VITAL MEDIA

Vision, Insights and Trends for Awareness and Leadership in Media

D3.2 Report on activities Towards Future Social Media

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Abstract

This document summarizes work done in the scope of the Vital Media project activities on elaboration of community views on future social media, its landscape and needed actions from European community in the future. To do so, a Call for Action has been issued seeking for contributions and discussions among the broad European media community, targeting consolidation of the community view towards the future of the social media within related community publications as well as promotion of the related community needs. Data protection, trust, new areas in social media, and related business and regulation models have been identified as crucial for future development in the social media, in particular in the European social media landscape, which needs to become competitive with the today's main global players in the area.

Executive Summary

This document summarizes work done in the scope of the Vital Media project activities on elaboration of community views on future social media, its landscape and needed actions from European community in the future. A corresponding Call for Action has been issued seeking for contributions and actions from the broad European media community. This activity was supported by discussions organized by the Vital Media project at various occasions as well as organization of a special session and key-notes at the NEM Summit 2017. The resulting White Paper was published in December 2017 and was used as a base for a deeper elaboration on the topics identified, leading to the final publication from the Vital Media project "Enabling Future Social Media", issued in June 2018.

Data protection, trust, new areas in social media, and related business and regulation models have been identified as crucial for future development in the social media, in particular in the European social media landscape, which needs to become competitive with the today's main global players in the area.

Personal data management is one of the key issues in order to give back the power to the end users. Several solution are possible, they need to be investigated further in order to build a powerful sustainable manner to manage personal data. As the fact-checking tools are of a high importance in the social media networks as a mean to compact spreading of disinformation, so called fake news, it is necessary to elaborate possibilities to improve already existing tools but also perform additional research and develop new fact-checking tools, which should be applied in the near future. Another mean of establishing trust in the social media is application of so-called self-regulation, which is considered as the most appropriate solution for the social media.

Internet of Things (IoT) is already a reality, but it is merely at the beginning of a social, economic and cultural transformation, where synergies between devices and people thanks to the information they exchange within the concept of the social media should be further explored.

The most business models applied by the social media platforms today are based on end user attention which offers opportunities for disinformation to be easily crested and spread across the social media networks and platforms, which naturally calls for alternative business models for social media. On the other hand, converting massive amounts of data into actionable insights means that algorithms become a new competitive advantage and will prove to be central to the next wave of economic growth.

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List of Authors

Organisation	Authors	Main organisations' contributions
Telecom Italia	Jovanka Adzic	Data protection, Business models, Social IoT, document review
Engineering	Silvio Boi	Fact-checking tools
Orange	Pierre-Yves Danet	Annex C publication editorial, Social IoT
Eurescom	Halid Hrasnica	Deliverable editorial, Annex B White Paper editorial, Business models, Regulation
UPM	David Jiménez Bermejo	Collaborative flows

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1 INTRODUCTION

This document summarizes work done in the scope of the Vital Media project activities on elaboration of community views on future social media, its landscape and needed actions from European community in the future.

The Vital Media project and the NEM Initiative agreed in spring 2017 to perform a set of activities, in order to engage the European media community and involve its members in discussions about future of the social media and possible European role in the global social media arena. The defined activities consist of the following main actions:

- To advocate within related European communities for need to act and get engaged in definition of future needed actions and concrete activities toward the future social media
- To ensure wide community discussions on the social media subject
- To establish a joint publication gathering first community inputs and defining the main area of involvement for the future
- To consolidate the gathered inputs and discussions as well as elaborate the future needs toward the future social media

The advocating for the needed activities on social media has been launched by the Vital Media project and the NEM Initiative through publication of a call for action, seeking for contributions and actions from the broad European media community. The call for action, presented in Sec. 2, indicated targets and means of the planned activities as well as a plan for issuing a NEM White Paper “Towards the Future Social Media” in December 2017.

In order to gather needed inputs for the White Paper and enlarge the discussion on the future social media, the Vital Media project issued call for contributions and organized related discussions within the NEM Steering Board. The Vital Media project was also active in promoting this activity among the community and related EU projects as well as in supporting related activities of European Commission (Sec. 3).

Furthermore, the Vital Media emphasized the topic of the future social media within the program of the NEM Summit 2017 by organizing a special session and inviting several key-note speakers on this topic. Moreover, various aspects of the future social media have been discussed along other events organized by the Vital Media project, as is also presented in Sec. 3.

The White Paper “Towards the Future Social Media” was created in accordance with the received inputs and outcomes of discussions mentioned above. The White Paper is summarized in Sec. 4.1 and its full text is provided in the annex of this document.

Based on the White Paper issued in December 2017, the Vital Media project, in cooperation with the NEM Steering Board, worked on a deeper analysis of the topics identified in the White Paper and finalized a publication “Enabling Future Social Media”, which is summarized in Sec. 4.2 (full text also provided in the annex).

In addition and based on the recommendations received after the final project review, this document includes the following two annexes:

- Recommendations for successful European Converged Media, which are published on the NEM Initiative website and communicated to the community members
- Recommendations for NEM Initiative, which have been communicated and discussed with the NEM Steering Board

2 CALL FOR ACTION

Following the intention to launch a wide community discussion and involvement on future of social media, the Vital Media project and the NEM Initiative issued a corresponding Call for Action in (Sumer 2017), which is presented in this section.

The New European Media (NEM) Initiative is taking an action to elaborate a vision "The Future of Social Media"; opportunities and challenges for European industry and society at large, needed research and innovation actions to achieve the Vision, as well as required activities in standardization, regulatory, and policy arenas.

What is and how will the future social media look like, how we are going to get there, and what has to be done to enable the future Social Media? Probably the largest research and innovation community of in area of media and content in Europe organized within the NEM Initiative will elaborate inputs to answer these questions within a coordinated action among the community members and beyond, which will be supported by the Vital Media project of the Horizon 2020 EU research and innovation program.

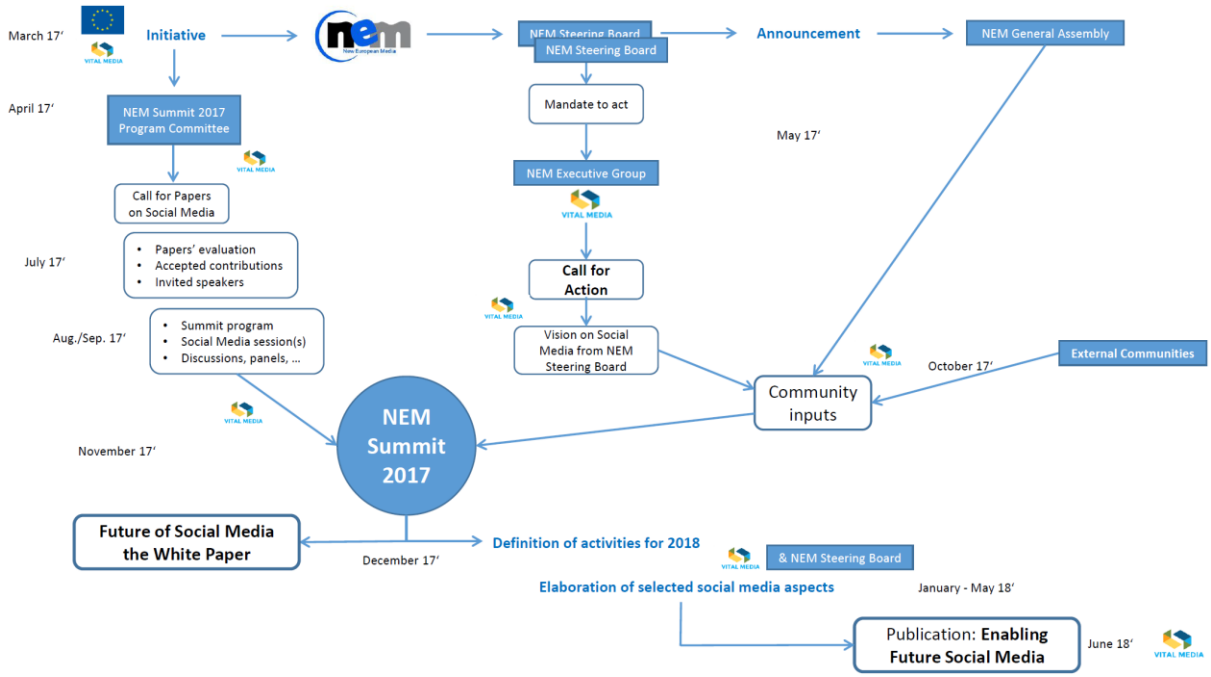

Figure 1: Toward Future of Social Media – Call for Action / time plan

*To do so, the NEM Steering Board already worked out an initial vision on "The Future of Social Media", which was discussed with all NEM members and other stakeholders around the European media landscape interested to participate (*Figure 1*). At the NEM Summit 2017, the 10th edition of the NEM annual conference and exhibition in Madrid, Spain, on 29/30*

November 2017, the discussion was further enlarged through a number of presentations, invited talks, and open discussions. Results of this activity has been summarized in a white paper "Towards the Future Social Media", identifying the next steps towards the future of social media, including required research and innovation activities in the next period to achieve the defined goals, as well as related standardization, regulatory, and policy actions. The white paper provided a base for further detailed elaboration of all these aspects which has been detailed in due course throughout 2018.

This activity was not limited to NEM Initiative and its members and has been open for everyone to participate. VITAL MEDIA invited anyone who wanted to be involved in this activity, having any ideas or information on this aspect to share and contribute, contacting us at contact@nem-initiative.org.

2.1 Background

Social Media used to be defined as a set of computer-mediated technologies that facilitate the creation and sharing of information, ideas, and other forms of content and applications via so-called virtual communities taking advantage of modern network and communications infrastructures. Social media uses web-based technologies to create a variety of interactive platforms through which individuals and communities can share, create, modify, and discuss different types of information and digital content which is available in the global Internet landscape. The most popular social media established today are Facebook, Instagram, LinkedIn, Twitter, Viber, WhatsApp, Snapchat, WeChat, YouTube, a number of related services applications provided by Google, etc.

It can be stated that during last one-two decades the social media applications introduced significant changes to way people communicate, as well as businesses, and more over entire communities organized through common interests. Moreover, the recent developments in Internet and communications technologies, media and entertainment sectors, as well as many other spheres of professional activities and life show that social media becomes is a standard part of different services and applications offered to people through a variety of communication and consumer devices; computers, tablets, smart phones, smart watches, etc. Furthermore, so-called classical media services, such as broadcasting and even traditional "paper" based media, are more and more introducing and using various social media technologies, to improve the overall user experience and further extend their offers and businesses.

Just few examples from everyday life: State of the art TV channels are providing additional information and features (e.g. interactivity) by applying the social media technologies; Nowadays when organizing a live audience event (sport, concert, etc.) it becomes a must to use social media in different ways (to inform, to sell tickets, to guide spectators to the event venue, to provide background information, to interact with the audience, etc.), Nowadays,

we are searching by using different search engines and in the future we might get suggestion on the search from the members of a broad Social Media community.

Finally, the Social Media is currently being used to infer social behavior and derive tendencies, in combination with the big-data analysis tools. Its capabilities are tremendous to obtain information about the acceptance of a new product or service, identification of needs, or even the determination of ways to influence particular social acts and events. A practical example of the above ideas is the still open question of whether social media, in combination with big-data tools, influence world-wide elections or not.

Furthermore, a concern about digital competition is acute in Europe because quite often digital markets and the Social Media platforms are dominated by few, big and foreign companies, accumulating volumes of exclusive operating data on their platforms and services and using it as the raw material for artificial intelligence or machine learning could have an insuperable competitive advantage over new entrants. Users gain good services, and often free of charge, from such platforms but there are also some potential drawbacks; e.g. using a predominant position to collect data (even improper), keeping that data exclusive in order to maintain monopoly power, which even might obstruct further innovations and creation of new ideas, or using it to prevent customer to change the platform providers. Therefore, from the competition point of view it is also desirable to ensure Personal Data and Profile Portability in the future Social Media services.

We can say that in the near future it will be more and more difficult to distinguish among traditional media, if we may say so, and social media. Where is or will be the border between traditional media and social media (e.g. shift from off-line to on-line media) as well as the border between social media and any future type of service or application, or will there be any birders in the future?

What is and how will the future social media look like, how we are going to get there, and what has to be done to enable the future Social Media? One of the largest research and innovation community in area of media and content in Europe, organized within the NEM Initiative, elaborating inputs to answer these questions within a coordinated action among the community members and beyond, strongly supported by the Vital Media project, delivered two publications related to Social Media.

3 COMMUNITY SUPPORT AND INTERACTION

In order to support the call for action presented above, spread awareness on the ongoing activities among relevant communities in Europe, and ensure community feedback, the Vital Media project performed dedicated actions in promoting the activities and gathering feedback for planned publications on the future of social media.

3.1 Events organized by EC

A concertation meeting with representatives of all active projects in the media area was organized by EC on subject of Collaboration Towards the Future of Media on 17 October 2017 in Brussels, where the Vital Media project was represented by several team members to participate in parallel sessions and be able to interact with different projects, promoting and discussing issues related to the future social media.

Vital Media representatives also participated at the Multi-stakeholder conference on fake news, organized by EC on 13/14 November 2017 in Brussels, in order to gather further inputs for project documents in creation at that time. The Vital Media also captured discussions from the conference and provided a report to EC on it, which is presented in Annex A.

3.2 NEM Summit 2017

Social media related topics were emphasized in the program of the NEM Summit 2017 conference, organized by the Vital Media project in Madrid on 29/30 November 2018. The Summit program included a special session “Toward the Future of Social Media”, where a Call for Papers has been issued, looking for contributions from broad interested community on technological, organizational, and regulatory aspects of the social media. Furthermore, two key-notes were included in the opening NEM Summit 2017 session:

- “What the F _ _ _!?”: Handling and verifying social media content, Jochen Spangenberg, Deutsche Welle
- A new and cooperative approach to combating «fake news», Kristoffer Egeberg, Faktisk.

, Four papers among several contributions received from the Call for Papers, were selected for presentation at the NEM Summit 2017 special session on social media, including an additional key-note:

- Keynote: Algorithmic Biases in Social Media, Krishna P. Gummadi, Head, Networked Systems Research Group, Max Planck Institute for Software Systems
- New Generation of Social TV, Iago Soto, Quobis Networks SL
- Evaluating different presentations of televised football on TV, for pub-like situations, Doug Williams, BT
- Engaging people to citizen journalism, two use cases, Karim Dahdah, VRT
- BigFoot – How big is your digital footprint?, Kevin Koidl, Trinity College Dublin / ADAPT Centre

3.3 Other events organized by Vital Media

The Vital Media project, as organizer of the NEM General Assemblies (collocated with the project workshops), have been including topics on various aspects of the social media in the General Assembly programs, to encourage related community discussions and gather further inputs for its activities. Thus, already the program of the 23rd NEM General Assembly, in Brussels on 11 May 2017, included a presentation, followed by audience discussion, from Mr Paolo Cesarini (Head of EC Unit I4 – Media Convergence & Social Media) on “Social media and new forms of cooperation across content and creative industries”.

At the 24th NEM General Assembly (Madrid, 29 November 2017 – collocated with the NEM Summit 2017), the program included a session “Toward Future of Social Media – The NEM White Paper: presentation, open discussion, endorsement”, moderated by Halid Hrasnica (Vital Media), where he presented current status (at that stage) of the community White Paper “Toward Future Social Media” and facilitated a panel discussion with the following participants:

- Paolo Cesarini, (European Commission)
- Andrew Perkis (NTNU)
- Mike Matton (VRT)
- Jovanka Adzic (Telecom Italia)
- Naima Camara (Digital Catapult)

At the 25th NEM General Assembly (Brussels, 30 May 2018), a session on Key-messages, have been organized with moderation by Silvia Boi (Vital Media project) and with the following two key-notes:

- What's wrong? Challenges in assessing the impact of fake news on social media, Giovanni Zagni (Pagella Politica)
- Artificial Intelligence, Image Analysis and Retrieval for the Creative Industry, Giuseppe Amato (CNR – ISTI)

In addition, one of the Vital Media cluster events, organized in the scope of WP2 by Digital Catapult in Dublin on 27 April 2018 (as reported in details in the Vital Media deliverable D2.3), included an Open Call and workshop on "Future Social Media: enhancing cohesion through advanced digital technology".

4 PUBLICATIONS ON FUTURE SOCIAL MEDIA

As result of the community activities launched and facilitated by the Vital Media project, as presented above, the NEM White Paper "Towards Future of Social Media" has been issued in December 2017. The White Paper, which is created by editorial support and (among others) contributions from the project partners is summarized below and included in Annex B as well as provided on the NEM Initiative / Vital Media website.

As a follow-up of the activities resulted with the publication of the White Paper "Towards Future of Social Media", the Vital Media project in cooperation with the NEM Initiative worked out several aspects identified in the White Paper and presented it within a publication "Enabling Future Social Media", completed in June 2018, which is included in Annex C and published on the NEM Initiative / Vital Media website.

Summaries of both publications are presented along the following two sections.

4.1 White Paper "Towards the Future Social Media"

This White Paper elaborates on several aspects of the future social media by providing relevant service and application scenarios and by deriving corresponding requirements and needed actions on policy and regulation as well as on research and innovation in the area. To note, although the inputs and requirements covered in this document are not exhaustive, we consider that it is already possible to identify a number of needed actions to enable a future European social media approach around the following main areas:

- Data protection
- Trust
- New areas in the social media
- Business and cooperation models
- Education

The white paper includes also selected future media scenarios, a deeper elaboration on requirements on policy and regulation as well as elaboration of needed research and innovation activities for the future.

4.1.1 Data protection

Protection of individual user rights

Regulatory intervention should aim to protect individuals' fundamental rights, while encouraging technological innovation and market-driven business development. The

General Data Protection Regulation (GDPR) , which comes into effect on 25 May 2018, represents an important step for personal data protection. It takes into consideration privacy issues emerging from social media and requires the collection and processing of individuals' data independently from the location of the social media service provider. Moreover, the recent proposed revision of the e-privacy Directive adds further privacy obligations for electronic communication services and networks. To ensure both legal frameworks support consumers as well as business innovation and growth, close attention should be paid on the coherence of them and on the avoidance of regulatory irregularities.

Data portability and competition/monopoly issues

Concern about digital competition in social media is acute in Europe because quite often digital markets and social media platforms are dominated by few, big and foreign companies, accumulating volumes of exclusive consumer data on their platforms and services. A monitoring of the market is needed in order to evaluate the existence of problems on competition with limitations on users' choice. Exploiting huge amounts of user data as the raw material for AI and ML could have an insuperable competitive advantage over new, European, entrants. Therefore, from the competition point of view it is also desirable to ensure personal data and profile portability in any future social media and other type of similar application or services.

Management of user information and portability

It will be of great benefit for the development of the market, for competition and for end-user value creation to have effective ICT tools, protocols, frameworks, APIs and systems that can help businesses and consumers to declare, enforce, control and report on data management, and wider aspects of GDPR implementation - to endorse and stimulate good practice and also to identify malpractice. Implementation and interoperability across social media providers should be considered in order to facilitate convergence between social media platforms and to unlock possible proprietary features, enabling data portability.

4.1.2 Trust

Regulation in social media

We consider that it is the appropriate time to start exploring and developing standards and regulations that apply to a range of aspects of social media. As well as regulations specifically applicable to personal data, regulation of AI and 'misinformation' (including advertising) are also growing in interest and need. However, instead of a strong and centralised regulation of social media / the various aspects that it comprises, self-regulation and/or application of standards among platform providers, media organisations, technology providers, content creators etc might be more effective. Regulation or at least a strong regulation might not be of help and could damage free press, freedom of speech and wider democratic principles and processes.

Ensuring trust and diversity

Besides the regulation measures discussed above, re-establishment of trust in organisations distributing/providing news media in particular, is crucial. Where levels of trust in governments and traditional news media is falling, and people's use and trust in other online sources increases, the likes of Facebook, Google, Twitter and YouTube need to play an active role in ensuring that the information and sources provided on their platforms, and that they 'push' to consumers through algorithms, is accurate, diverse, transparent and ethical. The objective also being to balance people's individual choices, beliefs and freedom of opinion, with educating them, challenging their perspectives and enabling them to understand how algorithms play a role in the content they see/search for.

Social media tools

There is a need to improve social media technologies, in particular fact-checking tools, and develop new solutions and processes. Furthermore, reputation tools for ranking news publishers/distributors (based on trust, good practice, high standards etc) that publish content on social media platforms directly (as opposed to news articles and links being shared by/between individual users or interest groups) should be put in place also. This ranking should be based on agreed standards and/or policies that news publishers/distributors are working towards, and be transparent, authentic and regularly monitored. Especially where AI and ML are being used for such a process, as "without this transparency, there will be claims of bias and censorship from different content producers".

4.1.3 New areas in social media

From the beginning of its existence, social media at large has evolved in various and not always predictable directions. Thus, new social media services and applications have been continuously established and deployed and there is no sign that this trend will stop in the future. We can expect a number of developments that will result from not only regulation and standardisation (as mentioned above) but also from innovation in content production and digital technologies.

As an example, in comparison with the social networks of human beings there is a need to consider a notion of social relationships among things – Social IoT – making devices and objects not only smart or connected but also social. Here, several different technologies need to be studied and integrated and further researched in order to understand how intelligent and social things can impact social media.

Distributed ledger technology (e.g. blockchain) is also paving the way for a new approach to social platforms, offering efficiency, privacy, and security for content producers and distributors as well as end-users. Not only can blockchain be used for enabling the design and exchange of cryptocurrencies and digital micropayments, but also to enable smart

contracts. Whereby decentralised licensing systems can be used to enable a producer of content to track usage and define the terms under which it will allow its content to be published by a third party.

4.1.4 Business and cooperation models

New and innovative social media models such as those exploiting distributed ledger technology, are probably the best mechanisms to ensure trust of various sources, democratic principles and processes, and diversity of content to prevent domination of particular world regions, societies, opinion makers, etc. The European Commission-funded D-CENT project being one recent example of collaborative decentralised social networks using blockchain to increase and reward user participation, and enhance trust and privacy.

New models related to search of information

Most web search engines are commercial ventures supported by advertising revenue and thus some of them allow advertisers to have their listing rank higher in search result for a fee. These practices are more and more rejected by end users because they will get the results that are the most profitable for the search engine and not the actual best (most relevant) result. Therefore, we need to consider what the role and relationship is, in the future, of advertising and new forms of adtech, such as 'crypto advertising', with content and search personalisation.

Business models for publishing in social media

The economic model of high-quality journalism is in danger, which is one problem of today's professional journalism, and lets enough room for alternative information gathering and publishing in the media arena, which is frequently (not always) used for spreading the fake news. Thus, there is a need to invest more in journalistic resources and provide additional funding for the area. Furthermore, social media business models are based on attention, so that the social media platforms are mainly interested to get the users' attention (number of visits, clicks), whereas the available content is secondary. Therefore, there is a need for alternative business models for social media, which might be imposed by corresponding regulation measures. The challenge is to ensure competitiveness of the proper social media platforms, as news providers, versus so-called fake news/website factories.

