



Towards European Media Sovereignty

An Industrial Media Strategy to
leverage Data, Algorithms and
Artificial Intelligence

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Introduction

Vice-President Andrus Ansip made me the honour to appoint me as a special adviser last October 2018 and asked me to share my views on the challenges and opportunities for Europe linked to the development of technologies such as Artificial Intelligence and Blockchain with a specific focus on the media sector.

The following report is an answer to this request. It is a work that I was able to lead with the support of four associate experts Dieter Boen, Daniel Knapp, Sten-Kristian Saluveer and Marc Schoenauer, and with the help of Charles Manoury, whom I want to particularly thank.

In order to prepare this report, we met a great diversity of European and non-European stakeholders coming mainly from the media field, the technology sector, academia and civil society. I also had the opportunity to discuss with members of the Commission's services and cabinets as well as representatives of other EU institutions and national authorities. I want to thank all of them for their time and their highly valuable contributions which fed into this report.

Of course, the recommendations made in this report reflect personal views and cannot be considered as the position of the European Commission. They aim at enriching the public debate on the use of these technologies for the medium term development of a sustainable, diverse and independent European media ecosystem, which is for us a fundamental condition for a vibrant and well functioning democracy and for an efficient functioning of the European economy. **The future of media and the future of democracy in Europe are intimately interwoven.** Both our media ecosystem and our democracies have been challenged for these recent years and are under strong pressure. To strengthen them, **urgent action is needed, building on the Digital Single Market and the proposals for the next EU budget** (Multiannual Financial Framework 2021-2027).

I hope these recommendations will also nourish the core priorities of the next European Commission but also the priorities of the Member States. In this respect, the mobilisation of the media community and of citizens will be crucial.

Guillaume Klossa

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Preface

Preface

We live in a world undergoing radical and extremely rapid transformations. The situation looks glum: international relations are based on force, informational disorder has become the norm in a very short time, democratically unaccountable organizations and algorithm-driven platforms use technologies that fragment societies, citizens' trust in their political and social institutions is deteriorating. In a word: our democracy is at risk. The media is both a vehicle for these disruptions, and a means to counteract them. But the European media ecosystem, a foundational pillar for healthy democracies, has become a patient in intensive care, which has an increasing difficulty to keep the attention of its audiences and their trust in a war for attention, and in a period of informational chaos.

An urgent wakeup call is needed to ensure a strong pluralistic, economically viable, innovative and independent reliable media ecosystem. This is crucial for the European Union, its democracies, its citizens, its consumers and its companies. It is a matter of social cohesion. It is a matter of trust in ourselves, in the value of our public debate and our capacity to be sovereign. We, as individual citizens and collectively as democracies, need to be able to conduct an informed and rational debate and to take rational collective and accepted decisions. It is also a major economic matter and a challenge in terms of innovation. Sustainable and free media are a key condition for liberal democracy and the social market economy to operate efficiently and transparently.

The media sector is central in our society and can also easily and rapidly serve as a test ground for actionable applications of ground-breaking technologies such as Artificial Intelligence (AI) and Blockchain. These are the future pillars of the digital revolution following the era of the World Wide Web, the Social Networks and Big Data. Media is central because it is a visible sector engaging all the citizens on a daily basis as well as the social, economic and cultural stakeholders. If it takes advantage of the latest technological developments to transform itself quickly, it will have a domino effect on the entire European society and economy. Strong links exist between innovations in the media and other sectors such as defence, security, health and automotive, enabling the potential for cross-fertilization.

The situation is clear: the media sector is at the forefront of the ongoing data, AI and Blockchain revolution, a revolution which does not know geographical borders. In this respect, **the media sector is at the forefront of the ongoing data, AI and Blockchain revolution, a revolution which does not know geographical borders.**

It is important for this strategy to be in line with the core European values in terms of fundamental rights, diversity, pluralism, quality and of course freedom of speech. **This is why I encourage the media sector to play a key role in the testing and implementation of the ethics guidelines prepared by the expert group on AI set up by the European Commission and to adapt them for the media sector.**

A specific use case for the media sector is all the more important since the data collected about users to provide media services tell a lot about the very personal identity of each of us and about our personal democratic choices. These elements must be consequently considered and protected, as the secret vote is.

Paradoxically, the media sector has never been really considered as a strategic industrial asset for Europe for different reasons: it was long perceived as a very fragmented sector that was predominantly national and low profile in terms of innovation. In addition, there was no comprehensive public awareness of the link between the weakening of democracy and the weakening of a pluralistic and independent economically viable media ecosystem. The nexus of changes encompassing the convergence between video, text, sound, augmented reality and gamification, the changes brought by the platform economy as well as the coming and rapid improvement of automated translation will render obsolete the traditional concept of frontiers and the very definition of the media sector. The shift is gigantic from traditional mass media to data-driven and converging media including newspapers, publishing, tv, radio, games, social platforms, communications companies. These media players are well aware of this change of paradigm. Long reluctant to cooperate, they are increasingly aware that innovation and transformation is coming essentially from the global platforms and the tech giants. For most of the media players, putting data technologies and AI at the core of their business models is becoming a priority to compete and differentiate.

Looking at the bright side, opportunities to use technologies like AI and Blockchain for the media sector are manifold. They should be put at the service of the quality and positive social impact of media. These technologies can allow to improve the quality of information and better contextualise it. They can help to fight fake news, develop a better understanding of the audience and an ever-more personalised relationship, better measure the audience in a cross-platform world, but also better distribute the content and better monetize it, supporting creativity. New technology can also help authenticate information and archives, develop micropayments, and better manage copyrights which deserve first experimentations. Looking at the other side of the coin: the same technologies can also be used to weaken the media ecosystem via the production and propagation of fake news, the development of deep fakes with a strong risk of falsification of any kind of digital archives, and to extract economic value from the media ecosystem.

There is a very small window of opportunity for Europeans to leverage these potentials and regain democratic sovereignty empowered by a sustainable, innovative and much more co-operative media sector. Seizing it requires the urgent mobilization of all the stakeholders. Regulation and competition should also be shaped for the era of tech giants and artificial intelligence.

**A radically
transforming
media
environment in
Europe**

A radically transforming media environment in Europe

The media ecosystem is the cornerstone of European national democracies and the social-market economies

Liberal democracies have blossomed in Europe after WWII in conjunction with the development of a strong pluralistic, dual (public-private) and innovative media ecosystem. This development was fundamental to allow an informed and responsible citizenry, a quality public debate, promote cultural diversity and contribute to informed economic decisions.

So, for a long time, the Media have not been a major topic of concern for the European Union. Its positive force has been taken for granted. Democracy was functioning in national silos with national rules and the media ecosystem was mainly a national affair with national stakeholders. It was in addition a prosperous economic sector for decades. The level of trust in the media was also high.

Europe was historically the place of major media innovations - or 'disruptions' in today's parlance - from the Gutenberg printing press invention in 1462 to digital TV standards that marry TV and internet like HbbTV¹ in the early 2000. Public investment was not required to fuel the sector, except for the creation of a strong public audiovisual sector mainly as early as the 1940s' and 1950s' as a key infrastructure for public debate, national creation and society cohesion.

Consequently, the media sector was not at the core of the EU politics and was largely viewed as a national matter. Few European regulations were developed and they were as light-touch as possible. No industrial policy was conceived and implemented because the need was not apparent.

But the last decade has completely changed the state of play. **Three major ongoing and intertwined phenomena - decreasing trust and information disorder, digitalization and changing user behavior, and global data and AI players - are extremely rapidly changing the face and the fate of the media sector. Thereby, they are also changing our democracies.**

Decreasing trust and the information disorder

The first wave of the internet in the mid 1990ies was initially perceived as a way to give each citizen the possibility to inform and contribute to the public space without intermediaries and without delay, nearly instantaneously with the possibility to distribute information globally. But a consequence of this liberating force was the value of expertise was successively challenged.

Step by step the idea of a society where everybody could be an expert or a journalist (the « all bloggers phenomenon ») emerged. The phenomenon was reinforced with the rise of social media - where everybody could share unverified information and comment on it.

While having clear positives like overcoming old gatekeepers, it inadvertently undermined the trust and the moral authority that the journalistic and media profession enjoyed for centuries. In other words, the status of journalism as an institution was challenged.

The weakening of trust in media as the « facilitator of socially mediated truth » has become even more pronounced in recent years. The blossoming of what could be called an « informational disorder » spurred by fake news and misinformation bolstered by recommendation systems and eventually sponsored by foreign organisations makes it an urgent societal problem.

Digitalization, changing user behaviour and the fragmentation of society

Digitalization has rapidly impacted the media reality in all its dimensions from content distribution, monetization and internal processes, to content creation and engaging with users. New types of user behaviours have flourished via social networks and global content platforms.

The most successful « traditional companies » have been up to now the ones that have completely transformed their business model. An enterprise such as *The Financial Times* was 12 years ago a traditional newspaper distributed on kiosks largely depending on traditional subscriptions. It has become now a data-driven company developing a largely personalised relationship with its audience and increasingly contextualising its contents according to the place, the mood or the available time of its audience.

Personalisation has also contributed to the fragmentation of society. Temptation among media companies is high to boost revenues and consequently to first favour users' preferences (« the clickbait approach ») and create filter bubbles at the prejudice of objectivity and sometimes quality of content.

This personalisation phenomenon, with the adoption of user-centric curation strategies by most major media companies, is a structuring trend for the future of the media sector.

Finally, digitalisation has blurred the traditional frontiers between text, video and sound, lean-back and interactive experiences. As a result, most forward-looking media companies do not consider themselves anymore as a newspaper publisher, a TV broadcaster or a radio station, but as a content publisher, simply producing and distributing content on different platforms and devices.

Competition: from national and traditional to global and data & AI-native players

Data and AI-native global platforms have emerged the last decade. Even if they are not European, they are increasingly structuring the European media ecosystem both in terms of supply of audiences and offer of content².

For the European media ecosystem, these companies are key partners but also major competitors. *They serve as the readily available and state of the art infrastructure allowing to reach unprecedented audiences across the world with non existing entry barrier for creators and consumers of content.*

They capture the vast majority of advertising growth, and define the advertisement currency by imposing their own audience measurement system for the digital world. They are a gatekeeper for distribution based upon selecting which content they allow to the platform, and how they censor it. This is particularly critical for news, it can also be critical for educational topics.

But at the same time, some of them are becoming major content producers, structuring increasingly both content distribution and content production markets at global level. Their algorithms create, manage and update the distribution of content without transparency. They also try to drive the media research in Europe via specific funding.

A key question is their societal impact: to what extent do global platforms contribute positively or negatively to our societies, their cohesion or their fragmentation and to which degree they avoid or circumvent established governance rules and practices followed by traditional media players? In this respect, former Google deputy legal counsel Nicole Wong's statement questions ourselves :« is it time for the digital giants to wonder if they do not design systems favouring verbal brutality and hatred escalation » ?.

This competition of global tech-driven players that do not widely obey to European rules and fundamental values and put data appropriation and valuation at the heart of their strategy constitutes a major challenge for European sovereignty and identity, especially as **global platforms tend to define de facto themselves some of the rules of play that apply to the media players in Europe.**

Innovation and tech are becoming key drivers : AI becomes a European priority

For the last two decades, even if they remain highly innovative in content and formats, European media companies have at large stopped to define disruptive technical innovations. They have mainly tried to catch up, with the obsession to keep the trust and attention of their audiences. The majority, except for some important groups such as the Financial Times, Springer or Schibsted and several public broadcasters such as BBC, Deutsche Welle, RTBF, VRT or YLE, have not put technology innovation at the center of their strategy and have not been successful in finding new sustainable business models.

The latest technological developments change the game. If they want to survive, the Media must acknowledge that they have to radically transform. From traditional mass media, they will become more and more hybrid media, both mass and personalised, and even more so « data companies ».

Data will become increasingly important and the capacity to collect and analyse vast amounts of data to know the audience, improve the user experience, make the journalist work easier, better distribute, maximise its audience reach and monetize the content will become critical. In this respect, AI and advanced analytics applications are fundamental.

Up to now, media have not been considered as a key sector under various public and private AI initiatives for two major reasons : the sector was not seen as high-priority and the media stakeholders did not push for radically reshaping technologies. A vicious cycle followed: the sector became less attractive for talent, the lack of transformative skills increased the difficulty of change, reinforcing the industry's unattractiveness.

The same vicious circle exists in the technological field - the media sector not being perceived as decisive one up to now, there has been limited applied and tailored technical solutions developed by tech companies for the media sector, resulting in its hindered transformation.

A new mindset

Over the last few years, two major shifts have triggered a change in mindset. On one hand, political leaders have come to acknowledge the structural weaknesses of the media ecosystem and the risk that fake news, disinformation and more widely misinformation represent for society and democracy. They have begun to understand the necessity of developing alternatives to non-European tech giants' infrastructures for the European media ecosystem, in particular in a period of international tensions and self-retreat. The tech giants have also come under increased scrutiny for their practices in amplifying disinformation but simultaneously for the avoidance of employees' rights who moderate violent or offensive content through their 3rd party contractors in an environment "where people develop severe anxiety while still in training, and continue to struggle with trauma symptoms long after they leave"³.

On the other side, media stakeholders and telecommunications stakeholders are fundamentally aware that their main competition does not come anymore from the national arena but from outside of Europe. The media needs to recognize that they have to organise collectively to develop joint alternatives in terms of research, data collection and hosting, platform, innovation and monetization strategies to develop the critical advantage indispensable in the era of big data and AI.

The media must also think bigger and wider and embrace the condition to seize the opportunities of the Digital Single Market. Specifically, the need is to speed up collaboration both at national and European levels and marry better tech and media, science and creativity.

One of the more advanced countries in this process is Switzerland, a non-EU member, where three major players Swisscom, the public service media SSR-SRG and the press group Ringier have allied to collect data. The last two organisations have also developed a research and development alliance in partnership with EPFL (Ecole Polytechnique de Lausanne) to achieve critical leverage in terms of R&D and development in the field of data science and AI for the media sector.

Digital technologies and the (re) structuring of the European media sector

Digital technologies and the (re) structuring of the European media sector

Critical developments in digital technologies, such as Big Data⁴ - handling, organizing, visualizing and analyzing vast amounts of distributed data; Artificial Intelligence (hereafter AI) - including Machine Learning; and distributed ledgers and Blockchain with its promises for fully secured information handling, have already started to impact most of the sectors of the world economy profoundly. The media in Europe and globally is not an exception.

Media is undoubtedly one of the most impacted and also most sensitive industries to the arrival of data and AI because, together with education, it is the cornerstone of an informed society and a well functioning economy and consequently the basis of citizens' choices in our liberal democracies.

While the engine for the major digital innovations is algorithms, their fuel is data. It is hence vital to control and enlarge the sources, availability, and quality of data. It is even more paramount for the media sector, heavily relying on information gathering, dissemination & distribution (« traditional media ») and the exchanges and interactions between the users and the consumers of media (« social media »).

Today, data gathering at the scale and complexity needed for quintessential innovation is widely monopolized by giant platforms, controlled by either US or Chinese interests. Platforms are essential for AI, because, on the one hand, they constitute the infrastructure capable of collecting the vast amounts of data that is necessary to leverage the impact of AI to the maximum. On the other hand, platforms constantly integrate in depth the latest state of the art research and applications of data & AI technologies in their products & services, processes and user-experience⁵. This reinforces their de facto leadership, their capacities to capture revenue and to limit competition.

In today's centralized global web economy, the European media sector cannot fully leverage the potential of data, AI and blockchain without critical size platforms and infrastructure. Instead, European media innovations remain fragmented and lack scalability which impedes a much needed accelerated take up.

Although the rise of the European, yet globally relevant super platform such as Google is a fantasy considering present political and economic status quo in the EU, there is still ample room for the emergence of sector- and continent-specific platforms.

European industry, with initial public impulsion, has viable market opportunities to capture, to build domain-specific alternatives to the generalist giants. **By committing together to pan-EU data commons, Europe can take the lead towards a new media ecosystem respecting European democratic values and regulations.**

For media in particular, data has a range of meanings and applications. It can be data attached to content (text, video, sound, pictures, document databases), personal data linked to content consumption and user experience, or data related to content distribution. In order to provide relevant data to the existing and future platforms, focus on high quality metadata, and proper archive classification, pan European digitalization and access, are fundamental.

In order to give birth to European platform challengers to the global players, Europe must create and provide a fully digital and creative environment (access to vast data repositories, algorithms and computing infrastructure, interoperability with existing platforms, and go to market focused R&D) to radically boost creative innovation in the media sector and beyond.

It is paramount to understand that in the medium run, the applications of **AI and data will be at the very heart of the internal processes of all European and global media organizations - there will be no other options to stay in the race** for audience attention and trust. We are at the very beginning of this revolution.

AI, Machine Learning and Big Data Analytics for media

Nowadays media productions from various and highly heterogeneous sources involving an enormous volume of data, which by nature is distributed. New tools start to appear on the market, that should increasingly allow journalists to fetch and summarize high quality information, and the advanced end-user to efficiently browse information with customizable web browsers and filters, possibly allowing to bypass the standardized recommendation algorithms and user data harvesting by the global platforms.

These tools are based on semantic understanding of information content, or statistical learning based on raw content considered as bags of words (or both). Furthermore, such tools can also help distinguishing facts from fake information at all levels of awareness.

Deep Learning (DL) is the prominent technique for Machine Learning. Its flagship application domain is image recognition: the current AI hype began around the year 2012 with outstanding results in all computer vision challenges. Although Deep Learning concepts were proposed already in the 1960s, most algorithms designed in the end 1980s and early 90s, the technique reached optimal performance in the early 2010s, because of the conjunction of the availability of vast amounts of data from the Internet, and the exponential growth in computing power.

Today, Deep Learning driven applications have achieved superhuman performances in a variety of domains, from image recognition (on general images like *ImageNet*⁶ or to diagnose cancer on radiographs⁷), to the widely publicized defeat of the best human players in the highly complex game of *Go*⁸ by means of deep reinforcement learning based on computer self-plays, without any a priori human expertise.

The range of practical applications of Deep Learning is rapidly escalating, but several of these impact the media ecosystem in the areas of creation and dissemination - for the good and for the bad.

Because of Deep Learning, in recent years automatic translation has made tremendous leaps, and news, articles, blogs, and other textual content can be reliably translated between the most major global languages.

Image retrieval (finding images most similar to a given model) from huge data sets of images can be now carried out in seconds or minutes, helping to spot re-use of old or non attributed photos in the fake news. Deep Learning can seemingly also unveil texts, and spot conceptual similarities between several versions, helping to identify the sources of fake news or misused information.

According to Yann LeCun⁹, a Deep Learning pioneer, one of the most significant advances in Deep Learning in the past decade is its generative ability. Because Deep Learning models capture a possible representation of the data, oriented towards a target task, Deep Learning can also be applied to generate data that resembles the original training data, to a point where it becomes indistinguishable to the human brain.

