



# NGI ENGINEER ROOM

## Research report: qualitative content analysis

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### I. Summative content analysis – method

#### 1. Aim of the study

The aim of this qualitative study was to analyze the media narratives surrounding emerging internet technologies (understood in broad terms, as technologies, applications, solutions, internet phenomena) in online magazines devoted to tech and futurology. Media narratives are defined as a way events (and stories) are composed to be presented to an audience.

The key questions were:

- What are the most common media narratives on emerging technologies?
- Are those narratives predominantly optimistic/pessimistic/positive/negative/neutral/argumentative/informational?
- Are there any recurring phrases (synonyms, antonyms, euphemisms, associations, etc.) which appear in media narratives focused on emerging technologies?

In order to obtain answers to these key questions, qualitative content analysis, based on the principles of summative content analysis (Hsieh & Shannon, 2015) was applied. Summative content analysis (SCA) is an approach to text data which combines qualitative and quantitative tools. In the case of this study, it was chosen as the most adequate because it combines both types of tools, allowing the incorporation of data mining procedures performed in the steps preceding the analysis. It is also open to a more interpretative analysis, and inclusive of euphemisms, associations, synonyms, antonyms of selected keywords. Since the research questions were predominantly open-ended (which was a decision made



on the basis of the projects' goals), answering them required a more inclusive approach.

## 2. Procedure

As a result of data mining, 35 keywords identifying emerging technologies were developed (the procedure is described in detail in XX) prior to the SCA. Those keywords comprised both technologies themselves (such as social media, 5G, edge computing, IoT, etc.), as well as values and problems associated with them (such as privacy protection, net neutrality, monopolization of technology, etc.).

A web crawler analyzed the corpus of leading tech journal articles (web), determining the number of keywords which appeared in each article. The articles were then ranked: from articles containing the most keywords to articles containing the least keywords. The key sources included: Wired, the Guardian Tech, Venturebeat, ZDNet, Gizmodo, Arstechnica. For the qualitative text analysis, top 100 articles were scraped and transferred as plain text to Atlas.ti for analysis. Because two articles did not meet the criteria of original articles (one was a copy of an earlier piece, and the other was a collection of links to other texts in the magazine), the corpus had to be supplemented with two more articles from the list.

The text were then read several times. Next, latent content analysis was deployed. This interpretative analysis (Holsti, 1969) is aimed at "discovering underlying meanings of the words or the content" (Babbie, 1992; Catanzaro, 1988; Morse&Field, 1995), contexts, and narratives. In the first step of latent context analysis, phrases most commonly appearing in relation to the keywords were identified in the texts. Those phrases included synonyms and antonyms, euphemisms and substitutes, associations, oppositions, actions towards (those categories are similar to those found in semantic field analysis). The result was the creation of initial codes (identifications of topics and sub-narratives, compared to thematic tags). Codes were assigned to paragraphs or sections of the text.



Then, the texts and the initial codes were re-read and revised, so that final codes could be created. The codes were constructed in the following way: they identified the key technologies, values, or issues (for instance, AI, self driving technology, tech workers), and informed about the specific context in which the keyword was represented (for instance, "social media: profound changes to public sphere through media"). Opting for a more descriptive code names facilitated the next analytical steps. Each code could be assigned to any number of quotations.

The following step was code grouping: first, the codes were revised and analyzed, and when applicable, their relationships were identified (for instance, contradictions or associations). Then, the codes were grouped on the basis of the main topic they referred to (such as particular technologies or areas of social influence). Each code could be assigned to one or more groups. The groups reflected the vital aspects of how emerging technologies influence various areas of society (particularly the economy, social security, environment, law, and politics, but also education, the military, and urban planning). An example of code group is "Technology affecting the market/economy".

The last step comprised analyzing the code groups and assessing the narratives surrounding emerging technologies found in the sources. Tone and aim of each narrative and its sub-narratives were identified, in order to determine if they were optimistic, pessimistic, positive, negative, neutral, argumentative, or informational. In the last steps, the narratives were grouped and the occurrences of each narrative type was counted and compared between articles and sources, in order to determine which narrative types were most common and what were their key features.



## II. Summative content analysis – results

### 1. Code statistics

As a result of analysis, in the entire text corpus there were 946 quotations (i.e. fragment of the text which were assigned a minimum of one code). Overall, 457 descriptive qualitative codes were created, each assigned to one or more quotations (i.e. marked fragment of the text).

