

# FERMI

## FAKE NEWS RISK MITIGATOR

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## D3.3 FERMI Behaviour Analyses and Community Resilience Facilitators Package - 1st version

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## Executive Summary

This deliverable D3.3 reports and demonstrates the first version of the Behaviour Profiler & Socioeconomic Analyser and the Community Resilience Management Modeler of the FERMI project. This deliverable reports and demonstrates results of the tasks T3.3 led by INOV and T3.5 led by BIGS in the FERMI project with further essential contributions by the project partners UCSC and Convergence.

D3.3 presents the results of a literature analysis, theory-based modelling as well as technical solutions to the tasks laid out in the Grant Agreement of the FERMI project. According to the Grant Agreement D3.3 is set to be submitted by month 16 of the project, namely by the end of January 2024. The deliverable starts out by describing what the Behaviour Profiler, the Socioeconomic Analyser and the Community Resilience Management Modeler aim to achieve.

It provides a detailed description on how these goals are aimed to be achieved within the single tasks and their components developed therein. This involves, first, a general description of our work. Secondly, it covers a model description on what the technology or output will be based on, which then goes into the practical implementation of this model.

In the following, the deliverable provides an overview of the results that have been achieved for each of the components. It gives an outlook on the outstanding tasks that need to be clarified and finalised and lastly the deliverable concludes by summarising the most important points.

The Behaviour Profiler & Socioeconomic Analyser aim at finding a connection between disinformation-induced politically motivated crime and economic outputs. Furthermore, the Behaviour Profiler analyses data from France, Germany, Sweden, Finland and Belgium that creates country profiles with regard to media consumption and media literacy in these countries giving additional information for the users of the FERMI platform. The Community Resilience Management Modeler, finally, applies the inputs from the Behaviour Profiler & Socioeconomic Analyser to output countermeasures supporting the end-users of FERMI in response to risks, in terms of politically motivated crime due to D&FN, to communities.

So far, the first version of the Behaviour Profiler have been working achieving two main results. First, it comprises a measurement of likelihood of crimes occurring due to disinformation. Secondly, it gives an overview of the countries under inspection with respect to media literacy and measurements of news consumption. For the Socioeconomic Analyser the code has been prepared and first results have been obtained but are for now not permitted to be published. The Community Resilience Management Modeler is prepared to depict the output from the Behaviour Profiler & Socioeconomic Analyser as a measure for potential risk for a community and adds by providing countermeasures.

Further steps have to be taken in the ongoing progress of FERMI. This mainly concerns further testing the methods with available data and receiving permission for publishing results.

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## Abbreviations

<b>GA:</b>	Grant Agreement
<b>LEA:</b>	Law Enforcement Agencies
<b>CRMM:</b>	Community Resilience Management Modeler
<b>D&amp;FN:</b>	Disinformation and Fake News
<b>DB:</b>	Database
<b>DSA:</b>	Digital Service Act
<b>FERMI:</b>	Fake News Risk Mitigator
<b>GDP:</b>	Gross Domestic Product
<b>GMM:</b>	Generalized Method of Moments
<b>LSDV</b>	Least-Squares Dummy-Variables
<b>MCDA:</b>	Multi-Criteria Decision Analysis
<b>MCDM:</b>	Multi-Criteria Decision Method
<b>ML:</b>	Machine Learning
<b>M-MACBETH:</b>	Measuring Attractiveness by Categorical Based Evaluation Technique
<b>OLS:</b>	Ordinary Least Squares
<b>OSIS:</b>	Open Society Institute – Sofia
<b>PKS:</b>	Polizeiliche Kriminalstatistik (Police Crime Statistics)
<b>PMK:</b>	Politisch Motivierte Kriminalität (Politically Motivated Crime)
<b>RSF:</b>	Reporters Without Borders
<b>SLR:</b>	Systematic Literature Review
<b>UI:</b>	User interface

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# 1 Introduction

The Behaviour Analyses and Community Resilience Facilitators Package is the second deliverable of WP3 due by month 16 – next to the technology facilitators package – of the Fake News Risk Mitigator (FERMI) project. It focuses on three components of work package 3 in the Grant Agreement (GA), namely the Behaviour Profiler, the Socioeconomic Analyser and the Community Resilience Management Modeler (CRMM). The deliverable provides a description on the modelling, the technical implementation of the models, the first results obtained from the implementation as well as the next steps to be coming along the lines of obligations for said components stated in the GA.

For that purpose, the deliverable is structured as follows. First, an overview of the components to be covered in terms of their overall objectives within the FERMI project is presented. The deliverable provides a brief depiction on the basic idea of FERMI in connection to the mentioned three components of work package 3 that can be summarised as the analysis of disinformation as well as the impact of such malicious content on socioeconomic factors in the society.

Subsequently, the integration of these components in the FERMI platform is depicted in chapter 3 while providing a brief overview on the involved technical solutions of the project. In chapters 4 and 5 the components are described in more detail. The structure of these chapters is built up in a comparable manner starting with introductory notes on the component, followed by the model description describing and formalising the ideas of the respective (sub-)component. The technical implementation describes how these formalised ideas are implemented, either in a technical or theoretical-analytical way. In the following, first results and the next steps to be covered are presented.

Since the Behaviour Profiler & Socioeconomic Analyser are subsumed under the same task in T3.5 of the GA they are described jointly in chapter 4 but are handled as sub-components examining different spheres of the topic at hand. The former focuses on measuring the likelihood of politically motivated crimes occurring due to online disinformation and creating country profiles on media and news consumption for the countries represented in the FERMI consortium by end-users and end-user-affiliated entities, namely France, Sweden, Germany, Belgium and Finland. The latter describes a model that analyses the connection between politically motivated crime and economic factors. In chapter 5 the CRMM focuses on visualising these results in a simply manageable user interface (UI) as well as generating potential countermeasures for the end-users.

The deliverable concludes by summarising the main updates and ideas of the components within the Behaviour Analyses and Community Resilience Facilitators Package.

## 2 Aim and Significance of the Behaviour Profiler & Socioeconomic Analyser and Community Resilience Management Modeler in the FERMI project

During the 2016 US presidential campaign an analysis by Silverman found that the top stories disseminating disinformation did receive more reactions than stories from traditional major outlets (like the New York Times, the Washington Post etc.). This was the case for the last three months of the campaign, supposedly the critical time period regarding the campaign, thus reflecting the potential of political influence.<sup>1</sup> In combination with a tentative tendency of social media to create echo chambers, considering that there is not a definitive yes or no answer to the question if social media spurs “[...] democratic deliberation and plurality [...]”<sup>2</sup>, the existence of echo chambers in social media, can have essential impacts on debates. While studies suggest that rather few citizens are susceptible to these echo chambers,<sup>3</sup> social media has the tendency to circulate information connected to strong emotions. It came to the foreground in research that disinformation spread online might influence voter’s decisions, moreover, might play a role in shaping opinions of voters.<sup>4</sup>

Accordingly, disinformation can play a crucial role in efforts to undermine domestic stability, not only in the sense of undermining the democratic process but even in the sense of transforming the hugely emotional sets of beliefs on the part of those that are susceptible to falsehoods into violent crimes. In recent years, two incumbent Presidents, Brazil’s Jair Bolsonaro and Donald Trump, lost their bids for re-election and used the ‘bully pulpit’ to stoke public anger by disputing their defeat. Numerous of their supporters did not hesitate to chime in on social media and beyond. Eventually, the rhetorical escalation that was facilitated by messages being exchanged in the online realm led to violent insurrections in both capitals. In Brazil a right-wing mob stormed three government buildings, including the Congress, and reportedly caused significant destruction, amongst other things by setting fire. In the United States the violence culminated in the infamous events of 6 January 2021. On the eve of the certification of Joe Biden’s win by the US Congress a group of Trump loyalists, including some openly extremist alt-right networks such as the Proud Boys stormed the US Capitol where they clashed with the Police.<sup>5</sup>

Some studies have corroborated the notion that disinformation can significantly further (politically motivated) crime by finding direct connections between online activity and offline crime, e.g. connecting anti-refugee sentiment on social media with hate crimes.<sup>6</sup> The analysis of online activities opens up the possibility to predict certain forms of crimes on spatial levels.<sup>7</sup>

The connection between online activities of people and impacts on the offline world stand in the centre of the FERMI project. Under this main goal FERMI subsumes various subsequent objectives and tasks. FERMI is creating tools, material and services that aim at supporting Law Enforcement Agencies (LEAs) in understanding the underlying connections, in helping them to distribute resources under the presumption of a real-life impact of disinformation accordingly and thereby reducing this impact on society. Next to LEAs also

<sup>1</sup> Silverman, C. (2016). Available at: <https://www.buzzfeednews.com/article/craigsilverman/viral-fake-election-news-outperformed-real-news-on-facebook>.