Coupled with image or text processing, this allows innovations in the following domains and beyond: automatic annotation of images; automatic description and real-time assistive technologies to the visually or hearing-impaired communities; automatic generation of news summaries; real-time editing, censoring and playback of content; instantaneous classification of textual, video and audio archives; video, sound and music creation assistance; and development of tools and solutions in the high end post production, game development, and animation sector.

Despite its positive impact, Deep Learning techniques generate new risks including purposeful or involuntary biases to data and algorithms and the creation of deep fakes - seemingly photorealistic yet false video or audio material thus participating in the production and propagation of fake news¹⁰.

It should be pointed out that high impact, market-ready applications such as automatic subtitling or text generation from the summary, that work amazingly well from an academic point of view, are still far from commercial deployment and must remain monitored by humans. Even the recent *GPT-2* model announced by *Open AI* only gives acceptable results 10% of the time, according to its authors¹¹.

Lastly, it is already certain that professional-quality automatic video subtitling and text translation would open-up the pan-European market to national productions from the member states which today often don't travel outside their country of production due to language differences, high costs of quality subtitling or dubbing and limited audience curation. Whilst experiments in automatic translation and subtitling have been carried out also by the global players such as *Netflix*¹² critical research is still needed to understand the subtleties of human language (e.g., irony, second degree, metaphors, and more).

Artificial and Mixed Reality

Beyond image recognition, and pertaining as much to AI as to Human Computer Interface, Virtual Reality (VR) and Augmented Reality (AR) technologies are now reaching maturity. There were already more than 2000 AR applications on the App Store as of September 2018, and the pioneering success of *Pokemon Go* demonstrates that these technologies can now scale up¹³.

Hence VR and AR promise to have a tremendous impact on the media sector by allowing new ways to tell stories, train and educate, engage with tools and objects,, collaborate or to present ads to the users. It might also favor transnationality more than any other media vector when automatic translation or subtitling have reached professional quality.

However, the sales VR headsets are still lagging, and mass applications might not appear as quickly as expected with the majority of high end technologies addressing the industrial domain¹⁴. Some actors of the media sector are nevertheless getting ready, following the innovation hype at the moment, as noticed in a *Reuters* report from October 2017¹⁵. Among the pioneers, *BBC* has experimented with Virtual Reality in sports during the last Football World Cup¹⁶ and its VR application has been downloaded more than 300.000 times. The broadcaster later launched a VR documentary about the Congo river¹⁷. *The Enemy*¹⁸, another experimental project funded by *Google DNI* and produced by a former war journalist, is another way to show war (and enemies) to combatants, or *Bloody Sunday*¹⁹ from Lithuania allows the viewer to relive the dramatic events of the conquest of the television tower in Vilnius during the independence movement.

Some AI use cases

For journalists and content-creators

AI frees up time for the journalist to focus on valuable tasks. *The Associated Press* uses an AI to transform raw earnings data into thousands of publishable stories, notably on the sport. *The Press Association* in the UK produces henceforth 30.000+ items local info per month using AI tools. In 2015, *Le Monde* used a technology called *Syllabs* during the departmental elections to write local articles on the results of the 36,000 municipalities and cantons affected by the elections, and the Norwegian News Agency produced sports report 30 seconds after a football game.

AI helps journalists find new angles to a story. For example the *INJECT* project (developed by the support of the H2020 programme in cooperation with *WAN-IFRA*) helps journalists scanning articles on a given topic and makes a proposal for a different angle by suggesting the story via different actors, submitting related cartoons or data, challenging by asking incidental questions, or producing facts cards on the topic.

AI can help in investigative journalism. In its documentary *Looting the seas* the *International Consortium of Investigative Journalists (ICIJ)* created information maps using a system gleaning information on the multitude of documents they collected. Data driven technologies and AI could furthermore provide significant improvements to the in depth analysis of vast amounts of data of journalistic value such as the Panama Papers or the different leaks the ICIJ has worked on²⁰.

More generally, data mining and processing, and AI can help journalists to provide more accurate information and develop a more comprehensive understanding of reality. For example, Serelay is a start-up which allows verifying if a supposed location of a captured image is correct and check if no post-processing of this image took place.

The Guardian has developed AI driven in-house tools allowing journalists to understand how audiences are responding to content - whether the audiences are reading the texts thoroughly or engaging with it in a particular way. **The wider application of data and AI tools will enable European content creators and producers to understand the impact of specific content on the audience and thus make better financing, production and dissemination decisions.**

Along these lines, *Rede Globo* in Brazil has experimenting with tools combining AI and neuroscience to understand how the audience engages with football matches. That kind of experimentation aims to develop an in-depth understanding of the audience, to seize its emotions. It can help sports journalists in their storytelling, contribute to enhance granularity/quality of the advertisements or improve perceived relevance of personalised content recommendations.

For publishers

First, AI can help publishers reach out more efficiently to their subscribers via intelligent content recommendation. *Times of London* and the *Sunday Times* developed a chatbot *Ask James*. The conversational robot uses artificial intelligence to suggest articles based on readers' past reading habits²¹. The Financial Times has created a tool, recommending articles remote from the common center of interests of its readers and uses a gamification logic by awarding points based on the articles actually read by the subscribers²².

Second, AI can help publishers engage with their audience more efficiently in the long term. Finnish public radio-television *YLE* has developed a personal assistant *Voitto* making a smart recommendation on the lock screen based on the long-term content consumption habits of the user. *Voitto* does not use click through rate but the long term use of the application by the users and takes into account whether the consumers are satisfied with the recommendations of the assistant.

Third, AI can help publishers valorize their archives. *Le Temps* uses *Zombie*²³, a tool helping to identify the best articles with notes, including reading time, audience history, engagement and debates on the social network, to determine when to republish them.

Fourth, AI also gives publishers deep insights to the consumption habits of their readers. *The Neue Zürcher Zeitung* (Swiss) uses a personalized and dynamic paywall with 150 criteria points determining the « hot point » when a reader can be converted to a paying version²⁴. On the same model, *Poool*²⁵ allows for requiring payment only for certain sections of the online newspaper, to charge for articles for regular readers or to remove the paywall for occasional readers. It is based on an in-depth and incremental knowledge of each reader.

Fifth, AI can also be handy for automated translation for international broadcasters such as *Deutsche Welle* or *Arte*, allowing them to engage with wider audiences and increase their reach - although human polishing is still needed for professional quality translations.

Lastly, AI is also vital for programmatic advertising. In this respect, *The Guardian News and Media*, *News UK*, *The Telegraph* and *Reach PLC*, are developing the *Ozone Project*²⁶, an alternative to the tech giants' services in terms of the programmatic advertising, compliant with European interests and rules.

For readers and the audience

AI can help the reader to select personalized news. *Flint*²⁷ is an AI based service delivering a daily list of articles and learning from the feedback of the user on the specific topics they choose.

AI can also expose readers to different sides of the same stories. *Knowherenew*²⁸ scouts the Internet, discovering stories and identifying narratives, evaluating the factual claims and bias for the algorithm to identify three perspectives (left, right, impartial) on every controversial story before an editor review it for publication.

Specific Use case: Fake news

The current media ecosystem influenced by algorithms, echo-chambers, and filter bubbles allows people to engage in « selective exposure » to media sources congruent with their own beliefs and biases²⁹. Recent work has revealed crucial characteristics of fake news.

First, misinformation spreads faster and further than other types of information. Second, this information is primarily shared by humans, not robots or automated accounts³⁰. Thus the identification of fake news, as early as possible, is a critical issue for factual and journalistic media in Europe and elsewhere.

In this regard the European Union will foster support to media innovation, including €2.5 million for the deployment of a European platform against misinformation to help fact checkers, journalists and academic researchers to identify cases, trends and patterns of misinformation. Numerous projects are financed at European level to explore ways of tackling this menacing trend³¹.

A variety of technology driven solutions exist to tackle fake news. The first option is content-based identification relying on semantics, ontologies, and linked data techniques, searching the graph of distributed data with ad hoc intelligent queries, as done in the *iCoda*³² project, or by analysing documents in their original language to understand what they are about. An example is the platform *Semantic Vision*³³, whose ontological architecture allows a comprehensive analysis and cross-language analysis of 630,000+ global sources in 11 languages.

However, the problem of fake news content can also be tackled statistically, without trying to understand its semantics, by identifying the influencers in specific domains³⁴, or visualizing the dynamics of information propagation, and thus identify the source of fake news. This principle is applied in the Journalist platform from *ISC-PIF*³⁵.

Going even further, rather than analysing substantive content, fake news tracking can also be achieved through the analysis of the statistical patterns of spread of news³⁶: Fake news propagate in a narrow dialogue and passing-on spectrum, whereas normal news are passed on by a more diverse and broad audience from the beginning. This is already applied by *Fabula AI*³⁷, using Deep Learning on graphs (« Geometric Deep Learning »³⁸), claiming a high accuracy rate for false news detection within hours of dissemination.

To conclude, AI and Deep Learning already have achieved promising results that help the human fact checkers in the media. Even more critically, education in digital literacy and targeted pre-bunking (a technique that preemptively inoculate the public against fake news³⁹ by using game based psychological interventions⁴⁰) remains the most sustainable path to information robustness and combating the spread of misinformation and fake news.

Specific Use Case: The Audiovisual Sector

The applications of AI and Deep Learning have been on the forefront in the audiovisual sector where matching of content with the preferences or search results of the audience have become the key driver for innovation. Whilst the most famous example is the well guarded curation algorithm of Netflix, similar initiatives and solutions are emerging from European deep learning startups.

For example, Finnish company *Valossa* has developed a range of Deep Learning tools for real time content moderation, video highlighting, brand monitoring, sports event recognition, content profiling and metadata generation and has recently established collaboration with industry leading video editing solutions provider AVID.⁴¹

Similarly, automated metadata extraction, content tagging and classification solutions desperately required by European archives and media repositories are developed by a range of specific-focus companies across the EU including *AiConix* from Germany⁴².

AI and Deep Learning is recently also applied to understanding the genres and performance indicators within video content for live parental guidance but also production optimization. A Swiss company *Sofy.TV* utilizes Deep Learning to identify the different micro-ingredients the movies are made of⁴³. This will both help content creators and producers to better optimize their productions, to achieve higher user retention to their productions, and provide better recommendations to the users.

Blockchain

Blockchain

A blockchain is a software construction that can unfalsifiably record a series of writings in a distributed ledger, i.e., without the need for a trusted third party. It is impossible (as of today's cryptographic standards) to modify a documented event or a record inside a blockchain ledger without letting the whole network know. Events and records can be transactions (as in the historically first, and still most famous blockchain, the Bitcoin), stored documents (as blockchain can be utilized as a secured distributed ledger whose content cannot be altered after the transaction⁴⁴), personal information, media assets, or financial data. Blockchains can be either open (anyone can then add new blocks to the chain, i.e., register new events), or private (and you must be invited to join the blockchain)⁴⁵.

There are several domains where the arrival of the blockchains could change the rules of the game in the media sector at large. Currently, the blockchain ecosystem has been mostly experimental, and at the pilot stage, and the impact of blockchain technologies is at its advent. For instance, Spotify acquired media blockchain company *MediaChain* to improve royalty payments to artists and rights holders through better and more transparent attribution⁴⁶. Many other media companies are involved in blockchain initiatives that range from consumer payments over consumption monitoring to advertising transparency.

In an ideal world, because they cannot be altered, blockchains can help to bring trust regarding the origin of documents, and contribute to identifying fake images, texts provided they have been correctly entered in a blockchain. Whereas this is hardly scalable today to all pieces of information, it can help authors to protect their intellectual property and author's rights on images and videos, yet it would more likely take the time to enter their properties in a blockchain.

However, this is not the panacea for a simple reason: blockchain is blind to the external world. On the one hand, there is no way to certify that some external input to the blockchain is authentic and true. On the other side, with the current technology, you cannot store all the news you want to verify the origin in a blockchain together with the source authentication. This goes for the content of the blockchain as well as for the authors: blockchains ensure integrity, not authenticity. This calls for a trusted third-party, either public, or privately handled by a consortium of a specific domain.

Most blockchain applications in media are experimental (e.g., the *New York Times*⁴⁷), with the most viable prototypes or first client platforms emerging in the European audiovisual industry - rights management, revenue allocation, and management of digital content assets⁴⁸.

Some industry observers claim that despite successful applications and pilots blockchain is not a silver bullet. For instance, the transaction speeds in digital advertising are so high that current blockchain technology is too slow and cost-intensive to verify them, also blockchain platforms in digital content distribution have been limited due to their tie in to the volatile and sparsely regulated cryptocurrencies.

It is clear that much more R&D is needed before the promises of blockchain can become a reality - and Europe must foster such research.

Some Blockchain examples

Although the applications of blockchain are still at its early stages, the potential applications in the media sector are numerous and could be useful to different actors.

First, Blockchain could be used to reinvent the way independent and quality journalism is funded. The *Civil* initiative⁴⁹ directs funding operated via tokens powered by the Ethereum blockchain. By creating a community-controlled network via their “CVL token”, they aim at funding difficult topics requiring long-term investment, or topics usually avoided by newsrooms. By incentivizing “good behaviour” with valuable tokens (Cryptoeconomics), they aim at making bad behaviors too costly, thus identifying bad actors (spammers, trolls, disinformers), incentivize the users to act as a collective and create quality newsrooms on a diverse range of topics. Though their initial token sale spectacularly failed in 2018, they today support more than a dozen of newsrooms, and will launch a simpler token in 2019.

Second, publishers could widen their audience and increase their revenues via payments by article, a solution that stalled in the past but could be revived thanks to blockchain-secured micropayments⁵⁰: payment by article would not be tedious anymore, and new models of music streaming or video on demand might appear based on blockchains, undermining the monopoly of the main players, and allowing decentralization of content distribution.

Third, publishers could in the future ensure compliance of their systems with GDPR via blockchain. The newspaper group *Sud Ouest* already started a private blockchain⁵¹ with local company *inBlock* to ensure consistency and transparency of their users' consents. While the owner is the only one who can write the blockchain, any user can see what is stored from her/his own data. The blockchain is a legal argument in case of disagreement.

Fourth, publishers could also work on protecting their digital archives, easy targets for tampering campaign, with infrastructures to authenticate and preserve them in the long run.

Fifth, publishers and creators could use blockchain to record and timestamp information about creative content and allow secured licensing. A start-up, *po.et*⁵², is specialising in mapping blockchain and cryptocurrencies to current industry standards in media and publishing to allow text, video or pictures to be licensed. This could make it easier to syndicate and manage content for different territories, with the process of managing rights effectively automated.

The Media group TFO is currently experimenting with a blockchain⁵³ to handle via the concept of “smart contracts” inherent to blockchain the 17 types of rights that they are routinely dealing with, involving all actors of the digital cultural products, from producers, movie/TV creators to artists.

The audiovisual sector has been experiencing the perhaps widest adoption of blockchain for revenue tracking, data collection, and transparent digital distribution in the video on demand vertical. A Romanian-UK based startup *FilmChain*⁵⁴ is utilizing blockchain to track and automatically distribute revenues in the audiovisual sector by digitalising the CAMA («collection management account») and simultaneously providing transparent performance indicators to the producers, public and private financiers.

A Swedish startup *Cinezen*⁵⁵ is in the process of launching a blockchain based video on demand service for providing the consumers a secure library of film titles but simultaneously providing key statistics and metrics to the producers and rights holders - an issue that has plagued the relationship of European content creators and global platforms.

*Breaker.io*⁵⁶ (formerly *Singular DTV*) has launched a blockchain driven toolkit for creatives and content producers to tokenize their creations and thus utilize blockchain for raising additional revenue from audiences. It has used the initial coin offering to create the first Hollywood scale blockchain entertainment studio⁵⁷. Last but not least, the *Motion Protocol* consortium, involving several smaller blockchain players in the ecosystem, is in the process of launching a "industry-specific blockchain ecosystem for all transactions arising in film"⁵⁸.

Content creators such as the video game industry are also developing new concepts and solutions around the blockchain. For example, *Ubisoft's Strategic Innovation Lab* has developed a prototype based on blockchain called *Hashcraft*⁵⁹: a treasure hunting and islands exploration game, where players directly contribute to expand the world (and the blockchain) by creating their own island, hiding their own treasures and setting their own challenges to others. Each new island is part of the blockchain and truly owned by the player who created it by the application of blockchain to the user created assets.

To conclude, a globally competitive and vibrant European media ecosystem marrying journalistic, creative and technological skills needs to strongly focus on the investment and implementation of the core digital technologies of the near future - AI and Deep Learning, Blockchain and other transformative digital technologies and implement them with an interdisciplinary approach.

This impacts not only combating fake news and misinformation and providing trust, but also providing attractive and state-of-the-art quality content and user experiences for the European audiences and media consumers. It will be a major condition to keep the attention of audiences.

The Data Revolution and its impact to the media ecosystem

The Data Revolution and its impact to the media ecosystem

The media sector is composed of a vast array of companies and organisations that vary in structure, business model, geographic footprint and not least the specific media channels they focus on – from cinema to TV over print to digitally native companies. But while they all face their own specific challenges, there is a broader set of challenges applicable to all of them. **Media innovation today is intrinsically linked to data and technology innovation. All organizations in the media space need to leverage data and technology to reach audiences, build sustainable business models, and distribute content.**

In this section, we outline how the rise of data and technology impact the European media ecosystem.

Knowing audience and content

One of the major challenges of European media at the AI era is to develop a real understanding of its assets, and particularly of some assets which were long undervalued or not valued at all : the knowledge of the audience and the archives. Artificial intelligence allows to make the link between past and present contents, to reuse content in order to create new contents, to help contextualise them and to value them much better. But for that, good quality content archiving and good metadata are key. But also strong copyrights on the content. And new production tools.

On the other hand, AI also needs to be fed with relevant data on the audience, its preferences, its behaviors, individual as collective, the way it reacts to content... This is largely new for the media sector and can be expensive. But this knowledge is fundamental to be able to provide relevant content in a state of the art fashion (formats, distribution channels, interaction and sharing modalities...) allowing to develop personalised approaches and keep the attention of audiences.