Collaborative live production workflow

These high-level requirements mandate a close collaboration between the owners and stakeholders of the various involved realms, i.e. advertisement agencies and networks, the providers of social media technology, the technology providers for the clip rendering/creation, the owners of the distribution channels and, finally, the broadcast organizations themselves to integrate and enable the workflow in their live productions.

4.1.5 Education

Education and promotion of media and news literacy among social media users will play a significant part in reducing negative impacts of social media, such as the creation and sharing of false information, hate speech and online bullying. Media and news literacy interventions should be introduced across a range of places/opportunities including school, the workplace, libraries, and community and charity schemes and even by content publishers and distributors themselves.

4.2 Publication "Enabling Future Social Media"

As presented above, the White Paper published in December 2017 identified several aspects of Social Media, where specific actions are needed to be performed by overall European media community, in order to move towards the future social media. In the publication "Enabling Future Social Media" (June 2018), the previously identified aspects, listed below, are further elaborated, providing concrete ideas on the needed approach in the future:

- Data protection
- Trust
- New areas in social media
- Business and cooperation models

The Vital Media project and the NEM Initiative consider all the four aspects presented above as crucial for future development in the social media, in particular in the European social media landscape, where obviously there is a need to increase level of activities needed to get into a position to become a significant player in the world-wide social media eco-system at the same level as the today's main global players are already acting.

Note, that education and media literacy, in relation to the social media, are also identified in the above mentioned White Paper as important aspects to be considered, but the related actions are not seen as focus of the activities to be performed by the Vital Media project and the NEM Initiative at this stage of discussions. A corresponding media literacy expert group tackling these issues has already been established by the European Commission, to discuss the related matters in details.

In this publication, the data protection issues are handled by considering processes for management of user data and options for ensuring data portability in social media. Ensuring trust in the social media is considered through elaboration on possible solutions to implement efficient fact-checking tools and impose appropriate regulation means for the social media. Social IoT, as specific kind of the social media interactions is elaborated,

followed by a consideration of business models and collaborative workflows for the future social media.

4.2.1 Handling user data

Today's Social Media platforms have the dominant position to further exploit user data economy in the data-driven society, creating new services and business opportunities based on Big Social Data collection and processing, Artificial Intelligence (AI) and Machine Learning (ML) techniques in combination with Internet of Things (Social IoT). Some fundamental and critical aspects are already identified

- Transparency, Privacy and User Data management;
- Users lock-in situations due to market dominated by a few big platforms providers;
- Huge volumes of exclusive Big Social Data accumulated and used as the raw material for Artificial Intelligence and Machine Learning as an hardly superable competitive advantage over new entrants.

For some visionaries Social Media are already old and will disappear in the future. The future of Social Media is not about posts, mobile apps, Social Media platform pages, but it is about Cyber-Physical-Social Hyperspace where meeting someone and being able to see and know all the events that concern her/him, thanks also to new wearable devices. Users will continue to provide photos, videos, opinions, routes in cars, all various information about their lives in a searchable database: they will be completely transparent, and with a Digital Identity. This could be seen as a sort of the Digital Historical Identity: digital trace of our existence as a consultable unicum. Obviously, a system of superior privacy and user data management will have to be established. Europe is becoming a sort of leader in this field with General Data Protection Regulation (GDPR), a robust set of requirements aimed at guarding personal information and reshaping how organizations approach user data protection and management.

It is quite clear that a sort of crossroad for Social Media platforms are coming: they are going to become an even bigger and more powerful Cyber-Physical-Social Hyperspace, a place for further socio-technological disruption, or they are going to have their position limited by new requirements and regulations coming from governments.

Personal data management is one of the key issues in order to give back the power to the end users. Several solution are possible, they need to be investigated further in order to build a powerful sustainable manner to manage personal data. For that purpose, one of the first needs is the personal data set standardization which should be used to ensure access and portability of personal data.

4.2.2 Ensuring trust in social media

As the fact-checking tools are of a high importance in the social media networks as a mean to compact spreading of disinformation, so called fake news, it is necessary to elaborate possibilities to improve already existing tools but also perform additional research and develop new fact-checking tools, which should be applied in the near future.

The publication "Enabling Future Social Media" elaborates on various options to shape the fact-checking tools of the future, by applying the newest technologies and processes, as follows:

- Machine Learning and collaborative algorithms to detect fake news
- Content-based analysis to detect fake news
- Text, including Natural Language Processing (NLP) in a multi-lingual environment
- Image analysis based algorithms
- Video analysis based algorithms
- Provenance and trust analysis for news propagation identification

For all these methods, the publication identifies current status of technology (state of the art), related ambitions to improve the existing and develop new methods, as well as innovation potential for all identified methods, as summarizes below:

- To understand how to translate gathered data into new knowledge involving diverse data sources and complex techniques
- To be able to identify fake news sources according to similar contents previously identified, including additionally, hybrid approaches such as weighted combination and feature combination
- To develop NLP based technologies helping to predict chances that a particular news item is intentionally deceptive, based on analysis of previously seen truthful and false news
- To enable and establish a novel market for forgery detection in media and multimedia for both image and video based processing
- To develop Model-based Collaborative filtering algorithms.

Another mean of establishing trust in the social media is application of so-called self-regulation, which is considered as the most appropriate solution for the social media. Here, the most challenging issue is creation of an independent and efficient self-regulation mechanism and its bodies for the social media at international level, including its funding which should be mainly but not exclusively provided by the social media platforms.

4.2.3 Social IoT

Internet of Things (IoT) is already a reality, but it is merely at the beginning of a social, economic and cultural transformation. Basically IoT could revolutionize our conception of the world and how we interact with it.

These advances will enable us to develop our capabilities further but posting new challenges to our society and how we relate to each other. New gadgets, devices, apps are continuously coming to the market that make our life, work and daily tasks easier. We already have smart homes managed by devices with artificial intelligence. This will also produce new ways of expressing our creativity extended to culture, leisure and art.

Social IoT will generate synergies between devices and people thanks to the information they exchange. All this devices generating and exchanging information will impact how we work and communicate with friends and relatives and how we spend our leisure time. The evolution of the Social IoT is about transforming our lives and spaces into a Cyber-Physical-Social Hyperspace based on the continuous flow of enormous quantity of personal and sensitive data.

4.2.4 Business models in social media

The concept of modern Internet based economy is relying on the fact that the online available information is abundant and its consumption is largely free of charge. Furthermore, the most business models applied by the social media platforms today are based on end user attention which offers opportunities for disinformation to be easily crested and spread across the social media networks and platforms. Therefore, there is a need for alternative business models for social media, which might also be imposed by corresponding regulation measures.

To get on speed with the newest media developments, the news publisher should directly use the social media platforms and all their features for distribution of their content. It does not necessarily mean they have to establish own social media platforms. Linking, cooperating with existing and new social media platforms, including cross-platform news distribution, is a must together with investigations, including needed research and innovation activities, on possible business and cooperation models of the future, which will better suit the user needs and be robust against disinformation in the modern digital society.

On the other hand, converting massive amounts of data into actionable insights means that algorithms become a new competitive advantage and will prove to be central to the next wave of economic growth. Therefore, we need a program that succeeds in limiting these concentrations without compromising the technological innovation and development.

5 CONCLUSIONS

The Vital Media project and the NEM Initiative agreed in spring 2017 to perform a set of activities, in order to engage the European media community and involve its members in discussions about future of the social media and possible European role in the global social media arena. To do so, a Call for Action has been issued seeking for contributions and actions from the broad European media community, targeting publication of a community White Paper "Towards the Future of Social Media".

This activity was supported by discussions organized by the Vital Media project at various occasions as well as organization of a special session, including related key-notes, at the NEM Summit 2017. The resulting White Paper was published in December 2017 and was used as a base for a deeper elaboration on topics identified in the White Paper, leading to the final publication from the Vital Media project "Enabling Future Social Media", issued in June 2018.

Data protection, trust, new areas in social media, and related business and regulation models have been identified as crucial for future development in the social media, in particular in the European social media landscape, which needs to become competitive with the today's main global players in the area. For this purpose, a number of activities, technological, regulatory, organizational, etc., to support further development of the European social media are detailed in the mentioned white paper and publication and summarized along presentation of their main outcomes within core part of this document.

ANNEX A NOTES FROM MULTI-STAKEHOLDER CONFERENCE ON FAKE NEWS

The Multi-stakeholder Conference was organised by European Commission as part of a series of discussions and activities on the challenges posed by "fake news" and the spread of disinformation online in the rapidly evolving digital news media landscape. The objective of the initiative is to help the Commission define the scope of the problem and reach a consensus on the state of the play and needed future actions, based on wide and open consultations with relevant stakeholders in Europe and world-wide.

The purpose of the Multi-stakeholder Conference was to obtain views and inputs from the full range of private-sector actors, including online platforms and media as well as academic and civil society organisations. The agenda for the conference was as follows:

A.1 Agenda

Opening and introduction

- By Mariya Gabriel, European Commissioner for Digital Economy and Society, and Paolo Cesarini, Head of EC unit I.4: Media Convergence & Social Media

Panel 1 – Fake news and disinformation online – the definition problem

Panel 2 – Current initiatives to counter fake news and their effectiveness

Panel 3 – Future actions to strengthen quality information and reduce the spread of disinformation online

Closing

- By Giuseppe Abbamonte, Director, DG Connect, Directorate I (Media Policy)

A.2 Opening and introduction

The conference was opened with a speech by Ms. Mariya Gabriel, European Commissioner for Digital Economy and Society (link).

Mr. Paolo Cesarini, Head of Unit, DG Connect/I.4 (Media Convergence & Social Media), welcomed participants and encouraged the audience to participate in the discussions.

Mr. Cesarini began by noting that the issue of fake news, or false news and information, is not new but has existed for centuries. However, new communications technologies and developments in the digital media landscape, such as the rise of the social media, magnify the impact of fake news. Therefore, fake news now presents substantial potential harms to citizens in Europe and around the world and to modern democratic societies.

He pointed out that fake news may consist of misinterpretations of true facts and does not necessarily represent illegal content. When illegal contact is not present, the means to combat fake news are more limited.

Mr. Cesarini outlined the consultation process envisaged by the Commission, which starts with this Multi-stakeholder Conference and will be followed by a series of events, including an EU Member States Workshop, a meeting of, the Media Literacy Expert Group, and the convening of a High-level Expert Group. In addition, a public consultation process has been launched, whereby citizens and legal entities are invited to provide their opinions, suggestions, and ideas via online questionnaire.

The results of the consultations will be considered in a Communication by the European Commission, which is planned to be issued during second quarter of 2018.

A.3 Panel 1 – Fake news and disinformation online – the definition problem

Vincent F Hendricks (University of Copenhagen)

Fake news can be defined as a bundle of incorrect facts and information combined with standard journalistic conventions, which is distributed through dedicated channels to targeted audiences.

Nowadays, as social media channels make available increasingly large amounts of content, users spend less time digesting particular news stories. At the same time, articles and other information are presented in a more compressed form. In this landscape, users cannot devote the attention necessary to distinguish true information from false information. Thus, rumours, false statements, and incorrect or distorted facts – fake news – find a perfect environment to be accepted as true.

The social media business model is based on users' attention, which is a limited resource. The more social media engage users' attention, the more advertising they can sell. Users' attention is measured by visits and clicks, which are driven by readers' emotions. It follows that content which mobilises sentiments like anger, fear and indignation prevails over content which does not. The real customer of the platforms is the advertising industry; the end user and their data are the product that platforms sell to advertisers.

The fake news problem can be seen as analogous to the subprime loans crisis. Each involves inefficient markets. The market for information is fundamentally non-regulated and it is not efficient, as it allows bad information to prosper. Unintentionally, the market has created an environment for the efficient creation and distribution of fake news.

There is a need for all relevant public and private actors, working in collaboration and with open minds, to address the problem of fake news.

Lisa-Maria Neudert (Oxford University)

It is very difficult for the end users to detect fake news, because it usually looks like true information.

We all have different understandings of what "fake news" is. It has been identified as a main tool for negatively influencing democratic processes around the world, including elections, referenda, and other political decisions. These cases have been discussed extensively. However, fake news also affects other areas of importance beyond politics, such as medicine and science, and other topics in daily life. Overall, the intention is to manipulate.

Fake news can indeed be a part of well-prepared propaganda activities. Such activities are not unique to today's society or to social media. However, social media, which closely track users' behaviour, facilitate niche targeting and thus increase their impact. Moreover, fast-developing digital technologies allow much easier creation and distribution of fake news and act as enablers. For instance, during the 2018 US elections, for every piece of professional content shared, a piece of fake content was also shared. The latest European elections showed a lower incidence of fake news. However according to a Oxford University study, during recent election cycles 13% of social media content in the UK and 25% of social media content in France was fake news. Much of this content was indeed actively shared by thousands of automated accounts.

To cope with such problem, fact-checking is not enough. The sheer amount of false news articles, and the time scale required to find and remove fake news and false information is too long to ensure proper reaction.

However, we should also acknowledge that most of fake news stories spread through organic reach, meaning that the majority is actively shared by users, and not imposed upon us. A study by the University of Columbia shows how fake news directly uses the human attention logic, using elements like outrage, humour and sensational information that confirm our opinions and biases. Social networks are designed to confirm our biases, as they are optimised to give users what they are interested in.

Fake news is closely interlinked with advertising, content monetisation and human attention logic. To solve this problem, we need to look at the scale, the dynamics and the ecosystem for each of the various different forms of fake news.

Giovanni Zagni (Pagellapolitica.it)

The application of publisher standards and self-regulation by platforms, journalists and other actors may be more effective at addressing fake news than centralised regulation of social

media. At present, the social media platforms do not take on publisher responsibilities, but this perspective is changing.

Accordingly, the efforts of EU and the Member States to cope with fake news should focus on education in media and news literacy as well as development of tools to detect fake news and remove it from social media platforms.

Current discussions of fake news focus too much on political issues. Other areas, such as medicine and science, are seriously affected by the fake news as well. In addition to well-organised fake news campaigns, false statements are also randomly distributed on social media and in some cases can have the same negative impact.

Furthermore, social media does not create fake news as such but is used as a means to distribute it. The motivations for producing and distributing fake news come from citizens' perceptions of political processes and events in society at large. Social media opens doors for the dark sides of the society to spread propaganda. Citizens' perceptions of contemporary problems (e.g., globalisation, migration, wars) and the psychology behind such perceptions must be taken seriously. It is necessary to establish a citizens' front against fake news, based on well- informed users of social media.

Deborah Nash (Teneo)

The social media end users typically do not go on social media to look for fake news; they're just looking for information. Fake news reaches them, regardless of whether they are able to recognise it as fake.

Fake news is not illegal as such but may include illegal content. Illegal content is subject to well-established legal measures and regulatory measures, including the following:

- Defamation law
- Intellectual property law, including copyright
- Rules against cyberbullying/harassment
- Press codes (e.g. holding media outlets accountable for false claims)
- Electoral laws

Legal action against fake news entails various shortcomings:

- Only individual cases are addressed
- Processes are slow and lengthy
- Jurisdictional issues may be raised
- Root causes are not addressed

Laws targeting fake news also pose risks to freedom of expression. Other actions that might reduce impact of fake news include media literacy actions to encourage critical thinking and the enforcement of community standards for platforms and ethical standards for media.

Improving the reputations of established brands might reduce the market for fake news. Players in the ecosystem must work collaboratively on these objectives, with the support of the EU.

Ben de Pear (Channel 4)

Currently, clickbait websites and Facebook make a lot of money out of fake news, which is easy and cheap to produce and distribute. By contrast, Channel 4 and other professional media outlets spend millions to produce high-quality content and operate distribution channels.

Therefore, there is a need for alternative business models for the social media and corresponding regulatory measures. The challenge is to ensure the competitiveness of the social media platforms as news providers versus so-called fake news factories, which exist even within the European Union.

During the Brexit campaign, the regulator required Channel 4 to give 50/50 coverage to both the Remain or Leave camps, leaving no possibility to weigh in on the merits of their arguments. The result was that viewers were confused by the coverage and didn't know which arguments to believe. Fake news filled the vacuum with appeals to emotion..

Media companies are subject to regulation, while the platforms, which are monopolies, are unregulated. This is a problem for our democracies.

In addition, fake news, as the Macedonian case demonstrates, often use copyrighted material. Facebook doesn't do enough to protect copyright in these cases.

Main issues, questions and statements from the audience:

Contributions from: Jakub Klanski (EEAS), Pascaline Gaborit (Euractiv), Giga Turk (Univeristy of Ljubjana), Aiden White (EJN), Giovanni Melogli (AEJ), Denis Teyssou (Agence France Presse)

- What tools are available for addressing the creation and distribution of the fake news – what tools do we have and how can we improve them, considering that some channels which spread fake news are not publicly accessible (like email chains, Telegram, Whatsapp)?
- How should we target amplifiers on social media?

  Panel reactions:

  - For amplifiers on social media, the tools currently exist, but we are not making sufficient use of them. Some publishers, for example, have tools such as NewsWeb that track the spread of their stories. Public data might also be exploited to track trending fake news
  - Debunking is a tool. However, it must be considered case-by-case whether debunking is effective

- How can the process for removing fake news (and other dangerous material, e.g. hate speech) be improved to react in real time?
- The current imbalance in the sharing of advertising revenues is pushing professional news outlets to embrace some characteristics of fake news (e.g. the use of sensational headlines to attract views). For every advertising dollar spent, Facebook and Google take 85 cents.
- One of the main points is to re-build trust in mainstream media. This applies to both social media and journalism.

Panel reactions:

  - In some countries, trust in media is actually at an all-time high. However, on social media people are likely to trust the friend that shared the article.
  - Is fake news the problem or is it the manifestation of deeper problems?
  - There is a need to establish editorial standards for providing news on social media, similar to the publisher standards that already existing for established media.
  - Both Google and Facebook already have editorial standards. Are there common denominators by which we can work together?
  - Copyright law should be used more often to address fake news which incorporates copyrighted material. We should take away the financial incentives for the Macedonian teenagers and others to spread fake news.
  - If the existing platforms restrict freedom of expression, then other platforms will be established. The real answer is media literacy.
  - Freedom of expression is not compromised, provided there is the possibility of launching new platforms.

- Why are we still speaking of "fake news". It's a buzzword and I think we should use "disinformation" to solve the problem.
- Platforms are not prepared to take editorial responsibility for content. Governments will therefore need to intervene and force them to do so.

Panel reactions:

  - Media literacy is key. Also professional media must re-connect with its audiences.
  - We need to be careful with giving editorial choices to platforms.
  - The market of information is non-efficient. Before addressing legislation we need to speak of corporate social responsibility.
  - We need to be careful with easy answers. Fake news is a manifestation of deeper problems.

A.4 Panel 2 – Current initiatives to counter fake news and their effectiveness

Jon Steinberg (Google)

Mr. Steinberg emphasised that the phenomenon of fake news goes against Google's mission to "organise the world's information and make it universally accessible and useful". Google focuses its activities on continuously testing and improving its search mechanisms.

Furthermore, Google's news service defines clear criteria for third parties participating in the service and does not take editorial actions on news made available, which is accessible to users through direct links to the news publishers.

Google is continuously reviewing and improving its policy on news search and publication by updating Google's indexing and ranking functions and through several related activities such as:

- The Digital News Initiative, which promotes high-quality journalism
- Provision of fact checked tags, not only for news but also for searches in general. This allows end users to further check received facts and news by consulting appropriate websites and social media sources.
- Following financial/ advertising flows around recognised fake news producers, with aim of preventing the distribution of the fake news. This activity is supported by the possibility for the end users to report false information and the fake news.
- Provision of the Google feed service, which allows end users to receive a wide set of information on particular topics of interest.
- Cooperation and training with publishers and journalists on fact checking.

Thomas Myrup Kristensen (Facebook)

Mr. Kristensen noted that the phenomenon of the fake news is not new, having existed since the dawn of news publishing; what is new is the ease with which fake news may be spread, including through social media. Facebook continuously takes action to improve its service and is open to collaboration on this matter with all relevant organisations.

Facebook supports end users' understanding of news posted on the platform by providing links to related articles and information, including fact-check articles.

Facebook also cooperates with fact-checking organisations. When a news article is disputed, it is marked as such on the portal but not automatically removed. Recognised click-bait headlines are also marked as questionable.

Facebook also follows up on financial flows from advertising at websites that are recognised fake news producers, with the aim of marking them as questionable sources.

Facebook is cautious about policy and regulation that addresses news content, including rules that require platforms to promote or remove specific content or dictate what content people can or cannot share. This may affect freedom of speech and ultimately reduce consumer choice.

Liz Corbin (Editor Reality Check, BBC)

Ms. Corbin presented experiences of a Reality Check team at BBC, which is dedicated to identifying and correcting fake news. As part of a public news provider, the Reality Check team strives to be impartial and serve its entire audience and to support decision-making on true and false news without fear or favour. The Reality Check is also operates under the umbrella of freedom of speech and diversity of opinion, which are very important consideration when dealing with fake news.

The presentation reviewed concrete examples of fake news and follow-up from BBC's initiative “Tomorrow’s World – Make it Digital”.

BBC also provides training to journalists to cope with the problem of the fake news.

Phoebe Arnold (Full Fact)

Full Fact acts against fake news by fact-checking and following up with sources to correct or stop disseminating false information.

Full Fact works on re-establishing trust. It is a neutral organisation, supported by multiple and independent sources of funding. Its goal is not to create opinion but to help people to make up their minds when consuming different types of information. Transparency of Full Fact's processes is key.

Full Fact regularly performs fact checking for debates in the UK parliament, for some BBC programmes, and for other occasions. Fake news and false information are not only marked, but action is taken to implement corrections and to provide side referenced, confirming the correctness of news. When possible, service is offered to journalists to check information in real time, at the moment it is received.

Full Fact is exploring opportunities to apply artificial intelligence in the fact-checking process. Furthermore, Full Fact is working to identify information gaps on particular subjects and fill them by providing relevant and correct information.

Full Fact is already working with other stakeholders, among them Facebook and Google. It believes there a strong need for all relevant stakeholders, on a global scale, to collaborate on the problem of fake news. However, actions should take into account cultural and local factors, including specifics of languages.

Adrien Senecat (Les Decodeurs, Le Monde)

At *Le Monde*, a team of twelve people is working on the detection and correction of the fake news. The large amount of information to review is challenging for any organisation dealing with fact checking. In particular it is very difficult to identify all main sources of fake news.

A simple tool – DECODEX – has been developed to support this work. It identifies fake news by fact checking and also finds links to sources of false information spread online. The tool also identifies entries which might appear to be false or fake news but In fact are not (e.g., satire).

DECODEX capabilities can be easily included in most common browsers as a plug-in. This enables users to be notified when they access a source that has been identified as spreading fake news. (1000 sources, 150 fact check linked to 5000 stories on the internet).