<sup>2</sup> Terren, L., & Rosa B. (2021). ‘Echo Chambers on Social Media: A Systematic Review of the Literature.’ *Review of Communication Research*, p. 112.

<sup>3</sup> Eady, G. et al. (2023). ‘Exposure to the Russian Internet Research Agency foreign influence campaign on Twitter in the 2016 US election and its relationship to attitudes and voting behavior.’ *Nature Communications*; Kling, J. et al. (2022). ‘Mapping the website and mobile app audiences of Russia’s foreign communication outlets, RT and Sputnik, across 21 countries.’ *HKS Misinformation Review*, 14 ed. Available at: <https://www.nature.com/articles/s41467-022-35576-9>.

<sup>4</sup> Pedriza, S.B. (2021). ‘Sources, Channels and Strategies of Disinformation in the 2020 US Election: Social Networks, Traditional Media and Political Candidates.’ *Journalism and Media*.

<sup>5</sup> For a brief analysis of these events, see FERMI Project (2023). ‘History of Election Fraud Claims Does Repeat Itself – and May Lead to Crimes.’ *FERMI website*. Available at: <https://fighting-fake-news.eu/articles/history-election-fraud-claims-does-repeat-itself-and-may-lead-to-crimes>.

<sup>6</sup> Müller, K. & Schwarz, C. (2020). ‘Fanning the Flames of Hate: Social Media and Hate Crime.’ Available at: <https://doi.org/10.1093/jeea/jvaa045>.

<sup>7</sup> Ristea, A. et al. (2020). ‘Spatial crime distribution and prediction for sporting events using social media.’ *International Journal of Geographical Information Science*.

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other stakeholders are targeted in the form of information days, training sessions and the created training material.

The aim of the Behaviour Profiler & Socioeconomic Analyser is to make the occurrence of politically motivated crime detectable (at least in terms of likelihood), measurable (in terms of severity, measured along the lines of cost) and explainable (in terms of risk). More specifically, not all disinformation distributed online potentially leads to crime in the offline world. This component aims to quantify likelihood and severity of crimes occurring due to disinformation whose combined terms outputs a measurement of risk. Qualitatively, this is further supplemented by providing additional information on country characteristics and examining news consumption behaviour.

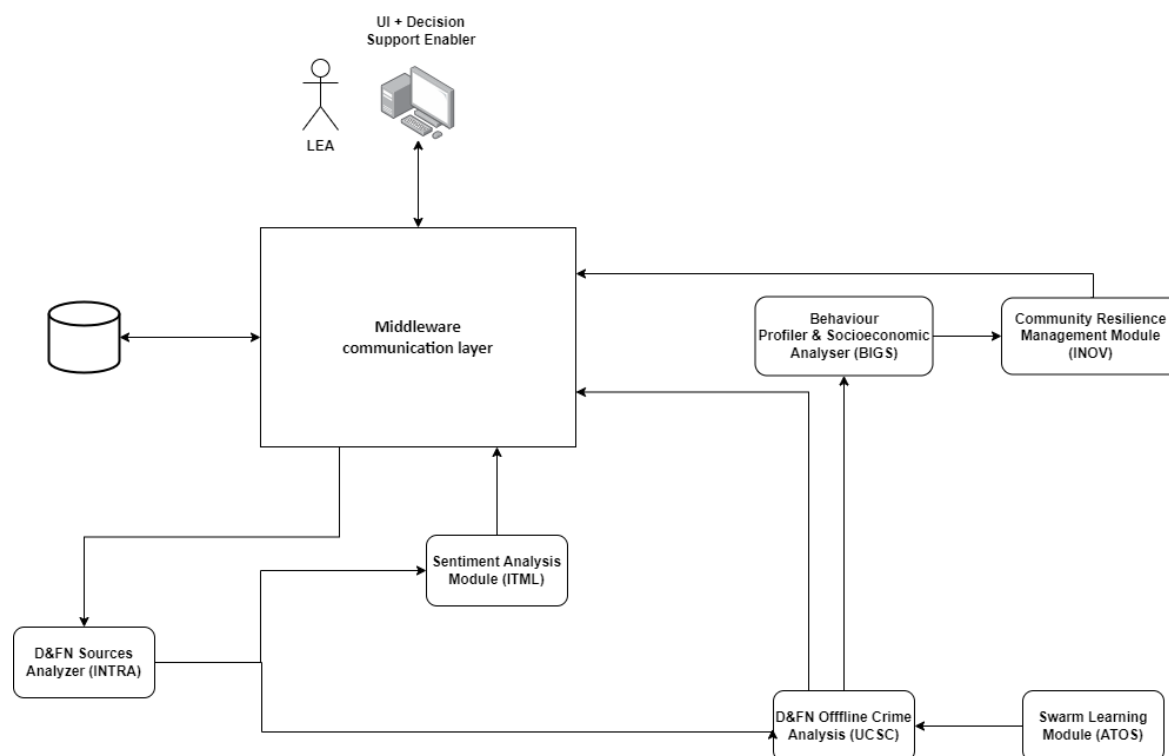
The analysis' results are fed into the Community Resilience Management Modeler. This component aims at supporting LEAs in their decisions with regard to countering disinformation online as well as their potentially adverse effects on crime itself and the society as a whole. By grasping community resilience and offering countermeasures it aims at giving support for allocating resources.

Finally, it applies technical tools, data and information fed by other components of the FERMI platform that aims to provide a tool for understanding and contextualising disinformation online for LEA practitioners.

In FERMI the Behaviour Profiler & Socioeconomic Analyser and the Community Resilience Management Modeler work closely together. Based on sophisticated scientific and technical solutions the Behaviour Analysis and Community Resilience Facilitators Package rests upon solid foundations to analyse the topic at hand.

### 3 Implementation, Component Description and Interaction

The FERMI project contains several tasks and technical components that are interlocked with each other. The components exchange information and data with each other forming a path starting from analysing and evaluating online content, analysing influencing factors and the impact of disinformation on crimes in the physical, i.e. non-online, world, visualising risks to formulating countermeasures. Each component combines individual datasets, theoretical expertise and technical solutions by the respective partner. The components and the interconnections are depicted in Figure 1.



**Figure 1: FERMI Technical Components. Source: Deliverable 2.1**

Without going into further details about all of the individual components it seems necessary to present where the Behaviour Profiler & Socioeconomic Analyser as well as the Community Resilience Management Modeler receive their input from and where their input goes to. Each box represents a component in the FERMI platform and each arrow describes the flow of data.

Basically, the process starts at the upper left with the user starting an investigation process through the UI. The Spread Analyser by INTRA uses this input with a specified investigation ID and a tweet from which to start fetching corresponding data. With a created dataset from X/Twitter it identifies bots or human-created content, and designs a graph for each sort of investigation that is considered by the FERMI project. This includes investigations related to left-wing, right-wing and COVID-19-related forms of extremism. It discerns disinformation-spreading accounts as well as their influence.

The Sentiment Analysis component further elaborates on this analysis by examining the sentiment of online content that may contain disinformation and thereby enhancing the analysis of online activities and offline criminal behaviour. UCSC’s Dynamic Flows Modeler creates a prediction of crimes that occur due to a specific form of disinformation rooted in left-wing, right-wing or COVID-19-related topics in the online content. Building upon the Swarm Learning module by ATOS which enables the Dynamic Flows Modeler to study past crime in Europe while guaranteeing data privacy it predicts crime caused by disinformation with respect to specific needs of the LEAs. The Swarm Learning Module, moreover, builds a decentralised format that enables work on aggregated rather than local models for collaboration between LEAs in a safe and secure manner.

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Finally, the output from the Dynamic Flows Modeler is integrated into the Behaviour Profiler & Socioeconomic Analyser. This is fully in line with the GA's requirement to "integrate information from multiple sources", which includes the analysis of information stemming from social media data and "information about D&FN [disinformation and fake news] sources" in the sense of the Tweet's extremist cause's ideological origin.<sup>8</sup> The Behaviour Profiler & Socioeconomic Analyser elaborates on crime that occurred due to disinformation analysing likelihood and severity in greater detail. The integration of this input is further elaborated on in chapter 4.2.

Moreover, what should be taken from the figure is that the input, i.e. the added value, from the Behaviour Profiler & Socioeconomic Analyser goes to the Community Resilience Management Module by INOV. This component uses the inputs to depict likelihood and severity of crimes occurring due to disinformation, checks if the event is of high or low impact and, in case of a high impact event, provides – to quote the GA again – "suggestions for measures that can be taken proportionally to minimize the consequences and the risks."<sup>9</sup>

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<sup>8</sup> See 'Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,' *European Research Executive Agency*, 2021, PART B, p. 12

<sup>9</sup> Whilst the GA assigns this requirement to the Behaviour Profiler See ('Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,' *European Research Executive Agency*, 2021, PART B, p. 12), it is fully covered by the platform, albeit by the subsequent Community Resilience Management Modeler.