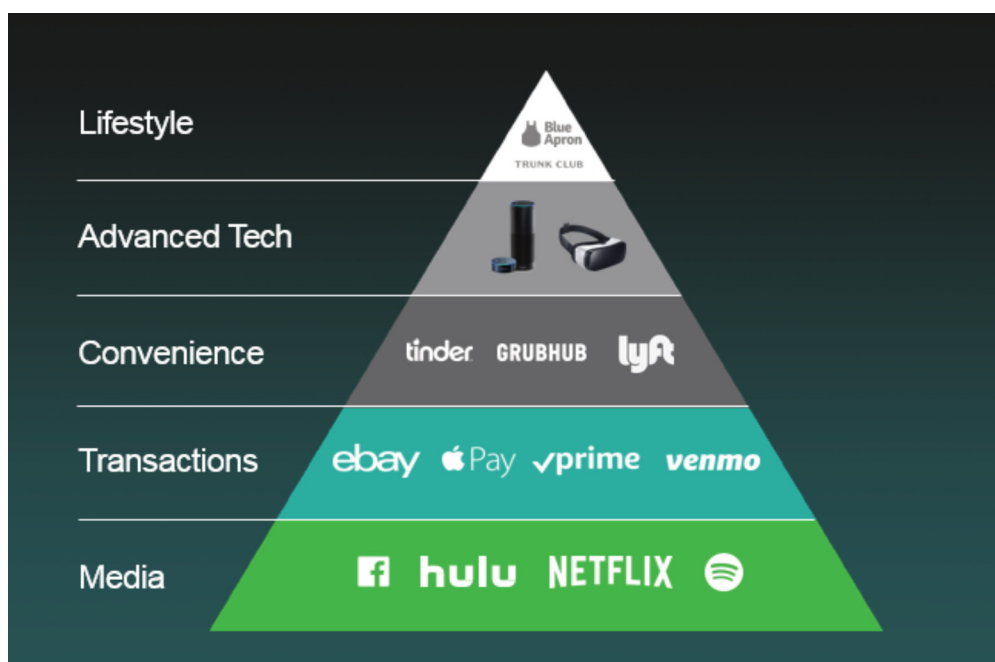
It is also a real challenge at the time of GDPR. A trust relationship between the media and its audience is fundamental for this latter to be comfortable to share data and information which are linked to its personal identity.

These elements are prerequisite for media to leverage AI or blockchain potentialities.

Developing relevant content for the personalization era

European citizens encounter more media content than ever. Falling production costs, cheap means of distribution, social media, and an always-on media environment have sparked an abundance of content. But quantity does not mean relevance or quality.

If content used to be the king, then *now digital content is the new normal* and the foundation of the *audience's digital fluency* - the capacity to engage with a layer of digital services, tools and platforms available based upon. The report by Hulu argues that "not only did we uncover that media is the foundation to consumer's digital fluency, but we found that there is a Hierarchy of Digital Needs. After getting comfortable with media, consumers begin transacting online - whether it's making a financial transaction, mobile payment, or using an online shopping app. Later, consumers begin to dabble with apps and services to simplify their lives from ridesharing apps to having food delivered (i.e. GrubHub) - they are all about the convenience that technology brings". Thus it is imperative that Europe will innovate across the board of relevant, high budget and globally competitive content. That means from education to entertainment, news to professional, political, human issues and minority audiences and languages - as this sets the basis for the European citizen future digital fluency⁶⁰.



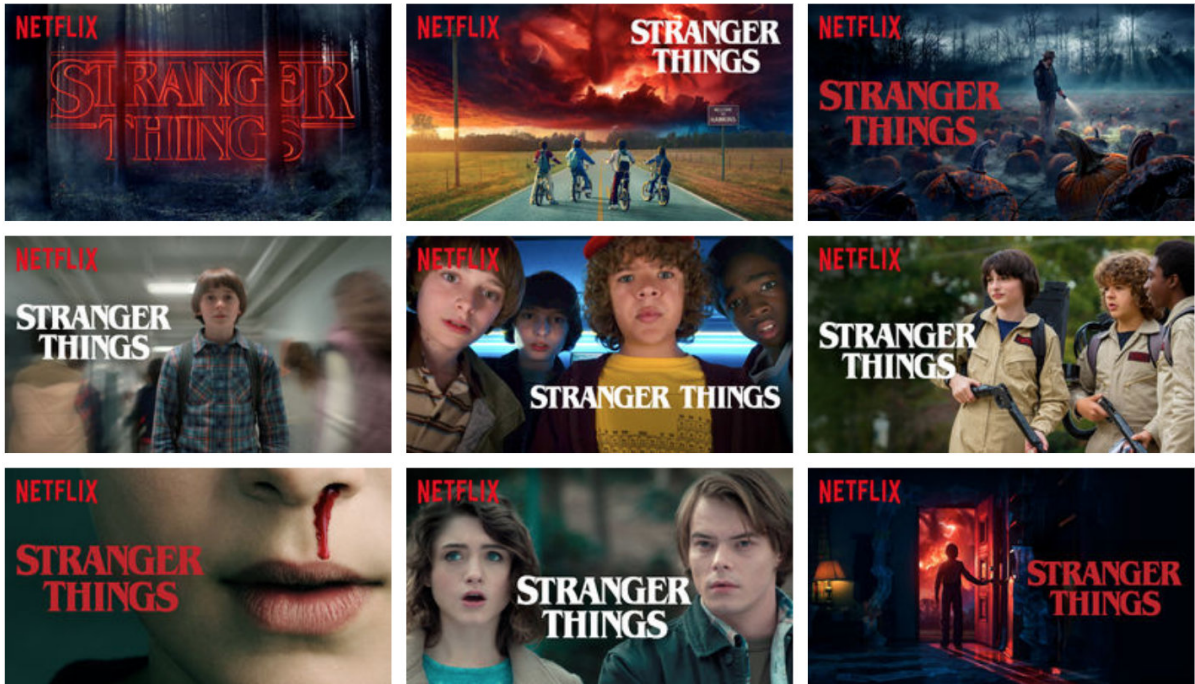
Source: Hulu blog

Media organisations face ever-growing hurdles to make their content stand out, and to reach consumers. Multiple means of distribution from traditional media over owned and operated digital properties to third party platforms need to be orchestrated. This requires new skills and technologies - from data-driven decisioning about content commissioning and acquisition, to advanced analytics that track and optimize the audience performance of this content. The complexity and innovation required to stand out is immense.

The *Netflix tech blog* is a good bellwether. In this blog, Netflix engineers share in great detail the innovations, data science and technology required behind the scenes to make features work that consumers take for granted. For instance, Netflix not only develops personalised content recommendations for users, but also customizes the preview artwork for a given piece of content for different viewer types. The complexity is immense, and Netflix' willingness to share its approach in public is less a commitment to open source and sector-wide innovation, but testament to the confidence that even if Netflix shares its approach, others will lack the ability to execute and replicate it.

The same applies for Netflix strategy for dubbing and subtitling as according to New York Times "each new title carries subtitles in 26 languages, and the company is creating high-quality, properly lip-synced audio dubbing in 10 languages"⁶¹ matching its content with unprecedented number of language segmented users across the globe. Comparatively, in 2017 only 25% of titles available in Europe's digital platforms were of European origin⁶² and accessibility in minority languages remains highly demanded but is poorly addressed.

The importance of 3rd party platforms - from YouTube over Facebook to Spotify, further complicates the quest for relevance. On the one hand, these platforms provide massive potential reach to content, making it accessible to audiences that the creator of a piece of content would not be able to address independently. At the same time, platforms need principles to order the massive volumes of content. Their algorithms thereby inevitably act as gatekeepers. While the analogue media world had must-carry rules, e.g. for cable TV, such prescriptions, for better or worse, are absent in the digital domain. This often leaves media organizations at the mercy of algorithms they do not control. Data-driven insight and analytics are vital tools to navigate this world, and media organisations require investment and resources to enhance their abilities in this area.



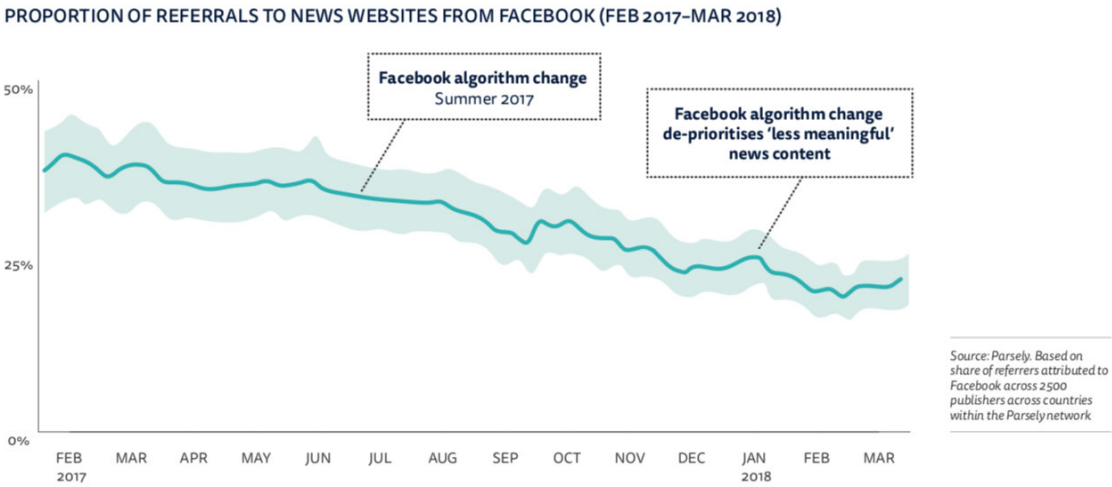
Source: Netflix Tech Blog

Going out of algorithm dependency

Beyond the relevance of content, the reliance on algorithmic infrastructures represents a knowledge and innovation challenge for the sector. The proliferation of platforms means that media companies also need to attract and engage audiences beyond their owned and operated digital properties. They cannot expect audiences to come to them, but need to use platforms like Facebook and Google to come to where the audiences are. Platforms are not neutral distribution engines. They rely on algorithms fuelled by an optimization logic. Often, this logic is maximising user time on platform. Platform algorithms see human behaviour as an optimization problem geared towards driving maximum platform profits.

This is an issue for citizens as literate and free democratic agents. But it is also an issue for media companies who seek to provide quality content – they cannot anticipate the whims of the algorithms, and the distribution of their content is dependent on how these algorithms function.

For instance, in order to maximise the time users spend on the platform, Facebook changed which posts feature in users *Newsfeed*. This entailed de-prioritising news organisations in favour of posts by friends, resulting in a drop of referrals to news organisations who relied on Facebook as a distribution mechanism.



While showing friends' posts is not controversial per se, this example shows that how these algorithms optimize changes over time. Platforms then are not a reliable distribution mechanism for media companies. Algorithm changes can make or break a business model. In an extreme case, *Mic*, a millennial digitally native publisher that tied its success closely to Facebook, had to shut down following algorithm changes at Facebook⁶³. More widely, such algorithm changes can be exploited by bad actors for means of political manipulation, where fake news and clickbait that is tuned to platforms' optimizations logics is preferred by algorithms over quality media content.

Recapturing economic value

The media sector is principally reliant on three sources of funding – advertising, consumer payments (transaction & subscription), and public funding.

Advertising-based monetization is a useful prism to highlight the challenges for media organisations to monetize their content and audiences in today's digital economy. In 2018, 30% of all linear TV revenues in Europe came from advertising, the rest being derived from license fee and pay TV. The print industry still remains very dependent upon advertising, despite structural decline, it has indeed lost around two thirds of its advertising revenue everywhere in Europe, France is a good example of this drastic fall among many others⁶⁴. Digital advertising is growing double-digit, recording spend of 48 b euros in 2017, up 13% according to *IAB Europe*. However, seismic changes in the advertising sector undermine media companies' ability to create a sustainable business through advertising. And digital subscriptions even when growing significantly do not compensate at all.

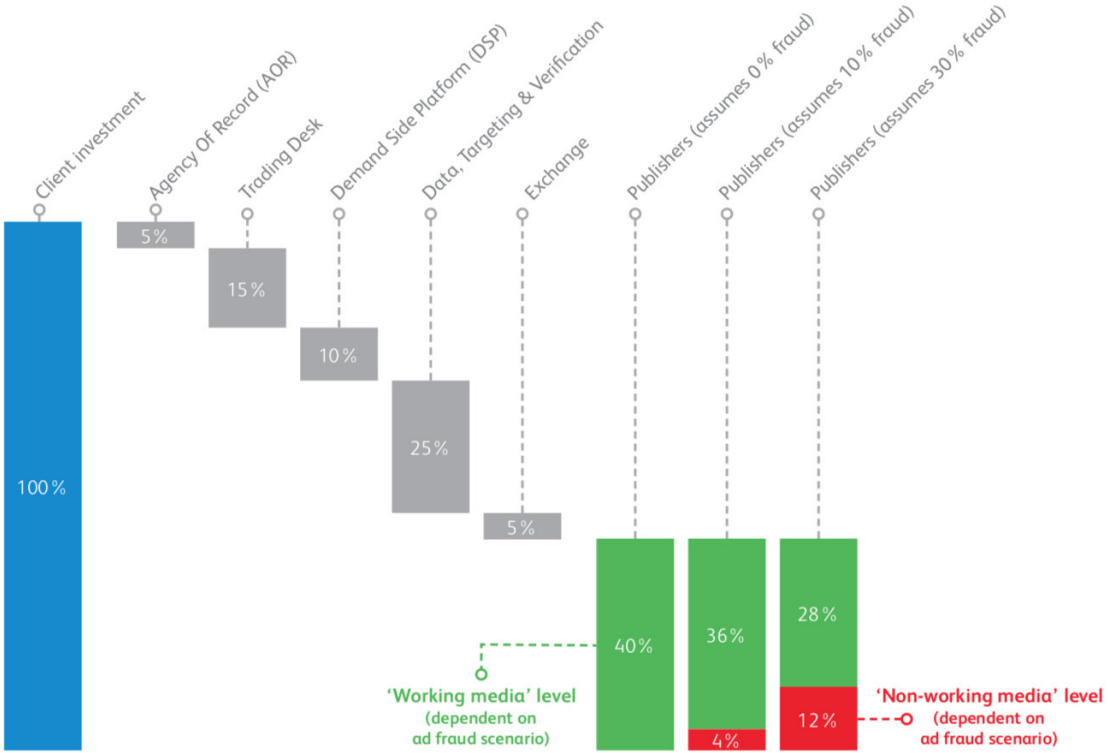
There is a fundamental change in the logic of advertising spend. Brands increasingly move their investment from working media (i.e. the money that goes to media companies) to technology, data, and software services. This is fuelled by the need to manage a complex landscape of consumers and devices, and to measure and steer (often short-term) objectives. Chief Marketing Officers (CMOs) are under high pressure to deliver business results, not just marketing outcomes. They are increasingly measured on more units sold, not on the number of clicks or views that an advert has received. As a result, marketing expenditure is under severe scrutiny and needs to prove that it works. Some of the largest marketing sectors, like Consumer Packaged Goods (CPG) and Automotive, adopt zero-based budgeting policies that hurt advertising flows to media companies.

The distribution of advertising spend across different media channels is changing and growth is concentrated on digital at the expense of other media. But media companies struggle to capture this growth in digital. According to analyst firm IHS Markit the global digital advertising market grew by 11.3% in 2018. But Google and Facebook grew three times as fast, with a blended rate of 33.8% and captured most of the economic value created.

Digital advertising is increasingly built on an algorithmic infrastructure that automates the connection between buyers and sellers ('programmatic advertising'). The aim is to optimize the flow of advertising to audiences through the use of data. This system brings many benefits to media companies. For instance, it increases the landscape of potential buyers by orders of magnitude. It also allows better tailoring of adverts, measurement and optimisation. But it also is problematic. In particular, programmatic advertising relies on a complex value chain of many intermediaries that stand between the advertiser and the media company. These intermediaries command a high share of each Euro invested in advertising. Estimates vary, but the media company could receive from 40% to as little as 10% of each Euro. The system is susceptible to fraud, where malicious actors mix in bot traffic and fake advertising views. The flow of spend through this ecosystem is complex, and it is increasingly algorithms which decide where adverts are being placed. As a consequence, media companies are themselves becoming mediated through an algorithmic infrastructure over which they have little control.

In the TV industry, Pay-TV revenues have been rising steadily across Europe for the past decades. However, this growth is peaking. Ofcom noted that revenues for Pay-TV operators declined in 2017 in the face of on-demand services like Netflix and Amazon Prime. There is currently a trend among broadcasters and digital video companies to launch subscription video-on-demand services. Motivations are the declining viability of advertising-funded business models and consumer appetite for premium content, often in specific categories (e.g. sports, drama). But an explosion of these services meets competition in consumers' wallets, whose discretionary expenses on entertainment are not growing – so called SVOD-stacking, the addition of several SVOD packages, is already peaking.

News publishers are also moving to subscription models to supplement, or move away from, advertising monetization. The move from advertising to paid-for models has wider implications for media pluralism. Only those media organisations who have premium content that differentiates through quality or exclusivity can set up a paywall. The economics of advertising are predicated on scale, and in an age of algorithmic optimization, content that is click-worthy, and thus drives traffic, irrespective of factual accuracy, can still make money. At its most extreme, this risks the emergence a two-tier media ecosystem, where only those consumers who are able to pay, have access to quality information, whereas others are more exposed to attention-engineering tactics that convert their time into advertising revenue. In that sense, advertising has the potential to be both limiting and liberating. It can be instrumentalized to monetize clickbait, it remains vital for keeping quality content free for all.

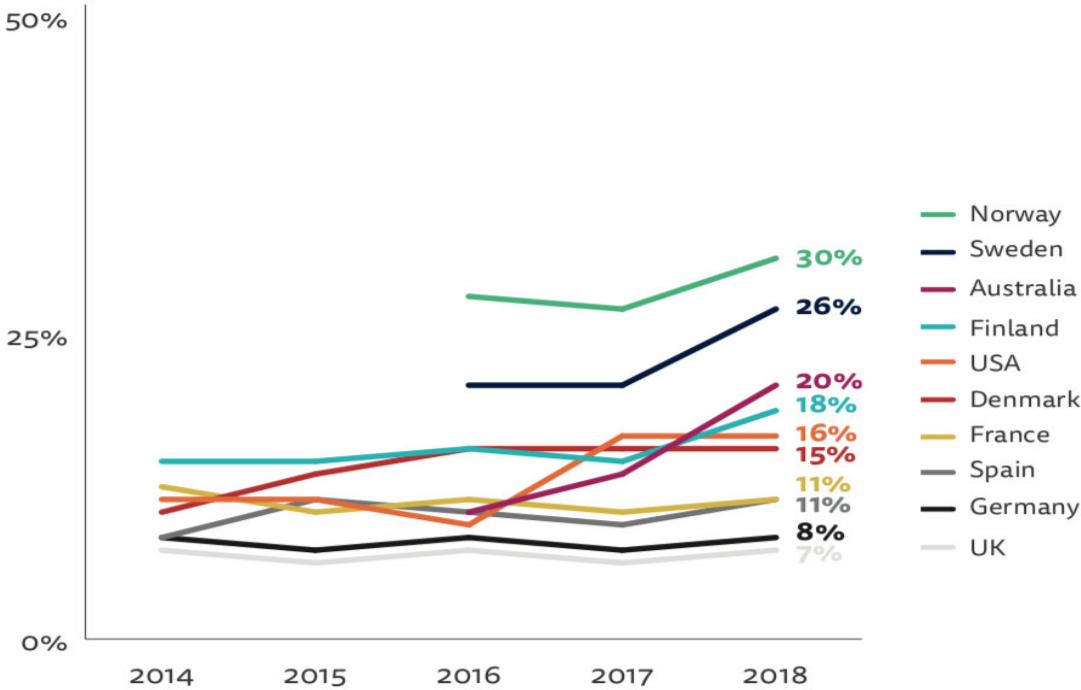


Source: World Federation of Advertisers

The main problem both in the US and the EU is the increasing concentration of online advertising revenues only with two companies, Google and Facebook, to the detriment to all media content producers. These two companies concentrate in their hands 80% of all new online advertising revenues.