Finally, Mr. Senecat emphasised that education and promotion of literacy among social media users may be the best way to reduce the negative impacts of fake news.

Juliane von Reppert-Bismarck (Lie Detectors)

Ms. von Reppert-Bismarck discussed the mission of Lie Detectors, a non-profit that trains and sends journalists to schools to teach children about media literacy in order to provide what technology, algorithms and debunking initiatives cannot do to contrast disinformation online.

Typically the group organises sessions for children in the 10-11 year-old and 14-15 year-old age groups. Children show a strong interest in the subject, and even youngest students have some understanding of social media and concepts such as click-bait and cyber-bullying. The sessions are illuminating for teachers as well. The group will be rolling out workshops in Germany and Belgium.

Ms. von Reppert-Bismarck mentioned also that disinformation messages circulate also on platforms different form Google and Facebook. She gave the example of a jpeg picture massively shared through in Germany, using Instagram reporting false information. Messages with such format are more difficult to detect and debunk.

Main issues, questions and statements from the audience

Contributions from: Gianni Riotta (Catchy), Christophe Leclercq (Euractiv), Marc Tuters (University of Amsterdam)

- Why there is still so much difficulty in removing hate speech, especially images?

  Panel reactions:

  - The platforms have signed up to a code of conduct with the Commission. Removing hate speech and other illegal content from the social media platforms is happening. The platform providers are getting better, but

there is still room available for improvement, in particular the removal of illegal visual , content, including faster reaction.

- Machine-learning technology can help improve performance of current tools; however, human intervention will be always needed for grey zone issues.

- Do the platforms agree that we are in a co-regulation phase, which might lead to strong centralised regulation in the event that co-regulation does not work? H

  Panel reactions:

  - The platforms are committed to cooperate with public services and on private initiatives to address the issue of fake news, since it relates to trust in online media. However, we do not want to pre-judge where the process will end up.

- It's time now to consider a common framework where everybody contributes to define an appropriate set of standards and regulation for checking the available information and take action when needed.
- What is the role of media literacy in the battle against fake news?

  Panel reactions:

  - Efforts to empower citizens to better deal with online information should be shared among various disciplines

- In order to analyse the problem and develop better tools, it is necessary that the main platform providers open their APIs and data for research and fact-checkers..

  Panel reactions:

  - Facebook is looking at this but there are privacy issue that need to be taken into account.

- Debunking doesn't work because people are sceptical of established sources. The re-establishment of trust is needed to successfully cope with the fake news problem.

  Panel reactions:

  - It's important to let audiences know how news is created in order to re-build trust.
  - Quality journalism should channel content where people look for it (e.g. social media platforms, video content aggregators) and should target a more diverse audience.

- There are trusted media brands in Europe (e.g. the BBC and public broadcasters in Germany).

- Media outlets specialised in deception still appears as top sources in Google Feed, This is unfair towards professional media. Why it's so difficult to resolve this problem?

  Panel reactions:

  - Google is going to just launch a new product with labels identifying sources.

- Platforms should share more information which enables the measuring of their efforts to tackle fake news.

  Panel reactions:

  - Facebook is testing how new tools are working. There is some initial evidence that putting a label on disputed content significantly limits sharing of that content.
  - Google always wants to improve search results and offer content that is interesting and relevant. It is open to improving transparency and collaboration with fact-checkers.

A.5 Panel 3 – Future actions to strengthen quality information and reduce the spread of disinformation online

Wout van Wijk (News Media Europe)

The reputation of digital media has been damaged and can be repaired by reestablishment of the lost trust between social media and end users. One way of doing so is to ensure high-quality journalism, which is expensive. Financing content is one of the main problems for professional journalism and it is being exacerbated by the ongoing development of the digital media and news.

Proposed actions:

- Publisher rights / rules are required, so that some forms of fake news can be addressed through copyright laws.
- Regulation might not be of help and could damage press freedom and freedom of speech. On the other hand, social media companies could and should take more responsibility.
- Media (news) literacy education should be offered to all EU citizens.

Nicola Frank (EBU)

The economic model for high-quality journalism is in danger. This offers room for alternative media, which is frequently (though not always) used for spreading fake news. Another problem is that the criteria with which news sources are ranked online are non-transparent. Platforms should let news media know on which basis they rank low or high.

Proposed actions:

- Platforms:
  - To recognise societal responsibility and promote quality journalism
  - To increase findability of diverse, qualitative news
  - To improve transparency in all processes and accountability (e.g. as news distributors) as well as support activities on fact-checking and providing related feedback and corrections
- Governments/regulatory bodies
  - To support quality journalism and independent and sustainable public media service
  - To support the needed media innovation and encourage self- or co-regulation among the social media players
- Media – To cooperate in fact-checking and support the needed innovation as well as adopt multi-platform approach for spreading information and news
- All – To promote digital media (news) literacy

Walter Quattrociocchi (University of Venice Ca'Foscari)

Social media provide a unique means for accessing knowledge anywhere on the earth. However, the complexity of the social media world is great and opens doors for misuse.

One of the prominent examples of misuse is of course the phenomenon of fake news, which is not created by social media but is rather an outcome of polarisation. Polarisation fuels fake news (e.g. 93% of fake news topics are polarised).

Fact-checking is not enough. In order to limit fake news we should combat polarisation.

- Thus, the most efficient solution for preventing fake news is to detect polarisation at an early stage. . Of course, it is difficult to observe all possible sources of polarisation.
- How to let new narratives into echo-chambers? We need to understand why people are polarised and bring together journalists and psychologists to frame a narrative that can penetrate the echo-chambers
- Another important point is re-establishment of trust, as already mentioned, but it cannot be accomplished by a single actor. Freedom of speech and diversity of opinion are pillars of our society. Trust exists for certain topics, but to increase trust we need to increase transparency and accountability.

Renate Schroeder (EJF)

The media ecosystem currently faces three broad threats: 1) the unstainable structure of contemporary journalism; the business model of the low-cost journalism is mainly responsible for fake news; 2) the decline of trust in journalism; Germany is cited as having trust in journalism, but even there trust is polarised; 3) the power of social media, coupled with a lack of accountability and responsibility..

Besides funding issues, a general protection of journalists (e.g. against pressure from politics and other power centres) is also very important, also in context of the fake news problematic.

Further actions should include:

- Media literacy and journalists training
- Public funding for fact-checking and and putting tools at the disposal of the public
- Common and open databases, in cooperation with the main platforms, to enable research activities, including data analysis
- Self-regulation measures, as already discussed within other presentations
- Algorithms that support quality news.
- [Stronger collaboration of media and researchers in order to develop in house systems to gather data]

Phoebe Arnold (Full Fact)

Ms. Arnold emphasised the complexity of fact-checking processes and the limitations of existing tools, including methods using artificial intelligence. Automated fast checking is efficient but not sufficient to fulfil the fact checking mission, so manual intervention is needed.

To reduce the impact of the fake news, broad global collaboration is needed, including standards and regulation as well as cooperation with different regions, taking into account cultural and language related factors.

Stephen Turner (Twitter)

All discussions in Twitter are open. Journalists and news organisations are key Twitter stakeholders. [We make sure they are verified, and are distributing information and news from their official individual or organisational accounts, to prevent the misuse.

[Twitter does not see the identification of wrong news and false accounts possible and does not consider it as its task. The platform looks for the highest quality and most relevant content and context. However, there is an increasing amount of suspicious accounts (3.3

million per week). The corporation is taking action to identify and remove these accounts. These activities include also identification of messages sent and accounts used by robots.]

Educating children on media literacy is key. Twitter is providing appropriate tools for classrooms, which enable children to create newsrooms and practice how to deal with challenges of the today's social media. We would like to extend media literacy activities to the all of Europe

In the next months, Twitter will implement several new actions against spam and suspicious activities..

Guy Berger (UNESCO)

Mr. Berger reviewed UN perspectives and initiatives on fake news, which are in line with the discussions by other conference participants.

- To keep using the term "fake news" discredits news itself journalism. We should talk of disinformation which imitates the form of news/journalism.
- Media literacy education should have a broader scope than the news ecosystem and include other concepts which are key in the digital domain (e.g. privacy).
- Media should embrace more diverse views and not focus only on the views of elites. News institutions have to improve their professional standards and strengthen redress mechanisms.
- Self-regulation in the news industry has had a great impact and internet intermediaries should learn from their experience. In particular, algorithm censorship should be complemented by redress process
- We need new business models in the social media, based on social inclusiveness and diversity, rather than business models that create filter bubbles.

Main issues, questions and statements from the audience

Vincent Need (AER), Vincent Need (AFP), Christophe_Leclercq (Euractiv), Gianni Riotta (Catchy), Jakub Kalenski (EEAS), Giovanni Melogli (AIJ), Paolo Celotto (EAVI), Mikko Salo (Faktabar), Marie de Cordier (EMMA), Ulrik Smed (EPSC)

- Radio is a well trusted media. It can be used as a tool to tackle fake news since it is a broadcast media that does not fuel filter bubbles.
- Fact-checking does not always work – what would be the criteria for successful debunking?

  Panel reactions:

  - For successful fact-checking, we first must understand the narrative behind fake news and then provide information that convinces.

  - Neutrality is central to fact-checking.
  - Journalists must be at the centre of fact-checking activities.
- Saying that fact-checking doesn't work ignores that there are people who have the intention to interfere in our democracy. There will always be people who believe in conspiracies. However, fact-checking can be a useful tool to counter lies and influence citizens who do not have strong opinions on issues.
- What can be done to strip out emotion from news?

  Panel reactions:

  - Journalists should be trained about the impact of headlines, which are central to clickbait – it's important to stick to the truth in the headlines.
  - News brands cater to particular audiences. Facts should come first, but we cannot get away from framing and tailoring to audiences based on geography, education level, etc.
  - Emotions cannot be split from facts. However, to reduce polarisation, we need to move towards empathy.
- There is a need to analyse in details all processes related to creation and distribution of fake news to ensure full understanding of the problem. Collaboration among various actors is needed here as well as access to data and availability of appropriate open source based tools. Furthermore, multidisciplinary approach is needed while investigating the broad context of the fake news.
- There is a need to improve social media technologies, in particular fact-checking tools, and develop new solutions and processes. In particular, there is a need to pool fact checking tools and improve their performance; currently, there too many fact-checking tools – as many as 30 to 40 different instruments. The EU can play a key role in this effort.
- Tools should be open source to allow adaptation to the local context.
- Should platforms pay levies for the work done by professional media?
- The ranking of news distributors in search results and social media should be based on reputation.

  Panel reactions:

  - Ranking/ratings might not work since fact checking is never completely accurate.

- New regulation should not give to social media or states the power to decide what can and cannot be said online. This is the role of the courts. Similarly, closing accounts should be handled transparently, and not by vigilantes in social media. An alternative would be to promote the use of real identities in social media in order to foster responsibility. This could include persons responsible for bots.

- Should platforms treat sources differently, depending on whether the source provides information about location and legal representatives?
- Education in media (news) literacy is crucial. Children in particular are targets. "Older" populations may also be vulnerable to conspiracy theories.
- There is an imbalance, as those who invest in quality journalism and fact-checking do not get the remuneration of the advertising.
- There is a need for regulation in the social media and extension of publishers and other related rights/rules/laws in this direction. However, regulation is a sensitive issue, so that the first target should be a kind of self-regulation among the social media actors.
- The current business models applied by social media actors are acting in favour of fake news and should be reconsidered – maybe through appropriate regulation and taxing measures.
- Political and societal clarifications are the main tools for fighting origins of fake news and its distribution.

ANNEX B WHITE PAPER "TOWARDS THE FUTURE SOCIAL MEDIA"

TOWARDS THE FUTURE OF SOCIAL MEDIA

NEM White Paper

December 2017

Preface

What is and how will the future social media look, how we are going to get there, and what has to be done to enable it? Probably the largest research and innovation community in the area of media and content in Europe organised within the NEM (New European Media) Initiative answers these questions within a coordinated action among the community members. This activity is supported by the Vital Media project[1] of the Horizon 2020 EU research and innovation programme.

This White Paper presents an initial vision on the future social media, based on inputs received from a broad range of media and content sector representatives in Europe (from the NEM Initiative), aiming to identify the next steps towards the future social media, including required research and innovation activities to achieve defined goals, as well as related standardisation, regulatory, and policy actions – underpinned with a European approach. It provides a base for further elaboration of

[1] Vital Media is a support action project under the Horizon 2020 Programme of the European Union – number: 688310 – project duration: June 2016 – May 2018.

selected aspects of social media, which will be detailed in due course throughout 2018. Feedback was also gathered at the NEM Summit 2017 - the 10th edition of NEM's annual conference and exhibition - held in Madrid, Spain, on 29/30 November, from the Summit presentations, invited and key-notes talks, as well as open discussions.

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1) Introduction

Social media used to be defined as a set of computer-mediated technologies that facilitate the creation and sharing of information, ideas, and other forms of content and applications via so-called virtual communities taking advantage of modern network and communications infrastructures. Social media uses web-based technologies to create a variety of interactive platforms through which individuals and communities can share, create, modify, and discuss different types of information and digital content, which is available in the global Internet landscape.

It can be stated that during the last one-two decades, social media applications have introduced significant changes to the way people communicate, as well as businesses and more over entire communities organised through common interests. Moreover, the recent developments in Internet and communications technologies, media and entertainment sectors, as well as many other spheres of professional activities and life show that social media becomes a standard part of different services and applications offered to people through a variety of communication and consumer devices; computers, tablets, smart phones, smart watches, etc. Furthermore, so-called classical media services, such as broadcasting and even traditional paper-based media, are more and more introducing and using various social media technologies, to improve the overall user experience and further extend their offers and businesses.

Social media is currently being used to infer social behavior and derive tendencies, in combination with big-data analysis tools. Its capabilities are tremendous to obtain information about the acceptance of a new product or service, identification of needs, or even the determination of ways to influence particular social acts and events. A practical example of the above is the still-open question of whether social media, in combination with big-data analysis tools, influence world-wide elections or not. Furthermore, a concern about digital competition is acute in Europe because quite often digital markets and social media platforms are dominated by few, big and foreign companies, accumulating volumes of exclusive consumer data on their platforms and services. And exploitation of this data as the raw material for artificial intelligence (AI) or machine learning (ML) could have an insuperable competitive advantage over new entrants. Consumers gain good services, and often free of charge, from such platforms but there are also potential drawbacks; e.g. using a predominant position to collect data (even improper), keeping that data exclusive in order to maintain monopoly power, which even might obstruct further innovations and creation of new ideas, or using it to prevent consumers to change platform providers. Therefore, from the competition point of view it is also desirable to ensure personal data and profile portability in future social media services.

We can conclude that in the near future it will be more and more difficult to distinguish among traditional media and social media. Where is or will be the border between traditional media and social media (e.g. shift from off-line to online media, or the shift from business to consumer (b2c) to consumer-to-consumer (c2c) as well as the border between social media and any other future type of service or application, or will there be any borders at all?

This White Paper defines a set of actions needed to be taken in a coherent and coordinated way to enable an effective, relevant, consumer-focused social media landscape, underpinned with a European approach.

The document is organised as follows:

- A summary of identified actions that are needed to be taken in order to enable the future social media (Chapter 2)
- Future social media scenarios, providing a base for elaboration on needed actions (Chapter 3)
- Detailed requirements on policy and regulation as well as needed research and innovation activities and education measures (Chapters 4 and 5 respectively).

2) Summary of identified actions toward the future social media

This White Paper elaborates on several aspects of the future social media by providing relevant service and application scenarios and by deriving corresponding requirements and needed actions on policy and regulation as well as on research and innovation in the area. To note, although the inputs and requirements covered in this document are not exhaustive, we consider that it is already possible to identify a number of needed actions to enable a future European social media approach around the following main areas:

- Data protection
- Trust
- New areas in the social media
- Business and cooperation models
- Education

Data protection

Protection of individual user rights

Regulatory intervention should aim to protect individuals' fundamental rights, while encouraging technological innovation and market-driven business development. The General Data Protection Regulation (GDPR)[2], which comes into effect on 25 May 2018, represents an important step for personal data protection. It takes into consideration privacy issues emerging from social media and requires the collection and processing of individuals' data independently from the location of the social media service provider. Moreover, the recent proposed revision of the e-privacy Directive[3] adds further privacy obligations for electronic communication services and networks. To ensure both legal frameworks support consumers as well as business innovation and growth, close attention should be paid on the coherence of them and on the avoidance of regulatory irregularities.

Data portability and competition/monopoly issues

Concern about digital competition in social media is acute in Europe because quite often digital markets and social media platforms are dominated by few, big and foreign companies, accumulating volumes of exclusive consumer data on their platforms and services. A monitoring of the market is needed in order to evaluate the existence of problems on competition with limitations on users' choice. Exploiting huge amounts of user data as the raw material for AI and ML could have an insuperable competitive advantage over new, European, entrants. Therefore, from the competition point of view it is also desirable to ensure personal data and profile portability in any future social media and other type of similar application or services.

[2] http://ec.europa.eu/justice/data-protection/reform/index_en.htm
[3] https://ec.europa.eu/digital-single-market/en/proposal-eprivacy-regulation

Management of user information and portability

It will be of great benefit for the development of the market, for competition and for end-user value creation to have effective ICT tools, protocols, frameworks, APIs and systems that can help businesses and consumers to declare, enforce, control and report on data management, and wider aspects of GDPR implementation - to endorse and stimulate good practice and also to identify malpractice. Implementation and interoperability across social media providers should be considered in order to facilitate convergence between social media platforms and to unlock possible proprietary features, enabling data portability.

Trust

Regulation in social media

We consider that it is the appropriate time to start exploring and developing standards and regulations that apply to a range of aspects of social media. As well as regulations specifically applicable to personal data, regulation of AI[4] and 'misinformation' (including advertising) are also growing in interest and need. However, instead of a strong and centralised regulation of social media / the various aspects that it comprises, self-regulation and/or application of standards among platform providers, media organisations, technology providers, content creators etc might be more effective. Regulation or at least a strong regulation might not be of help and could damage free press, freedom of speech and wider democratic principles and processes.

Ensuring trust and diversity

Besides the regulation measures discussed above, re-establishment of trust in organisations distributing/providing news media in particular, is crucial. Where levels of trust in governments and traditional news media is falling, and people's use and trust in other online sources increases,[5] the likes of Facebook, Google, Twitter and YouTube need to play an active role in ensuring that the information and sources provided on their platforms, and that they 'push' to consumers through algorithms, is accurate, diverse, transparent and ethical. The objective also being to balance people's individual choices, beliefs and freedom of opinion, with educating them, challenging their perspectives and enabling them to understand how algorithms play a role in the content they see/search for.

Social media tools

There is a need to improve social media technologies, in particular fact-checking tools, and develop new solutions and processes. Furthermore, reputation tools for ranking news publishers/distributors (based on trust, good practice, high standards etc) that publish content on social media platforms directly (as opposed to news articles and links being shared by/between individual users or interest groups) should be put in place also. This ranking should be based on agreed standards and/or policies that news publishers/distributors are working towards, and be transparent, authentic and regularly

[4] https://www.nesta.org.uk/2018-predictions/guiding-smart-machines
[5] https://www.ft.com/content/fa332f58-d9bf-11e6-944b-e7eb37a6aa8e

monitored. Especially where AI and ML are being used for such a process, as "without this transparency, there will be claims of bias and censorship from different content producers".[6]

New areas in social media

From the beginning of its existence, social media at large has evolved in various and not always predictable directions. Thus, new social media services and applications have been continuously established and deployed and there is no sign that this trend will stop in the future. We can expect a number of developments that will result from not only regulation and standardisation (as mentioned above) but also from innovation in content production and digital technologies.

As an example, in comparison with the social networks of human beings there is a need to consider a notion of social relationships among things – **Social IoT** – making devices and objects not only smart or connected but also social. Here, several different technologies need to be studied and integrated and further researched in order to understand how intelligent and social things can impact social media.

Distributed ledger technology (e.g. blockchain) is also paving the way for a new approach to social platforms, offering efficiency, privacy, and security for content producers and distributors as well as end-users. Not only can blockchain be used for enabling the design and exchange of cryptocurrencies and digital micropayments, but also to enable smart contracts. Whereby **decentralised** licensing systems can be used to enable a producer of content to track usage and define the terms under which it will allow its content to be published by a third party.[7]

Business and cooperation models

New and innovative social media models such as those exploiting distributed ledger technology, are probably the best mechanisms to ensure trust of various sources, democratic principles and processes, and diversity of content to prevent domination of particular world regions, societies, opinion makers, etc. The European Commission-funded D-CENT project being one recent example of collaborative decentralised social networks using blockchain to increase and reward user participation, and enhance trust and privacy.[8]

New models related to search of information

Most web search engines are commercial ventures supported by advertising revenue and thus some of them allow advertisers to have their listing rank higher in search result for a fee. These practices are more and more rejected by end users because they will get the results that are the most profitable for the search engine and not the actual best (most relevant) result. Therefore, we need to consider what the role and relationship is, in the future, of advertising and new forms of adtech, such as 'crypto advertising', with content and search personalisation.

Business models for publishing in social media

[6] https://firstdraftnews.com/coe-recommendations/
[7] https://www.digitalcatapultcentre.org.uk/project/content-personalisation-network/
[8] https://dcentproject.eu

The economic model of high-quality journalism is in danger, which is one problem of today's professional journalism, and lets enough room for alternative information gathering and publishing in the media arena, which is frequently (not always) used for spreading the fake news. Thus, there is a need to invest more in journalistic resources and provide additional funding for the area. Furthermore, social media business models are based on attention, so that the social media platforms are mainly interested to get the users' attention (number of visits, clicks), whereas the available content is secondary. Therefore, there is a need for alternative business models for social media, which might be imposed by corresponding regulation measures. The challenge is to ensure competitiveness of the proper social media platforms, as news providers, versus so-called fake news/website factories.

Collaborative live production workflow

These high-level requirements mandate a close collaboration between the owners and stakeholders of the various involved realms, i.e. advertisement agencies and networks, the providers of social media technology, the technology providers for the clip rendering/creation, the owners of the distribution channels and, finally, the broadcast organisations themselves to integrate and enable the workflow in their live productions.

Education

Education and promotion of media and news literacy among social media users will play a significant part in reducing negative impacts of social media, such as the creation and sharing of false information, hate speech and online bullying. Media and news literacy interventions should be introduced across a range of places/opportunities including school, the workplace, libraries, community and charity schemes and even by content publishers and distributors themselves.

3) Selected future social media scenarios

Big data – collection and analytics

Social media platforms have a relevant impact on modern society since they have increasingly been changing people's way of living and interacting with the rest of the world. They have been able to attract an increasing number of users by providing services and opportunities according to a business model that on a user's side is perceived as 'for free'. By entering the social network, users have access to a community that shares information, content, and emotions and the opportunity to always be connected with personal contacts, whatever the physical distance between them. In return, users are asked to provide essentially the following things:

- Explicit personal data (e.g. name, age, place of living…)
- Users' interactions within the social network (e.g. posts, photos/videos shared with the community, comments on other posts…)
- The right to collect, store, and elaborate any user data for various purposes.

