policy tools are most apt to answer them, is becoming essential. Especially in the political context, future-oriented fields of study are of particular importance, but they have only recently been integrated into political processes.¹²³ There are therefore possibilities for optimization in order to make these processes more effective. These are examined in more detail below.

Digital humanism

We advocate for the critical integration of a rights-based and intergenerational dignity-oriented foundation within the domain of future studies and strategic foresight, especially within the decision-making ecosystem on digital tools and systems. The principal objective is to construct a value-based conceptual framework aligned with the principles of democracy, rule of law, and human rights. Such a framework is pivotal for delineating the boundaries of envisioned futures.¹²⁴

While there is not one consented framework, the ethical concept of digital humanism seems *prima facie* promising.¹²⁵ The term “digital humanism” refers to the pursuit of human empowerment through digital technologies, especially artificial intelligence,

123. With a view to this trend, academic disciplines also need to take a hard look at themselves to see whether they can reform what they teach with a commitment to move from a past- to a future-oriented body of knowledge.

124. Approving: Carolina Facioni, “Why the World Needs Futures Studies: A Social and Methodological Challenge”, 8 Athens Journal of Mediterranean Studies 2022, pp. 223 et seqq.

125. Hannes Werthner and others, “Vienna Manifesto on Digital Humanism” <<https://caiml.org/dighum/dighum-manifesto/>> accessed 31 March 2024.

and the protection of humans from the negative effects of these technologies.¹²⁶ The aim of the ethical concept is to examine technological development by society, companies, but also lawmakers to see whether they serve humanity, which forms a society in which fundamental rights and, above all, human dignity come first. At the same time, it is important that, for all decisions taken in relation to technological developments, the responsibility for this decision is established in advance. This is especially true if the decision has an impact on fundamental rights.¹²⁷

The foundations of this ethical concept can be found in the EU's existing and emerging legal acts as part of its digital strategy although it is not specified. This refers in particular to the DSA described above. The fact that this concept forms the basis of the values of these legal acts can be seen, for example, in the binding of platforms to fundamental rights in order to contain the existing challenges of digitalization, which were also outlined earlier.¹²⁸ From the authors' point of view, recognizing and naming the basis of values through the EU lawmakers as such would be of particular importance in order to create a uniform framework and underline the elementary function of fundamental rights.

Institutionalization options for strategic foresight¹²⁹

Due to the recently introduced integration of strategic foresight into the policy-making structure of the EU and the member states, the authors believe that it is necessary to review the respective processes of the methods and, if necessary, to systematize them in order to make the processes more effective, legally secure and understandable.

The need for such an institutionalization of the processes was noted by the EU Parliament in the summer of 2022. It clearly stated that there was a lack of clarity in terms of the methods, the use and the binding nature of the goals that arise there. It is also important to be more explicit about how they contribute to improving the EU's legislative processes.¹³⁰ Furthermore, Parliament noted that various reports from existing panels, platforms and advisory boards must be taken into account in the context of strategic

126. Julian Nida-Rümelin and Klaus Staudacher, "Philosophical Foundations of Digital Humanism" in Hannes Werthner and others, Introduction to Digital Humanism - A Textbook, 2023, pp. 17 et seqq.

127. Ibid.

128. Approving: Martin Müller and Matthias C. Kettemann, "European Approaches to the Regulation of Digital Technologies" in Hannes Werthner and others, Introduction to Digital Humanism - A Textbook, 2023, pp. 635 et seqq.

129. <https://www.bundesregierung.de/resource/blob/974430/2059788/500a83030f58becb1cd-b55763a73beb4/2022-07-08-studie-strategische-vorausschau-data.pdf?download=1>

130. European Parliament resolution of 7 July 2022 on Better regulation: Joining forces to make better laws (2021/2166(INI)) <https://www.europarl.europa.eu/doceo/document/TA-9-2022-0301_EN.html> accessed 31 March 2024.

foresight processes. These include the work of the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the European Scientific Advisory Board on Climate Change (ESABCC).¹³¹ The EU, but also the member states, should comply with these demands. But a Parliament's last request is particularly important as it avoids duplication of work and makes processes more effective.

Furthermore, the authors have further institutionalization proposals, which are presented in more detail below:

- Policy-making processes need to be both grounded in existing law and tailored to meet future challenges.
- A concept of values like digital humanism is particularly suitable.
- Better guidelines on the real benefits of future studies and strategic foresight are to be developed.¹³²
- Existing foresight processes in the various EU institutions need to be better coordinated. This includes, for example, promoting cooperation between the Commission's Strategic foresight Group and the STOA through Parliament as well as the EU-wide Strategic foresight Network and the other institutions.
- Insights developed through the various processes need to be better incorporated into the legislative process so that they have sufficient impact. These include, for example, the report of the EU-wide Strategic foresight Network, which is being prepared by the ministers and their staff.
- In order to achieve wider acceptance, trust and understanding among the population with regard to these processes, consideration should be given to introducing opportunities for citizens to participate. For example, the work of the citizens' assemblies could be brought together with the strategic foresight processes.
- Finally, in all attempts to institutionalize strategic foresight processes, the nature of these processes must be taken into account. These are characterized by openness and flexibility so that too rigid formalization can prevent the necessary foresight.

131. Ibid.

132. Approving: Suzana Elena Anghel, "The use of strategic foresight in Commission impact assessments: Existing practices and the way forward" 2024, p. 12.