The Oxford University Reuters Institute and most of the companies we met claim that as of today, in this new online environment, no viable business model has been found for the traditional broad spectrum of daily press in EU Member States.

PROPORTION THAT HAVE PAID FOR ONLINE NEWS IN THE LAST YEAR (2014-18) – SELECTED MARKETS



Source: Reuters Institute Digital News Report 2018

Reinforcing Trust & Independence

Independent voices are critical for a pluralistic media ecosystem, in particular as some European countries witness a resurgence of censorship, tabloidization of news, and foreign ownership of the press is on the rise. These independent voices often are not large corporations with the resources and skills to navigate an increasingly complex landscape of media distribution and monetization, but smaller, often local, entities. Such voices are under threat. The economics of data, digital, platform dependency and ever-changing algorithms that curate access to information have eroded the ability of many smaller organizations to reach audiences reliably and to fund their content sustainably. This particularly true at both national level for national media not being part a major corporations and at local level. Regional media economics are weakening, which is a key informational issue for the whole society since local journalists are a major source of information for national and international news agencies which are the main sources of information for all the media ecosystem. Risks of a distrust vicious circle are high. Countering them requires capital, skills, and business transformation to navigate this world - investments that many smaller, independent organisations cannot afford alone. Education and public support are available, but often lack effectiveness because the resources are fragmented, sometimes insufficient, often not well allocated or simply have to capitulate in the face of technology or cost barriers. Co-operation to invest in data technologies and develop proper distribution platforms having a critical mass could also be a part of the solution.

The crisis of independent voices coincides with a wider crisis of trust in media. The siloing of the tech sector and media sector generates friction between the two and mistrust between the media professionals who feel that technology races too fast and technologists who believe that the media does not understand technology in detail⁶⁵.

Algorithmic distribution of content opens media for manipulation. Rogue actors with political motives are able to leverage the optimization logic of algorithmic recommendation systems to scale misinformation. The provenance of content has become harder to discern for users, taking the entire sector hostage. Attempts to fight misinformation through algorithmic filtering can further harm, not strengthen, independent voices, as the impact of Facebook's moves against fake news on citizen journalism in Bulgaria illustrates⁶⁶. Political power, economic sustainability of media and algorithmic curation are therefore intrinsically linked.

Catching up the Innovation deficit and redeveloping an holistic European media identity

The challenges within the European media sector in the era of Big data and Artificial intelligence are well understood. However, tools and methods to overcome them are scarce. A narrative of innovation pervades the media sector in Europe. But it is fragmented and siloed - both nationally and industry-wise. The promise and practices of major innovation are far apart. The European media sector risks a Balkanisation of innovation. Initiatives are too fragmented, piecemeal and are duplicated between organizations and countries. Innovation takes time of impact and the duration of media innovation projects tend often to be too short for that purpose. Europeans are too inefficient when it comes to resource allocation in this sector vital for its democracy and its societal transformation. Finding focus, and collaborating in order to take a bigger leadership role in media innovation across the world, and to help the sector flourish is fundamental in this respect.

Fragmentation, regulatory complexity and siloing of media, innovation, lack of shared visions beyond the frontiers of national policymakers and business leaders alike have been blocking the long term and coherent vision of a world-class European media ecosystem. At member states' level, frequently, digitalization and media in its various forms are being approached as one of the verticals within a national portfolio but not as a foundation of the democratic, pluralistic and holistic digital Europe. There is an increasing awareness at national level and at European level of this situation, it is an opportunity to develop a pan European, comprehensive and interdisciplinary vision that reinforces European media ecosystem as the whole vis a vis global players.

Platforms and infrastructure

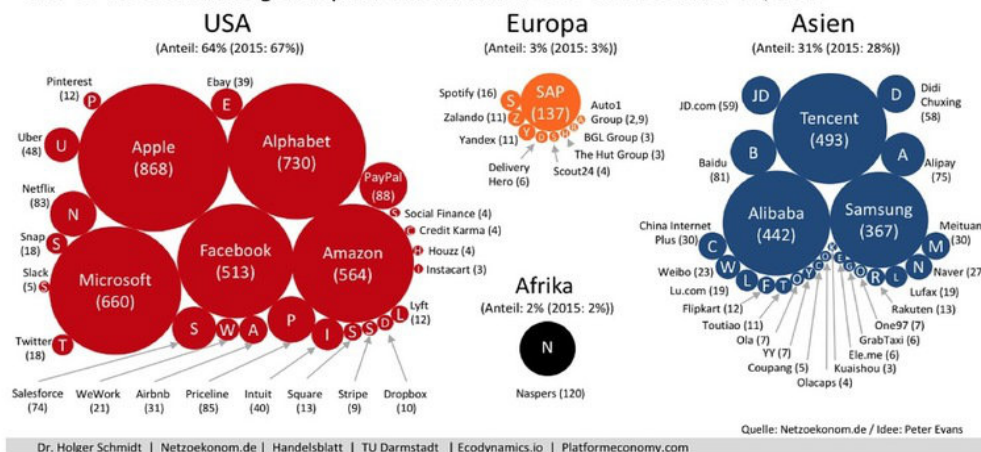
Creating a Digital Single Market has been a priority for the current Commission (2014-2019) which has invested huge efforts in breaking down regulatory barriers and modernising rules related to copyright and the audiovisual media sector. This was highly necessary. But because the Digital Single Market has only become a priority under the current mandate, progress has so far been too slow to leverage the size of Europe and its broad talent base. Media companies innovate primarily within the national environment, fortified by language and regulatory barriers. National borders, do-it-alone approaches by sector participants, the absence of industrial policies and the lack of technological transfers from the defense and security field to the media sector hold back the impact of innovation. Larger audience scale, more capital, and industry-wide participation, technological transfers are required to develop successfully *moonshot projects*.

The following structural limitations prohibit the growth of European media innovation capacity - the absence of a) digital platform economy players with global leverage but European origin; b) pan-European, peak performance data and digital delivery infrastructure.

Academics and industry analysts alike have hailed that we are entering the age of the platform economy - where the leaders will be global platforms - "based on enabling value-creating interactions between external producers and consumers. The platforms overarching purpose [is] to consummate matches among users and facilitate the exchange of goods, services or social currency, thereby enabling value creation for all participants"⁶⁷.

The imbalance of platform economy

The 60 most valuable global platforms in billion USD on December 31, 2017



It does not come by surprise that the world biggest super platforms are players from the US and Asia - the so called GAFA, and the Asian Tencent, Alibaba, and Softbank. In the US and in China, the emergence of these global platforms have been made possible by strategic industrial policies based upon strong R&D investment via major public civil and defense programs.

Nowadays, these global super platforms are harvesting European content producers and content consumers through multi-layered network effects, instant access and state of the art infrastructure. The platforms effectiveness relies on the combination of customer-centric innovation, immediate availability and on, extensive reach, ultra low cost yet state of the art infrastructure. Foreseeably, the GAFA + Netflix and the only European-originated platform - Spotify - have reached their exponentially exploding customer base through the utilization of platform effects and infrastructure. **These platforms combine capacity to collect huge quantities of data, capacity to innovate and consequently reinforce their competitive advantage by leveraging AI, reinforcing everyday their capacity to capture revenues** but also to structure markets.

To survive in the near future, **Europe needs to foster European, cross border platforms and state of the art infrastructure to allow European media innovations to the scale and achieve the potential of the Digital Single Market and beyond.** Fostering European platforms and platform infrastructure not only boosts the overall competitiveness of the media ecosystem but will give rise to new ecosystems and innovations. For example, the streaming hardware and software giant *Roku* has more than 22 million active users⁶⁸ by creating a streaming platform open to thousands of content licensors and aggregators. One can wonder - where is European hardware and software equivalent of *Roku* which would enable the streaming to the some 800 European publicly funded feature films that have not made to any digital streaming service?

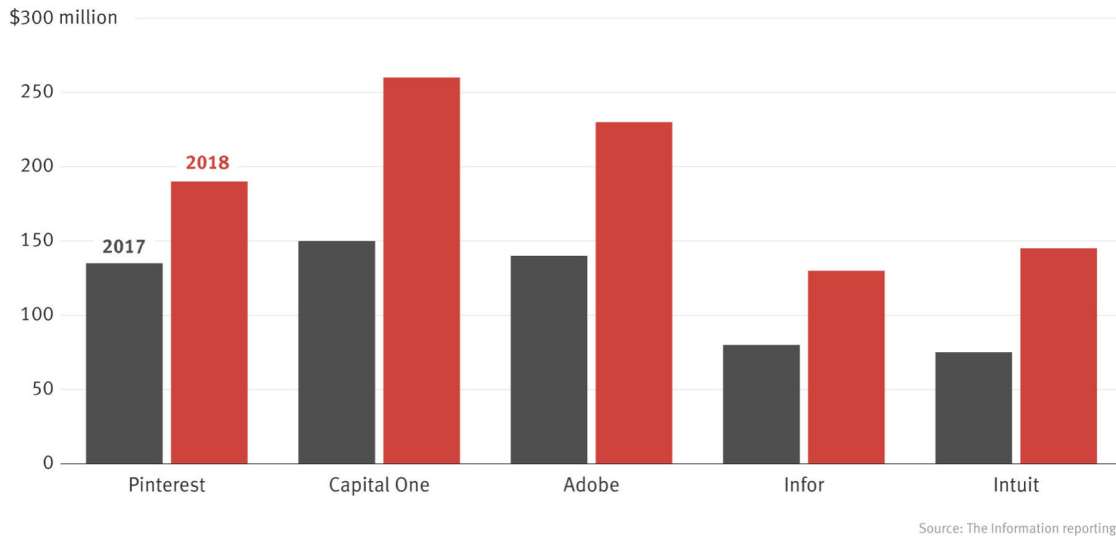
But building platforms comes with costs of entry. Platforms thrive on network effects. Achieving those network effects requires scale, capital to reach this scale and a favorable regulatory environment making transnational cooperation and joint-ventures or alliances easy in the media sector. Europe's fragmented media market, national and linguistic boundaries, lack of venture capital, slow public funding or national remits for public broadcasters not favoring enough cooperation despite the *European Broadcasting Union (EBU)* makes a successful European media platform an unlikely exception. The scattering of innovation and money and lack of European cooperation risk creating a valley of death for impactful technology innovation for media.

Today's successful platforms in the media space are underpinned by data, analytics, and their integration into the operation of the platform. Sophisticated analytics and data science get complex very fast. Specialised hardware, data, algorithms, and their integration into everyday workflows have work together in concert. For instance, technology companies realise that they need custom processors for AI-based computation in order to maintain or expand their market position. European media companies.

Google built specialised chips to accelerate machine-learning tasks and reduce compute costs⁶⁹. Many others are also building their own chips, such as Facebook though its recent partnership with Intel⁷⁰. The costs of processing are closely intertwined with the costs of data storage. The cloud so far has been a convenient way for companies to store and calculate data without the need for proprietary infrastructure. But the cloud is both democratising and totalising.

Climbing Cloud Costs

AWS bills for several big customers increased significantly in recent years



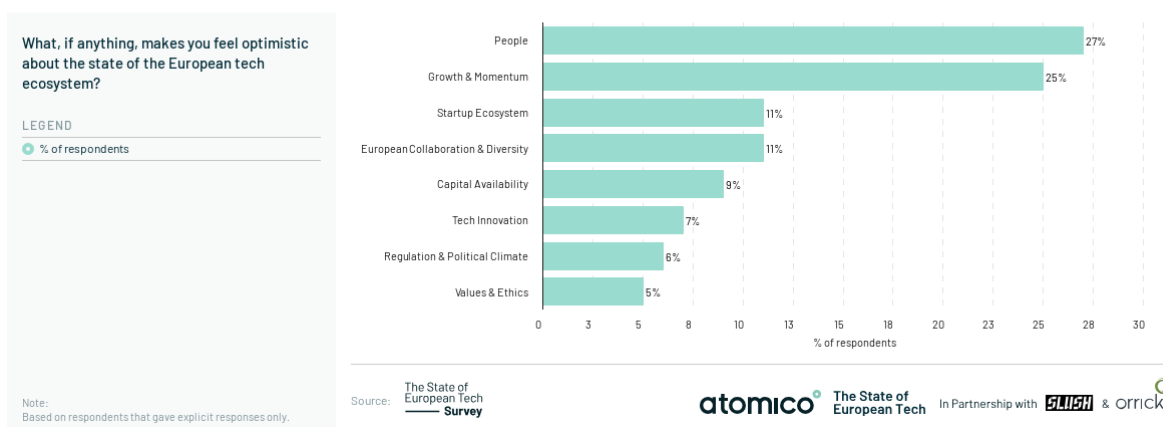
Source: The Information

While it gives more organisations access to cutting-edge technology, the costs of running complex calculations explode fast, and are hard to control. The Information, a news portal for Silicon Valley insiders, recently reported that companies have been caught off-guard by their rising bills on Amazon's Cloud, AWS. Only those who own these infrastructures or have near infinite budgets can afford to run the calculations at scale that are critical for future market success. These dynamics combined further increase the barriers of entry for European media companies.

Building an alliance of European media and tech excellence

Despite the fact that many of the world's biggest technology giants and the GAFAs are non-European origin the European tech sector still remains competitive globally. The influential annual The State of European Tech report pointed out recently that "the European tech ecosystem itself, including its founders and especially its VCs, agree with a plurality that European founders can compete equally on the global tech stage"⁷¹. The report furthermore stresses the importance of the plural European environment as a strong competitive force, the importance of heritage industries and the importance of European talent. To be clear- the " respondents gave a clear number one reason: the people that make up the tech ecosystem"⁷².

The factors that are driving optimism around the future of European tech are many and varied. But when asked to state the most important grounds to be optimistic, respondents gave a clear number one reason: the people that make up the tech ecosystem.



Source: The State of European Tech 2018. Atomico in partnership with Slush and Orric.

The success of the European tech sector, resides partially due to the foundations created by a diverse, democratic and forward looking European media industry - which enforces European collaboration and diversity, values and ethics, as well as promotes often European talent, ecosystems and success stories.

However, as of now, the relationship between the European media tech sector and the media sector has been primarily one directional - with both industries innovating in their silos and the media sector, especially the European audiovisual industry jogging behind the European tech sector sprinters.

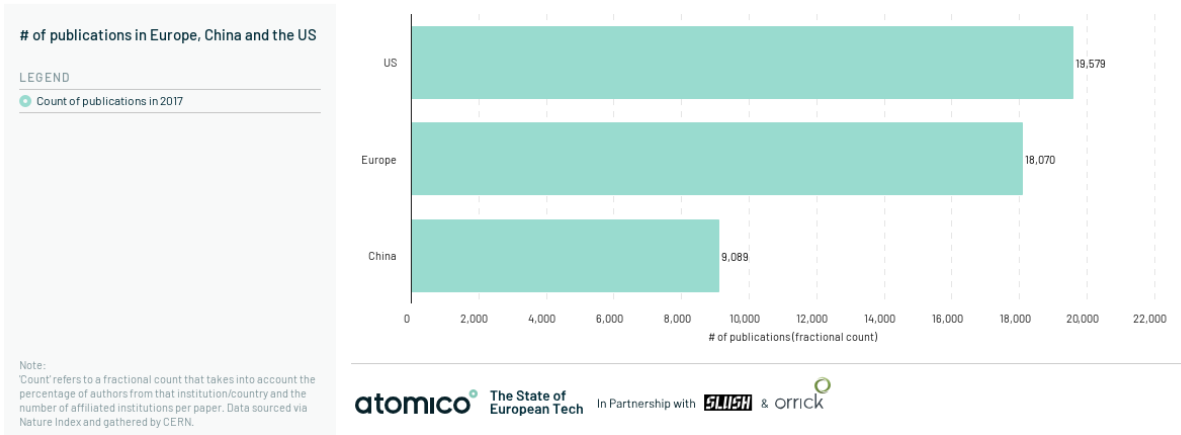
The primary reason for these have been the lack of high growth solutions and platforms in the media industry attracting venture capital investors, the absence of joint development programs, events and innovation platforms demonstrating the potential and impact of EU tech, the slow adoption and utilization of joint European R&D in both sectors, the lack of joint global mission that would establish dialogue and actions between the tech and media communities.

Firstly, the tech and media industry need to jointly harvest the benefits of the European R&D community - the ideas and knowledge factory which output can establish the foundations for the creation of the global platforms of tomorrow.

The many great challenges facing the world will require deep tech (or rather deep science) solutions. The convergence of tech, AI, Genomics, etc. creating new "internet" type opportunities will create the next Googles and Amazons...The desire for impact. A new generation of scientists, VCs, philanthropists, and entrepreneurs want to make the world a better place, not just get rich. They aren't interested in the next app for drone delivered pizzas. ...Universities are under pressure to engage with VCs and to enable the channelling of their research into the outside world. And finally, VCs can bring money, but more importantly their talent, to combine with deep tech/science so this channel becomes REAL"⁷³.

Dave Norwood, Oxford Sciences Innovation

Europe's research community is an ideas and knowledge factory and produces research at a level that is globally competitive and on par with the US.



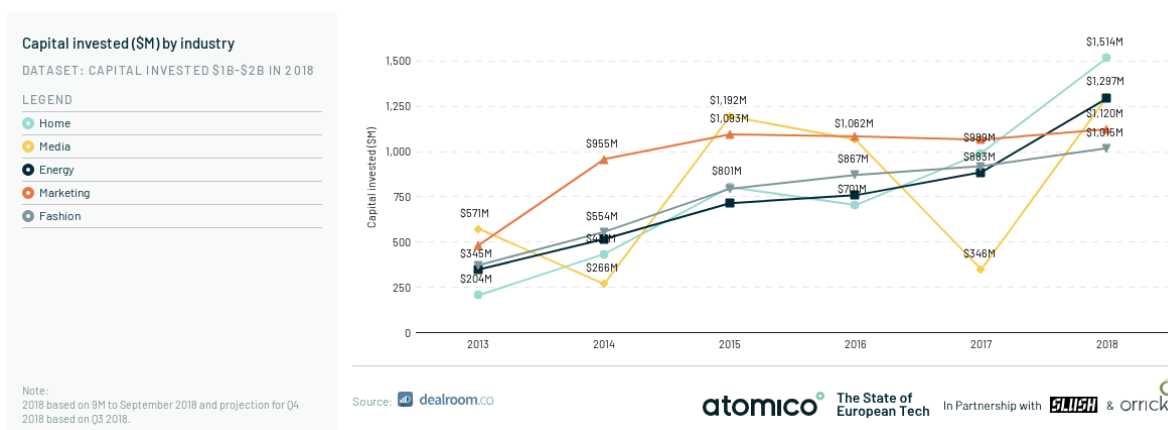
Source: The State of European Tech 2018. Atomico in partnership with Slush and Orric.