## 4 Behavioural Profiler & Socioeconomic Analyser

Task T3.5 of the Grant Agreement describes the work being done for the Behaviour Profiler & Socioeconomic Analyser. As a part of work package 3 this component includes a technical solution and is interlocked with further components from work package 3. The component of T3.5 consists of two parts. The first considers behavioural explanations for the spread of disinformation.<sup>10</sup> This analysis is supplemented by an assessment of the crime landscape provided by preceding processes of the FERMI platform so the ground for the further step can be laid, which encompasses the task's second building block that focusses on the socioeconomic impact of disinformation-induced politically motivated crime.

One central component of the FERMI project is the initial hypothesis that activities in the online realm can translate into physical real-life actions. Starting point for the FERMI project and for the Behaviour Profiler & Socioeconomic Analyser is, thereby, to analyse the connection between the online spread of disinformation and various crimes. Moreover, the specificity of the Behaviour Profiler & Socioeconomic Analyser is to narrow down the analysis to a certain form of crimes, namely to focus on extremist crimes, which are likely to feature particularly prominently in the online disinformation-offline crime nexus, as the overview above has revealed. Thus, the processes under inspection in this deliverable are considering motivations and ideologies that drive people to commit a crime.

### 4.1 Introductory Notes on the Component

As it has been mentioned in chapter 2 already, there is existing evidence that online activities might result in real-life action. Again, this is well-analysed by the Dynamic Flows Modeler. However, the output of the Dynamic Flows Modeler is supplemented by an assessment of the likelihood that politically motivated crime unfolds and an estimate of the socioeconomic costs thereof, which can further contribute to giving LEAs a better understanding of the consequences of disinformation-induced crime. Accordingly, the outputs of the above-mentioned components are merged into a single solution that includes a measurement of likelihood of politically motivated crime taking place and the severity of occurring politically motivated crimes. The product of these parts gives a measurement of the costs of extremism reflecting the risk connected to disinformation-induced politically motivated crime, which meets the GA-required examination of different “forms of politically motivated extremisms as well as its impact on society [...]”.<sup>11</sup>

<sup>10</sup> It should be noted that the GA also stipulates that the Behaviour Profiler “will be responsible for identifying who is driving a campaign and for what purpose” (‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, PART B, p. 12), which, however, has been overtaken by events, considering that the platform is designed in a way that makes the end-user feed it with Tweets. This is necessary to ensure that FERMI complies with legal and ethical constraints, considering that LEA end-users to whom the platform is tailored usually are not empowered to detect false allegations on social media, which mostly do not constitute a violation of the law (see the analysis of the legal landscape in D2.1). In the event, the boundaries of legality are crossed, though, an investigation of specifically identified Tweets can be launched. (The FERMI pilots will be designed accordingly (see D5.1).) Against this backdrop, the account and the content, including the ideological purpose of the Tweet are well-known to the end-user already. That being said, the FERMI consortium takes its obligation to identify the origin of the disinformation chain at stake very seriously. A technical analysis of a to-be-investigated Tweet’s roots in the sense of distinguishing between human- and bot-operated accounts and capturing the exact spread of the disinformation claims is provided by the platform, albeit, as explained above, the tool providing this service happens to be the spread analyser.

<sup>11</sup> ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, PART A, p.9. – Interestingly, the question of identifying the roots of these different forms of extremism (“the causes” and “emergence”) also comes up. As explained in the preceding footnote, it is beyond the scope of this project to develop a platform that can detect causes of extremist activities, which are at full display already in the form of a Tweet’s ideological message the platform is fed with by the end-user, but the spread analyser can trace social media messages informed by such attitudes back to the original account they emerged from and can further distinguish between human- and bot-originated roots.

Also, the topic of media literacy, which the task description mentions a factor that may have a chilling impact on the spread of “online propaganda”,<sup>12</sup> in other words: extremism-rooted disinformation campaigns, is not new. Analysing and comparing media literacy and media literacy education in European countries and the US, for instance, has already been under way.<sup>13</sup> Also, definitions of what media literacy actually entails may be different. An example can be retrieved from Livingstone (2004) where she defines media literacy as the “[...] ability to access, analyse, evaluate and create messages across a variety of contexts [...]”.<sup>14</sup>

Some studies were able to show that network heterogeneity of social media users is connected to news sharing as well as political interest of the users while political interest and further dissemination of news interact with each other.<sup>15</sup> Thus, political engagement might also be reflected in news sharing activities.<sup>16</sup>

Considering media literacy, there is tentative evidence of people receiving media and information literacy training being more likely to be able to estimate the accuracy of information while being less likely to share disinformation.<sup>17</sup>

These topics are foundation and subject of the upcoming chapter 4.2, 4.3, 4.4 and 4.5. BIGS is the responsible partner for the Behaviour Profiler & Socioeconomic Analyser in the FERMI project that comprises two sub-components. While the main work of the sub-component Socioeconomic Analyser lies mainly at BIGS, for the Behaviour Profiler the partners UCSC and Convergence were more deeply involved. Thus, in the model description, technical implementation and results the contribution of these two partners are reflected for the Behaviour Profiler.

<sup>12</sup> ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, PART A, p. 9.

<sup>13</sup> Grafe, S. (2011). ‘“media literacy” und “media (literacy) education” in den USA: ein Brückenschlag über den Atlantik.’ *Medienpädagogik*. Available at: <https://doi.org/10.21240/mpaed/20/2011.09.13.X>.

<sup>14</sup> Livingstone, S. (2004). ‘Media literacy and the challenge of new information and communication technologies.’ *Communication Review*, p.2. Available at: <http://eprints.lse.ac.uk/1017>.

<sup>15</sup> See Choi et al. (2015). Choi, J. & Lee, J.K. (2015). ‘Investigating the effects of news sharing and political interest on social media network heterogeneity.’ *Computers in Human Behavior*.

<sup>16</sup> There are approaches in explaining behaviour of people while using social media and sharing news on social media. Karnowski et al. (2018) use the theory of reasoned action that aims at describing behaviour from the origins of that behaviour. The findings suggest (with methodological restrictions and limitations of course) that news sharing in social media is mainly motivated by seeking information and seeking social contact. Moreover, higher news sharing activities is also connected to a higher political interest of social media users. Still, the literature argues that several aspects in explaining behaviour to be considered is – among others – attention, the form of reasoning, perceived source credibility, prior knowledge etc. See Karnowski, V. et al. (2018). ‘Why Users Share the News: A Theory of Reasoned Action-Based Study on the Antecedents of News-Sharing Behavior.’ *Communication Research Reports*. Available at: [https://anna-kuempel.de/publication/karnowski-why-2018/karnowski-et-al\\_2018.pdf](https://anna-kuempel.de/publication/karnowski-why-2018/karnowski-et-al_2018.pdf), Obadã, D. & Dabija, D. (2022). ‘“In Flow”! Why Do Users Share Fake News about Environmentally Friendly Brands on Social Media?’ *Environmental Research and Public Health*. Available at: <https://doi.org/10.3390/ijerph19084861> and Pennycook, G. & Rand, D. (2021). ‘The Psychology of Fake News.’ *Trends in Cognitive Sciences*. Available at: <https://doi.org/10.1016/j.tics.2021.02.007>.

<sup>17</sup> See Adjin-Tettey, T. (2022). ‘Combating fake news, disinformation, and misinformation: Experimental evidence for media literacy education.’ *Cogent Arts & Humanities*. Available at: <https://doi.org/10.1080/23311983.2022.2037229>. More specifically, radicalisation online might be facilitated by characterising in- and out-group in line with radical groups’ preferences. The purpose of radical groups online was identified as that their group is being seen in a positive light and simultaneously framing people not belonging to their group in a negative light with further potential of conflict. See Williams, T. et al. (2022). ‘How does language influence the radicalisation process? A systematic review of research exploring online extremist communication and discussion.’ *Behavioural Sciences of Terrorism and Political Aggression*. Available at: <https://doi.org/10.1080/19434472.2022.2104910>.



## 4.2 Model Description

The work of the Behaviour Profiler & Socioeconomic Analyser is described in the GA under task T3.5 and is part of the technical implementation in the FERMI project.<sup>18</sup> In the centre of the model description for both the Behaviour Profiler & Socioeconomic Analyser with its main outcome stands the following equation:

### Equation 1: Computation of the Costs of Extremism

$$Crime\_Cost_{c,r,f,t} = Number\_Crimes_{c,r,f,t} * Population_{r,t} * Cost\_Parameter_{c,r,f,t}$$

The model describes the computation of the costs of extremist crimes shown on the left hand side. These costs are dependent on the following variables. First, the number of crimes is computed by UCSC qua the partner's component for crime prediction. It gives the number of crimes following a disinformation campaign according to the nature of crime (c)<sup>19</sup>, a specific region (r), a time (t) and a political flag (f) that is connected to an underlying political motivation for a disinformation campaign.<sup>20</sup> This term translates into the likelihood of crimes occurring taking further explanations into account, e.g. gender and age demographics. Moreover, this term reflects the technical implementation of the Behaviour Profiler.