Social media platforms, by means of 'big data' collection and analytics, can derive the preferences and usage behavior of their members and use this data to monetise, selling the data to third-parties such as advertising agencies that have the opportunity to issue efficiently targeted marketing campaigns. Furthermore, social media providers use all the information retrieved by user interaction within the community to generate useful insights that helps to update and optimise the existing services and to create new services.

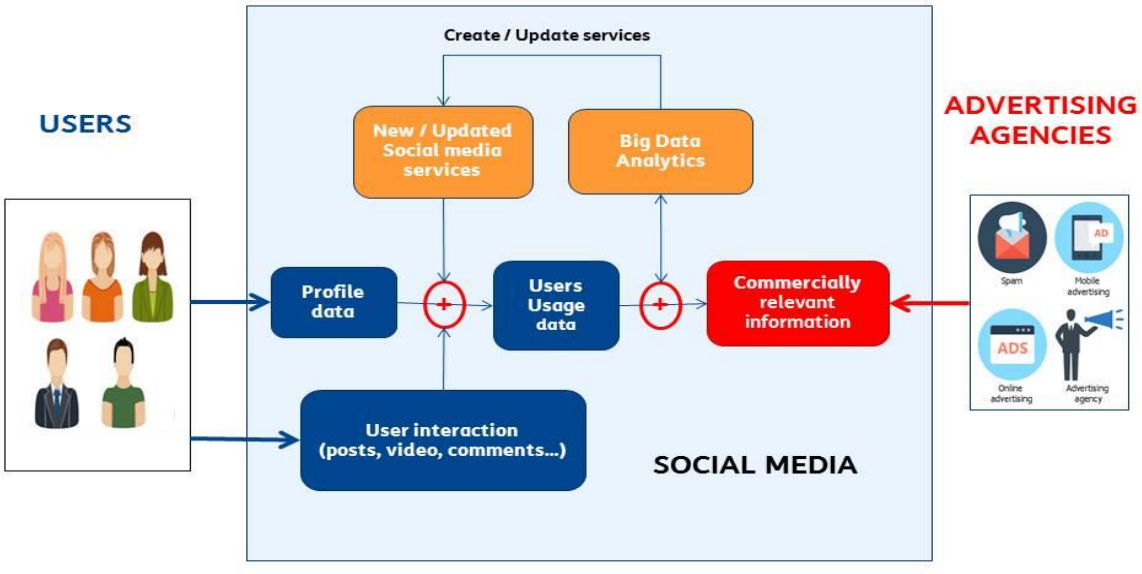

Figure 2: Social media business model based on big data – collection and analytics

This model (

Figure 2) has proved to be extremely successful for any party involved in the chain. The growth in terms of number of users and level of engagement with the platforms has been rapidly rising in the last years bringing to an average daily use of social media of about 135 minutes.[9] This number is expected to grow even more, because of the increasing number of contacts joining the communities, the number of platforms also growing, and also due to smart phones and mobile broadband becoming more cost effective and accessible.

In order to maximise users' engagement, leading to increased appeal for advertising agencies, social media platforms have been continuously enhancing their service proposition. With the objective of covering more aspects of users' lifestyles and creating a service providing not only communications, information and entertainment channels but also user needs such as purchasing goods and services, and making financial transactions. (See Figure 3 below).

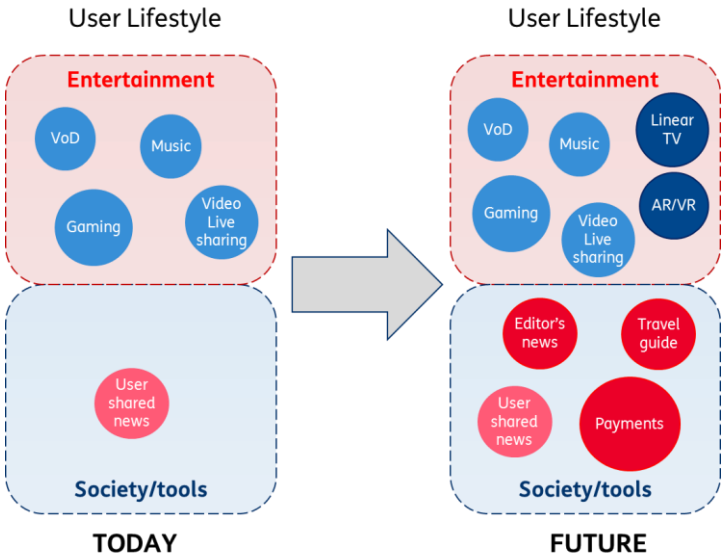

Figure 3: Shifting and enlarging social media service proposition

Social media providers are also increasingly (whether through desire or being required to because of external pressures) exploring ways to become trusted entities for audiences accessing news and information. Facebook, for example, has implemented initiatives to flag potential fake news content.[10]

Other services that are increasingly exploiting the big data-social media value proposition include the online travel market, whereby "travel companies are targeting different customer demographics personally in email and social media messages", and robust data capabilities are helping to "identify visitors across different channels and devices, driving personalized marketing and customer journeys".[11] And also immersive technology applications (augmented reality (AR) and/or virtual reality (VR)) which will likely become an every-day reality of people's social networking – from the way consumers will engage with advertising and marketing, to the way they can access and consume

[9] https://www.statista.com/statistics/433871/daily-social-media-usage-worldwide/
[10] https://newsroom.fb.com/news/2016/12/news-feed-fyi-addressing-hoaxes-and-fake-news/
[11] https://www.smartinsights.com/digital-marketing-platforms/big-data-digital-marketing-platforms/2017-travel-marketing-trends/

content, to the way they interact with each other (and each other's content). This, of course, will be accelerated by the implementation and roll-out of 5G.[12]

Social TV

Social television (social TV) is the union of television and social media, which is becoming increasingly popular in society. Video now exceeds 50% of all traffic on Facebook and is expected to rise to over 75% in the next few years. Also on Facebook, video has primarily been short clips (a few minutes) but in mid-2017 Facebook Watch was launched - a service offering long-form television, including specially commissioned content. Also, many people increasingly watch both short- and long-form content on YouTube and other similar platforms. They upload, share, and comment upon a huge range of video, whether self-generated or from secondary sources.

In the last 20 years the competitive and commercial pressure in the television industry has increased tremendously as a result of an ever-increasing number of channels and digital platforms viewers can use to access their content. In order to retain viewers, social is a recognised and proven proposition for introducing interactive elements to traditional broadcast formats, with the aim of making formats more personal, dynamic and attractive for viewers, which decreases churn.

An example of a scenario with socialised promotions is the launch of the Game of Thrones season seven in 2017, which used "social clues and games to tout the season" and reward audiences.[13] The Game of Thrones producers and the HBO network on which it airs have also created a number of partnerships and integrations – including with a celebrity chef, on music streaming platform Spotify, with emerging artists and with news and information aggregation platform Reddit – using social media channels to allow people to participate and to share the campaigns online.[14] Pilot studies have also shown that advertisement value can be increased enormously by adding social and interactive elements to video clips. Clips containing seamlessly embedded user-generated content significantly increase brand awareness and intention to buy, i.e., value for the advertising brand. Of course, similar campaigns as the Game of Thrones initiative, based on the same technologies, strategies and similar partnerships can be created for other brands launching new products and services.

While socialising broadcast productions is a promising and innovative playing field, there's another aspect that's often overlooked, namely the surrounding advertisements and promotions that essentially bring income for the broadcasters (as well as for the social media platforms where there is a revenue share). It will be interesting to observe in the future if audiences and engagers of social TV become disinterested and irritated by advertising and marketing campaigns in a similar way to traditional TV broadcast audiences. Who seemingly turn to social media as one way of disengaging from TV advertising, which is adding to the decline in advertisement revenues for traditional broadcast TV.[15]

[12] https://www.qualcomm.com/news/onq/2017/02/01/vr-and-ar-are-pushing-limits-connectivity-5g-our-rescue

[13] http://www.thedrum.com/news/2017/06/21/game-thrones-uses-social-clues-and-games-tout-the-season-seven-premiere

[14] https://medium.com/rta902/with-the-reportedly-second-last-of-game-of-thrones-approaching-this-summer-i-thought-it-would-be-8684dfe5c64e

[15] http://uk.businessinsider.com/facebook-tv-advertising-impact-2017-6?r=US&IR=T

We feel that there is tremendous unexplored value in the socialisation of adverts, which - in the absence of technologies and processes available to mine it - is still left unexploited by the industry today. Moreover, once advertisements can be made as social as the broadcast formats are today, it even becomes possible to link their respective social elements, thereby adding even more value to the ecosystem.

For broadcasters, this proposition increases the value of their most important source of revenue, i.e. their advertisements. For broadcasters and brands/advertisers it increases the effectiveness of their promotional material. For the market as a whole it creates a playing field where productions and advertisements can be linked through their social elements.

Finally, because of their embedded social content and their diversity, consumers and viewers will perceive these adverts and promotions much more positively and dynamic than their boring and often irritating predecessors.

Further aspects: Content/information - sharing and publishing in social media

Paradigm change from off-line to online publishing

The digital transition has significantly transformed the publishing value chain; introducing substantial opportunities for disintermediation, as digital technologies eliminate certain limitations of the physical world, but also for reinter-mediation, as new players take up some of the new functions. Whereas a disruptive potential is obvious, however, the digital transition does not eliminate or even completely subvert the essential roles of the value chain: e.g. the writing and publishing of books as one of the prominent examples. For publishers, new production processes entail a multiplication of tasks, linked in particular with the production of e-books and the management of metadata, as well as a wide range of innovations in products (mostly focused on the digital enhancement of books), services and business models (as the sale of books shifts toward the commercialisation of access models).

Social media is an important element of this evolving framework: it provides an alternative channel for marketing and sales to publishers, and allows the creation of a direct link with readers, establishing a dialogue and also highlighting and raising the profile of a publishing house among its customers. Social media can also become a tool for innovation in book production, as it can be a vehicle to involve readers in the creative process. Several social platforms dedicated to books, stories and reading have emerged, including Medium[16] and Flipboard,[17] which develop communities of interest and can become, in turn, instrumental for the launch of books and authors.

Enhanced user-generated content

Improved tools for media acquisition and processing are propitiating the increase of user-generation content, particularly across social media channels. Thus, the content is fed, consumed, and evaluated by its own users, where the long-term vision is that any user can create engaging original content, such as audiovisual and 360-degree video, with the ability to also distribute and monetise, supported

[16] https://medium.com
[17] https://flipboard.com

by tools and technology that will also add trusted and secure value. In the future, individuals, communities and organisations will be able to produce sellable content, without a central media agency, with a trusted origin and quality given by the community peers and AI and blockchain tools to support provenance verification, creation (and co-creation), exchange, and equal rules for content monetisation.

Decentralised vs centralised social media approach

The centralistic focus of current social media platforms is problematic and is mostly based on the traditional media approach that offers one 'central' channel (newspaper or television) for all content. To ensure the audience of these channels receives relevant information, the content distribution is curated and/or edited. In the case of social media this curation is mostly done by an algorithmic assessment of user interests and based on engagement signals (e.g. likes, comments etc) that are spread by the user and/or the directly related social network. These signals are then automatically matched with content (both from the social network of the user and commercial/ads) resulting in a mixed stream of content 'personalised' to what the algorithm thinks the user might find interesting. It can be argued that the main benefit of the centralistic paradigm of current social media networks is the establishment of a 'marketplace' for premium (ad-based) content resulting in most social network providers focusing on matching content with user interests to increase engagement, the main metric to assess content value and interest.

Several challenges have been identified in relation to the centrality of current social media networks:

- Focus on limited media sources and missing context of information due to automatic algorithms
- Trust issues – filter bubbles, echo chambers and fake news
- Privacy and ethical issues in respect to information flow control

To overcome the current limitations of 'media' focus and platform 'centrality', a more open, flexible and distributed solution is required. This solution is built on the prerequisite that objects and people are digitally identifiable by location and proximity to each other. Furthermore, that users operate in a post-mobile era in which the mobile phone is replaced and extended by one or several wearable devices that allow the extension of sensory perception through digital insertion, such as visual (AR/VR) and/or other senses (e.g. touch, hearing and smelling). Future social systems therefore should be able to support highly dynamic real-world social interactions with the person's environment. For this to be enabled several different technologies need to be extended and further researched towards this vision.

New way of searching information

Today, the usual way to find information is to use search engines, which are browsing huge databases trying to find matches with the user queries. Search engines are software systems designed to search information on the web. They get their information by web crawling from site to site. The 'spider' checks for the standard filename addressed to it, before sending certain information back to be indexed depending on many factors such as the titles, page content, headings etc. Indexing means associating words and other definable tokens found on web pages to their domain names and HTML-based fields.

Some techniques for indexing and caching are trade secrets, whereas web crawling is a straightforward process of visiting all sites on a systematic basis. Typically, when a user enters a query into a search engine it is a few keywords. The index already has the names of the sites containing the keywords, and these are instantly obtained from the index.

The usefulness of a search engine depends on the relevance of the result set it gives back. While there may be millions of web pages that include a particular word or phrase, some pages may be more relevant, popular, or authoritative than others. Most search engines employ methods to rank the results to provide the 'best' results first.

Social IoT networking

In the next future, there will be more connected things (objects and devices) than humans and these things will have to communicate together in order to synchronise themselves or to solve a problem. Such use cases should be researched and developed across a range of industries and government priorities, such as IoT (Internet of Things) and 5G networks, health, logistics, energy, smart cities, and Industry 4.0.

The evolution of IoT is transforming our lives into a cyber-physical-social hyperspace and changing what it means to be social, thanks to smartphones, tablets, and all types of wearable and stationary devices, which are connecting people and things both directly and indirectly through various applications and platforms.

In the future, many applications and services will require associated groups of things interacting among them, based on technologies such as swarm intelligence and swarm robotics. The establishment and management of relationships among things can occur with different levels of human intervention. In one case human is responsible only to set the rules of the things social interactions and then enjoys the services resulting from such interactions and groupings, while in the other case things just participate in the human social network built by their owners.

The physical things belonging to our everyday reality are, at the same time, witnesses and protagonists of the (hi)story of our places (territories, home and work environments) and of our social life and communities. If only they could tell stories about what happened to them and around them, the possibility of interacting with things in the person's environment could provide people with a significantly enhanced experiences and services. We can identify different levels of 'social' involvement of such intelligent and social things:

- Things posting information (about the state of environment) in the social networks of humans
- Things interacting with humans and other things at the application layer in social networks
- Things interacting socially with each other to build a dedicated communication network.

Impact of the evolution of social media on the creative industries

The phenomenon that is social media is the result of the evolution of the mega trend user-generated content. At the same time, users themselves become actors and consumers of an inter-active scenario that they convey through mobile platforms. Today's reality of Facebook, Instagram and even dating platform Tinder is closer to this vision than it appears at glance. Mainly digital natives, but increasingly also digital immigrants use such media alternatively and cumulatively to existing media;

but their focus has shifted significantly: The individual human existence is melting in an unprecedented way with the medialised world. Reality is medialised, media is reality and the medium is now the only message. In an aesthetic capitalism, symbolic attributes contribute more and more to economic value and the pursuit for fame in a virtual community is becoming increasingly important.

In this environment, the creative economy is increasingly becoming a significant value-adding element. We can identify two mega trends:

- On the one hand, we clearly see the increasing desire for authenticity and real-life, which will also be reflected even more in three-dimensional contexts in the future. It could be that after the mobile sector being the youngest sector of the creative economy, the 3D printing sector will explode within the creative economy. Also, technologies like AR and VR - usually overrated in the past – could play a modest role. The blending of real life and the contribution of the individual to a common theatre, as it is already possible today in Minecraft, will increasingly determine the mindsets and behavior. The interactive communication as it first began in the games sector will be enriched with artificial intelligence and increasingly gaining in importance in this context. Thus, social media has influenced human behavior much deeper than any other media revolution before. The user slips from passive consumption into an interactive role; the development of communities is only partly moderated but boosted through highly personalised advertising and influencer marketing. The increasing customisation of advertising allows business models to be developed that drive the social media community to authentically and simultaneously expand into every part of human life.
- But as a trend we can also identify a second important flow: Users also long for deeper and larger stories. These are currently being portrayed via the new series from overseas streaming services (Netflix, Amazon Prime etc) and partly also via television stations. This longing for a deeper meaning in the stories is, so to speak, the natural and implicit reaction to the social media-generated network access between reality and medial reality. It creates an increasing degree of relaxation and security in an environment of uncertainty. Therefore, it would be wrong to see the user-oriented social media reality as the only mega trend; at the same time, there is also a new form of storytelling, that is only just beginning and that will not only be reduced to television series. Narrative design is gaining in relevance in Europe - the cradle of narration - and a great opportunity for the creative industries of Europe.

Social media and news consumption

Digital news and social media continue to grow, with mobile devices rapidly becoming one of the most common ways to get news. Social networks have become a generalised point of access for news consumption. They have registered an increase in the share of their audience that gets news on the sites and share them, and in respond, they have carried out work in developing their news usability. Not only users grown somewhat in their use of social media for news overall, but now they are more likely than ever to get news from multiple social media sites.

This new reality has caused the appearance of some of the following effects:

- **Infoxication:** Journalism is increasingly mobile as shown by prominent trends such as mobile journalism and citizen (or witness) journalism, which are one more source to the journalist, as "a form of new media storytelling where reporters use portable electronic devices with network connectivity to gather, edit and distribute news from his or her community" (Richardson, Allissa). These trends and opportunities, summed up with global news coverage where it is immediate to access any news media of the world to lead to an excessive amount of information (infoxication) on any topic to whom want to be informed about it.
- **Authenticity:** Due to this amount of information available, sometimes it is uncertain to assure the authenticity of the news, and it is one of the big concerns for the news industry nowadays. Some cases are driven by a clear ideological intention looking to create an opinion state to bring on specific ideas. In the other hand, and growing in importance, the main intention behind them is clickbait, usually with the intention of making money with high views rates.
- **Bias:** Traditionally news media develop their own editorial policy, usually reflecting also ethical, political or ideological views. This lead to different interpretations of the same news among different media and the need of reviewing several of them to have a complete idea of the reality.

Phenomenon of disinformation / fake news

Nowadays, when information is consumed by end users (readers/audiences) through various social media channels, they are dealing with significant amounts of available information, are spending less and less time digesting the information and, furthermore, articles and other types of information are provided in a more and more compressed way. In this landscape, end users don't have the means – be it time, analytics skills, attention span, or the facts – to identify true from false information or information that has a particular bias or motive from information that is objective. Thus, rumours, false statements, inaccurate or diverted information, exaggerated or intentionally misinterpreted information – fake news – have a perfect environment either not be detected or be scrutinised. Consequently, they are often considered, by mass audiences, to be consider genuine and true. Where users' feelings, emotions and biases are heightened and confirmed, the manifestation of fake news is even more efficient and prolific.

Fake news is usually part of well-prepared propaganda activities, which are known from history and are not intrinsically caused by / a symptom of modern society and social media technologies and platforms. However, social media, where users' behaviours across several aspects and applications can be traced, enables more targeted propaganda activities by spreading the fake news targeting topics of a kind of emotional importance for the end users to increase its impact.

Recently (and as mentioned previously in this paper), fake news has been identified as tool to negatively influence various democratic processes around the world, to influence outcomes of elections, referendums, and further political decisions. Of course, these cases are intensively discussed and highlighted across the media as well as governments. However, disinformation and misinformation affects other areas of life of 'the average person' beyond political issues, which are

also of significant detriment to individuals and communities - such as medicine and science, advertising, religion and even romance.[18]

As mentioned above, social media in itself is not creating fake news and untrustworthy information, but it is enabling the creation and distribution of it. The reasons for individuals, groups or organisations to (intentionally) produce and distribute disinformation and misinformation is varied – from having financial, political or prejudice motive, to key societal and psychological elements such "fear, division and anger" (Hendricks, Vincent F). Furthermore, as recently discussed at the European Commission's Multi-Stakeholder Conference on Fake News, in November 2017, a lot of amplification of fake news is done by bots and artificial technology means. These aspects amplify even more end users' perception on different issues in the modern world (globalisation, migration, wars and crisis, science) and the psychology behind must be taken seriously and from different angles. In which it will be necessary to establish a 'citizens front' against fake news, starting with well-, transparently-, and permanently-informed (social) media end uses.

[18] https://www.actionfraud.police.uk/fraud_protection/dating_fraud

4) Requirements on policy and regulation

Protection of individual user rights

Regulatory intervention should aim at protecting the individuals' fundamental rights promoting meanwhile technological innovation and a market-driven business development. Consumer protection is one of the most important issues for the end-user experience. The use of social media, also in combination with communication services, is growing and it is important that consumers are protected in terms of transparency of information and contracts, privacy and data protection, and security. In order to better protect consumers, the same rules should be applied to digital services in terms of consumer protection and privacy so that a level playing field between providers is guaranteed and consumers are actually aware of characteristics and possible drawbacks on the use of social media. Clear and transparent information to the users should be provided both about the offered service and on personal data collection, storage, use and elaboration and independently of the kind of remuneration of the service (including not direct remuneration, but based on personal data).

The GDPR, which comes into effect on 25 May 2018, represents an important step for personal data protection. It takes into consideration privacy issues emerging from social media and requires the collection and processing of individuals' data independently from the location of the social media service provider. The GDPR is based on the following regulatory principles for personal data, which must be strictly applied within future concepts for social media:

- **Transparency and fairness** - data should never be collected and processed without the data subject being actually aware of it
- **Purpose limitation** - data can only be collected for specified, explicit and legitimate purposes
- **Data minimisation** - data should be limited to what is necessary in relation to the purposes for which they are processed
- **Consent** - data collection and processing is based on data subject consent
- **Storage limitation** - data must be kept for no longer than is necessary for the purpose for which the data were collected or further processed
- **Accuracy** - data must be kept up to date, erasing and rectifying them when necessary
- **Integrity and confidentiality** - data processing ensures appropriate security of the personal data

Moreover, the recent proposed revision of the e-privacy Directive adds further privacy obligations for electronic communication services and networks. To ensure both legal frameworks support consumers as well as business innovation and growth, close attention should be paid on the coherence of them and on the avoidance of regulatory irregularities.

Data portability and competition/monopoly issues

Concern about digital competition in social media is acute in Europe because quite often digital markets and the social media platforms are dominated by few, big and foreign companies, accumulating volumes of exclusive operating data on their platforms and services. Concerns about the control of large amount of data by a few companies have been expressed also by European Commissioner for Competition, M. Vestager, at the Web Summit 2017 Conference (5 – 8, Nov. 2017

in Lisbon) underlining that their dominant position could lead to situation where competition and innovation are undermined.