Secondly, the investments into European mediatech sector by the VC community must be supported by public guarantee measures or the creation of specific mediatech investment funds to support the influx of capital and innovation practices into European media sector.

Thirdly, the creation of interdisciplinary tech and media industry network must be supported where both sectors can learn from their experiences and address their global challenge.

The main obstacles the European tech industry according to their own words are **prioritization of diversity and inclusion, mobilization of talent pools, building density through interconnected hubs, building an investor base for underrepresented communities, bridging the tech and tech and policy divide to harness tech for good, and losing European inferiority complex**⁷⁴. Enhancing two way development strategies and providing support mechanisms for the increasing collaboration between the European media and tech industries can help to overcome these challenges and establish Europe as the global leader in tech and media alike.

There is a high level of industry diversity in terms of where capital is being invested in the European tech ecosystem at scale. The dominant industries in 2018 are fintech, software for enterprise applications, digital health and transportation, all of which are on track to be in excess of \$2.5 billion in total capital invested in 2018. Beyond those four industries, there are a further four industries that will all surpass \$1 billion in capital invested this year.



Source: The State of European Tech 2018. Atomico in partnership with Slush and Orric.

In specific, we argue for the creation of European mediatech hubs on the sides of the European tech centers, establishment of support funds for development and scaling of European mediatech solutions, pilot programs at the European Commission level for piloting innovative European tech in the media and audiovisual industry, as well as increasing the fiscal support mechanisms for encouraging European VCs to invest into lower revenue growth European media and entertainment tech solutions and founders.

The future of European Media:

**A fundamental
democratic,
geopolitical,
cultural,
societal and
economic
challenge**

The future of European Media: A fundamental democratic, geopolitical, cultural, societal and economic challenge

After more than sixty hearings across a vast range of industry players, we have strong and robust evidence that the future of media and the future of our European societies are intimately interwoven. In this era of data, AI and global platforms, the challenges in the media reflecting the main challenges of Europe at large.

The democratic and geopolitical challenge

Our democracies are based upon fundamental values and principles. These are freedom of speech, diversity of voice, enabling informed and educated citizens to exert their critical thinking, tolerance, dignity, and fighting against discrimination and hatred. They also include equality of access to information and privacy, each citizen being free to read, listen and watch any media without anybody to be informed of it. The development of a strong pluralistic and sustainable public and private media ecosystem in each European country has been instrumental to anchor and nurture European democracies. Up to recently, these principles have always prevailed over the economic interests of a limited number of corporations. But this has changed.

Over the last decade, these principles and values have been rapidly put into question by the global digital platform economy, in particular media platforms.

The AI algorithms that underpin these platforms and social networks are black boxes and corporate trade secrets. They are optimized according to a corporate logic that generates the most commercial value for the platform owner. Their objective usually is to drive traffic and maximise engagement to drive user time and loyalty and ultimately revenue. But algorithms are not neutral. Algorithms encode often latent value systems and lay-psychological and lay-sociological assumptions. They can give priority to democratic values, or to other interests without users being aware. Platforms are critical social infrastructures. Their algorithms create social outcomes in the way they curate information, and how they connect people and opinions.

Doing so, they may favor filter bubble effects, push sensational content and fake news and fail to ethically comply in the interest of the citizens⁷⁵. They also develop new kinds of communitarianism and contribute to fragmented societies, making public debate more and more difficult to be conducted on a rational basis.

In addition, the increasing knowledge of their audience, by gathering and processing usage data, allows them to predict vote whereas the vote is a fundamental secret decision at the core of our democratic system.

But as societies, we have no grasp on how these algorithms function. We need to ensure our values are reflected in the algorithms, not the other way around. In the analogue world, we had must-carry rules for TV channels that were of particular public relevance. We have lost the ability to understand the media infrastructures around us and struggle to intervene in them. Their black-boxed and privatized nature means our societies are increasingly constituted by systems that are not based on our values.

These platforms also have a major economic impact on European media. They capture most of the advertising revenues which were funding the press and audiovisual sector both at national and local levels. This revenue transfer has dramatically reduced the resources for journalism, investigative and feature length reporting, increasing a distrust effect with regards to traditional media and creating a series of vicious circles for democracy. The less money traditional media has, the less it invests in journalism. The less quality content is produced, disseminated and trusted, the more distrust in society flourishes. In this context, future neighbouring rights are excellent news but will never compensate the drastic revenue loss experienced by media.

The impacts are particularly felt on the local level, where revenue of the local press is eroding. The local press covers areas and themes that are not being followed continuously by other journalists. Quality of local information consequently decreases, national and international news agencies using local journalists to be informed are less well sourced, major mass media using these agencies as a significant source are less well informed, some key issues are consequently not well or enough considered by the media system.

The cost for society is high: citizens and leaders are increasingly disconnected to what happens in certain territories, which makes more difficult thinking of the cohesion of society but also taking a right political decision.

The democratic challenge through algorithmic platforms also is a geopolitical challenge. In a weakened media ecosystem, non-democratic organizations and non-European powers may take advantage of these technologies in order to increase "informational disorder," and to reinforce distrust via the organized promotion of fake news and disinformation and with the clear objective to fragment our societies.

Researchers have described this as the *chronic condition of misinformation*⁷⁶, utilized to their advantage by different players from hostile governments, corporations, and criminal organizations to undermine the social and political institutions and democratic processes in the society "The goal is not to fool people into believing any one individual lie. It's to overwhelm individuals' ability to determine what's true, to create chaos, and to undermine the social institutions that we rely on to convey and evaluate information"⁷⁷.

Even though social networks are, in a sense, the marketplace of ideas, no organization currently bears the responsibility for addressing large-scale systemic problems that affect them. It is no one's responsibility to alert affected individuals to mass disinformation campaigns that target them with extraordinary precision.

The risks are increasing with deep fakes and the future capacity to attack media and cultural archives which are the shared memory of our European societies. We also fear the *development of noise cancelling systems*⁷⁹ by foreign powers aiming at neutralising information they do not like. We would like to salute the huge work conducted by the European Commission and the EC European Political Strategy Centre (EPSC) on these topics.

The cultural and societal challenge

The cultural challenge is multifaceted. One major issue is creativity. The new digital technologies can contribute to create new audiovisual, informational and cultural formats and bolster European creativity. At the same time, conditions need to be guaranteed for creators so that they are not to be exclusively led by data-driven approaches and are able to express their creativity and imagination.

In addition, the global platforms structures both content formats to be displayed and the way users are consulting the format. The uniformization risk is high in the medium run. So visibility and findability of the works and content of public interest are fundamental. In this respect, the AVMS directive is an important step.

A key topic is the funding of creation to allow a diversity of works. The funding under pressure of the media system is a real challenge to which the answers are at the moment too limited. Neighbouring rights are a small part of the answer, a strong copyright system is fundamental.

A more general stake is the societal acceptance of the data, AI and blockchain technologies and their adoption in European societies. Reluctance for AI and the fear that AI development goes beyond the human control or could be a massive job-killer is a real limit. It is important to develop an ethics of these technologies which is human centered. It is highly important that these technologies are used in favor of the humankind, mastered and serve Europeans interests and values. The media sector being at the center of our societies is a major ground to test and experiment with these technologies. So, we believe that if these technologies are adopted successfully by the media sector and that their benefits for citizens are clear, their acceptance and adoption will be much quicker for the all European society and economy.

The economic challenge

This challenge is twofold for European societies :

It is a challenge in terms of quality of information and good functioning of the social-market economy. Our social-market economy is based upon a good quality and transparent informational framework, allowing European consumers and European producers to take economic decisions and make choices on a rational basis. The conditions for this qualitative information are less and less guaranteed. The platform economy based upon the capacity to value data in a non transparent way and to structure entire industry-sectors thanks to strong networks effects biases the normal functioning of the economy. The capacity of these platforms to leverage AI could reinforce the bias. Practically their search engine functions and more generally their algorithms give more visibility and rank better ad-sponsored and community-sponsored information. This accentuates informational disorder for economic actors for which the difference between information and ad sponsored information is less and less obvious. On the other side, traditional high quality media develop increasingly digital business models based upon digital subscription so that there is less and less free quality information for an important part of the population, limiting de facto equality of chances and economic opportunities for these concerned citizens and economic actors and contributing to less inclusive growth.

It is also a challenge in terms of economic value creation.

As shown earlier (see Section Recapturing economic value above), an increasing part of the revenues of traditional media is captured by non-European data and AI native global tech companies. These latter pay little tax in Europe and obey only partly to European regulation, contributing to a playing field little favourable to European media innovation and growth.

Vision:

An

**Indispensable &
comprehensive
industrial
strategy to
safeguard and
reinvigorate the
European media
sector**

Vision: An indispensable and comprehensive industrial strategy to safeguard and reinvigorate the European media sector

The time for a comprehensive industrial strategy on media is now. Both European media companies and citizens are highly engaged on the subject.

European media should join forces to stay relevant on a global scale. After the press being disrupted by social media and mobile services during the past decade, traditional TV is now at a tipping point. Viewing is shifting rapidly from linear plus catch-up services to data driven video on demand platforms. Technology giants have entered the content market rapidly. European quality and diversity in media is still there at the moment but it lacks scaling capabilities. These should be built fast. Actions are currently on the table, the Commission has for example proposed to increase investments to support the media ecosystem, with a specific budget of €61 million within the Europe Creative 2021-2027 programme dedicated to quality journalism, media freedom, media literacy and media pluralism. However, supporting policies and R&D initiatives that foster European wide collaboration on cloud platforms are crucial.

This media market transformation and its side effects also move European citizens. Misinformation and improper data use entered the public debate. Effects of these technological changes both on society as on individual citizens are big and a growing topic of concern pluralism and democracy as we know it are at stake.

A comprehensive industrial policy on media should combine all possible instruments in a powerful way. Regulation, competition and fiscal policies are logical instruments that should be used in their most effective way while fostering innovation to create a level playing field for European media while preserving European fundamental values. To really catch up also common R&D and platform development should be massively accelerated. Education both of creative and tech profiles should be fostered. The market for media and technology talents is already highly competitive and demand outstrips supply.

Effective regulation on data portability and interoperability between platforms needs to be part of these policies. It is a precondition to make competition possible. New innovative platforms leveraging fully AI potentialities can arise when data is not monopolised, can be traced and if possible certified (e.g., using a trusted blockchain), and services are open.

Starting up this comprehensive media policy and the development of a European narrative about it is a big opportunity for the next European Commission. It should

help the development of European platforms that do scale and do represent European democratic values. In this respect, initiatives both from public (e.g EU funded *Mediaroad*) and private (e.g. adtech cooperation such as Ozone) organisations should be strongly supported and scaled. Future European platforms can include technologies that are in particular relevant to Europe like multilinguality and subtitling and algorithms and AI that is good for citizens and democratic society as a whole.

A group of thought leaders from academia and European media companies should assist as soon as possible the Commission to get all this up to speed. Both public and private media and tech companies are grouped in membership organisations and alliances that are ready to act.

A sustainable, innovative and independent European Media ecosystem to serve European democracies, creation and societal transformation

We are entering a world where international relations are tense, where geopolitical power and technology power are intertwined, where information war is the norm, where algorithms and AI are part of the fabric of society. It will be indispensable for the European Union and its member states to have an independent, innovative and economically sustainable media ecosystem that guarantees a free access to quality, diverse and certified information to all European citizens in their native languages. This ecosystem should be diverse and pluralistic, and should favour a real articulation between local, national and European public spheres. The role of data science, AI, blockchain, and neurosciences will be pivotal in the media of the next decade and AI will be integrated at the heart of all media organizations. These technologies should be used at the service of European societies to improve the quality of information, the creativity of the media actors, and help citizens to find their spots and references in complex societies. New tech tools should be used also by journalists to augment their work - from developing their investigative capacity to contextualising information.

Data concerning the relation that citizens develop with informational and cultural contents should be considered as a private asset to the extent it can be considered as a part of the intimacy of the users and it gives critical information with regard to one's political and cultural behaviors. In this respect it is crucial that citizens can decide to whom and for what purpose they share their intimate data.

On the one hand, AI techniques should help to automatically detect fake news, but on the other hand, they will increasingly continue to automatically generate fakes (texts, images, videos) that are indistinguishable from the truth for normal human beings: we have entered the usual never-ending arms race, that no-one can expect to win. While research should nevertheless be pursued, other means are also necessary: on the technological side, the creation of public interest blockchains

should be considered; and on the behavioral side, educational means should be given at all stages of education to help the citizens to recognize and discard disinformation techniques.

Furthermore, high risks will also weigh on archives of the media, and more widely on cultural archives: archives digital preservation and authentication should be a top priority, with infrastructures to authenticate and preserve them in the long run.

The capacity of the media ecosystem to innovate jointly in terms of content creation and tech should be reinforced and cooperation for R&D, sharing skills and developing platforms should be the rule. Competition rules should favour cooperation.

At the same time, any such policy should avoid a simple anti-platform rhetoric. Setting up competitive Europe-native alternatives to foreign actors by decree is not realistic. Instead, an industrial policy should mandate platform companies that generate revenues in Europe to develop deeper cooperations with European media companies, but without hooking them to any particular technology or private ecosystem, e.g., by enforcing interoperability.

Beyond merely being able to use those platforms for means of distribution and monetization, core underlying technologies should be opened up for European media companies to built on. In the Fabernovel model (see below), media companies are primarily users of platform - they merely plug in. In this respect, **the industrial policy we call for should create incentives and frameworks for both media companies and platforms to partner, co-innovate, and to enable media companies to build differentiating services leveraging a platform's technologies.**

This could include encouraging second-tier platform companies to license key technologies to the European media and adjacent R&D sectors to co-innovate and jointly build competitors to leading players. Such collaborations are not fiction. Even Facebook and Google, antagonists in many areas, started to work together in 2018 to customize Google's AI hardware (TPUs) for Facebook's open-source machine learning framework PyTorch⁸⁰.

A new comprehensive policy must acknowledge that media are operating on algorithmic infrastructures that modulate the dissemination and curation of information. These infrastructures should not be seen as private property removed from intervention or external participation. A new media policy should seek inspiration in must-carry rules of the cable industry and the management of infrastructures in other sectors with the aim to ensure that European media can thrive on algorithmic infrastructures, and to give European citizens' choice and leverage how information for them is curated.

Such a policy also needs to foster citizen's abilities of critical thinking, media literacy and tech open-mindedness to ensure they can act confidently in an algorithmic media world. Nurturing STEM (Science, Technology, Engineering and Mathematics) skills is vital, but not sufficient.

A binary choice of *program or be programmed*⁸¹ people where some citizens can intervene in technology while others are manipulated by it, is not an option for Europe. Europe must ensure citizens are not divided in their ability to critically participate in the public sphere based on technology skills. AI-enabled mediation tools should be developed to help citizens understand the mechanisms and patterns of algorithmic recommendation and to manage the criteria by which information is recommended to them. The *Element of AI* Finnish site⁸² is a good example of what can be done, targeted to the general public. This could be completed via a *Mentor AI* that allows citizens to instruct recommendation algorithms how they would like information to be filtered⁸³.

Critically, the blurring boundaries between media, platforms and algorithms means that an industrial policy for media needs to be broader than media itself. It needs to stand in context of wider policy and funding initiatives around AI and technology. Rather than re-inventing technologies from the ground up, media innovation should be able to leverage AI technologies built in Europe and in the world, help shape the R&D agenda of AI development and be attributed a share of the research budget dedicated to AI. Media should be a key 'application' for technology innovation funds in Europe.

To succeed, regulators and politics need a decisioning template to understand what types of algorithms in media affect issues like media pluralism, economic sustainability of the sector, democratic independence and the rights of citizens. Not all algorithms are created equal. Europe needs tools and methods to determine their impact and guidelines where regulation or stimulation is required. Similar to the academic roots of the *right to be forgotten*' policy makers should look to academic concepts like *public relevance algorithms*⁸⁴.

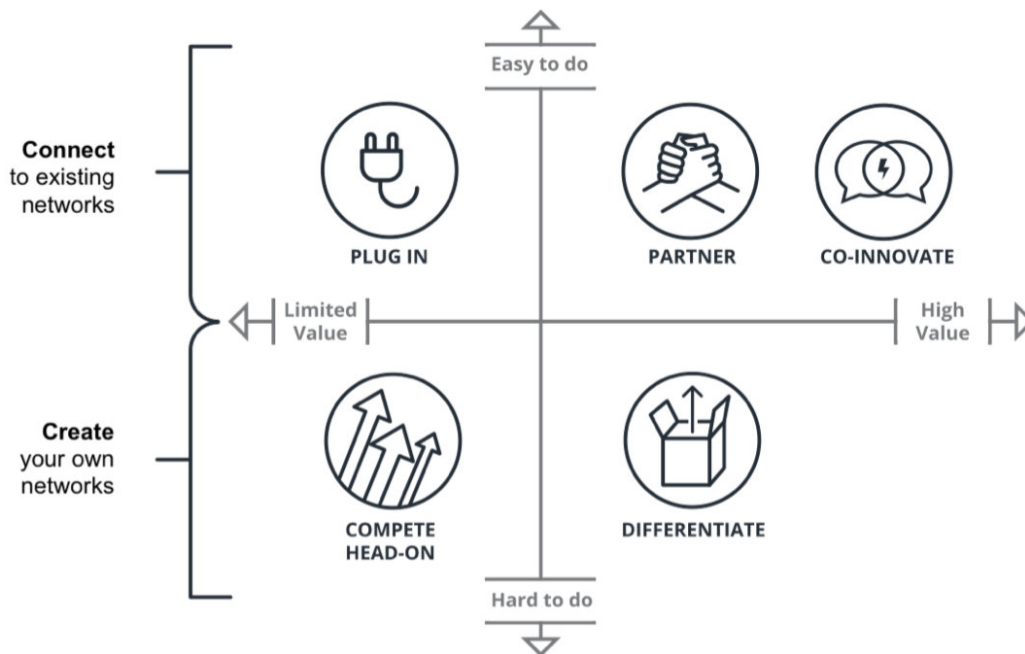
Ultimately, the infrastructure of the Internet itself also plays a crucial role. Because data-centralized economy is not compatible with our values, because platform economy possibly leads to non-democratic practices, Europe should lead the way toward alternative organization of right to personal data, in which the users have full control over their data and how services (algorithms) use it. This will furthermore create transparency and trust for users in how and by who their data are being used incl. by machine learning algorithms for advertising purposes.

Such possible alternatives already exist (e.g., Tim Berner Lee's *SOLID* project⁸⁵, MIT's *openPDS* platform⁸⁶, the *W3 ActivityPub* protocol⁸⁷) and are already supported by the Commission, e.g., by DG CONNECT⁸⁸ but more political momentum and more research are needed.

To make the transition possible between from the current oligopolistic global platforms of today and the totally distributed user-controlled alternatives, interoperability is mandatory. This vision could be favoured by regulation. But more importantly, because centralized platforms have heavier means to fight fake news or hate, Europe should offer public services to small providers to help them comply with the European regulations about content.