UCSC will predict, as stated previously, a certain number of crimes for a specific region at a specific time. However, this prediction will cover crimes belonging to a specific dataset. To give a prediction of crimes that can be connected to a political motivation given by a country-specific dataset of crime the nature of crime (c) has to undergo a classification to coarse fitting it to crime data for the country of interest in the FERMI project.

The second essential part of the equation is the cost parameter. This term is also characterised by nature of crime (c), a specific region (r), a time (t) and a political flag (f) to guarantee that both terms, i.e., the number of crimes and the cost parameter, are analysed on the same level according to these properties. This parameter reflects the change of crime costs, measured in economic terms, namely GDP per capita, due to a one unit increase in a crime of specific nature (c), region (r), time (t) and political flag (f). However, it needs to be added that the parameter will be computed as one single coefficient for all NUTS-2 regions. Thus, the parameter itself will be the same for all NUTS-2 regions and all years but will be based on the aggregated results from the individual NUTS-2 regions and years to guarantee data protection. This will be further elaborated on in sub-chapter 4.2.2.

The cost parameter is computed by the second component, namely the Socioeconomic Analyser, and gives a measurement of severity of (extremist) crimes occurring due to disinformation campaigns. The classification mentioned in the previous paragraph will ensure that crime prediction and cost estimation qua the cost parameter will analyse the same crime classes.

Lastly, the measurement of population ensures to estimate and output crime costs that have intuitive explanatory power. It is characterised by a specific region (r) and time (t).

In the following, the above-described components will be looked at in further detail starting with the Behaviour Profiler with its two sub-tasks and the Socioeconomic Analyser. It offers the logic behind the proposed models and provides the foundation for the technical implementation in chapter 4.3.

### 4.2.1 Behaviour Profiler

The Behaviour Profiler consists of two sub-tasks that partially complement each other. The first sub-task is covered by UCSC that is concerned with crime prediction following a disinformation campaign. It is

<sup>18</sup> 'Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,' *European Research Executive Agency*, 2021.

<sup>19</sup> Nature of crime is defined here for the crimes that we are looking at, e.g. theft, assault and intimidation.

<sup>20</sup> In the FERMI project, three different categories of disinformation are defined: right-wing, left-wing and COVID-19-related (translated to the crime dataset as "other crime") disinformation campaign.

the main component in the technical implementation for the computation of the likelihood of crimes occurring due to a disinformation campaign.

The second task is covered by Convergence in respect to country profiles that have been created. These profiles complement the Behaviour Profiler in a significant way qua their inspection of media literacy and information consumption behaviour in the countries of interest for the FERMI project.

#### 4.2.1.1 Crime Forecast

The crime forecasting technology, specified in the GA as task 3.1, D&FN-induced and -enabled offline crime analysis and prediction, delivers on its GA commitment to “evaluate the degree in which the spread of D&FN online impacts on the occurrence of offline crime,”<sup>21</sup> and “produce AI-based predictions of the most likely spatiotemporal evolution of D&FN-induced and D&FN enabled offline crimes.”<sup>22</sup> Through implementing machine learning (ML) prediction technology, the crime prediction technology represents an advancement in the standard practices of contemporary policing.

At its current state of development, the crime prediction technology generates informed, accurate predictions for the number of crime occurrences in NUTS-2 regions following, and with appreciation for, a D&FN event online. Specifically, its predictions are possible with three topics of D&FN-related extremism: COVID-19, right-wing and left-wing. For the case of left-wing political extremism alternative datasets and sources are currently being explored for that the results in this realm are not available at this stage of FERMI. Further details can be found in deliverable 3.1. The proceeding paragraphs will detail, briefly, the architecture behind the technology as well as the structure of its output. A more in-depth and expansive review of the technology is also provided in Deliverable 3.1, the “technology facilitator package – 1<sup>st</sup> version.”

The Dynamic Flows Modeler (a shorthand for said technology) uses AI-driven ML, particularly deep learning, to study a provided period of time, with its corresponding data, to understand the patterns and evolution of the provided variables, from which it predicts how one of these variables will evolve given the provided evolution of all others. Specifically, the Dynamic Flows Modeler is focused on predicting the evolution of offline crime given the socioeconomic variables we provided and D&FN’s intensity, provided by the platform, in the time period for which it is predicting. Two existing ML approaches were reworked for our purposes, 1-dimensional convolutional neural network (1D CNN) and Transformers. Just as well, an ensemble learning method, wherein the two models work together, was built.

In essence, the Dynamic Flows Modeler cannot be said to be one ML model, rather, it is a device wherein the best performing ML architecture, with respect to the end-users needs, is employed to produce the best possible prediction. During its development, multiple ML/deep learning architectures (and ensembles of them) were employed to identify which worked best for each crime type. The best performing architecture for each type was then included in the final composition of the Dynamic Flows Modeler. In other words, depending on the crime type (of those listed in Table 1) the prediction is requested for, the Dynamic Flows Modeler will utilise the architecture (or ensemble of architectures) identified as being most accurate during training, with socioeconomic controls (see Table 1) and past crime incident data (provided by T3.4’s swarm learning infrastructure) for a selected NUTS-2 region, to predict the number of crime incidents of said crime type, in said NUTS-2, following a D&FN event online.

Each crime type, therefore, has a dedicated ML model with which its prediction will be produced. D&FN was collected from NELA-GT, an annually released dataset of approximately 1.8 million real and fake news articles,<sup>23</sup> and used to train said models. The 2020 – 2022 editions of the dataset underwent NLP analysis

<sup>21</sup> ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021.

<sup>22</sup> *Ibid.*

<sup>23</sup> Gruppi, M. et al. (2021). ‘NELA-GT-2020: A large multi-labelled news dataset for the study of misinformation in news articles’. *arXiv preprint arXiv:2102.04567*. Available at: <https://doi.org/10.48550/arXiv.2102.04567>, Gruppi, M. et al. (2022). ‘NELA-GT-2021: A large multi-labelled news dataset for the study of misinformation in news articles’. *arXiv preprint arXiv: 2203.05659*. Available at: <https://doi.org/10.48550/arXiv.2203.05659>, Gruppi, M. et al. (2023).

to identify which articles were of interest to FERMI (i.e., matched the pilot topics). The articles of interest were then used to train the ML models, the significant coverage provided by NELA-GT represents a good measure of D&FN diffusion online, at a daily level of analysis. The articles of interest were then plotted on a weekly time-series, with the frequency of each topic being used as a measure of intensity for the topic, during each week of 2020 – 2022, inclusive. The crime incidents collected were also aggregated into weekly totals, separated by crime type (as listed in Table 1).

To prepare this data for input into the ML models, a windowing methodology was employed. This involved segmenting the data into 12-week intervals,<sup>24</sup> with a stride of 12 weeks, ensuring that there was no overlap between consecutive windows. As a result, the input matrix for each model comprises a 12-week data sequence, encompassing details regarding the specific crime category under examination, along with data on fake news intensity, mobility, and socioeconomic controls (see Table 1) corresponding to the geographic area where the train and test data originated. Season- and month-based dummy variables were created to give each model an appreciation for seasonality and all crime data was scaled to a consistent range. The windows were split into training and testing sets, with an 80% allocation for training data and a 20% allocation for testing data.

**Table 1: Socioeconomic controls utilised and crime types predicted**

Controls	Outputs
Population	Assault
GDP Per Capita	Burglary
Gender Demographics	Arson
Age Demographics	Destruction/Damage/Vandalism of Property
Unemployment Rate	Disorderly Conduct
Educational Attainment Level (Undergraduate or Higher)	Forcible Sex Offenses
Law Enforcement Presence Per Capita	Homicide
Spatial Mobility	Intimidation
Past Crime Incidents	Larceny/Theft
	Trespassing
	Weapon Law Violations

The resulting output, for all the models, consists of 12 integer values,<sup>25</sup> representing the predicted incidents for the specific crime type for a maximum of 12 weeks subsequent to the present, relative to when the platform is being used. The output can also be plotted into a time-series, allowing for a graphical representation of the crime type’s evolution, offline, following the date of a D&FN event online.