As a matter of fact, the concentration around few platforms that have strengthened their position across multiple service categories, becoming powerful integrated ecosystem and leading potentially to situations of consumers lock-in. A monitoring of the market is needed in order to evaluate the existence of problems on competition with limitations on user's choice.

Using that huge amount of user data as the raw material for analytics and machine learning could have an insuperable competitive advantage over new entrants. Users gain good services, often free of charge, from such platforms but there are also some potential drawbacks; e.g. using a predominant position to collect data, keeping that data exclusive in order to maintain monopoly power could be used to prevent customer to change the platform providers. Competitive markets generally flourish in an environment in which there are few or no barriers to switching, enabling customers to easily move to a better deal.

Therefore, from the competition point of view it is also desirable to ensure personal data and profile portability in future social media services. Here, the GDPR presents a set of recommendations and rules that could provide, particularly on data portability, a promising route to combat customer lock-in, fostering switching between social media providers, including potential new (hopefully European) entrants in this space. The concept of portability (retaining the customer's identifier when changing provider) and support for switching are well established in the context of broadband and voice services and is tightly regulated at EU and/or national level and must be strictly applied in social media.

Digital rights management – prevention of piracy

Whereas the above-mentioned requirements on policy and regulation are rather considering empowered end users and protection of their basic privacy rights, an also very important point is protection of intellectual and other rights on content published and re-published across the social media networks. A good example is the e-book publishing and other similar sectors which are suffering from data piracy present in the digital world in general as well as in the social media and networks. Therefore, an important issue is to find appropriate and applicable mechanisms to protect the published content and the corresponding rights preventing the social media users to illegally share and publish content which does not belong to them.

Regulation in social media

A great advantage of the unregulated social media market is that it completely supports the principle of freedom of speech, diversity of issues and discussions across different demographics and representations of society, and enables expression of citizens' opinions on a large scale. On the other hand, the lack of regulation is damaging the above-mentioned principles of freedom of speech and diversity, by misusing the gaps in the regulatory social media landscape.

As fake news usually does not represent illegal content, where the corresponding legal measures are already well established, the related laws cannot be used. However, the following legal and regulatory measures could be applied or start being applied in the future:

- Defamation of private rights, including copyright for some issues and rules against cyberbullying/harassment
- Establishment and application of press codes, such as not using misleading headlines in news, obligation to correct wrong statements, etc.
- IP law for shutting down so-called fake websites / cloned websites, and
- Improvement of election (and other affected) laws to reduce potential influence by fake news

The overall opinion is that it is time now to consider appropriate standards and regulation for checking the available information and its removing when needed. However, instead of a strong and centralised regulation in social media, application of editorial/publisher standards and a kind of self-regulation among platforms, journalists, users, etc. might be more effective. Regulation or at least a strong regulation might not be of help and could damage free press and overall freedom of speech in the nowadays democracies. On the other hand, responsibility of corporations involved in the social media business could and should be improved. For the time being, social media providers do not take publisher responsibilities, but this behavior is starting to change – be it through willingness or requirement.

Thus, there is a need for regulation in social media and extension of publishers and other related rights/rules/laws in this direction. However, regulation is a sensitive issue, so the first target should be a kind of self-regulation among all relevant social media actors.

The main social media platforms apply a light verification process of the end users' accounts because of the main aim to increase the number of users and increase 'active engagement'. However, the number of suspicious accounts (including Internet 'trolls') is considered to be increasing and a number of platforms, such as Twitter, Facebook and dating sites, are taking actions to identify and remove these accounts. These activities include also identification of messages sent and accounts used by robots. Thus, an open question is if there are any appropriate measures to be applied to cope with this problem.

It has to be mentioned that the EU and the Member States are limited in concrete actions in controlling fake news and misinformation (especially by news media and so-called news media organisations) because of issues around press independency and political bias. In principle, the States should not be the bodies making decisions as to whether news or information is false or true.

Ensuring trust and diversity

Beside the regulation measures discussed above, re-establishment of trust in organisations sharing/providing/creating the news is crucial to overcome the challenges and damage of fake news. Of course, the most efficient solution for preventing fake news is to detect its creation in early stages, which would help in preventing their further distribution. Here, of course, it is difficult to observe all possible sources of polarisation and fake news. Another important point is that the re-establishment of trust cannot be achieved by a single control entity or similar because of very important pillar of the today's society to keep principle of freedom of speech and diversity of opinions.

Some fact-checking organisations, such as Full Fact,[19] are directly working on trust re-establishment as fully neutral entities, which is ensured by multiple and independent sources of funding. The target is not to create people's opinions but to help people to make up their minds while consuming different types of information. To ensure it, the transparency of all related processes is needed.

Fact-checking has to be implemented through collaboration among multiple stakeholders, including the main social media platforms, on the global level. Furthermore, it is also needed to consider different cultural factors influencing the considered area, e.g. caused by specifics of languages. Here, the ethical responsibility of platforms and citizens engagement is of a high importance for success, whereas political and societal clarifications are the main tools for fighting origins of the fake news and its distribution.

To conclude, to successfully reduce impact of the fake news and its distribution, broad global activities and collaborations among all relevant stakeholders are needed, including standards and regulation as well as cooperation in different world regions by considering as many as possible cultural and language related factors, such as:

- To recognise societal responsibility and promote quality journalism as well as education on media/news literacy and journalists training
- To ensure public funding for fact-checking organisations and tools to be put on disposal for wide public usage, e.g. as open source
- Establishment of common and open data bases, in cooperation with the main platform providers, to enable wide research activities in the area through data analysis
- To cooperate in fact-checking and support the needed innovation as well as adopt multi-platform approach for spreading information and news
- To improve transparency and accountability in all processes as well as support activities on fact-checking and providing related feedbacks and corrections
- Establishment of self-regulation measures among stakeholders involved in overall publishing process in the social media

[19] https://fullfact.org

5) Needed research and innovation activities and education measures

Management of user information and portability

Considering the huge amount and relevance of user data that social media are supposed to handle in the coming years it becomes extremely important to impose to social media a correct management of user information and guarantee a set of rights to the final users that range to data security and protection, porting of data to another platform, to complete user control on personal information.

We think it could be of great interest for the development of the market, for competition and for end user value creation to have ICT tools, protocols, APIs and systems that can help to declare, enforce, control and report on data management and also on GDPR implementation as well as to ensure the needed user data portability.

Furthermore, in order to do so, there is need for research activities in order to help people to put their query on relevant social networks and also to develop filtering services helping people to capture queries that are relevant for them.

In addition, there will be a need to ensure communication between different social networks from different sectors and also with social media networks in order to bring to the end user the information about the decision taken by the system. Such interoperability among various social networks should be studied in order to facilitate convergence between these social networks and to unlock possible proprietary features.

Social media tools and processes

From the technology point of view, the current powerful social media has been established by developing and deploying the newest software solutions, enabling all the social media features the citizens are enjoying world-wide. On the other hand, the same tools allow very efficient creation and distribution of the fake news and act as their enablers.

In order to cope with this problem, of course the tools' capability should not be reduced, but they can be enhanced to help to find and remove fake news and false information from the special media platforms, including fake websites. However, the time needed for removing the fake news is still too long to ensure proper reaction within the needed real -time scale.

There is a need to improve social media technologies, in particular fact-checking tools and develop new solutions and processes. Furthermore, reputation tools for ranking the news distributors should be put in place, too.

Tools for fact checking

The fact checking tools are getting better, but significant improvements are needed to make them faster, to be able to provide the needed feedbacks within minutes. There are also ongoing activities in exploring opportunities to apply artificial intelligence and further technologies in fake news checking process.

Even there are powerful tools available for checking the potentially fake news, in most of the cases there is a need to finalise a fake news check manually, which means by a human action and a

corresponding action from a person or a team. This, of course, wakes up a question of impartiality or independency of people and organisations checking the news and providing the final opinion.

Need for collaboration and data exchange

In order to better analyse the entire problem and provide better tools, it is necessary that the main platform providers open their APIs, so that their data can be used for these purposes. There are open APIs provided, in some cases their users need to pay for it, but amount of information available through the APIs is not yet enough for a substantial problem analysis. However, the large social media platforms, which recognize the overall problem of false news as dangerous for their businesses, are getting ready and committed to collaboration, so we can expect improvements here in the next period as well.

There is a strong need for collaboration on issue of the fake news by all relevant stakeholders on the global level. Furthermore, it is also needed to consider different cultural factors influencing the considered area, e.g. caused by specifics of languages. There is a need to analyze in details all processes related to creation and distribution of the fake news to ensure full understanding of the problem. Collaboration among various actors is needed here as well as access to data and availability of appropriate open source based tools.

Investigation on origins of disinformation

Finally, there is need to investigate origins of false information in social media by a deep analysis of various technical and operational processes related to:

- Potential bias in search results – how they are intentionally or unintentionally created by providing information in the social media channels, search for information to influence ranking algorithms and final search results, etc
- Revision of the ranking algorithms to avoid that the search influences users' opinions
- To ensure full transparency of all processes related to search, ranking, and provision of search results to the end users.

Artificial Intelligence for/in social media

There is a big challenge for the development of the AI tools (mainly based on deep learning) tailored for social media, such as:

- Blockchain for media generation and exchange, to track the authorship of the content and be able to reward the content creators, and verify the content and the source
- Media analytics: value to measure the media reach and consumption
- Source analysis and distribution pattern forecasting: identifying origin and replication, avoiding modified content to be delivered and discovering increased impacts by zombie networks
- Lightweight quality assessment and enhancement: avoiding low-quality content to be distributed, enhancing the quality with automatic video processing

New social IoT models and technologies

In analogy with the social networks of human beings there is a need to study and define a notion of social relationship among things, making them intelligent and social. One possible definition is that things come in social relationship, because and when their owners come in touch with each other during their lives (e.g. devices and sensors belonging to friends, classmates, travel companions, colleagues).

Several different technologies need to be extended and further researched towards the vision on intelligent and social things,

- *intelligence and social abilities* of the things that allow them to interact with people and among themselves are based on reasoning and learning from the following kind of information:
    - semantic information such as common-sense and general knowledge about things domain and environment (e.g. an ontology)
    - user behavior data during interaction
    - content associated with the things (e.g. photos or videos posted on/from the things)
- people and things are both *social entities*, able to manage and share knowledge and to establish relations with other things and people - social network thus maintains three types of dynamic relations: *user-to-user* (e.g. friendship, similarity, etc.), *user-to-thing* (e.g. ownership, potential interest, etc.), *thing-to-thing* (e.g. similarity, proximity, task, etc.)
- *bidirectional interactions*: person and the intelligent thing may start a conversation
- *natural interactions:* gently and playfully led by interest, curiosity and fun while fully exploiting intelligent and social things
- *content adaptation, personalisation and aggregation*: the capability to filter, synthesize and mashup content in a meaningful way, ranging from the intelligent search, discovery and recommendations to the digital storytelling, that involve intelligent and social things.

New business and cooperation models

Strategically speaking, publishers and content creators in the digital age still face a degree of uncertainty; they will need to undertake a fundamental evolution that takes carefully into account the creation and distribution of value across all participants, including retailers, distributors, publishers and authors. The role and results of the players of the industry will depend heavily on future content consumption preferences (consumer-centric shift) and patterns and the evolution of the competitive landscape; in particular, moving towards a consumer-centric approach appears as an essential adaptation in the future social media.

On the other hand, the new and innovative business models are probably the best mechanisms to ensure trust to various sources in social media (of course the trusted sources only) and diversity of content to prevent domination of particular world regions, societies, opinion makers, etc.

New models related to search of information

Most web search engines are commercial ventures supported by advertising revenue and thus some of them allow advertisers to have their listing rank higher in search result for a fee. These practices are more and more rejected by end users because they will get the results that are the most profitable for the search engine and not the ‘best result’.

The future social media should disturb this model because users will question social network parties instead of using search engine. In this new way of searching, when one is searching information, he just has to send its query to a specific social media network and due to the number of users

connected on the social media network; it is obvious that one of them have the 'best' answer. Such a usage should also very interesting for internet businesses, they just have to filter on the social network queries that are fitting to their business and when it matches send back an answer.

This new practice should take a bigger and bigger role in the future and it should be a chance for European industry to come back on the playground in this field.

Business models for publishing in social media

The economic model of high-quality journalism is in danger, which is a significant problem of today's professional journalism, and it lets enough room for alternative information gathering and publishing in the media arena, which is frequently (not always) used for spreading fake news. Thus, there is a need to invest more in the journalistic resources and provide additional funding for the area.

The social media business models are based on attention – more people using a platform the more advertisement can be done, so that the social media platforms are mainly interested to get the users' attention (number of visits, clicks), whereas the available content is secondary, which is one of the enablers of the fake news. Thus, the current business models applied by social media actors are acting in favour of fake news and should be reconsidered – maybe also through appropriate regulation and taxing measures.

Furthermore, if we define a customer as somebody paying for a service, the real customer of the platforms is the advertising industry, whereas the end users are not paying for information on the social media and, accordingly are not the platforms' customers in a real sense and can be even seen as product of the platforms, which have established communication links to the end users, have the users' data, and know a lot about the users' behaviour.

Thus, the power of attention in social media, limited number of powerful global players in the area, power of financial flows coming from advertising industry into the social media and its commercialisation, unintentionally create an environment for efficient creation and distribution of disinformation and misinformation. Furthermore, follow-up of financial / advertising flows around the recognised fake news producers, with aim to cat them and with it prevent wide distribution of the fake news is needed as well. This activity is supported by possibility for the end users to report false information and the fake news.

Therefore, there is a need for alternative business models for the social media, which might be imposed by corresponding regulation measures. The new models and related regulation have to ensure creation and distribution of professional made journalistic content (particularly considering quality of information, its presentation, and true facts behind), which is of course significantly expensive, compared with simple and amateur work, which is however enough to establish and distribute disinformation and fake news.

The challenge here is to ensure competitiveness of the proper social media platforms, as news providers, versus so-called fake news/website factories, which exist even within the EU and could be counted by consequently applying current laws.

Collaborative live production workflow

These high-level requirements mandate a close collaboration between the owners and stakeholders of the various involved realms, i.e. advertisement agencies and networks, the providers of the social media technology, the technology providers for the clip rendering/creation, the owners of the distribution channels and, finally, the broadcast organizations themselves to integrate and enable the workflow in their live productions.

In order to materialise this concept, various technologies, concepts and processes will have to be developed, e.g.:

- Instead of a single clip that is designed, created and approved months before its first display, advertisements must become dynamic templates of which a large number of different versions will eventually be realised
- The end-to-end workflow, including its underlying technology, must be developed, from content reception, to moderation/selection, to rendering, to approval of the individual clips and finally the distribution/transmission of all the material to broadcast and/or portals
- In the context of social media, time and volume are everything. This implies that the whole workflow must have a short lead time and be scalable to large numbers.

Education and literacy

Education and promotion of media and news literacy among the social media users are probably the best way to reduce negative impacts of the social media, such as fake news. Thus, social media users and media audiences in general should be educated to consume the offered information (on the Internet and particularly on social media platforms) in effective, accessible ways, to look for complete information before forming opinions, and to look for more news sources where needed and possible.

Even results of a literacy education experiment with school children show a strong interest of young people to be educated in this area and their willingness and ability to learn. It can be concluded that there is a need and potential in organizing education programs on media (news) literacy, targeting different groups; of course, the end users, the journalists, broad IT personnel involved on various aspects of the social media, as well as many other groups of people.

On media (news) literacy, the corresponding education efforts should be shared among various disciplines which are taught at schools and other education centers instead of focusing on one single ‘media subject’, to be offered to all EU citizens. On the other hand, the corresponding education of journalists to cope with the problem of the fake news, e.g. training journalists to discard inaccurate news, should be part of overall education process towards future social media.

6) Contributors and Acknowledgements

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ANNEX C ENABLING FUTURE SOCIAL MEDIA

ENABLING FUTURE SOCIAL MEDIA

June 2018

Introduction

This publication is a follow-up from the activities of the Vital Media project and the NEM Initiative laid down in the White Paper "Towards Future of Social Media", published in December 2017. The White Paper identified several aspects of Social Media, where specific actions are needed to be performed by overall European media community, in order to move towards the future social media. In this publication, the main identified aspects are further elaborated, providing concrete ideas on the needed approach in the future.

Beside education, the White Paper considered the following key areas, important for the future social media landscape and its further evolution:

- Data protection
- Trust
- New areas in social media
- Business and cooperation models

Regarding the data protection, the emphasis is in protection of individual user rights, data portability, and handling competition and monopoly related issues, including overall user information management and management of data portability.

Trust, as an important paradigm in social networks, can be established by appropriate regulation methods combined with ensuring broad diversity in the social media platforms and information flow through the social networks. Various social media tools, such as the fact-checking tools, can further increase the trust in the social media.

Nowadays, people, the social media users / consumers, understand the social media as a mix of various platforms allowing publication, sharing, and consumption of various types of information. However, in the future the machine based communication will increase in all sectors of life and will influence the future social media by introducing new ways of social media communication, e.g. by introduction of so-called Social IoT.

The business and cooperation models in the social media also cannot be seen as static and will need to evolve in the future to meet the new requirements of users but also other actors in the social media, such as the platforms, publishers, etc. Application of new business models in the social media are also seen as one of the means to efficiently reduce spreading and impact of disinformation in the social media, so-called fake news.

The Vital Media project and the NEM Initiative consider all the four aspects presented above as crucial for future development in the social media in particular in the European social media landscape where there is obviously a need to increase level of activities, needed to get into a position to become a significant player in the world-wide social media eco-system at the same level as the today's main global players are already acting.

In this publication, the data protection issues are handled in the second section by considering processes for management of user data and options for ensuring data portability in social media.

Ensuring trust in the social media is considered through elaboration on possible solutions to implement efficient fact-checking tools in the third section and impose appropriate regulation means for the social media in the fourth section. Social IoT is considered, in the fifth section, as specific and possible trend in the social media interactions, whereas the business models and collaborative workflows for the future social media are elaborated in the sixth and seventh sections of this document.

Conclusions on the social media aspects elaborated in the document are provided within the corresponding sections.

Note, that education and media literacy, in relation to the social media, are also identified in the above mentioned White Paper as important aspects to be considered, but the related actions are not seen as focus of the activities to be performed by the Vital Media project and the NEM Initiative at this stage of discussions. A corresponding Media Literacy Expert Group has already been established by the European Commission to discuss the related matters in details.

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1) Handling user data

1.1) Management of user data

One of the defining phenomena of the present times reshaping the world as we know it, is the rise of Social media, which comes in many forms, including blogs, forums, business networks, photo-sharing platforms, social gaming, microblogs, chat apps, and last but not least social networks. Social media phenomena have influenced human behavior much deeper than any other media revolution before. The development of social media communities is only partly moderated but boosted through highly personalized advertising and influencer marketing that expands into every part of human life.

The power of social networking is such that the number of worldwide users is expected to reach some 3.02 Billion monthly active Social media users by 2021, around a third of Earth's entire population.

The leading Social media platforms are usually available in multiple languages and enable users to connect with friends or people across geographical, political or economic borders and usually boast a high number of user accounts or strong user engagement metrics. Approximately 2 Billion Internet users are using social networks and these figures are still expected to grow as mobile device usage and mobile Social networks increasingly gain traction.

Market leader Facebook was the first Social network to surpass 1 billion monthly active users, whereas recent newcomer Pinterest was the fastest independently launched site to reach 10 million unique monthly visitors. The majority of social networks with more than 100 million users originated in the United States, but European services like VK or Chinese social networks Qzone and Renren have also garnered mainstream appeal in their areas due to local context and content.

Social media usage is diverse: platforms such as Facebook or Google+ are highly focused on exchanges between friends and family and are constantly pushing interaction through features like photo, or status sharing, and social games (Figure 4). Other Social media like Tumblr or Twitter are all about rapid communication and are aptly termed microblogs. Some Social networks focus on community, others highlight and display user-generated content.

However, regardless of the kind of interaction that is enabled in the community and the business model that is used to generate economic value, every Social media platform shares a common characteristic with each other: the size of their business is strictly related to the number of users actively taking part to the social network, with particular emphasis on the "Monthly Active Users" (MAU) metric, which defines the users that perform at least one access in a month. This number is so relevant to the economics of the Social media platforms that it is typically used as the reference metric to be exposed to investors and financial community. For these reason only players with either a huge number of MAUs or with a bullish growth trend can act profitably in this market, avoiding to be cannibalized by much bigger fishes that can count on big network externalities.

Figure 4: The heterogeneous world of Social Media

The Figure 5 shows an updated statistic on the most popular networks worldwide as of April 2018, ranked by number of active accounts. Market leader Facebook currently sits at 2.2 billion monthly active users. Sixth-ranked photo-sharing app Instagram had over 800 million monthly active accounts. Meanwhile, blogging service Tumblr had an estimated 794 million monthly active blog users on their site.

At a first look the landscape happens to be heterogeneous and distributed, with a first group of huge social media with 800 million users or more on one side, and a second group of small-middle sized players with less than 300 million accounts. However, taking a careful look at the first group and bearing in mind that WhatsApp, Messenger and Instagram are all Facebook properties, **it suddenly comes clear that this market is highly concentrated among just 2 players, Facebook and Google/YouTube**, with a share of about 44% and 11% each over the first 20 Social Media.

Concern about digital competition in social media platforms is acute in Europe because few, big and foreign companies, accumulate large volumes of exclusive operating data on their platforms and their dominant position could lead to situation where competition and innovation are undermined. The concentration around few platforms that have strengthened their position, becoming powerful integrated ecosystems, lead potentially to situations of consumers lock-in. Users gain good services, often free of charge, from such platforms but there are also some potential drawbacks; e.g. using a dominant position to collect data, and keeping that data exclusive in order to maintain monopoly position could be used to prevent customer to change the platform providers.