Six dimensions of public relevance algorithms after Gillespie:

1. Patterns of inclusion: the choices behind what makes it into an index in the first place, what is excluded, and how data is made algorithm ready.
2. Cycles of anticipation: the implications of algorithm providers' attempts to thoroughly know and predict their users, and how the conclusions they draw can matter.
3. The evaluation of relevance: the criteria by which algorithms determine what is relevant, how those criteria are obscured from us, and how they enact political choices about appropriate and legitimate knowledge.
4. The promise of algorithmic objectivity: the way the technical character of the algorithm is positioned as an assurance of impartiality, and how that claim is maintained in the face of controversy.
5. Entanglement with practice: how users reshape their practices to suit the algorithms they depend on, and how they can turn algorithms into terrains for political contest, sometimes even to interrogate the politics of the algorithm itself.
6. The production of calculated publics: how the algorithmic presentation of publics back to themselves shape a public's sense of itself, and who is best positioned to benefit from that knowledge.



Source: Fabernovel

Strategic recommendations

Strategic Recommendations

The time for a comprehensive industrial policy on media, leveraging the latest digital technologies, is now. There is a strong, positive climate to engage on the subject from both European media companies and the research community. Public awareness is changing: citizens understand clearly that democracy needs strong quality media if it wants to survive.

Starting up this comprehensive media strategy and the development of a new European narrative on media and democracy in the platform and AI era is a big opportunity for the next European Commission. A group of thought leaders from academia, European media companies, tech and civil society can assist the Commission to get it up to speed. Both public and private media and tech companies, are grouped in membership organisations and alliances that are ready to act. Researchers, consumers organizations, trade unions and cultural stakeholders will join them.

Reshape the mindset : designate Media and New Tech a top industrial priority for Europe

We need a new approach that moves media from the margins to the centre of industrial policy. The era of big data, algorithms, global digital platforms and convergence knows no frontiers. The media sector is faced with global and disruptive competition that cannot be acted upon within national boundaries. Previously, the media sector was considered non-strategic for innovation due to its comparably limited turnover. Today, some of the world's largest companies blend media and technology. In addition, for Europe, innovations at the intersection of media and technology are vital for a diverse and inclusive public sphere. The latest developments in automated translation open the perspective of a real transnational public and media space by the end of the next decade. As democracy is under pressure, media should not only be assessed according to its economic impact but more widely with regard to its contribution to European democracy, culture, social cohesion and fundamental values, and consequently to the development of collective and personal identities.

Software eats the world, as the venture capitalist Marc Andreessen said. Indeed, ever more areas of the European economy and people's everyday experience are mediated by software platforms, with wide-ranging socio-economic consequences. Platforms are inherently neither good nor bad, but by their very nature completely transform how a market operates. The media has been one of the first sectors impacted by the global digital platform economy. Its specific form has weakened traditional media business models, captures most of the economic value and challenges the ability to develop sustainable business models. Platforms have recast competition in the media sector as a technology competition.

European media companies are adapting in these changing times. They are becoming data-driven and user centric incl. data journalism. But to succeed, they need critical size in terms of quality data and R&D capabilities, and negotiating power towards the technology giants they are increasingly dependent upon. This requires new kinds of cooperation but also a renewed ecosystem. Without structural action of the public power, these global technology giants and the platforms they operate do structure both the offer and the supply. They are biasing the functioning of the market and preventing the entry of new competitors, de facto limiting innovation outside their own walls.

We propose consequently **to develop a systemic industrial strategy for the media sector in Europe leveraging the potential of new digital technologies**. This strategy should be co-built with the stakeholders of the media sector at large. These stakeholders could be gathered in the framework of **a EU media stakeholders' forum**. This forum would have the vocation of being a permanent consultative body.

Recommendation 1 : Develop a New industrial media strategy co-built with a EU media stakeholders' forum focussed on leveraging new digital technologies and creating a virtuous circle between European media, Tech and the creative field. A shared ambitious and proactive "Vision 2030" should be defined, with a rethinking of the media branches at the time of convergence, AI and platform.

This New industrial media strategy should be a top priority of the next European Commission mandate. Its three objectives should be to (1) speed up the digital transformation of European media and help media companies to benefit from the untapped opportunities of the Digital Single Market, (2) create a level playing field while preserving European fundamental values and (3) favour a sustainable, innovative, cooperative and independent media ecosystem serving democracy, creation and society transformation. This strategy should take advantage of the next European Budget (MFF) and of its new programs such as Horizon Europe and Digital Europe.

The New Industrial Media strategy: focus on freedom, ethics and citizens rights

This systemic industrial strategy should be underpinned by clear values and ethical principles around the use of data and artificial intelligence. Economic progress and competition must be aligned with societal values and individual or collective freedoms which are at the core of our European democracies. The Cambridge Analytica scandal has pointed out the ease of extracting the political profile of a citizen from her personal data. This contradicts privacy rights and the secrecy of the vote, which are protected throughout the EU. It is crucial to establish a political reflection regarding citizens' rights and liberties when the media environment is a data and algorithmic decisioning environment.

As an example, **it is important to give European citizens economic rights over their data including access control and data interoperability when dealing with personal data** linked to the consultation of political, societal and cultural information that should be protected as the secrecy of the vote is. We need a **New Deal on Data**.

Every citizen must be able to access diversified quality information within the EU. We propose to develop a right of access to a diversity of free and qualitative information in one's own language for every European citizen. The implementation of this right could be facilitated by the implementation of a European quality content media platform, equipped with automated translational tools.

Quality could be enforced by the development of a European blockchain infrastructure, which would support new trust services and tokens, with certain guarantees provided by the EU Member States, in order to contribute to quality insurance while preserving the sovereignty of the continent. Ideally, it should also be possible to act faster on the diffusion of suspicious contents, and stop it, or at least slow it down, until deeper analysis has been done. This principle should of course be conciliated with the freedom of speech. Furthermore, current technology might not always be capable of identifying suspicious contents without also looking at its diffusion patterns, nor to prevent its fast diffusion. Hence it should probably be limited to the responsibility of the identified "content accelerators", as defined in the recent report about fighting racism and antisemitism on the Internet⁸⁹.

Wide access can be made possible thanks to the progress of automated translation and for example co-operation between national public service media that share the same value in terms of independence, quality of information and diversity.

We finally propose that the media sector and actors should be trailblazers by actively **taking part in the pilot phase of the AI Ethical Guidelines** developing a specific assessment list for the sector in link with the media stakeholders, and providing feedback by the end of this year. The sector could then take the lead to implement these guidelines and set up the global standard for media.

In the end, ethical standards may not be applied in isolation in a given geographical area without causing concerns as regards their cultural and economic impact on a globalized industry. Discussions at global level should be further strengthened so that any EU ethical standards become a global landmark.

In the end, ethical standards may not be applied in isolation in a given geographical area without causing concerns as regards their cultural and economic impact on a globalized industry. Discussions at global level should be further strengthened so that any EU ethical standards become a global landmark.

Ethical rules imply a minimum level of transparency of algorithms and platforms: fairness, loyalty, explainability are ill-defined concepts from a formal point of view. There are no measurable KPIs to assess the quality of a given software in these aspects. Experience shows that self-regulation is not an option anymore: despite strong commitments, commercial considerations seem to always come first. Hence, the only way to check ethical properties is through experimentations. But large-scale experimentations are not possible today on these platforms: for instance, it is not possible to issue more than a small number of queries from the same computer on google scholar. It is not possible either to create thousands of profiles with known characteristics on Facebook in order to implement controlled experiments regarding biases. Similarly, some platforms and websites have been threatening researchers, e.g. under the US Computer Fraud Act, or blocking their applications when researching transparency. In order to check the compliance with ethical guidelines, regulation should hence **enforce that all platforms expose specific APIs targeted to experimental assessments** (kind of “**algorithmic sandboxes**”), open to academic researchers as well as to some designated public committee of appointed experts, or recognized citizen associations, as it should be possible in all democracies (see Recommendation 11).

Alternatively, and simultaneously, such **right to know** should also be enforced at the individual level, in order to increase the awareness of the public to what is being used, and how, from his personal data. For instance, some transparency tools currently offered by platforms are unlikely to be sufficient. Regulation should impose to tell the user why, and on the basis of which personal data, this or that article/video etc has been proposed to her or him;

Symmetrically, a “**neutral**” **button should be available for the user to see what would have been proposed without using any of personal data**⁹⁰. Finally, users should have a right to know how their data have been traded, which companies acquired the data from and with whom it shared it with. Given the well-known risk of re-identification, this should apply to anonymized data as well.

Recommendation 2: Give European citizens fundamental rights over their data including access control and data interoperability when dealing with personal data linked to the consultation of political, societal and cultural information that should be protected as the secrecy of the vote is. We need a New Deal on Data particularly when it deals with Media.

Recommendation 3: Create a right of access to diversified and free quality news in one's own language for every European citizen. This right should be implemented through European platforms for quality content, equipped with automated translation tools and accessible to all European citizens. A specific effort should be conducted to speed up the quality of automated translation in the different EU languages through a specific automated translation Media initiative (see below). The EC should favour projects in this purpose.

Recommendation 4: Create a citizen's right of transparency and accountability with regard to the objectives of algorithms. In this respect, request social and content platforms to provide transparency over recommendation and curation algorithms. Platforms that use algorithms to optimize what content people see shall need to transparently convey what an algorithm is optimizing for (i.e. maximising time spent on platform).

Request social and content platforms to provide transparency and control over recommendation and curation algorithms. Platforms that use algorithms to optimize what content people see shall need to transparently convey what an algorithm is optimizing for (i.e. maximising time spent on platform). Request platforms to give citizens intuitive tools to change these curation mechanisms to reclaim agency over the filters through which they experience the digital world.

Recommendation 5: Implement Ethical Artificial intelligence guidelines for the media sector. The Media stakeholders should take the lead as soon as possible on this issue by providing feedback on the pilot phase of the EU ethical guidelines. By doing so, European media will set the global standard for AI guidelines in the media sector.

**A series of
essential
proposals for a
European
industrial Media
strategy**

A series of essential proposals

Launch A Media Data initiative

If we want media companies to become innovative data-driven organizations, they need to have access to datasets that are both relevant and large enough. Such repository should contain correctly stamped and archived information (text, audio, video, picture) as well as relevant data concerning the user. And it should have the critical mass to allow leveraging the AI applications. Such properties are important for personalisation, re-use and contextualisation of content, monetization, and are a prerequisite to develop new business models.

In this respect, an EU Media data initiative should be launched by the European Commission. It should have the following objectives:

- facilitate metadata standard
- sponsor digital content archiving
- help data sharing between organisations and facilitate data flow
- favour the development of shared data-management platforms
- when dealing with personal data, foster the development of privacy-preserving data processing systems

Recommendation 6: Launch a EU Media data initiative with the following objectives:

facilitate metadata standard

sponsor digital content archiving

help data sharing between organisations and facilitate data flow

favour the development of shared data-management platforms

when dealing with personal data, foster the development of privacy-preserving data processing systems

Allocate One Billion Euros European media digital innovation fund

In the short term, we consider it very urgent to spread and manage innovations in the media sector. A lot of experimentation is taking place today, but with a lot of duplication, and too few shared best practices. We recommend developing places to share best practices and develop a **European fund to support innovation in the media sector** in the same mindset of Google DNI fund, which is anyway coming to an end. While we appreciate the Google initiative, how smart and easy to use it is, it raises real issues for many companies in that they are increasingly dependent upon Google (e.g. distribution, advertising, audience measurement, research and development). We estimate the public investment required to spread innovations in the sector at about **1 billion euros for the next 5 years**.

This fund could be **focused on data analysis technologies, AI, blockchain, neurosciences and the media sector**. It should be established for 5 years and reconstitutable. Its financing could come from the EU but it could be complemented by private funds (businesses and foundations). It should be part of a wider media investment strategy to be defined with the support of the European Investment Bank and the Member States who should be encouraged to invest more in media innovation.

We recommend also to support the generation of quality content **by leveraging the potential of AI for example for international data journalism cooperation** in the field of investigative journalism (such as leaks) but also for the understanding of international topics such as migration and climate change, which need to analyse large amounts of data, requiring data processing technologies and machine learning algorithms to develop a better understanding of reality.

Another major topic is the **quality of information and the fight against informational disorder**.

It is also important that this fund is not limited to new tech innovation funding, it could be equipped with **interdisciplinary highly skilled professionals** able to advise European companies and help them speed up their digital transformation strategies. This is also important to retain in Europe young highly skilled professionals who want increasingly to work continent-wide and not limit themselves to work with single companies that they consider too small and not challenging enough.

Recommendation 7: Create a European Media digital innovation fund with a One billion Euros initial EU public funding. This fund should be focussed on data analysis technologies, AI, blockchain, neurosciences and the media sector. It should be established for 5 years and reconstitutable. Its financing could come from the EU but it should be complemented by private funds (businesses and foundations). It should be part of a wider media innovation investment strategy in the media sector supported by European Investment Bank and Member States.

Develop European innovation ecosystems for media : Scale up MediaRoad

It is also important to promote systematically shared infrastructures to develop a common understanding of the future of the media sector, share best practices and working experiences, develop an avant-garde media culture. In this respect, the *MediaRoad*, an EU funded pilot project gathering public and private media, academia and start-ups sets a productive precedent with its focus on data, AI and new emerging technologies. But its impact is limited due to its small scale compared to Asian and American equivalents. In addition, it is a short-term project.

We suggest consequently to drastically scale it up, to make it more sustainable, but also to promote more specific *MediaRoad* initiative for news and publishing, and reinforce interdisciplinarity at the heart of this initiative. It is important to marry technological, journalistic, creative and commercial capabilities. By doing so, it will allow to create real European media and tech hubs.

Recommendation 8: Scale up European media and tech hubs. It is fundamental to develop a sustainable European infrastructure for media to speed up innovation through much better connection between Media, Tech and Creation, share best practices and disseminate them rapidly and develop an avant-garde innovation mindset within the media sector. In this respect, the European Commission should scale up initiatives such as the *MediaRoad*, a EU-funded public-private partnership to better link media and tech.

Promote a Media Moonshots program and dare European digital platforms

Moonshots are game-changing projects that could allow the European media ecosystem to both recapture economic value by developing new collective business models and reinforce technological and technical independence. The EU should promote the relevant legal, financial and human environment to allow Moonshots to take place rapidly.

In this respect, several topics have been identified which could allow European media and companies to recapture economic value such as :

- the development of **transnational quality content platforms** possibly structured by linguistic areas. These platforms could be specific (such as the one existing yet for Comics) or generalistic, they should also be interconnected. Practically and to start with a critical size, **public service and private media in Europe could develop on a volunteer basis a powerful quality platform** equipped with search, single-sign-on, and multilingualism tools (such as automatic subtitling in any EU language by choice) making content from other Member State accessible and providing editorial access for regional, thematic and language-based interests.

- It could initially focus on specific content making particular sense (for example, documentaries, news, investigation, coproductions...). The EU would provide funding for technology and technical functioning, while the content-related governance would be left to participating media organisations. This platform could be rapidly extended to other public service and commercial media and other cultural organisations providing quality content.
- the promotion of **news quality search engines** for the European media. Such search engines could be open to non-European quality content and could use European and non-European existing tech and infrastructures to be deployed rapidly.
- the development of **cross-devices and cross-platform privacy-preserving audience measurement** which will allow to develop impartial measures and better value the added value of content.
- the funding and development a **common and open-source platform for media analytics and optimization** inspired by the infrastructure that underpins Netflix and similar services. This platform shall be designed to do the data science heavy-lifting for media companies, and to provide them with cutting edge tools without investing in large proprietary teams and technologies. Applications for insight, monitoring and monetization will then be built on top of this platform. We envision a Apache for media - a technology stack that is open source and that media organizations can draw on and refine to run on the platform. This technology platform and applications could underpin online streaming platforms, content recommendation systems, newsfeed filters etc.

These different initiatives will allow Europeans to develop infrastructures, interfaces and innovation capacities indispensable to increase the amount and quality of relevant data and create the conditions to develop powerful AI apps benefitting European citizens and in accordance with their values.

Such initiatives would contribute to recreate competition and help develop a level playing field.

Though European, these Moonshot programs should have an international perspective and no limit themselves to the European territories.

In the interviews we conducted with several leading players of the media sector, both companies and professional organisations showed interest in such approaches, and some were already discussing them. Some telecommunication companies would also be ready to ally at European level in this perspective.

We considered also that **public service media should have a specific role** to play altogether in this respect, given that they collectively have a critical mass in terms of audience and quality content, an important investment capacity, and a strong leverage effect on the whole media ecosystem. In order to collectively play this role, **Member States must foster European cooperation at the heart of the national remit of public service media, and make it easier for them to share data, align R&D and platform development.** It will allow to develop a critical mass immediately and would change the position of Europe in the global competition at a minimal cost.

More generally, **it is important that Member States rethink competition regulation and policies that overlook the growing relevance of regional and global markets compared to strictly national ones.**

Recommendation 9 : Favor European platforms for quality content, for media analytics and optimization and push European quality search engines and a new cross-devices audience measurement standard. The EU and the Member States should promote the relevant legal, financial and human environment to allow these Moonshots to take place rapidly. It allows Europeans to develop infrastructures, interfaces and innovation capacities indispensable to increase the amount and quality of relevant data and create the conditions to develop powerful AI apps benefitting European citizens and in accordance with their values.

Initiate a Media Trust initiative

A key issue is the quality of information and how the digital technologies could help support it.

We believe that AI and network science could help to fight fake news and deep fakes, but also to better contextualise information and help citizens to develop a better understanding of mere facts. Network science and/or AI could be useful to help authenticate information and archives - all the more since there are real risks of attack and falsification weighing on media archives in the near future. **The EU should take the lead and mobilise the most relevant technologies along with investigative journalism to face these challenges.** Otherwise, this could create distrust that erodes the foundations of a functioning democracy. Yet we do not consider that the answer will be only technological. It is a much wider and societal challenge with different kinds of instruments to mobilise.

It is important to educate citizens and promote media and social-media literacy, helping citizens to understand the role of journalists and social-media and how it will remain fundamental even in the big data era. It is also important that citizens have **direct access to news information feeds,** to be confronted to the **raw material of journalism.** It is also important that **local journalism is sufficiently sustained,** given that local media and local journalists are a key source of information for national and international news agencies. It will make it easier to fight fake news and informational disorder. Similarly, it is essential for governments to promote social media literacy. How social media works and can be abused incl. for disinformation campaigns.

Different debunking initiatives have been launched through gamification to help citizens to challenge fake news. These experimentations should be continued and could give place to a specific EU debunking initiative, providing tools on a portal accessible everywhere to all citizens.

Beyond educated citizens, it is important that journalists are continuously trained to use data and AI technologies to challenge information, better contextualise it and reinforce their investigation capabilities. Journalism schools should liaise with data science academics to develop new programmes, collaborations with journalists and continuous educational programmes for journalists and media professionals.