Considering the question for calculating economic costs that will be presented in more detail in chapter 4.2.2:

**Equation 2: The calculation of economic costs to political extremism**

$$Prod_{r,t} = \alpha + \beta_1 Ext_{c,f,r,t} + X_{r,t} + v_r + \varepsilon_{r,t}$$

Where  $\alpha$  is the constant for the regression,  $v_r$  is a vector of time-invariant region-specific properties.  $\varepsilon_{rt}$  is the error term for the regression.  **$Ext_{c,f,r,t}$  is the measurement of extremism in terms of crime**,  $\beta_1$  gives

‘NELA-GT-2022: A large multi-labelled news dataset for the study of misinformation in news articles’. *arXiv preprint arXiv: 2203.05659*. Available at: <https://doi.org/10.48550/arXiv.2203.05659>.

<sup>24</sup> In the final FERMI platform, the window and prediction size (in terms of time) may undergo changes, based on how the provided intensity from the Impact and Spread Analyser is provided.

<sup>25</sup> The size of the output is dependent on the provided input, therefore, may be subject to change based on the provided intensity by the FERMI platform.

the cost coefficient, and  $X_r$  describes a vector of control variables, such as size of the region. This will be further elaborated on in sub-chapter 4.2.2. This equation gives the coefficient (or cost parameter) by the Socioeconomic Analyser that is included into UCSC's component.

For the integration recall Equation 1 again:

$$Crime\_Cost_{c,r,f,t} = Number\_Crimes_{c,r,f,t} * Population_{r,t} * Cost\_Parameter_{c,r,f,t}$$

It is in this equation that the integration between technologies is most relevant. The **Number of Crimes, in this equation, is sourced from the Dynamic Flows Modeler**, which provides a level of offline crime occurrence following a D&FN event online, indicated as **likelihood**. Recalling that the past D&FN events studied by the Dynamic Flows Modeler correspond to political extremism, at its current state of development, particularly right-wing extremism. As shown previously in Figure 1, the image presents the data flow between FERMI components, as a whole. Within said figure, the linkage between the Dynamic Flows Modeler (D&FN Offline Crime Analyses) and the Behaviour Profiler & Socioeconomic Analyser can be seen. Just as well, the outputs of the Behaviour Profiler & Socioeconomic Analyser are then passed to the Community Resilience Modeler.

#### 4.2.1.2 Country Profiles

The need behind the Country Profiles section analysis is directly derived from T3.5: FERMI Behaviour Profiler & Socioeconomic Analyser. Specifically, T3.5 is divided in two parts, the first part of the task being the most relevant to this section. As described in the GA the first part relates to the ambition “to determine effects of online propaganda on offline actions. In this respect, the degree of media literacy may tend to correspond to the degree of resilience of a society. The means of information and news consumption is a first indicator for the assessment of media literacy. Factors such as the type of source, the “general” assessment of the medium, the level of trust (if feasible) and differentiation by age groups (demographics) play an important role. Based on secondary literature, an analysis of the media literacy of certain countries will be conducted, considering the factors mentioned above. This preliminary work allows behavioural profiles to be better differentiated and classified.”<sup>26</sup>

Working towards this direction, this section describes the intuition behind and the results of the analysis of specific country profiles. The analysis conducted places a particular focus on media literacy to contribute towards determining the effects of online propaganda on offline actions. Based on secondary literature, as required by the task description, the aim of this analysis is to examine if and how media literacy of specific EU countries affect the spreading of potential pieces of disinformation. The country profiles chosen are the five target countries relevant to/for FERMI i.e., Finland, Belgium, Germany, France and Sweden.

##### 4.2.1.2.1 Methodological Notes

This choice of countries was informed by the validation needs of the FERMI project. As explained in the GA and in greater detail in Deliverable D2.1, the FERMI platform for which work package 3 of the GA lays the ground in the sense of outlining its key components will be validated in three different pilots. These will be held in Finland (the first pilot on violent right-wing extremism), Belgium (the second pilot on violent COVID-19-related extremism) and Germany (the last pilot on violent left-wing extremism).

Accordingly, these three players clearly needed to make the list “of certain countries” included in the media literacy analysis the task description cited above alludes to. This is a self-evident selective step to ensure that the partners from the above-mentioned EU member states (FMI, BFP, and BPA) that are in charge of carrying out the pilots can find proper information on the media literacy landscape within their borders, which can then be included in the situational analysis. Media literacy in France is covered as well, considering that the third pilot was originally planned on being held in France, which was no longer possible after the

<sup>26</sup> ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, PART A, p.9.

withdrawal of the French LEA partner DMIA. However, DMIA helped recruit French security experts who will assist in the validation of the platform. Against this backdrop, it is beneficial to cover France as well, in the event the French expert participants have any questions about the media literacy landscape in their country. The same applies to Sweden where expert practitioners taking part in the pilot validation efforts will be recruited by the Swedish LEA partner SPA (albeit SPA will not organise a pilot of their own).

For the purposes of this media literacy analysis, the secondary sources utilised are, among others, review articles, scientific papers, newspaper editorial/opinion pieces and empirical data. The data used and summarised in this section as well as presented in the Appendix have been critically evaluated regarding the quality, validity as well as the reliability of the data and their sources.

In the effort to analyse and compare media literacy in the target countries some specific indexes, that offer relevant data for the respective countries, have been used as a point of reference.

The Press Freedom Index (also seen as World Press Freedom Index)<sup>27</sup> measures the state of press freedom in 180 countries, it offers a yearly ranking and evaluation of countries according to the degree of freedom available to journalists. The index is compiled and published by the renowned NGO Reporters Without Borders (RSF)<sup>28</sup>.

The second index utilised for the analysis of the five target countries is the Media Literacy Index. “The Media Literacy Index is an instrument for assessing and ranking societies in their potential for resilience in the face of the post-truth, disinformation, and misinformation (e.g. “fake news”) phenomena”<sup>29</sup>. The Media Literacy Index was developed by the Open Society Institute – Sofia (OSIS) and includes 35 European countries (editions in 2017, 2018, 2019, 2021). In 2022, the number of countries was enriched with 6 additional European countries. For the purposes of this analysis, a recent report regarding the Media Literacy Index published by OSIS<sup>30</sup> has been used and referenced for/in each country section. This report “contains an instrument for measuring not media literacy itself, but predictors of media literacy with the aim to rank societies in their potential for resilience.”<sup>31</sup>

In the report by the Open Society Institute the model employs several indicators that correspond to different aspects related to media literacy and the post-truth phenomena. The indicators taken into consideration in this regard are; (1) **the level of education** (PISA scores in reading – scientific – mathematical literacy by OECD and the Tertiary Education Enrolment by the World Bank), (2) **the state of the media** (Freedom of the Press score by Freedom House and the Press Freedom Index by Reporters Without Borders), (3) **trust in people/society** (Trust in others by the World Values Survey), as well as (4) the usage of **new forms of participation** (E-participation Index by UN).<sup>32</sup>

The countries in the index are also divided into clusters using cluster analysis, to group countries with similar characteristics based on their scores. The clusters are hierarchical ranging from the best-performing countries in the 1<sup>st</sup> cluster to the poorly performing ones in the last 5<sup>th</sup> cluster.

For each of the five target countries (a) a brief overview of demographic facts, including the political landscape which can be found in footnotes in each country section, (b) the media & media literacy setting and (c) an analysis of the main findings have been conducted and are presented in the Appendix.

<sup>27</sup> RSF. ‘Press freedom index’. Available at: <https://rsf.org/en/index>.

<sup>28</sup> RSF. Who are we? Available at: <https://rsf.org/en/who-are-we>.

<sup>29</sup> OSIS. ‘Media Literacy Index’. Sofia: Open Society Institute. Available at: <https://osis.bg/?p=4491&lang=en>.

<sup>30</sup> Lessinski, M. (2023). ‘Bye, bye, birdie’: Meeting the Challenges of Disinformation. The Media Literacy Index 2023. Sofia: Open Society Institute. Available at: <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>.

<sup>31</sup> Lessinski, M. (2023). ‘Bye, bye, birdie’: Meeting the Challenges of Disinformation. The Media Literacy Index 2023. Sofia: Open Society Institute. Available at: <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>, p.4.

<sup>32</sup> Ibid., p.4-5.

#### 4.2.1.2.2 Media Literacy and Disinformation

According to the European Commission's communication to the European Parliament, the European Council, the European Economic and Social Committee and the Committee of the Regions in 2007, "[m]edia literacy is generally defined as the ability to access the media, to understand and to critically evaluate different aspects of the media and media content and to create communications in a variety of contexts".<sup>33</sup>

The first part of the definition may slightly supplement the task description's assumption to consider "[t]he means of information and news consumption [...] a first indicator for the assessment of media literacy." Whilst grasping where the population (mostly) receives their news from is crucial for understanding whether the spread of D&FN might be contained by media literacy (some media outlets or likely to be more prone to spreading D&FN than others), this step might be preceded by analysing what media outlets are used in general (irrespective of the news dimension).