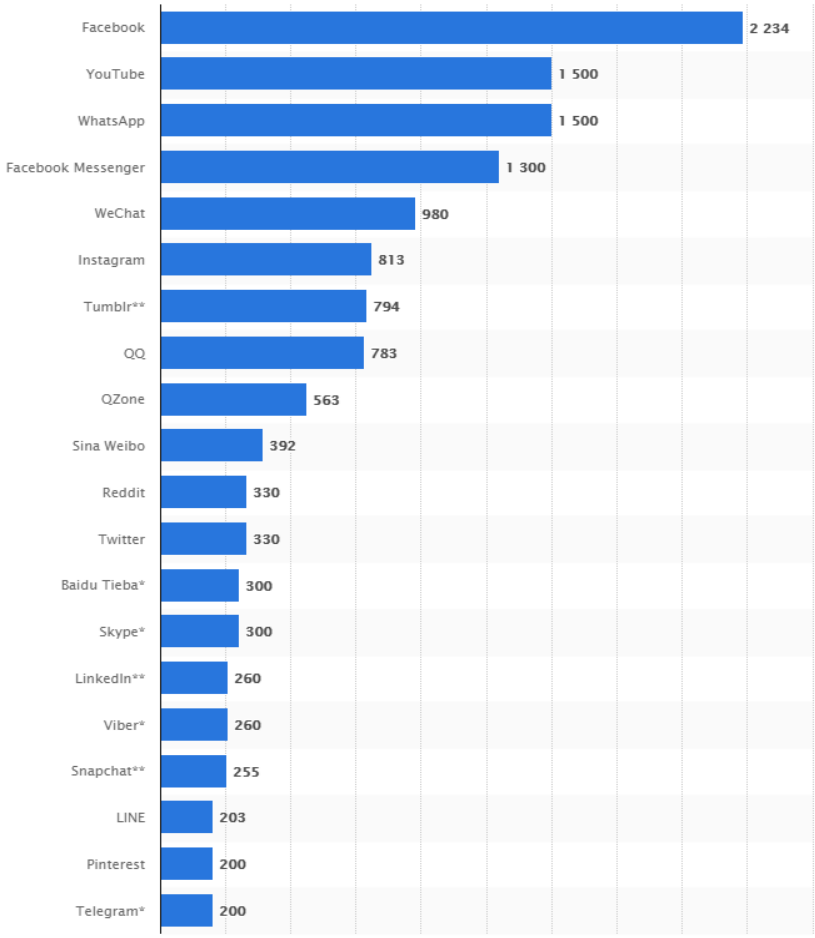

Figure 5: Most popular social networks worldwide as of April 2018, ranked by number of active users (in millions)

Using that huge amount of user data as the raw material for analytics, artificial intelligence and machine learning could have an insuperable competitive advantage over new entrants in existing services and businesses and even more for the future and potential new services and businesses based on data exploitation and monetization.

For the reasons explained above, it appears extremely unlikely for small players currently struggling in this market or newcomers to get the traction required to foster their business, creating an enormous barrier to new players and a relevant lock-in effect on active users of well-grown big Social media platforms. Capital expenditure for research & development in this sector, that is crucial for long-term growth and sustainable presence in the market, is strongly correlated with the volume of business or the potential revenue growth, which is in turn related to the community size; this brings to a situation where small players could not bear fair competition with bigger and well established Social media platforms, because of much bigger costs per user to deal with and limited potential to innovate in order to reduce costs and increase revenue reach through innovative services.

Today's Social Media platforms have the dominant position to further exploit user data economy in the data-driven society, creating new services and business opportunities based on Big Social Data collection and processing, Artificial Intelligence (AI) and Machine Learning (ML) techniques in combination with Internet of Things (IoT).

Considering the huge amount and relevance of user data that Social media platforms are supposed to handle in the coming years (see Social IoT), it becomes extremely important to impose to Social media platforms a correct management of user information and guarantee a set of rights and tools to the final users that range from data security and protection, porting of user data to another platforms, to complete user control on personal information.

Regulation should address this potential issue of concentration and potential user lock-in, fostering the possibility of social network users to move freely between many platforms, reducing the side effects of relocation on different social media platforms and aiming at the creation of a common reference model for user information in order to facilitate the retrieval and injection of users data from the old platform to the new one chosen by the user.

1.2) Data portability

General Data Protection Regulation (GDPR),applied in Europe from 25th May 2018, addresses data protection and privacy issues for individuals in European Union with a set of prescriptions, including a mandate for data portability in order to enable people to transfer personal data from one electronic processing system to and into another.

GDPR presents a set of recommendations and rules that could provide, particularly on data portability, a promising route to combat customer lock-in, fostering switching between social media providers, including potential new (hopefully European) entrants in this space.

It could be of great interest for the development of the market, for competition and for end user value creation to have ICT tools, protocols, APIs and systems that can help to declare, enforce, control and report on data management and also on GDPR implementation as well as to ensure the needed user data portability.

The concept of portability (retaining the customer's identifier when changing service provider) and support for switching are well established in the context of broadband and voice services and is tightly regulated at EU and/or national level and should be strictly applied in social media services.

Data Portability is quite a big issue if applied to Social media platforms for several reasons:

- Different user profiles in every Social media platform (e.g. the set of all information that describe user inside community);
- Different data formats for Social media platform (e.g. kind of data shared by the user inside community);
- Many Social media platforms have terms and conditions (accepted by users at the time of registration) that set a sharing property of user data uploaded on the platform (e.g. pictures, videos…), preventing users to erase all their data while relocating on another platform.

Regarding the set of data that is included in GDPR, it is considered both data being 'provided' by the user (data subject) and data being 'observed', such as data about behavior, interaction,…; both kid of data, according to the regulation, "have to be provided by the controller in a structured and

commonly used standard electronic format", but there is no standard defined yet for user data structure that can play the common framework part across all platforms.

Furthermore, after signing a contract during registration phase where the user accepts terms and conditions that gives the Social media platforms some rights on the data published on the platform, it may be difficult to completely retrieve user data at the time of relocation to another player; this would put a limit on end user freedom to use any platform, reducing the possibility to cut any relationship with former Service Provider if he wants to.

For all these reasons there is still some uncertainty on how this issues will be addressed, bearing in mind the imminent deadline required by GDPR. While it is predictable that in the short time all big platforms will be working separately and in a heterogeneous way in order to solve this issues, some worries arise looking at the long-term scenario, where a common solution is expected to streamline the data portability process, just like it currently occurs in the Mobile Telecommunications with the Mobile Number Portability procedure that is a standardized and well-established process.

The way Social media platforms currently work, implies a central logical repository role for the platform where, after initial registration, users upload their profile information and personal data in order to allow other members of the community to access their content stored in central repository, as described in the Figure 6. This approach require users to accept upload, in order to share, personal files and documents, that will be stored in the Social media data centers; this could also implies that users cannot get any visibility of which (and when) members of the community are either accessing or even downloading their contents, lacking any kind of user's control on his personal data stored on the platform.

Figure 6: Current approach of Social media to User Profile and Personal Data sharing

While on one hand, it would be crucial to pave the way to a structured and common activity framework for the specification of the data portability procedures, on the other some members of

the media industry are looking for alternative approaches to comply to GDPR prescriptions, such as Data Decentralization and Trusted Third Parties Data Portability.

1.2.1) Data decentralization

A first alternative to actual implementation of data management within Social media platforms could be data decentralization. In order to maximize users' control over their personal data and to simplify data portability process across Social media platforms, a decentralized approach to data storage and access could be beneficial. Decentralized approach would overturn the classic paradigm of interaction within the Social platforms, followed by any player in the Social media landscape, in line with the client-server communication typical of the OTT operational model.

In a centralized approach, the platform that retrieves and stores all users' content plays the role of the server that processes the requests coming from all the clients, represented in this case by the users. This paradigm fits with the call of Social media platforms for data ownership and control, since it boosts their profiling-based advertisement business model, and it is fostered by the continuous capacity growth of telecommunication networks, both on Fixed and Mobile, sustained by Telcos all over the world; thus it is possible to quickly, almost instantaneously, upload text, pictures, videos and other kinds of personal user data on the platform, via reliable broadband and ultra-broadband connections. Social media platforms are used to take advantage of Telcos huge investments in network evolution and capitalize in the best way their own ability to quickly launch new services (e.g. 360° video, AR/VR) to increase user engagement, boosting the advertisement revenues, simply relying on the Telcos need to provide quality of experience to their customers.

A decentralized approach is more similar to a peer-to-peer type of communication, and requests in addition a fast and efficient control engine to manage routing and forwarding of requests and data. According to this view users do not need to upload their information and contents on a centralized platform, where they are cached locally in order to be delivered when accessed or downloaded by other users; in a decentralized system, personal data and information are always inside the user storage devices/cloud and the only way to get access to these contents is through a request authorized by the user. The role Social media platforms could play in this approach would be, as depicted in the Figure 7, the control platform that handles all the requests coming from the users and routes correctly the signaling to the proper recipient in order to get access, if granted by the end user.

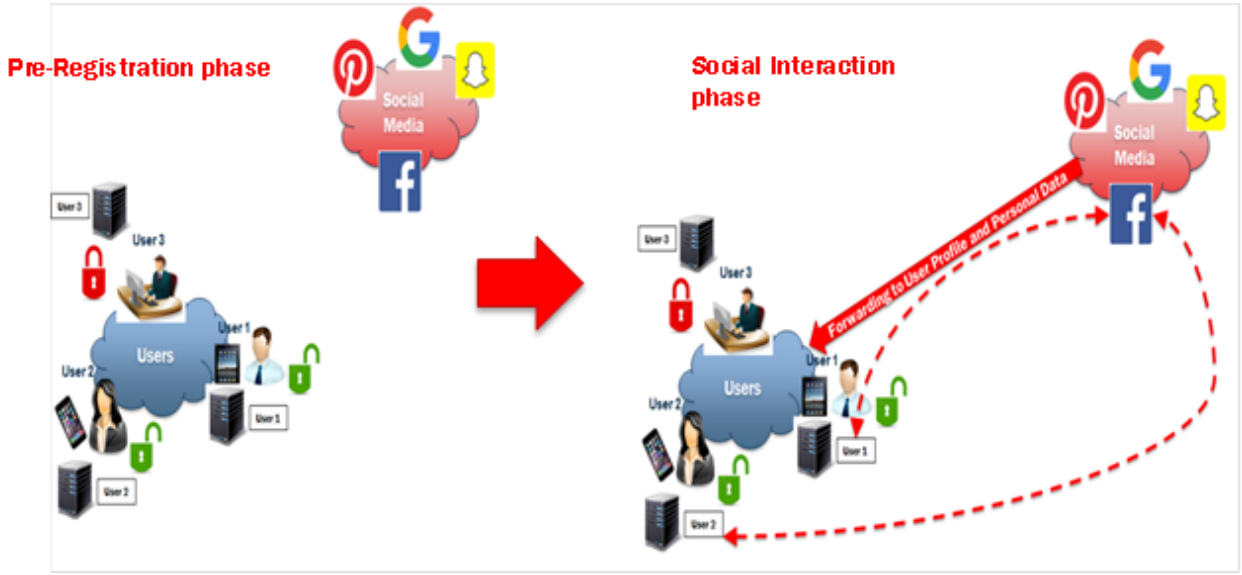

Figure 7: Alternative hypothetical approach of Social media to User Profile and Personal Data sharing

Therefore user profile and personal data would not be bound anymore to the particular Social media platform used by the users, leading to a simplified data portability process; indeed, by changing Social media platform, the user would just select another point of access to his data and contents, without need to re-shape and move his own data set.

In order to modify so heavily the Social media environment, some activities are required:

- Regulatory recommendation to shape the current approach to user data management in Social media platforms, including for example:
  - new requirements for user data storage and management inside the Social media platforms;
  - enabling users to opt-in for a decentralized approach;
- Definition of a brand new set of standards and rules for the management of user data by Social media platforms, ranging from:
  - possibility to retrieve and access User Profile and Personal Data according to user grants;
  - possibility to retrieve and aggregate user information in anonymous way in order to be monetized;
  - request for total transparency - the Social media platforms does not see any user data/content;
  - implying new business models for Social media platforms particularly those based on subscription, in-App selling, fee for premium contents,….;
- Innovation activities to support this brand new approach, taking care of all aspects that would be affected by the paradigm shift:

Platform processing capacity, network capacity, routing/forwarding efficiency, security and privacy issues…All these activities require deep investigation and studies to be carried out at European level, involving all interested players. This process could help to investigate all aspects that would be

overturned by decentralization and would help to fine tune all the actions to be taken and the tasks required to streamline the process, which will take years to complete.

1.2.2) Trusted Third Parties Data Portability

Another innovative approach to help Social media platforms to comply to GDPR regulation in terms of data portability is to rely on trusted third parties that would be responsible for data retrieval, collection, parsing in a common standardized format and delivery to the new Social media platform selected by the end user. It is well known that every Platform has its own format and is oriented to a particular kind of communication: Twitter for many years has been entirely based on short text sharing, while Youtube relied heavily on video contents; other Social media selected a mixed content approach and are investing to enrich the set of contents the user can share, in order to increase users engagement and enhance customer profiling. For instance, if video contents have historically been almost entirely low quality 2D on-demand videos, in recent years big social platforms like Twitter, Facebook and Youtube have been increasingly betting on Live videos, that are supposed to be about 3 times more engaging than classic VoD (source Facebook).

Parsing user data would be a fine and complex process to take as an input all the data shared through a Social media platform and user profile and having in output a set of data sorted in a common standardized format. Therefore, every new Social media platform could collect information from the trusted 3rd party and populate its platform accordingly, as described in the steps highlighted in the Figure 8 – Trusted 3rd Party Data Portability process:

1) User 1 during the interaction with the former Social media platform uploads his contents and user information, which are stored in the platform data center;
2) Following user's decision to relocate to a new Social media platform, the former one uploads all his data to a trusted 3rd party (the selection criteria of the 3rd party that should be in charge of the data portability process is out of scope);
3) Selected 3rd party receives user data in the format used by the old platform and performs data parsing to achieve a standard format;
4) 3rd party delivers all user data to the new Social media platforms in order to populate all the fields in the user profile and contents, to let the user immediately interact within the platform with other users.

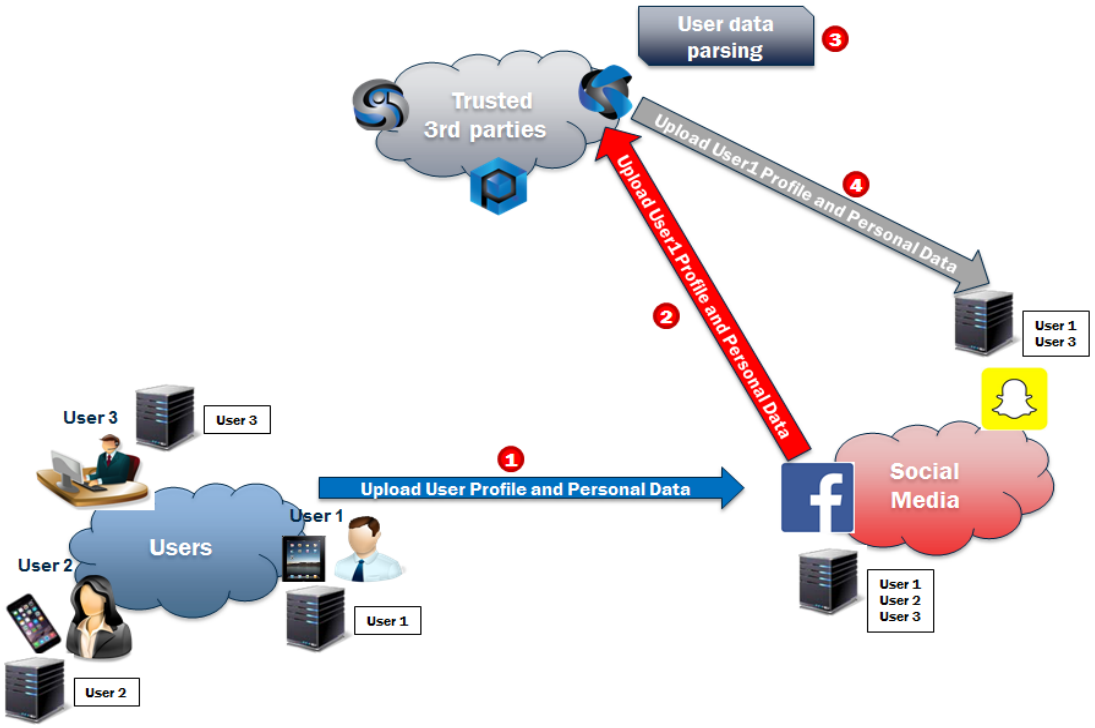

Figure 8: Trusted 3rd Party Data Portability process

Even in this case, some activities are required to make this scenario feasible:

- Regulatory recommendation to shape the current approach;
- Specification of the data portability process;
- Definition of the trusted 3rd party entity, role, function, responsibilities;
- Innovation activities to support this brand new approach, taking care of all aspects that would be affected by the paradigm shift.

1.3) Summary on user data

Today's Social Media platforms have the dominant position to further exploit user data economy in the data-driven society, creating new services and business opportunities based on Big Social Data collection and processing, Artificial Intelligence (AI) and Machine Learning (ML) techniques in combination with Internet of Things (Social IoT). Some fundamental and critical aspects are already identified

- Transparency, Privacy and User Data management;
- Users lock-in situations due to market dominated by a few big platforms providers; Huge volumes of exclusive Big Social Data accumulated and used as the raw material for Artificial Intelligence and Machine Learning as an hardly superable competitive advantage over new entrants.

For some visionaries Social Media are already old and will disappear in the future. The future of Social Media is not about posts, mobile apps, Social Media platform pages, but it is about Cyber-Physical-Social Hyperspace where meeting someone and being able to see and know all the events that concern her/him, thanks also to new wearable devices. Users will continue to provide photos, videos, opinions, routes in cars, all various information about their life's in a searchable database:

they will be completely transparent, and with a Digital Identity. This could be seen as a sort of the Digital Historical Identity: digital trace of our existence as a consultable unicum. Obviously, a system of superior privacy and user data management will have to be established. Europe is becoming a sort of leader in this field with General Data Protection Regulation (GDPR), a robust set of requirements aimed at guarding personal information and reshaping how organizations approach user data protection and management.

It is quite clear that a sort of crossroad for Social Media platforms are coming: they are going to become an even bigger and more powerful Cyber-Physical-Social Hyperspace, a place for further socio-technological disruption, or they are going to have their position limited by new requirements and regulations coming from governments.

Personal data management is one of the key issues in order to give back the power to the end users. Several solution are possible, they need to be investigated further in order to build a powerful sustainable manner to manage personal data. For that purpose, one of the first needs is the personal data set standardization that should be used to ensure access and portability of personal data.

2) Ensuring trust in social media / tools for fact-checking

2.1) Machine Learning and collaborative algorithms to detect fake news

State-of the-art: Massive amounts of misinformation have been observed to spread in uncontrolled fashion across social media. Examples include rumors, hoaxes, fake news, and conspiracy theories. The resulting information cascades contain instances of both accurate and inaccurate information, unfold over multiple time scales, and often reach audiences of considerable size. According to [Shao16], the sharing of fact-checking content typically lags that of misinformation by 10-20 hours. Moreover, fake news are dominated by very active users, while fact checking is a more grassroots activity. In platforms such as [Shao16] the system collects data from two main sources: news websites and social media. From the first group, we can obtain data about the origin and evolution of both fake news stories and their fact checking. From the second group authors collect instances of these news stories (i.e., URLs) that are being shared online. However, automatic tracking of online misinformation is not present in such platform. Other authors base the research in the identification of sources promoting the fake news [Saez14] by collaborative analysis to identify users that are consistently uploading and/or promoting fake information on social networks, using credibility classification for the tweet and the user.

Ambition: The future ambition is to improve the efficiency of the mentioned techniques. This will be reached by the concentration of diverse data sources in a common system that allows to fuse the information of the diverse data-sources as well as the results provided by these techniques to overcome individual disadvantages of every technique,

Innovation potential: Provide a deep understanding of how to translate gathered data into new knowledge involving diverse data sources and complex techniques.

2.2) Content-based analysis to detect fake news

State-of the art: There exists a wide range of assessment methods for content-based analysis relying on two major categories: Linguistic and Networking approaches. In the former category, several types of analysis such as syntax, semantic and discourse are identified. An analysis of "liars" yields to infer that there exist some hard-to-detect language "lackages": negative emotion word usage, patterns of pronoun, conjunctions, among others. The main goal of linguistic approaches is to identify such "predictive detection cues". In [Rubi15b], the syntax analysis is performed by the creation of advanced knowledge bases and its integration in personalization models allows to reach up to an 85% accuracy in fake news detection. Moreover, in [Rubi15a] a system using syntax analysis is implemented through Probability Context Free Grammars (PCFG). Sentences are transformed to a set of rewrite rules (a parse tree) to describe syntax structure, for example noun and verb phrases, which are in turn rewritten by their syntactic constituent parts. Furthermore, at the discourse level, deception cues present themselves both in CMC communication and in news content. A description of discourse can be achieved through the Rhetorical Structure Theory (RST) analytic framework, that identifies instances of rhetorical relations between linguistic elements. Systematic differences between deceptive and truthful messages in terms of their coherence and structure has been combined with a Vector Space Model (VSM) that assesses each message's position in multidimensional RST space with respect to its distance to truth and deceptive centers [Rubi14]. At this level of linguistic analysis, the prominent use of certain rhetorical relations can be indicative of deception.

Moreover, Network Approaches using network properties and behavior are ways to complement content-based approaches that rely on deceptive language and leakage cues to predict deception. As real-time content on current events is increasingly proliferated through micro-blogging applications such as Twitter, deception analysis tools are all the more important. The use of knowledge graph supports a significant improvement towards scalable computational fact-checking methods. Queries based on extracted fact statements are assigned semantic proximity as a function of the transitive relationship between subject and predicate via other nodes. The closer the nodes, the higher the likelihood that a particular subject-predicate-object statement is true. There are several so-called 'network effect' variables that are exploited to derive truth probabilities [Ciam15], so the outlook for exploiting structured data repositories for fact-checking remains promising. From the short list of existing published work in this area, results using sample facts from four different subject areas range from 61% to 95%. Success was measured based on whether the machine was able to assign higher true values to true statements than to false ones [Ciam15].

Currently, content-based techniques are still very popular, however there are a huge set of model-based techniques increasingly useful in real systems, thanks to the new techniques in parallelization, cloud computing and big data frameworks. These techniques are especially important in those scenarios that have to deal with a very specific domain or with a set of users with specific features. Some of the most representative model-based collaborative filtering (CF) techniques are Bayesian Belief Nets CF, Clustering CF, MDP-based CF, Latent semantic CF, Sparse Factor Analysis, and CF using dimensionality reduction techniques, such as Singular Value Decomposition SVD or Principal Component Analysis.

Ambition: The future ambition is to develop a set of content-based algorithms for rating on fake news detection. The comparison of users/profiles against item feature vectors based on similarity

measures will allow predict whether the news is deceptive or not. Additionally, Content-based techniques can be significantly improved by mixing its prediction results with the extraction of multiple features as the ones given by demographics [Gupta15] to create ratings on the data/user sources.

Innovation Potential: The employment of content-based techniques will allow identifying fake news sources according to similar contents previously identified. Within the project lifetime, novel techniques such as genetic algorithms [Sad15] will be explored to filter news based on its contents. Additionally, hybrid approaches such as weighted combination and feature combination.

2.3) Text, including Natural Language Processing in a multi-lingual environment

State-of the-art: Modern machine learning for natural language processing is able to do things like translate from one language to another, because everything it needs to know is in the sentence its processing and on the other hand, identifying claims, tracing information through potentially hundreds of sources, and making a judgment on how truthful a claim could be based on a diversity of ideas- all that relies on a holistic understanding of the world, the ability to bridge concepts that aren't connected by exact words or semantic meaning.

For now, AIs that can simply succeed at question-and-answer games are considered state of the art. As recently as 2014, it was bleeding edge when Facebook's [FBAIR] AI could read a short passage about the plot of the Lord of the Rings, and tell if Frodo had the Ring or not.