We also encourage both certification of media and information processes in an ISO perspective, and quality label for the sources of information, both topics concurring to reinforce trust. A European blockchain infrastructure, certified by the European Commission and implemented by some volunteer private media actors could be used to reinforce trust in the media contents.

Recommendation 10: Implement a media trust initiative based upon media and social media literacy, the promotion of debunking initiatives, in-depth cooperation between media and academia and the certification of media processes and content.

Create an Automated Translation Media initiative

There is powerful translation automation tool powered by some search engines, but it essentially deals with the top 5 main global languages. In addition, contextualised automated translation is not yet satisfactory. In this period where quality media diversity is under pressure in many countries, it would be important to allow European citizens to have a **free access to automatically translated quality news in their native language**. Building on the European Commission initiative to collect language resources for languages less represented on the web (funding of €10 million from the Connecting Europe Facility) and make them available as downloaded datasets on the European Data Portal, a **specific and ambitious initiative should be conducted in this field**.

Quality content automated translation is also important to promote quality content circulation and better monetize content more generally speaking. It would be a useful contribution to the development of a truly European public space.

In this respect, improving rapidly quality in automatic under-titling and automatic indexing in all languages for video content is crucial, in addition to automatic voice translation. Multilingualism tools for media should be at the center of the future R&D efforts and financing for adoption a priority.

Media as a priority of Horizon Europe R&D and Digital Europe programmes

R&D related to media and more widely to creative industries has been marginal the last 15 years. Since many coming research topics are fundamental for the future of these industries and also the future of our democratic systems, **it is relevant to boost to 3% the share of creative industries in the next Horizon Europe program, which stands for the period about 3 billions euros.**

It is not the objective of this mission to define the precise fundamental research topics, but some of them are obvious and relate to :

- AI, neurosciences and educational content
- user-centric and practical privacy-preserving algorithms, technologies (e.g. PIMS/Personal Information Management Systems⁹¹, decentralized Web, ...), and related business models
- multi-industry R&D programmes, favouring thus industrial transfers (e.g. entertainment in self driving cars with the car industry; AI, face and voice and more widely deep fakes recognition with the security industry; AI and content analysis with the health sector)
- Automated translation

The new Digital Europe programme aims at increasing EU international competitiveness as well as developing and reinforcing Europe's strategic digital capacities, with special focus on AI, digital skills or market potential. The media sector will play an important part in contributing those objectives and should also benefit from this programme. Data sharing is especially important for the media sector. The European Union is advanced on the topic and aim at creating a *Common European Data Space*⁹² with an actionable set of tools. It is important to continue working on the development of specific tools⁹³ allowing *GDPR-compliant data sharing*⁹⁴ to foster innovation in the media sector. Additional guidance on the GDPR rules may be also important to protect journalistic investigation⁹⁵ and more generally to preserve the freedom of the press.

Recommendation 11 : Allocate 3% of Horizon Europe funding, the next European R&D program to media and creative industries, which stands for a 3 billion Euros budget. We recommend a focus on the following fields of R&D :

AI, neurosciences and educational content

user-centric and practical privacy-preserving algorithms, technologies (e.g. PIMS/Personal Information Management Systems⁹⁶, decentralized Web, ...), and related business models

multi-industry R&D programmes, favouring thus industrial transfers (e.g. entertainment in self driving cars with the car industry; AI, face and voice and more widely deep fakes recognition with the security industry; AI and content analysis with the health sector)

Automated translation

Go on shaping regulation and competition rules in the platform and AI era

These below recommendations are key for a sustainable and responsible independent media ecosystem and the development of globally reaching European media companies based upon a fair competition and a level playing field.

Effective regulation on data interoperability between platforms and under the control of the user needs to be part of these policies. Data should not be oligopolized or siloed and dominant services should be interoperable. In this respect, targeted measures need to be particularly considered for platforms having market power.

We fully believe that there is an urgent need to adapt the EU Competition law to the global platform and AI economy in the follow-up of the EC seminar “Shaping Competition policy in the era of digitisation” organised last January 17 by Commissioners Margrethe Vestager and Mariya Gabriel. In this respect we encourage the Commission to look for more competition everywhere it is practically possible and go on shaping the rules to the platform and AI era.

We consider also that it is paramount to promote a regulatory environment to make it easier for European media companies to ally and develop partnerships and platforms that could constitute alternatives to global tech giants. These should be done both for public and private companies (see above *moonshot projects*). Indeed Europe-wide cooperation on technological and data platforms should be actively fostered with in addition a specific focus on interoperability⁹⁷ as mentioned earlier while protecting competition on the merit and local and national diversity on quality content but also prominence of these contents on platforms. In this respect, we warmly **invite Member states as recommended earlier to adapt remits of their national public service media to reinforce their cooperation particularly in R&D, data, platforms and AI and develop a collective critical mass in these fields.**

As Dame Cairncross's recent report ⁹⁸suggests for the UK regarding the importance of examining whether the “rapid growth of the big online platforms - especially Google and Facebook - created distortions that justify government intervention”, we consider that national competition regulators should **“use their information gathering powers”, when they have it, “to conduct a market study into the online advertising industry”**, which is certainly one of the most data and AI advanced industries at the moment. “By looking more closely into the position of different players, their roles, costs and profitability”, these authorities “will be able to identify how efficiently the online advertising is working, and what remedies, if any, are needed”. More generally, we consider that a major reflection should be led to regulate digital advertisement. Increasing digital advertisement is the economic engine of the diffusion of problematic content, which largely explains the difficulty of implementing efficient self-regulation.

We consider that the EU should develop a specific Digital regulatory body which would have three core functions :

- monitor, analyse and incentivise the behaviors of digital actors. This body could request data from digital actors including online platforms, manage access and publish dashboards and open data to empower end-users and comparison tools. The body would interact in an ecosystem including academic researchers, Non profit, DG Competition and National competition bodies (and also bodies in charge of consumer protection, fair competition or privacy protection) and interest "Reg Tech" third parties.
- impose to systemic platforms the development of sandboxes notably to test key algorithms (e.g. ranking algorithms) and new policy making approaches, in particular w.r.t. Fairness, Accountability and Transparency. These access should be shared with qualified researchers to study and help understand their impact on competition and society
- set up common standards and be requested to implement future regulations adopted by the EU notably based upon cooperation with national regulators. The regulator would also steer a EU group of regulators on digital.
- we propose the following definition for systemic platforms. They are platforms with major networks effects, a capacity to structure markets and/ or have a strong societal, democratic and informational impact. We invite the European Commission and the European Council to pave the way to a supervision of systemic platforms as it exists one for systemic banking.

We also invite the European Commission to conduct further reflection on device neutrality with regards to apps and media services.

Recommendation 12 : Create a European digital regulation body. We consider that the EU should develop a specific Digital regulatory body which would have three core functions :

monitor, analyse and incentivise the behaviors of digital actors. This body could request data from digital actors including online platforms, manage access and publish dashboards and open data to empower end-users and comparison tools. The body would interact in an ecosystem including academic researchers, Non profit, DG Competition and National competition bodies (and also bodies in charge of consumer protection, fair competition or privacy protection) and interest "Reg Tech" third parties.

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set up common standards and be requested to implement future regulations adopted by the EU notably based upon cooperation with national regulators. The regulator would also steer a EU group of regulators on digital.

Recommendation 13 : Consider a supervision of systemic platforms, with the possibility to impose targeted measures allowing real-size/real-time experiments for testing their Fairness, Accountability and Transparency.

Media at the core of the AI European strategy

We outlined the importance to have a sector specific industrial policy in the media sector. This goes hand in hand with the implementation of the ambitious AI strategy presented by the Commission in April 2018⁹⁹, which foresees €20 billion of public-private investment for the period 2018-2020 and €20 billion per year over the next decade. The strategy was followed by a coordinated plan¹⁰⁰ to ensure complementarity and synergies between national and EU level. The media sector should be considered as a key sector for the development and use of AI, next to sectors such as health and transport.

The next European Commission should consider AI and media as key priorities both in terms of organisation and policy-focus

The current Commission is actively delivering on its AI strategy, with a next deliverable on ethics in the coming days. It is crucial that the next Commission continues this work and ensures synergies between an industrial media strategy and the AI strategy.

We recommend two specific focuses :

- A specific media data initiative (digital archiving, metadata standards, data circulation...)
- A specific focus should be made on education and talents promotion and conservation. Building on actions of the coordinated plan, we recommend several elements specific to the media sector: to foster **Chairs in European Universities at the intersection of media and data / AI** and, to favor transnational and interdisciplinary talents pooling (data analysts, data scientists, algorithm developers, data wranglers, combined with sociologists, philosophers, creative, journalists...) and to include data science modules in multi-disciplinary media master programmes.

Recommendation 14 : Make media a priority of the European Artificial intelligence strategy. The European Commission should consider AI and media as key priorities both in terms of organisation and policy-focus The current Commission is actively delivering on its AI strategy, with a next deliverable on ethics. It is crucial that the next Commission continues this work and ensures synergies between an industrial media strategy and the AI strategy. We recommend to put the focus on education and talents promotion and conservation

Summary :
14 Strategic
Recommen-
dations for a
European Media
Sovereignty

Summary : 14 Strategic Recommendations for a European Media Sovereignty

Recommendation 1 : Develop a new industrial media strategy co-built with a EU media stakeholders' forum focussed on leveraging new digital technologies and creating a virtuous circle between European media, technology and the creative field. A shared ambitious and proactive "Vision 2030" should be defined, with a rethinking of the media at the time of convergence, AI and platform. This new industrial media strategy should be a top priority of the next European Commission mandate. Its three objectives should be to :

- (1) speed up the digital transformation of European media and help media companies to benefit from the untapped opportunities of the Digital Single Market,
- (2) create a level playing field while preserving European fundamental values and
- (3) favour a sustainable, innovative, cooperative and independent media ecosystem serving democracy, creation and society transformation.

This strategy should take advantage of the next European Budget (MFF) and of its new programs such as Horizon Europe and Digital Europe.

Recommendation 2: Give European citizens fundamental rights over their data including access control and data interoperability when dealing with personal data linked to the consultation of political, societal and cultural information that should be protected as the secrecy of the vote is. We need a New Deal on Data particularly when it deals with Media.

Recommendation 3 : Create a right of access to diversified and free quality news in one's own language for every European citizen. This right should be implemented through European platforms for quality content, equipped with automated translation tools and accessible to all European citizens. A specific effort should be conducted to speed up the quality of automated translation in the different EU languages through a specific media automated translation initiative. The EC should favour projects in this purpose. Establish a must-carry equivalent for platforms that curate and recommend content based on algorithms.

Recommendation 4 : Create a citizen's right of transparency and accountability with regard to the objectives of media algorithms. In this respect, request social and content platforms to provide transparency over recommendation and curation algorithms. Platforms that use algorithms to optimize what content people see shall need to transparently convey what an algorithm is optimizing for (i.e. maximising time spent on platform).

Recommendation 5 : Implement Ethical Artificial intelligence guidelines for the media sector. The Media stakeholders should take the lead as soon as possible on this issue by providing feedback on the pilot phase of the EU ethical guidelines. By doing so, European media will set the global standard for AI guidelines in the media sector.

Recommendation 6 : Launch a EU Media data initiative with the following objectives:

- facilitate metadata standard
- sponsor digital content archiving
- help data sharing between organisations and facilitate data flow
- favour the development of shared data-management platforms
- when dealing with personal data, foster the development of privacy-preserving data processing systems.

The European Commission should have the leadership of this initiative.

Recommendation 7 : Create a European Media digital innovation fund with a One billion Euros initial EU public funding. This fund should be focussed on data analysis technologies that will shape and nurture the media sector, such as AI, blockchain, neurosciences. It should be established for 5 years and be renewable. Its financing could come from the EU but it should be complemented by private funds (businesses and foundations). It should be part of a wider media innovation investment strategy in the media sector supported by European Investment Bank and Member States.

Recommendation 8 : Scale up European media and tech hubs. It is fundamental to develop a sustainable European infrastructure for media to speed up innovation through much better connection between Media, Tech and Creation, share best practices and disseminate them rapidly and develop an avant-garde innovation mindset within the media sector. In this respect, the European Commission should scale up initiatives such as the *MediaRoad*, a EU-funded public-private partnership to better link media and tech.

Recommendation 9 : Favor European platforms for quality content, for media analytics and optimization and push European quality search engines and a new cross-devices audience measurement standard. The EU and the Member States should promote the relevant legal, financial and human environment to allow these Moonshots to take place rapidly. It allows Europeans to develop infrastructures, interfaces and innovation capacities indispensable to increasing the amount and quality of relevant data and create the conditions to develop powerful AI apps benefitting European citizens and in accordance with societal values.

Recommendation 10 : Implement a media trust initiative based upon media and social media literacy, the promotion of prebunking and debunking initiatives, in-depth cooperation between media and academia, and the certification of media processes and content.

Recommendation 11 : Allocate 3% of Horizon Europe funding to the next European R&D program for media and creative industries, which stands for a 3 billion Euros budget. We recommend a focus on the following fields of R&D :

- AI, neurosciences and educational content
- user-centric and practical privacy-preserving algorithms, technologies (e.g. PIMS, (Personal Information Management Systems, decentralized Web), and related business models
- multi-industry R&D programmes, favouring thus industrial transfers (e.g. entertainment in self driving cars with the car industry; AI, face and voice and more widely deep fakes recognition with the security industry; AI and content analysis with the health sector)
- Automated translation

Recommendation 12 : Create a European digital regulation body. We consider that the EU should develop a specific Digital regulatory body which would have three core functions :

- monitor, analyse and incentivise the behaviors of digital actors. This body could request data from digital actors including online platforms, manage access and publish dashboards and open data to empower end-users and comparison tools. The body would interact in an ecosystem including academic researchers, Non profit, DG Competition and National competition bodies (and also bodies in charge of consumer protection, fair competition or privacy protection) and interest "Reg Tech" third parties.
- impose to systemic platforms the development of sandboxes notably to test key algorithms (e.g. ranking algorithms) and new policy making approaches, in particular w.r.t. Fairness, Accountability and Transparency. These access should be shared with qualified researchers to study and help understand their impact on competition and society.
- set up common standards and be requested to implement future regulations adopted by the EU notably based upon cooperation with national regulators. The regulator would also steer a EU group of regulators on digital.

Recommendation 13 : Consider a supervision of systemic platforms, with the possibility to impose targeted measures allowing real-size/real-time experiments for testing their Fairness, Accountability and Transparency.

Recommendation 14 : Make media a priority of the European Artificial intelligence strategy. The European Commission should consider AI and media as key priorities both in terms of organisation and policy-focus The current Commission is actively delivering on its AI strategy, with a next deliverable on ethics. It is crucial that the next Commission continues this work and ensures synergies between an industrial media strategy and the AI strategy. We recommend to put the focus on education and talents promotion and conservation.

Acknowledge- ments

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Appendix

Appendix 1 Biographies of the report team

Guillaume Klossa is special adviser to Andrus Ansip, Vice-President of the European Commission. Director of the European Broadcasting Union from 2013 to 2018, he led the EBU Big Data Initiative and initiated with the support of the European Commission the *MediaRoad* project, a European public private continental partnership to boost digital innovation in the European media ecosystem. Previously he had senior top executive responsibilities in major European corporations. Former sherpa to the reflexion group on the future of Europe (European Council), Guillaume is lecturer at Sciences-Po Paris. He co-chairs the Civico Europa citizen movement and, with civic tech Make.org, he is at the initiative of the WeEuropeans consultation, the biggest ever transnational and multilingual European consultation operated by citizens. He also founded EuropaNova, a leading Paris-based European think tank and created EYL40, the first European young leaders' program.

Dieter Boen is Head of Technology Strategy and Innovation at the Flemish public broadcaster VRT. Dieter strongly believes in the value of international collaboration and maintains an open innovation approach. His department works together with European and Flemish partners, among which startups, universities, broadcasters and other media organizations. By maintaining a strong connection with VRT brands, the department is able to turn innovation into practice. This approach also lies at the heart of VRT Sandbox and its initiative to support startups, which has now grown into an international network of media innovation accelerators.

Daniel Knapp is an advertising and media analyst with more than 15 years of international experience. He has served in leadership roles spanning market analysis, strategic advisory, and business intelligence. He is currently setting up a data science company for media and advertising in London and San Francisco. Previously he was Executive Director at IHS Markit, overseeing the company's global advertising research, consulting and forecasting practice. Daniel's key research areas span all domains of digital advertising, platform economics, data strategies and the business application of AI/ML technologies in media. Daniel holds a PhD from the London School of Economics (LSE). His academic work focuses on the sociology of algorithms and the datafication of media.

Sten-Kristian Saluveer is audiovisual media innovation and policy strategist and advisor, and content & technology entrepreneur based in Estonia and Japan. He is the founder of Storytek Accelerator-mixing deep audiovisual sector knowledge, technology and funding with a selection of hand-picked tech entrepreneurs and content creators, as well as curates the NEXT innovation section of the Cannes Marche Du Film.

Marc Schoenauer is Principal Senior Researcher (Directeur de Recherche 1ère classe) with INRIA, the French National Institute for Research in Computer Science and Control. He graduated at Ecole Normale Supérieure, with a PhD in Applied Maths at Université Paris 6 in 1980. After 20 years with CNRS (French National Research Center), working at CMAP (Applied Maths Lab) at Ecole Polytechnique, he joined INRIA, and founded the TAO team (Thème Apprentissage et Optimisation) in Saclay in 2003 with Michèle Sebag.

Since the early 90s, Marc Schoenauer has been working in Artificial Intelligence, at the interface between Evolutionary Computation and Machine Learning. He is author of more than 150 papers in journals and major conferences of these fields. He is or has been advisor of 33 PhD students.

Marc Schoenauer is Chair of SIGEVO, the ACM Special Interest Group for Evolutionary Computation, since 2015 (Executive Board Member since 2005). He has been president of AFIA, the French Association for Artificial Intelligence (2002-2004). He was one of the experts of the Villani mission working on the French Strategy on Artificial Intelligence in 2017-2018.

Charles Manoury is policy assistant in the cabinet of Vice-President Andrus Ansip. His work is especially focused on delivering the European Commission's outputs on Artificial Intelligence. He worked previously in the Publishing industry, studied European Law in Paris and Utrecht as well as European politics in Bruges where he wrote his Master thesis on the European approach on AI.