The part on critical evaluation is fully in line with the task description's above-mentioned ambition to take "[f]actors such as the [...] "general" assessment of the medium [and] the level of trust" into account. Besides the overall question of trust, the critical thinking requirement includes awareness of D&FN, which, obviously, is of particular interest to FERMI.

Broadly speaking, media literacy has been described as the ability to access, analyse, evaluate, create, and act while using all forms of communication. Media literacy has its roots in traditional literacy in the sense that "literacy was traditionally linked to an alphabet or a language code, that is, through reading, writing and understanding and linked with print media". The term has evolved and "today, the term literacy has been extended to cover the skills and competencies involved in finding, selecting, analysing, evaluating and storing information, in its treatment and its use, independently of the codes or techniques involved[...]. The model that is related to the new communicative environment is known as media literacy."<sup>34</sup> Media literacy bears a positive connotation since it empowers people to act and think critically. It can be seen as a dynamic process which is apparent in the following definition "[m]edia literacy is the ability to encode and decode the symbols transmitted via media and synthesize, analyse and produce mediated messages"<sup>35</sup>, which further emphasises the evaluation dimension of the above-mentioned definition. Importantly, media literacy is assuredly an essential key one needs to hold in the fight against disinformation.<sup>36</sup>

Accordingly, the analysis of the five aforementioned countries created in the document on the country profiles and summarised in the Appendix starts off with the secondary literature's key takeaways on media literacy as defined in the preceding paragraphs. Subsequently, in-depth empirical data from major research studies on the subject matter is analysed. In accordance with the GA and the scholarly literature's definition of media literacy that data is analysed along the lines of four key criteria: daily media consumption (incl. social media), accessing news, trust in news sources and the acknowledgment of D&FN and their existence within the country. The task description's requirement to distinguish the results "by age groups (demographics)"<sup>37</sup> is taken into consideration wherever feasible.

Media literacy education is beneficial and even necessary for/in any age, adults as well as children, as it assists in the possible identification of disinformation. Since media literacy cannot be achieved through a one-off crash course, it necessitates a lifelong commitment on an ongoing process which includes practical skills, knowledge, information and awareness about the digital environment, given that digital and media

<sup>33</sup> Commission of the European Communities (2007). 'Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A European approach to media literacy in the digital environment'. Brussels. Available at: <https://www.cedefop.europa.eu/en/news/european-approach-media-literacy-digital-environment>.

<sup>34</sup> Pérez, T., & Manuel, J. (2006). 'Current trends on Media Literacy in Europe. Approaches – existing and possible – to media literacy.' Available at: [https://ec.europa.eu/assets/eac/culture/library/studies/literacy-trends-report\\_en.pdf](https://ec.europa.eu/assets/eac/culture/library/studies/literacy-trends-report_en.pdf).

<sup>35</sup> NAMLE (2023). 'Resources-Media Literacy defined'. Available at: <https://namle.net/resources/media-literacy-defined/>.

<sup>36</sup> Goodman, E. (2021). 'Media literacy in Europe and the role of EDMO.' Available at: <https://edmo.eu/wp-content/uploads/2022/02/Media-literacy-in-Europe-and-the-role-of-EDMO-Report-2021.pdf>.

<sup>37</sup> 'Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,' *European Research Executive Agency*, 2021.

environments are constantly evolving. Media literacy education is vital, however, cannot be seen as the only solution to the problem of disinformation, it necessitates complementary regulations and initiatives. Accordingly, it has been incorporated into the task description as a factor possibly contributing to community resilience but not as the only factor. Furthermore, it has been argued that the burden of “the responsibility of understanding the incomprehensible” should not be placed solely on the citizen<sup>38</sup>. D&FN, the importance and relevance of media literacy in correlation with various social markers such as age, race, nationality, and the related recipients-respondents ability to detect these has gathered significant research attention especially in politics and during the COVID-19 pandemic.<sup>39 40 41 42</sup> The main results from the analysis are summarised in sub-chapter 4.4.1.2.

#### 4.2.2 Socioeconomic Analyser

The Socioeconomic Analyser is mainly covered by task T3.5 and is considered with the connection between crime and effects on economically measurable variables, such as GDP per inhabitant. According to the GA, by “[...] applying econometric methods, the effects of radicalization and extremism will be reflected in financial terms to quantify the costs of these negative effects (based on data availability in the respective country/region) for the society.”<sup>43</sup>

The intuition behind this analysis is coming from Ferguson et al. (2019) who built the theoretical foundation for looking at possible effects of political extremism on economic variables. It is proposed that political extremism leads to a loss in social welfare via different channels. These may concern the deterrence of investors, the influence on political decisions and institutional output as well as trade and further factors.<sup>44</sup>

Starting point for the Socioeconomic Analyser is therefore how to approach the topic of political extremism. In this regard, extremism as a concept explaining certain phenomena is hard to define. There is no universal clear-cut explanation of what extremism is, how it is visible and how it is to be detected. Ferguson et al. (2019) took three different approaches to define extremism for the case of Germany. The first concerns a removal or impairment of fundamental values and norms that contradict the German constitution. The second approach views extremism as a stand-alone phenomenon with individual characteristics, thereby focussing more on the counting and definition of the scope of extremism. A third definition describes extremism as a non-acceptable distance of political views from a political centre.<sup>45</sup>

In the following, the focus will be on extremism in terms of extremist crimes. To that end, Germany will serve as the foundation for selecting corresponding data. Since the dataset on politically motivated crime is quite rich in terms of a clear distinction between right-wing, left-wing, religious and foreign motivation as well as not assignable this dataset will be used as the foundation for the other countries under inspection and

<sup>38</sup> Ibid.

<sup>39</sup> Adjin-Tetty, T. (2022). ‘Combating fake news, disinformation, and misinformation: Experimental evidence for media literacy education.’ *Cogent Arts & Humanities*.

<sup>40</sup> Pérez-Escoda, A. et al. (2021). ‘Fake News Reaching Young People on Social Networks: Distrust Challenging Media Literacy.’ Available at: <https://doi.org/10.3390/publications9020024>.

<sup>41</sup> Austin, E. et al. (2021). ‘COVID-19 disinformation and political engagement among communities of color: The role of media literacy.’ *Harvard Kennedy School Misinformation Review*. Available at: <https://doi.org/10.37016/mr-2020-58>.

<sup>42</sup> Moore, R., & Hancock, J. (2022). ‘A digital media literacy intervention for older adults improves resilience to fake news.’ *Scientific Reports*. Available at: <https://www.nature.com/articles/s41598-022-08437-0>.

<sup>43</sup> ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, p.37. - Elsewhere the GA argues in a similar vein that the Socioeconomic Analyser “will make sure to design and deliver mechanisms that will determine any economic factors that could influence the discourse outcomes and lead to potential polarization cases. The analyser will be built based on BIGS’ relevant expertise in measuring costs of extremism and the overall platform economics and polarization.” (Ibid, PART B, p. 12).

<sup>44</sup> Ferguson, N. et al. (2019). ‘Die Kosten des Extremismus’. *BIGS Standpunkt zivile Sicherheit*.

Available at: [https://www.bigs-potsdam.org/app/uploads/2020/06/BIGS-Standpunkt\\_Nr.-9-2019\\_Kosten-des-Extremismus\\_WEB.pdf](https://www.bigs-potsdam.org/app/uploads/2020/06/BIGS-Standpunkt_Nr.-9-2019_Kosten-des-Extremismus_WEB.pdf).

<sup>45</sup> Ibid.

represented in the FERMI consortium. Accordingly, proxies or similar distinctions in motivation of crimes are currently under exploration for these countries.

To comply with the data it makes sense to align with definitions by the owners of the data as well as responsible authorities. Thus, the definition to build on is provided by the *Bundeskriminalamt* and the *Verfassungsschutz* in Germany. The latter, representing Germany's domestic Surveillance Service, defines right-wing extremism as a movement that is extremist and desires a society where there is clear hierarchy, based on the endowed supremacy of certain individuals or the supremacy of a specific sect of society. Moreover, right-wing extremism aims to achieve its goals by non-democratic means.<sup>46</sup> Crimes defined as right-wing underlie the assumption of inequality of people. If there are connections to nationalism, racism, social Darwinism or National Socialism corresponding crimes are considered right-wing.<sup>47</sup> According definitions for left-wing, foreign, religious or not assignable motivations can be found on the website of the *Bundeskriminalamt*.<sup>48</sup>

The main model to explain economic costs by politically motivated crime is depicted in the following regression equation recalling Equation 2:

$$Prod_{r,t} = \alpha + \beta_1 Ext_{c,f,r,t} + X_{r,t} + v_r + \varepsilon_{r,t}$$

It describes the measurement of productivity for a given region (r) for a given time period (t), which is a catch-all approach that does justice to the GA's emphasis on numerous socioeconomic factors in the sense of capturing the economic outcome of all such changes. This approach is further corroborated by the GA's reference to the "means of production" and "a loss of productivity" in this regard.<sup>49</sup>  $\alpha$  is the constant for the regression,  $v_r$  is a vector of time-invariant region-specific properties.  $\varepsilon_{rt}$  is the error term for the regression.  $Ext$  is the measurement of extremism in terms of crime. This measurement changes with regions (r) and time (t) but also with political flag (f) and nature of crime (c).  $\beta_1$  gives the cost coefficient, i.e. how a one unit increase in crime will effect economic welfare. Lastly,  $X_{rt}$  describes a vector of control variables, such as size of the region.