The total number of code groups is 17. Each code group contained between 11 and 114 codes. The number of codes and quotations per code group is presented in Table 1 below. Note that each code could be assigned to one or more groups, thus the total number of codes in Table 1 exceeds the total number of created codes.

Table 1. The number of codes and quotations assigned to each code group within the text data corpus. Source: own analysis.

Name od code group	Number of codes	Number of quotations
technology affecting the market/economy	114	330
inequalities arising from new technologies	83	327
technology impacting politics / fake news	65	250
cybersecurity issues and challenges	81	221
monopolisation of technology and centralisation	62	173
citizens vs states vs tech giants - changing roles, functions, and prerogatives	46	161
AI as emerging technology with many unknowns	30	159
hate speech and online extremism as systemic problems of future web	34	154
emerging services - new forms and novel alterations	51	111
technology affecting the military and warfare	30	88
other actors supporting change	20	67
net neutrality	15	59
IoT as emerging tech with great potential and challenges	16	43
cloud computing as key topic of debates on future tech	25	40
social media taking over news industry and changing media landscape	12	34



environmental concerns related to growth of tech industries	11	27
urban transformations through tech	11	27

Table 2 below shows the number of occurrences of 10 selected keywords (unigrams and acronyms, as no bigrams could be analyzed through the Atlas.ti built-in word cruncher). The numbers indicate that significant attention is paid to issues related to artificial intelligence, job market and job automation, as well as leading companies and data security, and Internet of Things. Those topics can be considered “hot”, while there are few mentions of such technologies as 5G or self-driving cars.

Table 2. The number of occurrences of selected keywords in the text data corpus. Source: own analysis.

<b>Keyword</b>	<b>Number of keyword occurrences</b>
AI	694
Google	342
machine	259
security	199
media	183
jobs	148
automation	107
IoT	92
cybersecurity	70
GDPR	23

The numbers presented in Tables 1 and 2 were then used as reference points in the analysis of media narratives.

## 2. Media narratives

It should be pointed out at first, that while the media narratives without exception pointed to the deep societal transformations resulting from emerging technologies, AI and machine learning in particular, the attitudes towards and predictions of the scope of change in particular domains (such as economy, social structure, law, etc.) were very



diverse. In most cases, the changes that were defined as occurring or starting now, were predicted to last or deepen in the next decades.

## **1. Key areas of society affected by the digital transformation**

### **1.1. The economy and labour market**

Key themes: job automation, mass unemployment, redeployment of labour, monopolization of tech companies

Main points: impact of AI and job automation on labour market definite, but hard to predict, all industries affected by AI, necessity of labour force redeployment and continuous education, emergence of new jobs imminent, machines taking over some jobs as a viable prediction, monopolization of tech companies as a challenge and potential threat to several industries, tech giants dictating the pace of change and benefitting most from the digital transformation, importance of governmental support and regulatory intervention regarding labour market, the negotiation of power relations between tech giants and states.

### **1.2. Civil and human rights**

Key themes: free speech, hate speech, data privacy and security, data abuse, centralization, hackers, bottom-up decentralizing movements and initiatives (blockchain)

Main points: threat of free speech due to centralization, rise of hate speech in social media, tech giants failing to curb hate speech and online extremism, emerging issues of data privacy and security due to development of AI, IoT, cloud, and plans to limit net neutrality, cybercrime on the rise (cyberattacks induced by governments and malicious insiders), the rise of ethical hackers, AI used to combat hate speech and cyberattacks, the rise of bottom-up decentralizing movements (Raspberry Pi computers, blockchain solutions) as a response to market monopolization and data abuse.



## 1.2. Social structure

Key themes: social inequalities, algorithmic bias

Main points: job automation and AI may increase social inequalities, tech giants contributing to rising inequalities, inadequate state reactions to emerging inequalities, threat to social structure due to predicted mass unemployment and redeployment of labour, algorithms making decisions about human life based on biased datasets, danger of algorithms making decisions without any human verification and oversight (mechanisms unknown).

## 1.3. Politics and International relations

Key themes: targeting voters, propaganda and fake news, cybersecurity, online extremism, cyber warfare, polarization of democracy, governments balancing interests of tech giants and citizens

Main points: algorithms in social media used to target voters via ads, fake news and filter bubbles, social media as propaganda tools, tech giants failing to control spreading of fake news, cybersecurity as a political topic and issue for state security, online extremism as a new arena of conflict, social media used by extremists and terrorists to spread harmful content, inadequate tools used by governments to push tech giants for more control over content distribution, predictions of online democracy being polarized and transforming into AI-backed cognitive warfare, the need for states to balance the interests of tech giants, support innovation, and care for citizen rights, GDPR as a move in the right direction to protect citizens' data.