The Stanford Question Answering Dataset [Squad], or SQuAD is a new benchmarking competition that measures how good AIs are at this sort of task. But parsing a few paragraphs of text for factuality is nowhere near the complex fact-checking machines AI designers are after. It is incredibly hard to know the whole state of the world to identify whether a fact is true or not. Even if there was a perfect way to encompass and encode all the knowledge of the world, the whole point of news is that we're adding to that knowledge.

The novelty of news stories means the information needed to verify something newly published as fact might not be available online yet. A small but credible source could publish something true that the AI marks as false simply because there is no other corroboration on the internet—even if that AI is powerful enough to constantly read and understand all the information ever published.

Some of the technologies for automated fact checking already exist in some form. Claim Buster [Claimb] is an Australian project [Guardi] that uses natural language processing (NLP) techniques to try to identify factual claims within a text. It won't automatically fact check them, but it can assist a journalist by pointing them to the most "checkable" statements.

We also have knowledge bases that provided structured data to query statements against. Wikidata [Wikidat], a Wikimedia Foundation project, provides it free to anyone who wants to use it.

Ambition: The goal is to explore how artificial intelligence technologies, particularly machine learning and natural language processing in a multilingual approach that might be leveraged to combat the fake news problem among all EU countries. We believe that these NLP technologies hold promise for

significantly automating parts of the procedure human fact checkers use today to determine if a story is real or a hoax.

Assessing the veracity of a news story is a complex and cumbersome task. Fortunately, the process can be broken down into steps or stages. A helpful first step towards identifying fake news is to understand what other news organizations in all Europe are saying about the topic. This include a deep NLP architecture that can match semantic analysis of different languages. We believe automating this process could serve as a useful building block in an AI-assisted fact-checking pipeline.

Innovation potential: NLP Technologies help in creating a fake news detection system that aims to assist users in detecting and filtering out varieties of potentially deceptive news. The prediction of the chances that a particular news item is intentionally deceptive is based on the analysis of previously seen truthful and deceptive news. A scarcity of deceptive news, available as corpora for predictive modeling, is a major obstacle in this field of natural language processing (NLP) and deception detection.

2.4) Image analysis based algorithms

State-of the-art: Image analysis, in this context, refers mainly to techniques for image forgery and semantic analysis. While the former is an important task to detect if an image was artificially manipulated, the latter will help to correlate the content of an image to its context.

Many methods have been developed for image forgery thus far. The most usual attack been the move-copy one [Fridr03] where the attacker adds or subtracts from the image an object of interest. In order to detect such attacks, algorithms have been developed [Zhili17, Amerin11, Jian15, Cozz] in order to detect the slight changes that such operations will produce on an image. On the other hand, semantic analysis is trying to develop algorithms able to extract high level semantic information of an image such as identify the person within an image. It is important to verify which person or people are in an image in order to correlate with the given context. To do so, techniques such as face verification will be used. Face verification is a technique trying to identify a person from its facial characteristics so as to map a facial image to a specific person. Thus far a multitude of algorithms and tools have been developed to cope with this problem [Yan14, Yi14, Junl14, Dong17, Gaur17] with a wide range of different methods trying to cope mainly with the vast variations that a person's face may have under different illumination conditions and poses.

Ambition: The future ambition is to go beyond the state of the art, in both domains, by developing tools able to tackle the above mentioned problems. For move-copy detection, novel deep learning algorithms need to be developed to enable to detect such attacks even from sophisticated image processing tools. The idea is to train a convolutional neural network (CNN) in order to detect differentiations on the edges of objects of interest within the same image. By correlating the edges of different objects on the same image, the artificially created ones will be detected. On the other hand, regarding face verification, new techniques need to be development for face verification "in the wild". To do so, deep learning techniques taking into account the context will be developed in order to achieve better face verification accuracy.

Innovation potential: Novel market for forgery detection in multimedia, fake news based image processing.

2.5) Video analysis based algorithms

State-of the-art: As in image analysis, video analysis in this perspective will be used to: 1) detect forgery in videos and 2) to semantically analyse the video so as to correlate it to its context. Forgery detection in videos is a very old and still active research area. Other than methods already used in the context of image based copy move detection, in videos many methods are using the motion as a feature to detect forgery [Hsu08, Subram12, jing09, Su09]. In these methods, the idea is to detect ghosts of the missing information (in the case of subtractions) and therefore to decide if a video has been forged. Another category of algorithms for forgery detection in videos is to model the noise and therefore detect key frames where the noise is altered which are a result of forgery [Ravi14, Waha14]. Such methods have been proven to work better in cases of CCTV cameras, but they lack to do so in common videos where the context is much more complicated (such as news videos). Finally, video semantic analysis, refers to techniques able to extract high level semantic entities from a video. Also known as video summarization [Lee12, Mund06], these techniques can provide high level semantic labelling of the videos that can therefore be used to correlate a video with its context. Moreover, the use of metadata in video summarization has been investigated with great success mainly in web videos where there is an abundance of metadata due to people interactions [Wang12].

Ambition: The main idea in forgery detection is the development of a recurrent neural network (RNN) able to correlate features in the temporal dimension so as to detect forged videos. By doing so, we passively integrate both image based technique and video ones. On the other hand, regarding video summarization, a CNN will be developed that will extract high level semantics from videos within context. To do so, we will train the network in a context dependent manner through transfer learning techniques that will enhance summarization capabilities.

Innovation potential: Novel market for forgery detection in multimedia, fake news based video processing.

2.6) Provenance and trust analysis for news propagation identification

State-of the-art: Collaborative or item based techniques to profile users, which can help to identify fake news generators are based analysis analyze a set of documents and/or descriptions of items previously rated by a user, and construct a model or profile of user interests based on the features of the objects rated by that user [Rubi15b]-[Ciam15]. The profile is a structured representation of user interests, adopted to recommend new interesting items. The recommendation process basically consists in matching up the attributes of the user profile against the attributes of a content object. The result is a relevance scale that represents the user's level of interest in that object/item/topic. If a profile accurately reflects user preferences, the effectiveness of an information access process is very high. As an example, it could be used to filter search results by deciding whether a user is interested in a specific WebSite or not and, in the negative case, preventing it from being displayed. These systems mainly comprise three steps: (a) A Content Analyzer– this component is in charge of extracting the main features of the sources ingested and represent the content of items (e.g. documents, Web pages, news, product descriptions, etc.) coming from information sources (e.g non-structured text. This representation is the input to the other system components. (b) A Profile learner– This module collects data representative of the user preferences and tries to generalize it to construct the user profile. Usually, the generalization strategy is realized through machine learning techniques and most recently through Deep Learning. (c) A Filtering component – This module

exploits the user profile to suggest relevant items by matching the profile representation against that of items to be recommended.

Ambition: Both mentioned techniques (Content-Based and Collaborative Filtering) will be combined in order to overcome the possible drawbacks of each. Common problems associated to filtering systems such as the cold-start and limited coverage problems will be addressed by the development of hybrid approaches.

Innovation potential: The ambition is to develop Model-based Collaborative filtering algorithms. There are novel approaches relying on techniques such as Alternating Least Squares (ALS) and Matrix Factorization [Chen17]. Within the project, ALS technique will be incorporated due to its advantages in terms of parallelization and its effectiveness when dealing with non-sparse matrices.

3) Regulation / self-regulation

In order to cope with disinformation in the social media, there are many voices advocating for regulation of the social media to combat the fake news. However, there are also many others strong factors in discussion which are not in favor of this solution, calling rather for kind of light or self-regulation in the social media, as is also discussed in the high level expert group on fake news, established by European Commission [EC18].

One of the main postulates to be kept while discussion regulation in the social media is the freedom of speech as well as a minimum as possible interference in the regulation process from states, EC, and other public authorities [UN11]. Furthermore, the “hate speech”, as one of the main problems in disinformation process within the social media discussions, is an fully emotive concept without an universal definition of it. Thus, it is complex to explicitly decide what is the hate speech or any other unlawful or false information with a potentially high negative impact [Art18].

Further specifics of the social media and spread of the false information are well-known issues on filter/bubbles or echo chambers, which do not necessarily intentionally support the fake news, but support it through limiting the social media users to gather complete information and in some cases even leading them to sources of the disinformation. Also, the news contributors in the social media are not professional journalist, which directly support creation of the false information along the business models related issues discussed above.

Form all these reasons, a kind of **self-regulation instead of strong (state) regulation in social media is considered as the most appropriate solution**. Primary target of the social media regulation should remain as set of measures ensuring right to seek, receive, and influence the (right) information by the consumers / social media networks participants.

Self-regulation can be defined as a combination of standards setting out the appropriate codes of behavior in the social media [UN11]. The self-regulation should entirely rely on voluntarily compliance with defined principles. A good example of self-regulation in media is mechanism of so-called press councils, which used to be established by printed media, providing corresponding codes of conduct (rules of behavior) applying for publishers, journalist, and wide public.

Self-regulation bodies to be established to implement the adopted self-regulation rules have to gain public trust and support along the following principles:

- Be independent from governmental and commercial organizations as well as any further groups of particular interests
- Be democratic, transparent, inclusive, ensuring a broad representation of relevant stakeholders in the self-regulation bodies and decision-making processes
- To define clear rules and mechanisms of all activities including the decision making
- To work fully in public interest and be accountable
- Limited degree of state / EC / public authorities support is possible; e.g. on legal definition of the established self-regulation mechanisms.

The most challenging issue is creation of an independent and efficient self-regulation mechanism and its bodies for the social media at international level, including its funding, which should be mainly, but not exclusively provided by the social media platforms.

As mentioned above, the role of the states and EC should be limited focusing on the following issues:

- Ensuring that an editor (also) in the social media is responsible for the published content
- To reaffirm and further develop principles of limited liability for hosting third party content
- To refrain from legislation on content regulation

4) Social IoT

IoT could be defined as a group of smart devices (cars, fitness trackers, TVs, etc.) fitted with sensors, software and that are able to connect to the network, store and exchange the data. In the next future, there will be more connected things than humans and these things will have to communicate together in order to synchronize themselves or to solve a problem. IoT scenarios will be replicated in many use cases requiring such IoT networking: health, logistics, energy, smart city, Industry 4.0, etc. (Figure 9).

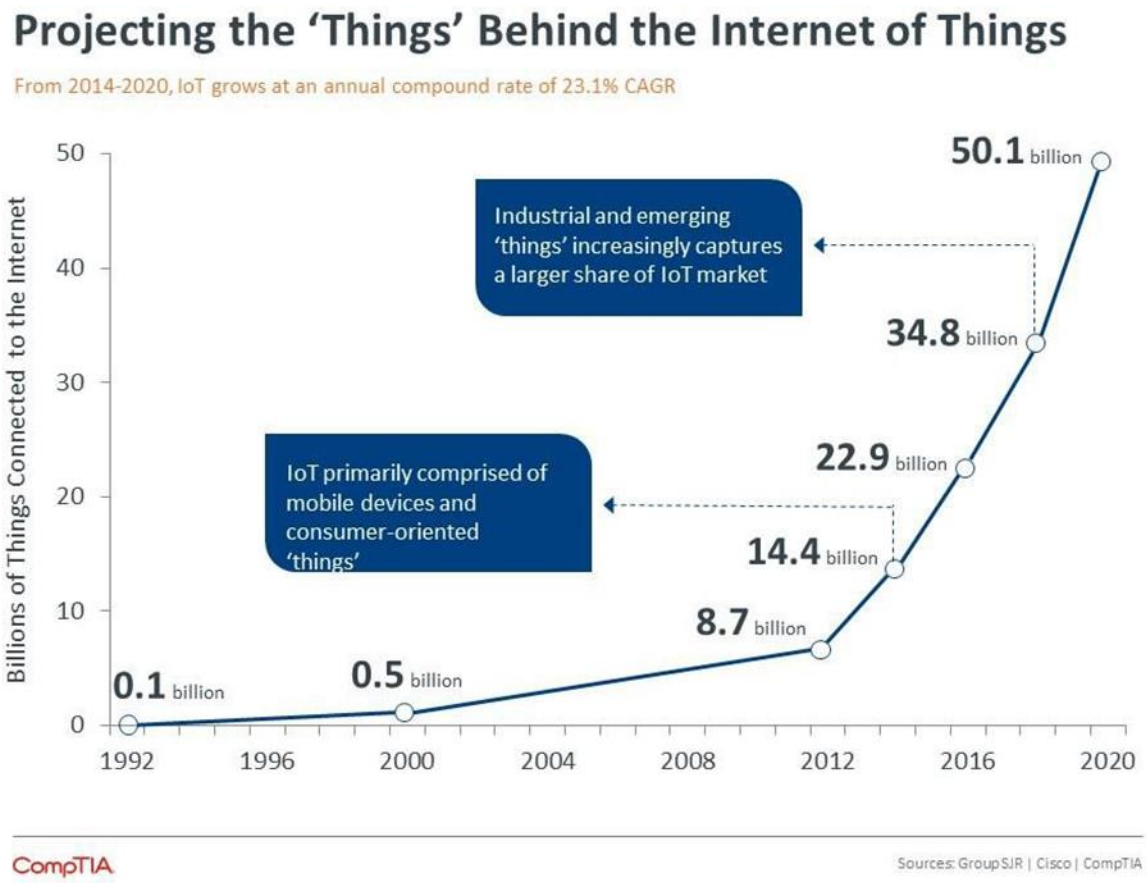

Figure 9: IoT evolution

The Internet of Things (IoT) integrates a large number of technologies enabling a variety of things or objects around us to interact with each other and cooperate with their neighbors to reach common goals. The convergence of the Internet of Things and the Social Networks worlds is gaining momentum. This is due to the growing awareness that a Social Internet of Things (Social IoT) paradigm could bring many (desirable or not) implications into a future world populated by intelligent objects impacting the everyday life of human beings. Social IoT include not only thing-to-thing or human-to-thing interactions, but also new roles that the IoT augmented everyday objects will play, such as mediating the human-to-human communication and/or supporting additional activities in everyday life.

Robots should also be considering as "special" IoT and the conjunction of IoT technologies and Artificial Intelligence (AI) will contribute to the creation of such Social IoT world where IoT will

communicate together in order to address a specific task and will only come back to humans to report about the task achievement.

The evolution of the Internet of Things (IoT) is transforming our lives into a **Cyber-Physical-Social Hyperspace** and changing what it means to be social, thanks to smartphones, tablets, and all types of wearable devices, which are connecting people and things both directly and indirectly through various applications and platforms.

In the future many applications and services will require associated groups of things interacting among them, based on technologies such as swarm intelligence and swarm robotics. The establishment and management of relationships among things can occur with different levels of human intervention. In one case human is responsible only to set the rules of the things social interactions and then enjoy the services resulting from such interactions and groupings, while in the other case things just participate in the human social network built by their owners.

The physical things belonging to our everyday reality are at the same time witnesses and protagonists of the (hi)story of our places (territories, home and work environments,..) and of our social life and communities. If only they could tell stories about what happened to them and around them, the possibility of interacting with things in the person's environment could provide people with a significantly enhanced experiences and services. We can identify different levels of "social" involvement of such intelligent and social things:

- Things posting information (about the state of environment,…) in the social networks of humans;
- Things interacting with humans and other things at the application layer in social networks;
- Things interacting socially with each other to build a dedicated communication network

In one kind of Social IoT space, where social network is a social network of humans and it is utilized by things as an infrastructure for service advertisement, discovery, and access, an individual can share the services offered by her/his smart objects with either her/his friends or their things. This kind of Social IoT is different from the vision in which the objects should interact spontaneously to offer value-added services to humans.

4.1) New social IoT models and technologies

In analogy with the social networks of human beings there is a need to study and define a notion of social relationship among things, making them intelligent and social. Empowering physical objects to share pictures, comments, and sensor data via social networks is just the one of the "easiest" way to integrate IoT and Social Networks.

One possible definition is that things come in social relationship, because and when their owners come in touch with each other during their lives (e.g., devices and sensors belonging to friends, classmates, travel companions, colleagues).

Several different technologies need to be extended and further researched towards the vision on intelligent and social things:

- **Intelligence and social abilities of the things** that allow them to interact with people and among themselves are based on reasoning and learning from the following kind of information:
  - Semantic information such as common-sense and general knowledge about things domain and environment (e.g. an ontology);
  - User behavior data during interaction;
  - Content associated with the things (e.g. photos or videos posted on/from the things).
- **People and things are both social entities**, able to manage and share knowledge and to establish relations with other things and people - social network thus maintains three types of dynamic relations: user-to-user (e.g. friendship, similarity, etc.), user-to-thing (e.g. ownership, potential interest, etc.), thing-to-thing (e.g. similarity, proximity, task, etc.).
- **Bidirectional interactions**: person and the intelligent thing may start a conversation
- **Natural interactions**: gently and playfully led by interest, curiosity and fun while fully exploiting intelligent and social things.
- **Content adaptation, personalization and aggregation**: the capability to filter, synthesize and mashup content in a meaningful way, ranging from the intelligent search, discovery and recommendations to the digital storytelling, which involve intelligent and social things.

4.2) New main Challenges related to Social IoT

The growing diffusion of connected objects will lead to more and more data being available and also sharable in social platforms. Therefore it is becoming even more important the protection of individual privacy and personal data above all in relation to sensitive data or related to minor.

Some of challenges related to Social IoT include:

- **User lack of control and information asymmetry**: users might find themselves under third-party monitoring and in situations of lack of control of the dissemination of their sensitive personal data such as hearth data collected and managed from Quantified Self related devices and applications;
- **Profiling**: analytics based on information collected in an IoT environment might enable the detection of the behavioral patterns of an individual with the consequence of possible impacts on the way the individuals behave, e.g. personal habits and lifestyles possibly detected in smart homes;
- **Repurposing of original processing:** data collected for a particular purpose may be requested by other parties for different purposes not respecting the original consent given by the user. Therefore it is important that, at each level (whether raw, extracted or displayed data), IoT stakeholders make sure that the data is used for purposes that are all compatible with the original consent given by the user (data subject). For example

data collected by the accelerometer of the smartphone can be used to infer driving habits;

- **Quality of data subject's consent**: in some IoT scenarios, the user (data subject) may not be aware of the data processing carried out by specific objects, e.g. a smart watch may not be distinguishable from a normal swatch, so the owner could be unaware of the collection of her personal data and the possibility to have a growing insights combining different data. Classical mechanism to obtain individuals' consent may be difficult to apply in IoT scenarios, resulting in a low-quality consent. New ways of obtaining the user's valid consent should be considered, including implementing consent mechanisms through the devices themselves.
- **Security risks**: IoT may turn an everyday object (e.g., video cameras connected to the internet) into potential privacy and information security target. Security of the IoT should consider also the communication links, storage infrastructure and other inputs of the ecosystem. The integration of physical and logical components provided by a set of different stakeholders only guarantees the level of security provided by the weakest component.

4.3) Summary on Social IoT

Internet of Things (IoT) is already a reality, but it is merely at the beginning of a social, economic and cultural transformation. Basically, IoT could revolutionize our conception of the world and how we interact with it.

These advances will enable us to develop our capabilities further but posting new challenges to our society and how we relate to each other. New gadgets, devices, apps are continuously coming to the market that make our life, work and daily tasks easier. We already have smart homes managed by devices with artificial intelligence. This will also produce new ways of expressing our creativity extended to culture, leisure and art.

Social IoT will generate synergies between devices and people thanks to the information they exchange. All this devices generating and exchanging information will affect how we work and communicate with friends and relatives and how we spend our leisure time. The evolution of the Social IoT is about transforming our lives and spaces into a **Cyber-Physical-Social Hyperspace based on the continuous flow of enormous quantity of personal and sensitive data.**

5) Business models in social media

The concept of modern Internet based economy is relying on the fact that the online available information is abundant and its consumption is largely free of charge [Per16]. Furthermore, the most business models applied by the social media platforms today are based on end user attention; the more people are the platforms members or consuming information provided in the social media, the more advertising can be sold by the related social media stakeholders, where the advertising is in most of the cases the only revenue stream for the social media platforms.

On the other hand, the social media platforms allow practically to everyone to publish and share any kind of information world-wide and within minutes. Thus, if larger attention is needed, the information posted has to be very important, as dramatic as possible, very catchy for the end users independently on the content behind, must be tailored to wake-up attention, etc. With it, the Internet ecosystem and the social media are unintentionally offering opportunities for disinformation to easily spread and for the so-called fake news factories to gain from the attention based business models. These facts are affecting even so-called professional / good media and corresponding quality journalism behind these stakeholders is getting in danger as well.

Therefore, there is a need for alternative business models for social media, which might also be imposed by corresponding regulation measures. The challenge is to ensure competitiveness of the proper social media platforms, as news providers, versus so-called fake news/website factories. However, there is no recipe, or at least no easy one, to rapidly change business models in the social media and finally combat the fake news because revenues for the social media platforms, based on the today's models, are enormous.

To elaborate on possible directions while thinking about new and appropriate social media business model(s), the related evolution in news publisher models and aspects of data and algorithm-based economy are discussed below.

5.1) Evolution of news publisher models

The traditional news publisher business models have been started to be affected by new media since start of public Internet services around the year 1995. During the first 10 years of Internet (until 2005), the traditional news publisher did not pay particular attention to the new media and were focusing on optimization of the existing revenue streams at this time instead of elaboration on opportunities of the future revenue and business models. There were two reasons for acting in this direction; the financial situation of the news publisher at this time was still in a good shape and some of the publishers still enjoyed a kind of preferable or even monopoly positions in their areas of involvement – no motivation to change.

Gathering revenues from advertising is/was not a new filed for the traditional news publishers, which contributes significantly to the publishers' income together with the subscriptions, sails, etc. However, the nature of advertising in Internet and social media is of course different from classical newspapers and journals. Accordingly, the news publishers take the action and include advertising within their online portals, which are nowadays maintained by near to all nest publishers. However, in the modern social media it is necessary to follow the latest trends and ways of advertising, such us so-called native advertisement, which is however not typical for standard websites but is well advanced across the social media platforms.

Beside the advertisement, further organizational and marketing measures could / should be taken by the news publishers, in order to come with challenges of the modern media and increasing impact of the social media networks [Panda17]:

- Separation of journalism and business (journalists and editors on one side and business and marketing staff on another) was widely adopted by the traditional news publishers, whereas modern and social media require tighter cooperation among these two pillars of the publisher
- In the past, journalists and editors rarely interacted with the readers, but in the social media, the journalists must be able and ready to further explain their positions articles through direct and timely discussions with the readers through various social media channels; blogs, posts, etc.
- In the today's Internet / social media there are too many rivals offering in principle the main products to the world-wide community. Therefore, an important challenge for the news publisher is how to become unique and provide special and good quality, in terms of the modern social media. An option along these lines is also to package other related offers along the news content and attract further customers

To get on speed with the newest media developments, the news publisher should directly use the social media platforms and all their features for distribution of their content. It does not necessarily mean they have to establish own social media platforms. Linking, cooperating with existing and new social media platforms, including cross-platform news distribution, is a must together with investigations, including needed research and innovation activities, on possible business and cooperation models of the future, which will better suit the user needs and be robust against disinformation in the modern digital society.