Conceptually, Equation 2 controls for time-invariant characteristics for the region under inspection, i.e. this term captures variance that is specific to a given region. This is fully in line with the GA's requirement to "deliver continuous analyses of all the socioeconomic factors that may be location – specific."<sup>50</sup> Regional differences are not uncommon in this field of research. Cultural, historical and social developments might

<sup>46</sup> Bundesamt für Verfassungsschutz. 'Begriff und Erscheinungsformen'. Available at:

[https://www.verfassungsschutz.de/DE/themen/rechtsextremismus/begriff-und-erscheinungsformen/begriff-und-erscheinungsformen\\_artikel.html](https://www.verfassungsschutz.de/DE/themen/rechtsextremismus/begriff-und-erscheinungsformen/begriff-und-erscheinungsformen_artikel.html).

<sup>47</sup> BKA. 'Politisch Motivierte Kriminalität (PMK) - rechts -'. Available at:

[https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKrechts/PMKrechts\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKrechts/PMKrechts_node.html).

<sup>48</sup> See for left-wing politically motivated crime: BKA. 'Politisch Motivierte Kriminalität (PMK) - links -'. Available at:

[https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKlinks/PMKlinks\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKlinks/PMKlinks_node.html), foreign: 'Politisch

Motivierte Kriminalität (PMK) – Ausländische Ideologie –' Available at:

[https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKAI/PMKAI\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKAI/PMKAI_node.html), religious: 'Politisch

Motivierte Kriminalität (PMK) – Religiöse Ideologie –' Available at:

[https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKreligioes/PMKreligioes\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKreligioes/PMKreligioes_node.html) and if it is not

assigned to the aforementioned nature of crime it is considered not assignable. See also BMI (2023). 'Politisch Motivierte Kriminalität im Jahr 2022'. Available at:

[https://www.bmi.bund.de/SharedDocs/downloads/DE/veroeffentlichungen/nachrichten/2023/05/pmk2022-factsheets.pdf?\\_\\_blob=publicationFile&v=5](https://www.bmi.bund.de/SharedDocs/downloads/DE/veroeffentlichungen/nachrichten/2023/05/pmk2022-factsheets.pdf?__blob=publicationFile&v=5).

<sup>49</sup> The GA alludes to "different areas of economic measurement of the costs of extremism, which can lead, for example, to welfare losses through the loss of human life as well as through the physical destruction or damage of (intellectual) property, assets or other **means of production**" (emphasis added) as well as "costs [...] borne by the direct or indirect victims of extremism [that] can affect investment and real estate - as they can deter investors - directly affect policy decisions and institutional outputs, and even affect trade, mobility and tourism. This can lead to job losses - through relocation or expansion to other locations - and consequently a **loss of productivity** [emphasis added] and wealth in a region." See Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01, 'European Research Executive Agency, 2021, PART A, p. 9.

<sup>50</sup> See 'Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01, 'European Research Executive Agency, 2021, PART B, p. 12).



explain different activities and might also influence the perception of people. One example is shown for the case of Germany, where a recent survey found differences in observing extremist violent activities in their own surrounding between the *Neue Bundesländer* and the *Alte Bundesländer* (eastern and western parts of Germany). Survey participants from the former indicated to observe more left-wing and right-wing extremist activities compared to participants from the latter. Furthermore, survey participants from the *Neue Bundesländer* indicated to feel significantly more often threatened by extremist violence.<sup>51</sup>

Still, when analysing economic outcome other potential explanatory factors need to be considered to avoid omitted variable bias, i.e. the risk that the regression outputs results that do not take into account possible further explanatory factors and thereby might distort the results.<sup>52</sup> In this model it is chosen to control for the size of a region by looking at surface and population.<sup>53</sup>

BIGS is working with static data within the Behaviour Profiler & Socioeconomic. Both components therefore use data that is provided by partner institutions (mainly LEAs) and data that can be publicly extracted

<sup>51</sup> Endtricht, R. & Kleinschnittger, J. (2023). ‘Wahrnehmung extremistischer Aktivitäten und subjektives Bedrohungserleben in Deutschland: Verbreitung und Einflussfaktoren.’ In: *Kriminalität und Kriminologie im Zeitalter der Digitalisierung*, by L. Deyerling, A. Dreißigacker, I. Henningsmeier, M. Neumann, J. Schemmel, C. P. Schröder & L. Treskow T. Bliesener.

<sup>52</sup> Since *certainty* for the researcher with regard to knowing which factors meet the conditions of control variables is highly unlikely careful selection of control variables is needed. Simply put, variables “[...] measured before the variable of interest was determined are generally good controls.” (Angrist et al. 2008, p. 50). For the case of the Socioeconomic Analyser, the “variable of interest” is here represented by the measure of economic outcome and control variables should ideally not have an effect on politically motivated crime. See Angrist, J.D. & Pischke, J.-S. (2008). ‘Mostly harmless Econometrics: An Empiricist’s Companion’. Available at:

[http://diglib.globalcollege.edu.et:8080/xmlui/bitstream/handle/123456789/141/Angrist%20J.D.%2C%20Pischke%20J.-S.%20Mostly%20Harmless%20Econometrics%20%28PUP%2C%202008%29%28ISBN%20069112034X%29%28O%29%28290s%29\\_GL\\_.pdf?sequence=1&isAllowed=y](http://diglib.globalcollege.edu.et:8080/xmlui/bitstream/handle/123456789/141/Angrist%20J.D.%2C%20Pischke%20J.-S.%20Mostly%20Harmless%20Econometrics%20%28PUP%2C%202008%29%28ISBN%20069112034X%29%28O%29%28290s%29_GL_.pdf?sequence=1&isAllowed=y). It has to be added that the inclusion of additional control variables is not always beneficial in respect to what is being researched. Adding unnecessary control variables to the estimation might also increase bias. For a discussion on this topic see for example Angrist, J.D. & Pischke, J.-S. (2008). ‘Mostly harmless Econometrics: An Empiricist’s Companion’. Available at:

[http://diglib.globalcollege.edu.et:8080/xmlui/bitstream/handle/123456789/141/Angrist%20J.D.%2C%20Pischke%20J.-S.%20Mostly%20Harmless%20Econometrics%20%28PUP%2C%202008%29%28ISBN%20069112034X%29%28O%29%28290s%29\\_GL\\_.pdf?sequence=1&isAllowed=y](http://diglib.globalcollege.edu.et:8080/xmlui/bitstream/handle/123456789/141/Angrist%20J.D.%2C%20Pischke%20J.-S.%20Mostly%20Harmless%20Econometrics%20%28PUP%2C%202008%29%28ISBN%20069112034X%29%28O%29%28290s%29_GL_.pdf?sequence=1&isAllowed=y), Clarke, K. A. (2005). ‘The Phantom Menace: Omitted Variable Bias in Econometric Research’. *Conflict management and peace science*. Available at:

<http://www.saramitchell.org/clarke05.pdf>, Rosenbaum, P. R. (1999). ‘Choice as an Alternative to Control in Observational Studies’. *Statistical Science*. Available at: <https://projecteuclid.org/journals/statistical-science/volume-14/issue-3/Choice-as-an-Alternative-to-Control-in-Observational-Studies/10.1214/ss/1009212410.pdf>.