## 1.4. Natural and urban environment

Key themes: increasing energy consumption, privatization of urban space, smart cities, smart homes



Main points: tech industry development requires more physical space (data centers, server farms, etc.) and consuming more energy, exceeding emission limits, harming the environment, smart cities as arenas for data extraction, smart cities as privatization of public goods and services at the expense of the state and the citizens, self driving cars as a chance for decreasing pollution, self driving cars as tech transforming cities, smart cities as modular, fluent and digital spaces, smart homes as a result of expanding IoT, smart homes as security threat due to data extraction and interconnectedness of devices.

## 2. The assessment of the effects of emerging technologies on society

### 2.1. Caution, concern, pessimistic assessment of tech use

Overall, unquestionably positive narratives regarding the effects on society were less prominent than cautious ones. The caution is in many cases voiced explicitly, in an argumentative manner, i.e. by providing reasons for concern:

“A tiny number of technologists may become billionaires for this innovation, which could eliminate millions of jobs.” ([fastcompany.com](https://www.fastcompany.com))

“The communications industry could use 20% of all the world’s electricity by 2025, hampering attempts to meet climate change targets and straining grids as demand by power-hungry server farms storing digital data from billions of smartphones, tablets and internet-connected devices grows exponentially.” ([theguardian.com](https://www.theguardian.com))

“AI is expected to destabilize the labor market, taking 30 to 40 percent of jobs by 2030, according to a PwC study. Those losses will disproportionately hit certain jobs, cities, and nations around the world.” ([venturebeat.com](https://venturebeat.com))





In other cases, the caution is expressed indirectly, for instance when some key technologies and/or societal effects are discussed:

“Anything can be a cyberweapon nowadays. With very basic programming skills you can weaponize a Word Office document.” ([zdnet.com](http://zdnet.com))

“We’re all going to have many careers now. We will need good basic education, plus resilience, curiosity and adaptability.” ([theguardian.com](http://theguardian.com))

“Decisions are no longer taken in the political realm but are delegated to asset managers, private equity groups, and investment banks that flock to real estate and infrastructure searching for stable and decent returns. Google Urbanism would not reverse this trend, it would accelerate it.” ([theguardian.com](http://theguardian.com))

It is safe to assume that the **cautionary** tone is backed up by pessimistic predictions made by some top tech entrepreneurs (among them Elon Musk) and scientists (such as the late Stephen Hawking) regarding the impact of technology on society, as well as tech-related scandals breaking out worldwide (among them the Cambridge Analytica case, attracting a lot of media attention). It is important to emphasize at this point that it were *not* the emerging technologies per se which were the reason for cautionary or even pessimistic predictions: rather, what caused the authors to exhibit such attitudes was the fear that technology may be *used* by certain actors (companies, states, terrorist groups, etc.) for harmful and unethical purposes<sup>1</sup>.

The caution is reflected also in the **scope of predictions**: the most daring and long-term ones are in most cases made by experts and guest speakers, rather than the authors of the articles themselves. The latter most often position

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<sup>1</sup> One exception to this rule was AI and AGI. Artificial intelligence was in many cases presented as an existential threat to humanity since it has the capability to learn, act on its own, predict and control human behavior. As a result, it may not only surpass human intelligence, but also eventually become so complex and self-reliant, that it will be beyond human control. While such a scenario is associated with s-f movies, it is one that some experts fear will be possible in the future if AI is not wisely managed and closely monitored.



themselves as wary critics, whose role is to ask more in-depth questions and nuance the “downright” claims made by the commentators. While one would perhaps expect a certain techno-enthusiasm on the side of the editors of tech magazines, the analysis has shown that emerging technologies are just as much a cause for optimism, as they are for concern.

The strongest tendency towards **skepticism** and **pessimism** related to **job automation, rising inequalities, cybersecurity, politics, and natural environment** becoming affected by emerging technologies. **Job automation**, due to more widespread implementation of AI and robots is seen as cause for major concern, especially for states and companies, who, for the most part, are presented as not paying the matter enough attention. Decision-makers and education systems are shown as inadequately equipped to respond to the changing reality, which, according to some predictions, will lead to perhaps the greatest social problems, unrests, and problems ever occurring in the modern era. Some optimistic predictions of AI facilitating the emergence of new creative jobs and allowing people to do more interesting, well-paid work, do not balance the negative narrative to a significant degree.