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Appendix 2 List of organisations met for the report

Agence des Participations de l'Etat	Finland's national public broadcasting company (YLE)
Agence France-presse (AFP)	France Television
Anzyz	Google
Arte	Guardian Media Group
Association of Commercial Television in Europe (ACT)	Grupo Planeta
Axel Springer	Hossein Derakhshan "Hoder" (MIT MediaLab)
Baylis Media	Institut National de l'Audiovisuel (INA)
CAP (Stéphane Rozès & Karine Patte)	Institut national de recherche en informatique et en automatique (INRIA)
Christophe Leclercq (Euractiv foundation)	Interactive Software Federation of Europe
Conseil supérieur de l'audiovisuel (Belgium)	Jean-Gabriel Ganascia
Debunk.EU	JPI Media
Deutsche Welle	KM Media Group
DG CNECT	Laboratoire d'électronique et de technologie de l'information (LETI)
DROG/Cambridge analytic-lab	Marten Kaevats, Government Office of Estonia
EGTA (association of television and radio sales houses)	McKinsey
Element AI	Media-participations
ENPA-EMMA	Microsoft
Estonian Newspaper association (EALL)	MindMedia
European Broadcasting Union (EBU-UER)	Netflix
European Consumer organisation (BEUC)	Netzpolitik
European Research Council (ERC-CER)	News Media Europe
Fabula.AI	Newsguard
Facebook	News Media Europe

News Media Association

Orange

Oxford Reuters Institute

Ozone

Postimees

Publicis

Radio-Télévision belge de la Communauté
française (RTBF)

Reach plc

Scottish Newspaper Society

SMIT, Vrije Universiteit Brussel

Syndicat de la presse indépendante
d'information en ligne (Spiil)

Telegraph Media Group

Union Européenne de Radio-télévision/
European Broadcasting Union (EBU)

VG media

Vivendi

Wan-Ifra

Appendix 3 EU-funded projects against disinformation

Project	Programme	EU Contribution
SocialSensor	FP7	€6.5 M
Reveal	FP7	€5.1 M
Comprop	H2020 (ERC)	€2 M
Botfind	H2020 (ERC)	€150 K
Debunker	H2020 (ERC)	€2 M
ELHO	H2020 (ERC)	€2.5 M
GoodNews	H2020 (ERC)	€150 K
Invid	H2020 (LEIT)	€3.1 M
Fandango	H2020 (LEIT)	€2.9 M
Co-inform	H2020 (SC6)	€4.1 M
Eunomia	H2020 (LEIT)	€2.5 M
SocialTruth	H2020 (LEIT)	€2.5 M
Provenance	H2020 (LEIT)	€2.5 M
WeVerify	H2020 (LEIT)	€2.5 M
SOMA	H2020 (LEIT)	€1 M
	Total	~39.50 MEUR

Co-Creating Misinformation-Resilient Societies

Project totally financed by the European union via Horizon 2020 (under the "Research and Innovation action" scheme) up to €4 110 758, incubated in Sweden. From April 1, 2018 to March 31, 2021.

Aim: (a) detecting and combating a variety of misinforming posts and articles on social media, (b) supporting, persuading, and nourishing misinformation-resilient behavior, (c) bridging between the public on social media, external fact checking journalists, and policymakers, (d) understanding and predicting which misinforming news and content are likely to spread across which parts of the network and demographic sectors, (e) infiltrating echo-chambers on social media, to expose confirmation-biased networks to different perceptions and corrective information, and (f) providing policymakers with advanced misinformation analysis to support their policy making process and validation.

Tool: Open source tools and platform to engage citizens, journalists, and policymakers. Co-creational methodologies and practices for engaging stakeholders in combating misinformation posts and news articles, combined with advanced intelligent methods for misinformation detection, misinformation flow prediction, and real-time processing and measurement of crowds' acceptance or refusal of misinformation.

Reveal

REVEALing hidden concepts in Social Media

Project partially financed by the European Union via Horizon 2020 up to €5 168 000 (under FP 7 framework) incubated in Luxembourg. From November 1, 2013 to December 31, 2016.

Aim: revealing the trustworthiness of information by analysing the contributor impact, reputation and influence to judge the quality and accuracy of content, and predicting future trends with greater accuracy.

Tools: Social network analysis and multi-content correlation

Comprop

Computational Propaganda: Investigating the Impact of Algorithms and Bots on Political Discourse in Europe

Project financed entirely by the European Union via the ERC up to €1,980,112 (under the "consolidator grant" scheme) incubated in Oxford. From January 1, 2016 to December 31, 2020.

Aim: to fight against the different technologies (bots, algorithms) that negatively affect civil and political engagement via social media.

Tools: Bot detectors via a network of experts in the field (computer scientists and disinformation specialists), log of the past event where bots were involved to create a comprehensive database, computational theory via network ethnography tools (fake news dissemination patterns analysis), algorithms and qualitative statistics, strategic dissemination of results of the study for information purposes.

Debunker

The Problem of European Misperceptions in Politics, Health, and Science: Causes, Consequences, and the Search for Solutions

Project financed entirely by the European Union via the ERC up to €1,931,730 (under the "consolidator grant" scheme) incubated at the University of Exeter. From September 1, 2016 to August 31, 2020.

Aim: To change people's misperceptions about certain topics (including immigration, vaccines and climate change).

Tools: Assessment of the level of misperception in three areas of politics, health and science. Approaches and techniques to combat them by changing public opinion through factual information received and integrated by the subject.

Botfind

Finding Bots, Detect Harassing Automation, and Restoring Trust in Social Media Civic Engagement

Project financed entirely by the European Union via the ERC up to €149,921 (under the "proof of concept" scheme) incubated at Oxford University. From August 1st, 2017 to January 31st, 2019

Aim: to demonstrate that (i) current bots can effectively keep negative messages and false news in circulation longer (ii) target journalists and civil society groups and (iii) operate without control by social media. This is to better fight these bots.

Tools: TBC

Invid

In Video Veritas – Verification of Social Media Video Content for the News Industry

Project financed entirely by the European Union via Horizon 2020 for €3,765,706.25 (under the "IA - Innovation action" scheme) incubated in Greece. From January 1, 2016 to December 31, 2018

Aim: Combat video manipulation and help media actors (news agencies, newspapers etc...) to detect, authenticate and verify the reliability and accuracy of relevant video files and video content broadcasted via social media.

Tools: The InVID platform and applications will be validated through several development and validation cycles. They will be piloted by three leading institutions in the European information industry ecosystem: AFP (the French news agency), DW (Deutsche Welle) and APA (the Austrian news agency), and will create new opportunities for all consortium members to exploit them.

Results expected by the team (currently in the final phase of the project): (a) improve productivity by significantly reducing the time required for video verification, (b) increase the integration of user-generated content for engagement, interaction and dialogue with users to increase brand loyalty through community building, (c) avoid the dissemination of hoaxes and propaganda that could damage journalists' reputation and trust and put their business model at risk, (d) regain control of the verification process by journalists rather than delegate it to more advanced users of social networks; this avoids costly legal proceedings for illegal use of third party content (e.g. individual users upload and republish documents as if they were their own on reputable media channels), and (e) create or strengthen new positions in media and journalism, such as content and social media curators or audit experts.

Fandango

FAke News discovery and propagation from big Data ANalysis and artificial intelligence operations

Project partially financed by the European Union via Horizon 2020 up to €2,879,250 (under the PPP big data scheme) incubated in Italy. From January 1, 2018 to December 31, 2020.

Aim: The objective is to aggregate and verify different types of information data, media sources, social media and open data in order to detect false news and provide more effective and verified communication for all European citizens.

Tools: Provide companies and newspapers with the ability to use cross-sectoral big data management and analysis, as well as an effective interoperability scheme for all data sources.

SocialTruth

Open Distributed Digital Content Verification for Hyper-connected Sociality

Project partially financed by the European union via Horizon 2020 up to €2 505 027, incubated in Greece. From December 1, 2018 to November 30, 2021.

Aim: to create a distributed and scalable verification system that allows easy access to various verification services (both internal and third-party) an open, democratic, pluralistic

Tools: open Application Programming Interfaces (API) standards wide content analytics, blockchain registry for immutable and distributed trust that would be auditable, browser-embedded and user-friendly personal tool to detect fake news on a daily basis.

ELHO

The Age of Hostility: Understanding the Nature, Dynamics, Determinants, and Consequences of Citizens' Electoral Hostility in 27 Democracies

Project totally financed by the European union via Horizon 2020 (under the ERC-ADG – "Advanced Grant" scheme) up to €2 499 838, incubated in the UK. From April 1, 2019 to March 31, 2024.

Aim: Determining the causes and consequences of electoral hostility at individual, group, and aggregate levels and how it develops over time.

Tools: 27 country multi-level panel survey, visual, physiological and field experiments, election diaries, family focus groups, a scoping survey of Election Management Bodies, and campaign and atmosphere coding. The project will also explore possible mitigation in ambitious partnership with psychiatrists, ergonomists, lawyers, EMBs and IGOs creating new Electoral Hostility Research Centre and Observatory.

GoodNews

Fake news detection in social networks using geometric deep learning

Project totally financed by the European union via Horizon 2020 (under the ERC "Proof Of Concept" scheme) up to €150 000, incubated in Switzerland. From September 1, 2018 to February 29, 2020.

Aim: build the technological capability for algorithmic fake news detection in social media using a novel paradigm (geometric deep learning).

Tool: New paradigm in machine learning (from an Euclidian- 2D to a non-Euclidian technology involving 3D or graph analysis) The focus of the project will be three-fold: developing a demo system for fake news detection with real data from social media; verifying and solidifying the IP portfolio and its licensing terms; analyzing the market and coming up with a financeable business plan).

Social Sensor

Sensing User Generated Input for Improved Media Discovery and Experience

Project partially financed by the European Union via Horizon 2020 up to €5 168 000 (under FP 7 framework) incubated in Luxembourg. From November 1, 2013 to December 31, 2016.

Aim: discovering trending and high-quality content, identifying influencers, sentiment around discussed topics, and establishing links between different online sources by collecting, processing, and aggregating big streams of social media data and multimedia

Tool: Use of dynamic Social COntainers (DySCOs), a new layer of online multimedia content organisation with particular emphasis on the real-time, social and contextual nature of content and information consumption. Through the proposed DySCOs-centered media search, SocialSensor integrates social content mining, search and intelligent presentation in a personalized, context and network-aware way, based on aggregation and indexing of both UGC and multimedia Web content.

WeVerify

The Wider and Enhanced Verification for You project

Project totally financed by the European union via Horizon 2020 (under the "Research and Innovation action" scheme) up to €2 500 000. From December 2018 to December 2021.

Aim: To expose fabricated content through cross-modal content verification, social network analysis, micro-targeted debunking and a blockchain-based public database of known fakes.

Tools: Open source platform, participatory verification approach, open source algorithms, low-overhead human-in-the-loop machine learning, intuitive visualizations.

Appendix 4 Mission statement

Document: Context and main issues

Topic : identify opportunities and challenges of KET such as AI, Blockchain, neurosciences and derived techniques (such as automated translation, style adaptation...) for Europe with a focus on the media sector at large (press, audio-visual, animation...) that is the bedrock of democracy and culture in Europe.

Perimeter : the media sector at large : newspapers, audio-visual, social media, creative industries, videogames, communication companies.

Context : The media sector is a cornerstone of the cultural identity of the EU and has a special role in our democratic systems. Given the current backdrop a reflexion on the means to safeguard and foster this sector is paramount for at least three different reasons. This is key firstly to uphold European values by fostering an informed and emancipated society treasuring free speech and based upon critical thinking for a liberal pluralistic democracy. Key as well as for European cultural identity to foster the creation and the promotion of a European culture that is diverse and specific. Finally it is key to promote an independent and sustainable economic media ecosystem for a sector creating great economic value in Europe based upon renewed business models. All in all these elements (values, cultural identity & diversity, economic sustainability & independence) are at the heart of European (digital) sovereignty. Moreover the media sector is a bridgehead sector that is very visible; sometimes slow in transformation, but with a strong leverage on the entire economy and society. It is consequently at the heart of the transformation of the European economy and society at large.

The sector is in full transformation, due to digitation, globalisation and under economic and political pressure due to nationalism threatening the independence of free and critical media in Europe. A big part of its economic value creation is captured by global digital platforms and social media, putting at risk the business models of the entire sector. Solutions in term of competition and taxation have to be found to restore the balance. Additionally, little transfer exists from the defence and security sector to the media sector (on the contrary to the US) and more generally the lack of cross-fertilization between different sectors prevents the advent of innovative and cutting edge technologies.

Key questions arise:

- How to develop a coherent and comprehensive European approach linking up national and European levels regarding the role of technologies and media for democracy? How to foster a common approach building on a European long-standing tradition and championing a model based on democratic and cultural values as an alternative to the Asian and American models?
- What are the societal issues and challenges linked to the media sector for Europe?
- What are the challenges and key issues of the sector for Europe in particular in the context of the European elections? What perspective for the development of a real European public space?

- What impact and responsibility of the media sector on the cultural identity of the EU?
- What are the conditions of a sustainable and pluralistic media ecosystem? What are the opportunities for new business models in this sector?
- Can we and how to leverage the latest innovations such as big data, IA, Blockchain, neurosciences?
- What are the ethical issues behind these innovations?
- What concrete recommendations in term of strategy, policy (R&D, regulation, education & media literacy, funding,) in the follow-up of the actions already implemented at the EU level?
- How to capitalise on existing experiences and go ahead?
- How to leverage and cross-fertilize between different sectors (such as defence, medical image, automotive sector ...).
- What are the «quick win» i.e. actionable actions that Europe could implement within a short period of time?

Examples of concrete topics:

- How to recreate or reinforce trust in the information system? The role of tech?
- How to develop a real European public space leveraging technologies?
- How to speed up the circulation of content and better value the consumed content? What role for the Blockchain technology, for copyright or for automated translation in this regard?
- How to develop a strong media ecosystem maximising both creation and tech? Which new business model may be foreseen and fostered in Europe?
- Which education to foster the use of tech? How to use tech to reinforce media education and contribute to the improvement of human knowledge in general?

Output/deliverable:

- Public report by early march

N.B. This draft working paper was elaborated following discussions with several stakeholder, inputs from services of the Commission and in line with Vice President Ansip's portfolio.

Endnotes

1. Hybrid Broadcast Broadband TV
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3. <https://www.theverge.com/2019/2/25/18229714/cognizant-facebook-content-moderator-interviews-trauma-working-conditions-arizona>
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5. For example Netflix frequently runs initiatives to apply data and machine learning to improve processes beyond recommendations - including content assessment, production and financing of their original series. The initiatives are part of regular product development and are evaluated on a frequent basis of A/B testing by interdisciplinary teams.
6. See <http://www.image-net.org/> with more than 14 millions images and thousands categories.
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9. NIPS 2017 keynote talk, or his Quora session interview.
10. <https://www.youtube.com/watch?v=cQ54GDm1eL0>
11. <https://blog.openai.com/better-language-models/>
12. <https://blog.openai.com/better-language-models/>
13. <https://blog.openai.com/better-language-models/>
14. Such as the eye resolution Varjo VR headset from similarly titled Finnish start up.
<https://varjo.com>
15. VR for News: The New Reality? <https://reutersinstitute.politics.ox.ac.uk/our-research/vr-news-new-reality>
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25. <https://pooool.fr/>
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27. <https://flint.media>
28. <https://knowherenews.com>
29. Prior, M. (2003). Liberated viewers, polarized voters: The implications of increased media choice for democratic politics. *The Good Society*, 11, 10–16.
30. Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. *Science*, 359(6380), 1146–1151. <https://doi.org/10.1126/science.aap9559>.
31. See Appendix 3 for a table of the European-funded projects.
32. <https://project.inria.fr/icoda/project/#goal>
33. <https://project.inria.fr/icoda/project/#goal>
34. <https://project.inria.fr/icoda/project/#goal>
35. <https://politoscope.org/2018/10/fakenewsdiffusion/> for an example in English (most is in French).
36. <http://science.sciencemag.org/content/359/6380/1146>
37. <https://fabula.ai/news-index/2019/2/7/fabula-ai-announces-breakthrough-in-algorithmic-fake-news-detection>
38. See Appendix 3 for GoodNews project.
39. van der Linden, S., Roozenbeek, J., Oosterwoud, R., Compton, J., & Lewandowsky, S (2018). The Science of Prebunking: Inoculating the Public Against Fake News. Written Evidence submitted to the Parliamentary Inquiry on Fake News. House of Commons: Digital, Culture, Media, and Sports Committee. United Kingdom. Retrieved from <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/digital-culture-media-and-sport-committee/fake-news/written/79482.pdf>
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41. <https://valossa.com/valossa-announces-avid-certification-as-an-avid-alliance-partner/>
42. <http://www.aiconix.de/en/home/>
43. <https://www.startupticker.ch/en/news/may-2018/sofy-tv-launches-platform-for-only-short-films>
44. One of the worldwide leaders of blockchain based document security systems is Tallinn, Estonia based technology startup Guardtime (<https://guardtime.com>) which has provided blockchain based solutions to Verizon, Maersk, and key players in the security community.
45. A major private blockchain development framework is Ethereum Project, which is utilized by several European media sector blockchain companies.
46. <https://www.bitcoinmined.net/post/spotify-acquires-blockchain-startup-mediachain-to-solve-musics-attribution-problem>
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53. <https://conferenciers.tfo.org/inscription-blockchain/>
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65. <https://www.buzzfeednews.com/article/josephbernstein/tech-industry-survey>
66. <https://blogs.lse.ac.uk/mediapolicyproject/2018/06/18/collateral-damage-how-algorithms-to-counter-fake-news-threaten-citizen-media-in-bulgaria/>
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68. <https://adage.com/article/digital/q-aa-roku-stream-king-anthony-wood/315492/>
69. <https://cloud.google.com/blog/products/ai-machine-learning/what-makes-tpus-fine-tuned-for-deep-learning>
70. <https://www.reuters.com/article/us-tech-ces-intel/intel-working-with-facebook-on-ai-chip-coming-later-this-year-idUSKCN1P2020>

71. <https://2018.stateofeuropeantech.com/chapter/state-european-tech-2018/>
72. Ibid.
73. Ibid.
74. Ibid.
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76. <https://edition.cnn.com/2018/11/16/media/reliable-sources-podcast-renee-diresta/index.html>
77. <https://www.justsecurity.org/59152/information-operations-cybersecurity-problem-strategic-paradigm-combat-disinformation/>
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90. Proposal made during YLE hearing
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92. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM:2018:0232:FIN>
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94. See for example <http://opalproject.org/>, <https://aircloak.com/solutions/diffix-en/>, <http://casd.eu/>
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98. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779882/021919_DCMS_Cairncross_Review_.pdf
99. <https://ec.europa.eu/digital-single-market/en/news/communication-artificial-intelligence-europe>
100. <https://ec.europa.eu/digital-single-market/en/news/coordinated-plan-artificial-intelligence>

Background

In October 2018, College of Commissioners appointed Guillaume Klossa as special Adviser to Vice-President Ansip on new technology and the media sector. The Special Adviser's mandate included the preparation of a report on how to use new technologies (inter alia Artificial intelligence and blockchain) to strengthen the media sector in Europe. This report is the result of numerous meetings that the Special Adviser had with stakeholders of the sector. The Special Adviser also has been assisted in his work by four experts. Opinions expressed in this report are personal and do not necessarily reflect the position of the Commission or its Vice-President.

Towards European Media Sovereignty
Special adviser Guillaume Klossa
European Commission March 2019

End of Report