5.2) Data-based and algorithm-based economy

Value chains are being redefined in the new data-based and algorithm-based economy, value webs rather than value chains is becoming normal, and new types of partnerships in digital ecosystems will become drivers of value creation. In the simplest terms, we can state that digital ecosystem is an interconnected network of living and nonliving entities governed by rules or principles or algorithms.

The media sector current business models are being reshaped by challenging technology and market trends, and has already experienced digital transformation being a great example of new digital ecosystems in data-based and algorithm-based economy. Even healthcare might be an digital ecosystem made up of human actors like patients, doctors, nurses, etc., and nonliving things like medical equipment, ambulances, hospitals and governed by rules or principles codified in legislation and leading practices but also it could be (partially) governed by algorithms applied on huge amount of data (medical, operational, content,..).

We live in a world where everything is or will be connected, software becomes embedded in almost everything and data is created almost everywhere becoming an essential input fueling algorithm-based economy. The tools that create, ingest, transmit, manage, store and secure data create a new set of ecosystem considerations and new types of partnerships. Ecosystems are not new in business,

but they are different in the data-based and algorithm-based economy. Moreover, given the volume of data being created now, machine learning and artificial intelligence (AI) - based on algorithms that will become ever smarter and more sophisticated - are essential and critical to unlocking value out of such huge amount of data.

Converting massive amounts of data into actionable insights means that algorithms become a new competitive advantage and will prove to be central to the next wave of economic growth.

Given the opportunities and the complexities associated with, data, AI, and Cyber Security, a new digital ecosystem is required to survive and thrive in the algorithm-based economy. These shifts in technology are contributing to, if not driving, the digital transformation of companies, communities, and the economies of entire countries.

The data is already the basic element of many business models: for Google in the ranking algorithms, for Amazon in the recommendations algorithms, for Facebook in the news feeds. Thanks to the huge amounts of data accumulated on their platforms, the algorithms are able “to see” the correlations and provide meaningful results. But the data and the algorithms, for the apocalyptic, influence or even plan and program our choices, our consumer habits and even our cultural and political views. Data are sold and bought as a commodity, often without the consent of the person concerned. The platforms will continue to move the boundaries with ever more invasive techniques to get the full picture of users.

The threats to privacy and to the competitive market are now the same thing. On the Privacy side, the EU’s GDPR could become the reference standard. On the competitive market side, applying historical antitrust interventions could be practically difficult also due to the question of identifying the reference market, having competitors based in America or China. Some propose to block further vertical integrations of platforms. There is the possibility to consider their platforms as an essential facility and then to apply regulations to Google, Facebook and Amazon as if they were utilities.

We need a program that succeeds in limiting these concentrations without compromising the technological innovation and development, from which our future depends, fostering creation of infrastructures facilitating the circulation of data along the value chains and value webs.

6) Collaborative workflows

Achieving collaborative workflows requires embedding collaborative technologies deep into processes and incentivizing collaborative behaviors transforming the way organizations turn knowledge into action. Through the use of collaboration technologies companies can achieve impressive results that improve the efficiency in which work is done, while by the advent of social media this goal is accompanied by unprecedented means of sharing, externalizing and retaining knowledge as well as sharing the information anywhere (Figure 10). Innovative business collaboration techniques can improve company's productivity by 20 to 30% [HKA].

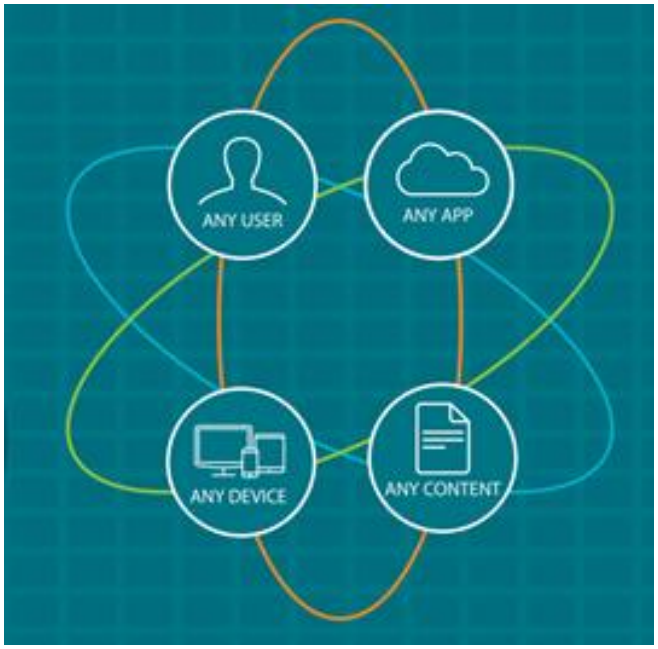

Figure 10: Access anywhere concept

Social media enables a new model of managing knowledge that involves formal and informal communication, collaboration using a variety of applications. Full potential of collaborative workflows will be achieved through mechanisms for sharing and collaboration, empowering users to spread their sources and to benefit from those of others. Social Media, by means of enhanced Platforms (SMeP) for the management of knowledge work (communication and collaboration), provides mechanisms to support the sharing of workflows within and across multiple communities. These platforms incorporate social media and networking functionalities for empowering cooperative efforts at both personal and organizational level. Thus, information and communication tools used traditionally in organizations to support collaborative work processes have started to be increasingly replaced by social media-enhanced platforms. These platforms can speed up knowledge conversion, improve team performance and can take collaboration and communication to a higher level within most companies. They can also provide an answer to global work trends as globalization, super mobility, cloud-based infrastructures, big data and analytics, intelligent devices and distributed computing resources and the proliferation of context rich systems.

By adding social networking and crowdsourcing to companies' workflow through social media collaborative tools to boost collaborative behaviors, a new potential to improve organizational agility, increasing productivity, supporting decision making and sparking idea generation is quite easily added to the company work power. Social media-enhanced platforms are designed to provide conditions in which knowledge is shared and new know-ledge is created or exchanged through collaborative processes using social network, as innovation and knowledge creation are two strong interrelated concepts. [Liana]

The complete revolution brought by new work environments, the increasing importance of a deep analysis of the related human factors and this progressive socialization of workflows lead to a more complex learning of the methodologies to define the most efficient procedures and to achieve the best results. Visual tools to provide in advance information on the consequences of potential decisions and to support real-time decision-making are critical a need to be deployed besides the internal knowledge management solutions in the challenge of adapting to new ways of working inherently distributed and collaborative, including more and more frequently, both humans and computational systems in the mix. Thus, social media becomes a key element to develop new patterns of use, new possibilities for shaping new work practices and to integrate a more flexible, scalable and powerful knowledge management within the companies' workflows for the sake of achieving a new level in competitiveness.

Collaborative workflows are a key piece in the ongoing digital transformation reaching almost any corner of industry. They belong to the core challenge any business must rise to in order to reclaim their position in our increasingly mobile, digital, and competitive world. It's all about content, if you take into account the big data powered insights / analytics, information from ubiquitous sensors and devices of the internet of things, it creates a new world of content; and content is so important to our understanding, anything we can't express as content is something we can't share. It is the very core of business knowledge and business information. [BAR]

Social media platforms own the power to convert the connections into productivity. The answer is one of convergence, for now. Over the past few years, communication and collaboration tools have become sophisticated, easy to deploy and readily available. However, these tools still create disparate overall experiences. Social media can unify the framework and homogenize the experience, and are versatile enough to quickly evolve integrating new media contents even immersive and interactive.

Thus, It is necessary to work further in the integration of new kind of contents, and for sure, media content will arise again as the most disrupting way of creating, sharing and understanding about data and information, leading to richer and powerful capabilities and features in content management and transforming the way industrial processes are done. Moreover, that's a big opportunity to make a big impact on the way we leverage value creation.

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ANNEX D RECOMMENDATIONS FOR SUCCESSFUL EUROPEAN CONVERGED MEDIA

Recommendations for successful European Converged Media

During last two years, Vital Media project[20] has been working on establishment of research and innovation strategy of the media community for next 5-10 years. In order to establish the community strategy, the Vital Media project was closely working with the NEM Initiative[21]. Based on the gathered community contributions, summarized in a number of NEM strategic documents[22], the Vital Media project defined **Recommendations to decision makers at European Commission and on the EU Member States level for successful European Converged Media,** addressing also the next EU research and Innovation framework program **Horizon Europe (FP9)**, which are summarized in this document.

Needed policy measures and regulation

The most important **trends**, **challenges, and opportunities Next Multiannual Financial Framework**[23]:

1) **Prominent presence of media sectors in Horizon Europe** and **stronger synergies between** the relevant **programs at European level**

- Establishing a gateway between Horizon Europe, Digital Europe and Creative Europe for Media
- Focusing on media innovation sectors in Horizon Europe program, its second and third Pillars

[20] Vital Media is a support action project under the Horizon 2020 Programme of the European Union, number 688310, project duration June 2016 – June 2018; https://nem-initiative.org/vital-media-project/.

[21] The NEM Initiative – New European Media Initiative – is a European Technology Platform, fostering the convergence among Media, Content, Creative industries, Social Media, Broadcasting and Telecom sectors, as well as Consumer electronics to develop a common innovation environment for the new European media landscape – www.nem-initiative.org.

[22] Documents area available at https://nem-initiative.org/documents/ (sub-pages on SRIA and position papers).

[23] "Policy Recommendations for the Next Multiannual Financial Framework", Joint White Paper by Vital Media, I^3 and MediaRoad projects

2) Support for **European cooperation in media** sector, ensuring its **high competitiveness world-wide**

- Support to European stakeholders to overcome market fragmentation, boosting capacity of collaborating at international level, adoption of innovative and alternative business models

3) **Dedicated investments** in the latest technological advances, **bridging innovation and creativity**

- Introducing policies and actions that clearly address the media sector,
- Ad hoc initiatives supporting infrastructures and technologies along the media value chain[24].

Based on the requirements defined in the Vital Media strategic documents, the following **regulatory measures** have been recommended: A clear framework for on-line services and content to overcome the existing complex regulatory and to promote accessibility issues cross Europe in a digital single market of media services through hyper-personalization and adoption of principles "Designed-for-All". From the **Social Media** perspective, regulation should address the issue of concentration and potential user lock-in within few global social media platforms, fostering the possibility of users to move freely between platforms, and creating a common reference model for user information in media in general. Furthermore, self-regulation is considered as the most appropriate solution for Social Media, ensuring right to seek, receive, and influence the (right) information by the consumers / social media users. Here, the most challenging issue is creation of an independent and efficient self-regulation body, including its funding, to be established by the platforms with a limited involvement of public authorities, e.g. EC.

In respect to **standardization activities**, topics related the **3GPP 5G** system, addressing media and entertainment as vertical sector but also addressing converged media as enabler for other vertical sector scenarios, should become focus of the European media community.

Towards new business models in media sector

There is a need for **novel business models** in the media sector, going beyond traditional, mainly advertising revenues streams, to cope with current and further technology innovation which will allow the media sector GDP share to grow, along the following main trends:

- Irruption of data as enabler of value generation within the data-driven economy,

[24] AR/VR, 5G, blockchain, hybrid distribution models, AI, meta- and big data analytics, etc.

- Convergence of business models of stakeholders from media, content, telecom and broadcaster,
- Customization of products and services aiming at empowering users and offering differentiation.

The most business models in **Social Media** today are based on end-user attention and targeted advertising, which offers opportunities for disinformation gaining from such models. Possible directions towards new and appropriate Social Media business models include evolution of traditional news publisher models and the awareness on critical economic value and relevance of the user and her/his data. Here, algorithms able to convert massive amounts of data into actionable insights are becoming a new competitive advantage and will be central to the next wave of economic growth in this area.

Future technologies for media sector

In accordance with the discussions on strategic technologies and directions for the media industry sector, the Vital Media project has defined the following **research priorities** for the upcoming period:

1) Immersive technologies including the Immersive Cloud platform[25]

Immersivity is the most impacting media technology, incorporating a number of further technology enablers; visual rendering and capturing, gaze, gesture, physiological and psychological tracking, etc. Here, the Vital Media project fully supports establishment of a focused research and innovation program (e.g. a PPP) focused on immersive technologies.

2) Artificial Intelligence and Machine Learning

Current AI applications are used for marketing, service comprehension, search, etc. but are offering large potential to completely reshape products and services in media and creative industries. Machine Learning is a powerful tool able to learn from the data and provide predictions important for future media services.

3) Content distribution (with particular focus on future 5G networks)

Media is moving to concede more power to users and achieve higher levels of personalization, which needs to be addressed by consolidating new network capabilities becoming a cornerstone of the New Generation Internet.

[25] I²C concept, https://nem-initiative.org/i2c-ppp/

4) Hyper-personalization, including personal data management

Hyper-personalization, as an advanced and real-time customization process aiming at closing the gap between consumers' desires and offers, takes into consideration the different aspects of maximizing opportunities to customize the content and drives engagement among media audiences.

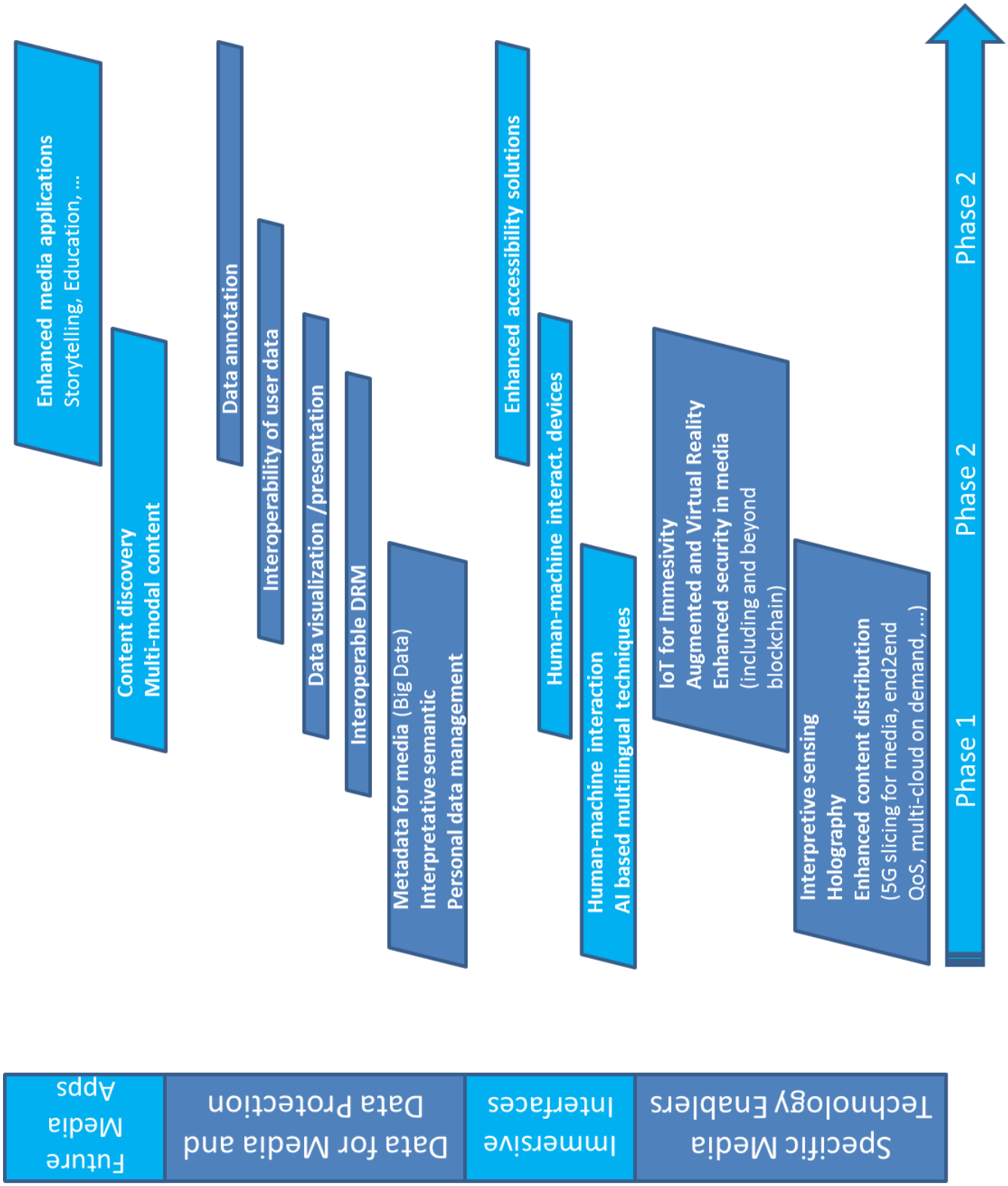
5) Social media[26], including social IoT

The social media platforms have a relevant impact on the modern society since they have increasingly been changing people's way of living and interacting with the rest of the world. Taking advantage of user interaction within the community, and by means of Big Data collection and analytics, Social Media platforms can generate useful insights to update and optimize the existing services and to create new services.

Detailed description of concrete topics related to the research activities presented above, can be found in the latest version of the NEM Strategic Research and Innovation Agenda – NEM SRIA 2025 – and recent NEM position papers (all documents available on the NEM website at www.nem-initiative.org). A **high level roadmap** towards implementation of the research priorities and related topics can be found in Annex of this document.

[26] The topic should also be considered in the scope of priorities 1-4 contributing to future social media landscape in Europe

Annex


Enhanced media applications
Storytelling, Education, ...
Content discovery
Multi-modal content
Data annotation
Interoperability of user data
Data visualization /presentation
Interoperable DRM
Metadata for media (Big Data)
Interpretative semantic
Personal data management
Enhanced accessibility solutions
Human-machine interact. devices
Human-machine interaction
AI based multilingual techniques
IoT for Immesivity
Augmented and Virtual Reality
Enhanced security in media
(including and beyond blockchain)
Interpretive sensing
Holography
Enhanced content distribution
(5G slicing for media, end2end QoS, multi-cloud on demand, ...)
Phase 1
Phase 2
Phase 2
Specific Media Technology Enablers
Immersive Interfaces
Data for Media and Data Protection
Future Media Apps

ANNEX E RECOMMENDATIONS FOR NEM INITIATIVE

Recommendations for NEM Initiative

During last two years, Vital Media project[27] has been working on consolidation of European community of stakeholders in a broad sector of media, including creative industries, as well as on establishment of research and innovation strategy of the media community for next 5-10 years. In order to establish the community strategy, the Vital Media project was closely working with the NEM Initiative, the largest community of media stakeholders in Europe, supporting NEM Community through organization of events and further community building activities. Based on the experience in working together, the Vital Media project defined **Recommendations for future actions of the NEM Community and needed reorganization of the NEM Initiative**, which are summarized in this document.

The NEM Initiative Mission

The mission of the NEM Initiative should be focused along the following **main goals**:

- To give a powerful voice to the Convergence Media and Creative Industries and be a reference point for these industries in Europe
- To foster creation of a large embracing ecosystem for all community players
- To offer dedicated services to the NEM Initiative members in accordance with their needs.

In order to achieve these goals, the **NEM Initiative** has to follow its **fundamental mission t**o keep on exchanging information with European Commission and European Parliament for strategic alignment on priorities, ensuring European leadership in Convergence Media and Creative Industry sectors.

In order to achieve these goals, the **NEM has to become self-sustainable** and establish itself as a not-for-profit organization, being funded by various means including public support.

[27] Vital Media is a support action project under the Horizon 2020 Programme of the European Union, number 688310, project duration June 2016 – June 2018; https://nem-initiative.org/vital-media-project/.

Recommended Objectives of the NEM Initiative

In order to concretize how to fulfil the NEM Initiative mission, the Vital Media project recommended a set of objectives for the future activities of the NEM Initiative:

General

- To catalyze the needs, demands and challenges of Content, Media, and Creative Industry
  - by fostering a cutting edge research community reflecting EU wealth in diversity and creativity
  - by fostering innovation addressing industrial and societal needs
- To ensure sufficient funding opportunities for Content, Media, and Creative industries
- To better position convergence media and creative industries in the European and Global context

Strategic

- To define research and innovation agendas for Convergence Media and Creative Industry in Europe
- To work towards implementing the Digital Single Market strategy
- To establish the European Converged Media as a technology enabler and core sector as well as a very important vertical industry sector:
  - Media technologies for various vertical application sectors - establishing necessary collaborations
  - Media and Entertainment as one of the main vertical sectors to exploit the future networks

Community related

- To get the entire European media ecosystem together to collaborate in the pre-competitive phase
- To support all stakeholders in Content, Media and Creative Industries by providing community services they need
- To work on establishment of the NEM Initiative as a self-sustainable organization
-

Community Building and Engagement

In order to achieve goals of the NEM Initiative, it is important to have a significant number of community members involved, but it is more important, even crucial to ensure high engagement of the community. **Lessons learned** from the Vital Media community building activities are summarized below:

- The active or potentially active community members should be in focus
- Benefits of being a NEM member have to be continuously emphasized and widely promoted[28]
- Mechanism of NEM Ambassadors is needed to outreach in regions with low participation in the community, where, again, is important to look for active ambassadors
- The NEM members need regular annual/biannual community events to meet and share their views
- The NEM Initiative should define concrete service offer for the members

The proposed NEM Initiative Service Offering

- Repository containing thematic and geographical map of NEM members, including their interests, results, skills and knowhow, including related information from EC funded projects
- Members' support, in particular for SMEs:
  - Access to standardization activities and contribution to these
  - Business support, including self-assessment, coaching, and mentoring through workshops
  - Facilitation of members' participation at large industry events and exhibitions
- Establishment of expert groups on specifics topics (besides existing NEM Working Groups)
- Support for members' participation and exhibitions at events important for the sector.

Furthermore, the NEM Initiative should enable sandbox and living lab type of activities for the members.

The NEM Initiative needs a powerful tool enabling online collaboration among the community members in a secured repository. In this respect, Engineering leaves as a heritage from the Vital Media project the OPENESS platform to NEM Initiative and will continue to maintain it on own expenses, at least for next two years, so it can be widely used by the community members in the future.

[28] Benefits for being a NEM member are defined by the Vital Media project and published on the NEM website.

Sustainability of the NEM Initiative

In order to offer all these services and ensure their sustainability during a longer period, the proposal is to establish a legal entity or similar, ensuring establishment of NEM Initiative as a self-sustainable non-for-profit organization. The needed financing can be ensured by membership fees, registration fees from NEM Initiative events, sponsorships from large members' organizations, dedicated funding from projects and revenues from the NEM Initiative services selling.

The NEM Steering Board was informed about the recommendations from the Vital Media project at its 29th meeting in Brussels on 29th May 2018 and the same proposal was presented at the 25th NEM General Assembly, in Brussels on 30th May 2018. Both groups highly welcomed the recommendations and adopted an approach to focus on implementation of the recommendations in the upcoming period.