Rising **inequalities** are seen as the most acute consequence of labour market transformation: tech giants (whose power is described as beyond estimation) are described as main benefactors of the changes, at the expense of citizens and states. It is explicitly claimed that while tech giants are often recipients of public monies and benefit from preferential treatment and/or their lobbying powers (regarding tax, land ownership, etc.), they keep most of the profits of the technological transformation, but burden other actors with its negative consequences. Thus, while the public often (indirectly) subsidizes large corporations, it is omitted from sharing the profit, and in many cases in fact “pays twice”: communities suffer from pollution caused by the growing communications industry, citizens are subject to algorithmic discrimination which often has dramatic consequences for their careers and personal lives, their personal data is extracted without their explicit consent, etc.



An interesting example of tech-related inequalities concerns smart cities and urban transformations resulting from the emergence of self-driving tech, modular buildings, and IoT. While the goal of living in more eco-friendly, energy-efficient areas is presented as worth pursuing, at the same time the authors warn against giving up public services and municipal governance to private companies. Explicit warnings against the privatization of public services and goods point once again to the problem of paying the cost and sharing the benefit: companies such as Google, once they become the providers of services in urban areas, will in all likelihood apply market logic to their models of urban planning, forcing the cities, and indirectly the citizens themselves (through taxes, for instance), to pay the price of their policies and uncontrolled expansion. Tech giants “dictating the pace of change”, while inspiring technological advancement with the potential of community empowerment, must thus be closely monitored.

The **centre/periphery divide** is also indirectly depicted as becoming deeper and more problematic, as parts of the world become disproportionately more technologically advanced than others. The tech race between China, the US, Australia, Russia, and parts of Western Europe, leaves behind those regions which do not have the resources and the know-how to keep up.

Another object of caution is **cybersecurity**, both on the international, state, enterprise, and individual level. Several authors agree that cybercrime, cyberterrorism, or cyberwarfare are inevitable elements of the future, and conclude that states nowadays take part in cyber wars both as perpetrators (through state-sponsored breaches, state-induced hacks, etc.) and victims. Data is defined as “commodity” or “the currency of the digital age,” and some commentators point that due to job automation, what most people in the future will be able to offer is not labour, but data. With the increasing interconnectivity of devices, the development of centralized, cloud-based data storage and management systems, more data is being transmitted and processed than ever before. This raises several security concerns, as with more entry nodes/links



comes an increased threat of breach and data exploitation. Another facet of this problem is the inadequacy of security measures deployed by all actors: state cybersecurity policies and resources are often described as outdated (in the US army, for instance, intelligence systems and military software are often incompatible, or the staff lacks the necessary skills to implement, use, and update the software), although in some cases it is the state itself abusing citizen data (through invigilation) for the sake of “fighting terrorism” which is pointed at as potentially harmful. Leading tech companies are blamed for either dismissing the cybersecurity threat as exaggerated, abstract, or irrelevant, or positioning themselves as victims of cyberattacks instead of taking the responsibility for indirectly facilitating them (due to negligence or for the sake of protecting their interests). Individuals are depicted as victims of unfair company policies (in particular through unclear terms of service lacking explicit consent to data use, and data abuse by social media companies and tech giants), as well as carefree users lacking proper education regarding data safety (and thus disclosing personal information in exchange for access to digital services and products). Authors discuss how personal data is handled by various states, and conclude that the EU is in the forefront of setting data protection standards due to the enforcement of the **GDPR** in May 2018. All commentators view these regulations as a step in the right direction, and a way of providing governmental oversight of private companies, limiting the “laissez-faire” attitude of tech giants toward user data.

**Politics**, or speaking more broadly **democratic principles**, are seen as endangered by online propaganda and hate speech. Using AI to influence voters, target individuals with ads, creating filter bubbles on social media, and disseminating fake news contributes to the polarization and deterioration of the public sphere. Tech giants are seen as partially responsible for this state of affairs, as they enable data extraction and manipulation, and in fact are said to benefit from it financially or politically. Social media companies become the most important news media outlets, consuming the ad revenue of traditional news media, but at the same time, they do not pay enough attention to source



reliability. Furthermore, in many cases (such as Facebook) they keep their algorithms of content selection secret. The quality of news deteriorates, and the polarization of the public sphere increases, as the filter bubbles clash. The need for dialogue and openness is overshadowed by the striving to make profit, and the situation is likely to get worse, as the political struggle becomes more strongly bound with cyberterrorism, hate speech, and online propaganda — a rather grim perspective for future digital societies.

Pessimistic predictions also concern the impact of emerging technologies on the **natural environment**: the growth of information industry is shown as becoming more voracious and demanding in terms of energy consumption, land, and emissions, thus having a dramatic impact on pollution levels, climate change, and on local communities. Once again, the key issue here is not the technology itself, but its use dictated by economic calculation benefitting certain institutions and organizations, without taking into account the long-term societal and environmental costs.

## 2.2. Praise and positive assessment of tech use

**Positive** narratives concern **decentralization, education, and the use of AI in novel forms and/or areas**. Most commentators agree that centralization and attempts to limit net neutrality or curb free speech are dangers which all networked societies are facing. Monopolization of technology hinders large-scale, effective actions to keep the web accessible for all. Some commentators argue that the principles upon which the Internet was built (equality, empowerment, free speech, free access) have lost against the striving for economic profit. However, they emphasize that bottom-up movements may help empower communities and individuals in the connected world. The development of blockchain solutions to data and services, and edge computing are seen as promising: while cryptocurrencies are marginalized in the narratives, the distributed model engaging its users in data safety, circulation, and updates is depicted as having great value for user empowerment. In a similar vein, the increasing popularity of “DIY” computers such as Raspberry Pi is presented as



having positive effects in the future — it allows users to become partially independent from tech giants, to make their own rules of access (at least to some degree), and it inspires creative, innovative bottom-up solutions.

According to some authors, **digital education** (and lifelong learning) will play a vital role in decentralization. It will not only help individuals find better work opportunities in the era of job automation, but it will offer guidance on data safety and civic rights. It will also be mandatory in the future of increased connectivity. Education will help decrease inequalities — although no author suggests that it will remove them altogether — and enable members of silenced or discriminated communities to let their voice be heard.

While **AI** is generally treated with caution, some authors point to its possible novel uses in the future. For instance, some claim that AI will be able to solve some problems humanity has been struggling with for centuries, such as hunger, natural disasters, or pollution. Even on a smaller scale, the potential of machine intelligence can be put to good use to prevent suicide, help individuals in their daily life (by managing task coordination, taking care of household chores, etc.), enable individuals to do more creative jobs, or allow businesses to become more effective and competitive. AI may help us fight diseases such as cancer, and assist doctors during medical procedures (or replace them in some areas of diagnostics and treatment). Machine intelligence will enrich our lives by providing more customizable entertainment, and becoming implemented in creative industries.

Generally, the positive narratives on the societal effects of emerging technologies concern **empowerment of users and communities**, as well as the latter taking care of freedom of speech and shared responsibility for data handling.

To summarize all media narratives, emerging technologies, from the perspective of their influence on future societies, can be described as a **double-edged sword**. On their own, they are neutral, but can be put to either good or harmful



use depending on the motivations and goals of the actors using them. Emerging technologies should not be feared or condemned, but nor should they be accepted unconditionally, without reservations and clear rules.

### 3. The predictions regarding the scope of change

The texts agree on the conclusion that **AI** (or machine learning) will be the **driving force** and **foundational technology** of the digital transformation. Some authors call these technologies “the fourth industrial revolution,” which emphasizes the profound, if not total, transformation of human life. It is agreed that all industries and domains of human activity (work, leisure, education, household maintenance, health, etc.) will be affected by these technologies, as will the environment and urban landscapes.

However, the commentators and specialists in the field do not see eye to eye on the timeframe of these transformations and its scope regarding specific domains. Some narratives predict that the deep societal and economic change, especially with regard to labour market shifts, job automation, and omnipresence of AI, will occur no sooner than in 50 years, while other predictions talk about the next decade or two. An interesting aspect of this narrative is the incomparability of the current revolution to previous technological and industrial revolutions. Since experts base their predictions on historical events and conclusions drawn *a posteriori*, their conclusions may not reflect the novel character of current transformations, which are less about machines simply replacing muscle power, and more about machines learning to predict, emulate, and control human behavior. Some experts claim that machine intelligence will eventually equal, or even supersede human intelligence, which will bring about unknown challenges for the human race, including perhaps an existential threat. Thus, several narratives point out that our ability to make predictions regarding the exact scope and timeframe of change is limited and inevitably biased.



The narratives are also rife with contradictions regarding particular domains of society being affected by the digital transformation. Some texts argue that job automation will inevitably lead to mass unemployment and redeployment of labour, while others claim that since humans will no longer need to do dull, repetitive work (such as factory work), they will be able to use their potential by doing more creative jobs. While some authors predict that job automation will affect low-paid and low-skilled workers first, others counter this argument by saying it is most likely that expensive, high-skilled employees will be the first ones to be replaced by machines, just because it will be cheaper to program a robot to perform a lawyer's or surgeon's job than it currently is to train a human specialist.

Similar contradictory predictions concern also several other technologies. Cloud computing, considered by some commentators as a technology in decline, is considered by others to be on its way out. Few technologies are exceptions to this rule — those are:

- 5G: all commentators agree that 5G in transport corridors will be widely implemented in the next decade, as the data volumes processed globally increases dramatically
- IoT: voice-operated home devices are shown as inevitable tech transforming households within the next decades, a process well in place in the US
- Bot market: demand for bots in services will increase, and the bots will resemble humans
- AR and VR: authors predict rapid growth of both technologies, with versatile use (entertainment, healthcare, etc.) and wide application possibilities. While no timeline is given, all texts agree that the ongoing development of AR and VR will not be curbed anytime soon
- 3D printers: market for 3D printers is expected by all commentators to grow, and the tech itself is shown as having a lot of potential and versatile use (the military, housing, construction, medicine, etc.).

#### 4. Overarching themes





The narrative concerning the societal effects of emerging technologies also has one common theme: governments have the responsibility to react to the inevitable changes, and together with the main proponents of the technological revolution (tech giants) they should look into solutions empowering the citizens, communities, and future societies. While this may sound elusive, it comes down to implementing effective social security and labour market policies, maintaining state control over tech giants, and welcoming (or at least not curbing) bottom-up, emancipatory citizen movements.

The narratives **contrast** the **EU and the US**. The States are shown as a land of invention and technological advancement, but at the same time a country struggling with the government and the growing power of tech giants. Remarks of “laissez-faire attitude” of lead key companies towards the changes they propose and inspire are supplemented with criticisms of the US government limiting citizen rights for the benefit of these companies and the interests of the state. In contrast, the EU is presented as a region where citizens’ rights are more important than economic interests of few tech giants, and where state oversight over tech industry is more effective and serving the interests of society. At the same time, European governments are criticized for not being able to predict the coming changes and for responding too slow to the problems that need decisive, quick, and responsible solutions; as such, they often fail to keep up with the pace of the digital transformation and assume a defensive position instead of being the leaders.

Overall, it should also be pointed out that the media narratives explicitly criticize the oligopolization or monopolization of technology. As was shown numerous times in this report, the authors wish there was more equality in the citizen-state-business relations, and openly praise open-source, decentralizing, bottom-up movements. At the same time however, the very same narratives are focused almost exclusively on the tech giants (Google, Facebook, Apple, Microsoft). Other tech companies are mentioned in the texts, but they are never the focal points. Some authors address this problem by saying tech giants are acquiring



innovative startups and thus lead the race without competition. Thus, the media narratives indirectly affirm the “undesirable” state of monopolization, by giving the monopolies they criticize significantly more attention than other market players or organizations.

## 5. Summary of key findings

- ✓ Most narratives display a cautionary tone towards the societal effects of emerging technologies and tech-related processes.
- ✓ Exact timeframe and scope of the societal transformations remains unknown and their predictions are often divergent or contradictory.
- ✓ Caution and/or skepticism concerns mainly **job automation, rising inequalities, cybersecurity, politics, and natural environment** affected by emerging technologies.
- ✓ Positive narratives are centered on **decentralization movements, digital education, and the use of AI in novel forms and/or areas.**
- ✓ AI is depicted as the driving force of the digital transformation and a technology with the potential to be applied in all industries.
- ✓ Other technologies expected to develop and become omnipresent in the future include AR, VR, IoT, and bots.
- ✓ Overarching narrative concerns the importance of a monitoring/controlling function of the state over tech giants, and maintaining a reasonable balance between the interests of states, tech companies, and citizens.

*Report prepared by:  
dr Marta Kołodziejska*



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