<sup>53</sup> Measures of size of countries or regions is a commonly used variable in multivariate regression analysis. Studies reveal mixed results with respect to population depending on the underlying model. While some showing no results others reveal correlation when adjusting for age structure and demographic change. Also, including convergence models of growth population size seem to be positively related to per capita output. For a discussion see on the relation between population and economic growth see for instance Prskawetz et al. (2007). ‘The relationship between Demographic Change and Economic Growth in the EU’. *Vienna Institute of Demography*. Available at:

<https://www.oeaw.ac.at/fileadmin/subsites/Institute/VID/PDF/Publications/Forschungsberichte/FB32.pdf> and Abd El-khalek, A. M. A. (2020). ‘The Dynamic Relation between Population and Economic Development; a Systematic Analysis Review Considering Developing Countries’ Empirical Evidence’. *Journal of Economics and Finance*. Available at: [https://d1wqtxts1xzle7.cloudfront.net/62936351/C110204122120200413-95721-e1zjt-libre.pdf?1586774623=&response-content-](https://d1wqtxts1xzle7.cloudfront.net/62936351/C110204122120200413-95721-e1zjt-libre.pdf?1586774623=&response-content-disposition=inline%3B+filename%3DThe_Dynamic_Relation_between_Population.pdf&Expires=1706540834&Signature=Cj~xulFP-u8d9X~f4I65wEmRRdmn3x5DTku6bpwEmn3sYn37j~3Pa-L1SXyMjYcUmtLPH4LEvtuQih3r0p4~26aMD6HqSMgNEVclvaV0tSBL1~rlQg3zas6Zugm2rqRhka-vQ15RKuFh400tz~KMF~UKaOCNsXXHFoaWrAO0rxAjb9jRFvaFigXywD0qfkC19IP3xoKzmOX4UgbT8skOx981MRQXeNy5xBWHkELHKxTOXAxPf0aPzKJOVrDSV3Mm0BAxYKkoflory5DK0XN8re4pLiqNRI4DZU1sZ6LDMHqHRyKED2qBndppCwzGER2hxXWdc1EKa9SLBL2DDyjh8Q_&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA)

[disposition=inline%3B+filename%3DThe\\_Dynamic\\_Relation\\_between\\_Population.pdf&Expires=1706540834&Signature=Cj~xulFP-u8d9X~f4I65wEmRRdmn3x5DTku6bpwEmn3sYn37j~3Pa-L1SXyMjYcUmtLPH4LEvtuQih3r0p4~26aMD6HqSMgNEVclvaV0tSBL1~rlQg3zas6Zugm2rqRhka-vQ15RKuFh400tz~KMF~UKaOCNsXXHFoaWrAO0rxAjb9jRFvaFigXywD0qfkC19IP3xoKzmOX4UgbT8skOx981MRQXeNy5xBWHkELHKxTOXAxPf0aPzKJOVrDSV3Mm0BAxYKkoflory5DK0XN8re4pLiqNRI4DZU1sZ6LDMHqHRyKED2qBndppCwzGER2hxXWdc1EKa9SLBL2DDyjh8Q\\_&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA](https://d1wqtxts1xzle7.cloudfront.net/62936351/C110204122120200413-95721-e1zjt-libre.pdf?1586774623=&response-content-disposition=inline%3B+filename%3DThe_Dynamic_Relation_between_Population.pdf&Expires=1706540834&Signature=Cj~xulFP-u8d9X~f4I65wEmRRdmn3x5DTku6bpwEmn3sYn37j~3Pa-L1SXyMjYcUmtLPH4LEvtuQih3r0p4~26aMD6HqSMgNEVclvaV0tSBL1~rlQg3zas6Zugm2rqRhka-vQ15RKuFh400tz~KMF~UKaOCNsXXHFoaWrAO0rxAjb9jRFvaFigXywD0qfkC19IP3xoKzmOX4UgbT8skOx981MRQXeNy5xBWHkELHKxTOXAxPf0aPzKJOVrDSV3Mm0BAxYKkoflory5DK0XN8re4pLiqNRI4DZU1sZ6LDMHqHRyKED2qBndppCwzGER2hxXWdc1EKa9SLBL2DDyjh8Q_&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA).

from websites. This mainly concerns data sources provided by INKAR<sup>54</sup> and by EUROSTAT<sup>55</sup>. Data that measures or proxies politically motivated crime is partially provided by responsible police offices. In part, this data underlies strict conditions of access and use.

An overview of the data used for the Socioeconomic Analyser can be found in Table 2. Further control variables not presented in this table are being tested.

**Table 2: Input, output and socioeconomic controls utilised for the Socioeconomic Analyser**

Input (Explanatory Factors)	Controls (Additional Factors)	Outputs (Explained Factors)
Data on politically motivated crime	Control variables (population, size of region etc.)	GDP per capita

The input factor is the politically motivated crime for regions, time, political flag and nature of crime. Control variables comprise population and size with testing further controls. The output is GDP per capita. For the result of the Socioeconomic Analyser, the coefficient for the cost of crime, i.e. the change in economic output (GDP) following an increase of politically motivated crime by one unit is delivered to UCSC.

For forecasting crimes as well as for correlating politically motivated crime with economic outcomes control variables are applied to account for potential influences.

For the case of input factors some critical remarks need to be stated. In Germany, data on politically motivated crime is considered as sensitive data. Thus, during the FERMI project it has to be secured that the outputted results do not sensitive information, i.e. it needs to be prevented that the results give the opportunity to reconstruct actual crime numbers in individual NUTS-2 regions in Germany. For that purpose, one coefficient is computed that represents the change in GDP per capita following an increase of politically motivated crime by one unit and is computed over all NUTS-2 regions. Thus, the resulting coefficient is based on politically motivated crime rates in NUTS-2 regions. Different output is created for the regions qua multiplying this coefficient with population in the regions. This process guarantees that no information about the actual number of politically motivated crime in that region is provided.

In the case of Germany, the outputted forecasted crimes can be assigned to crimes in the German dataset directly according to crime labels. This approach will be tested for the other countries participating and represented in the FERMI consortium as well. In case the labels cannot be matched groups of crimes are created to match the crime data of the respective country with the crime data of the forecast by UCSC.

For the case of media literacy that was intended to be included restricted data availability was prohibiting the inclusion as an explanatory or control variable in the estimation models. Data on media literacy is available as an index and is created from a fusion of measurements for – among others – scores for the freedom of the press and PISA scores as it has been mentioned in sub-section 4.2.1.<sup>56</sup> Nevertheless, this data is only available on a country level and thereby is not suitable for the inclusion in the regression analysis since all variables need to be measured on the same geographical level to deliver meaningful results.

<sup>54</sup> INKAR ('Indikatoren und Karten zur Raum- und Stadtentwicklung') comprises socioeconomic data for about 600 indicators on Germany and Europe. For Germany, a more granular dataset is available covering data on NUTS-3 level. Therefore, INKAR provides helpful data sources for the purpose of the Socioeconomic Analyser. Data is available at: <https://www.inkar.de/>.

<sup>55</sup> Data is available on a NUTS-3 level at: <https://ec.europa.eu/eurostat/web/regions/data/database-tbd>.

<sup>56</sup> Among these measurements is the Freedom of the Press score, the Trust in Others by the World Values Survey and PISA scores published by the OECD and the Worldbank. See Lessenski, M. (2023). 'Bye, bye, birdie': Meeting the Challenges of Disinformation. *The Media Literacy Index 2023. Measuring Vulnerability of Societies to Disinformation.* Available at: <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>

Proxies for the index of media literacy were created by the EU in form of a measurement for media use and media trust extracted from an EU-wide survey.<sup>57 58</sup> These measurements give an overview on how and what media is consumed and it gives an indication for the perception of trust by people with regard to media. However, this data is also incompatible with the regression analysis due to its measurement on NUTS-1 level and can therefore not be included for meaningful regression output.

## 4.3 Technical Implementation

In the following chapter the technical implementation of the components will be presented. Along the lines of the Model Description chapter, the technical implementation description will also be divided into the Behaviour Profiler component and the Socioeconomic Analyser. In the upcoming sections the outlined theoretical and descriptive models from the previous sections are presented as a translation into a technical instrument.

First, the Behaviour Profiler is presented. Coming back to the statements from the model description, the technical implementation of this component is in large parts covered by UCSC qua the crime forecast. Subsequently, the technical considerations concerning the Socioeconomic Analyser are presented by BIGS.

### 4.3.1 Behaviour Profiler

With respect to the Behaviour Profiler two technical implementations are provided. In the following, the technical implementation of both will be presented. For the crime forecasting, UCSC is covering the technical implementation qua the ML-driven Dynamic Flows Modeler. Secondly, the technical implementation of the Country Profiles is considered. This part will cover briefly the rather simple implementation via the establishment of a separate website to be accessed by the end-user.

#### 4.3.1.1 Crime Forecast

The methodology undertaken to construct the Dynamic Flows Modeler features two primary tasks: (1) pre-processing the data used for training and (2) the development of the ML architecture that produces the forecasts, via studying the behaviour of past data. In the current subsection 4.3.1.1, the focus is on the latter, that is, the ML architecture. Specifics regarding data pre-processing can be found in Deliverable 3.1, the technology facilitators package. Said ML architecture was comprised of three different approaches, employed, as specified in 4.2.1.1, on a crime type basis. It applies the best performing approach with respect to each crime type, during training, being called upon when the end-user requests each crime type. 1D CNN, Transformers, and an ensemble of the two are the three architectures currently being used by the Dynamic Flows Modeler.

1D CNN can be characterised as a deep learning model tailored for processing sequential information that captures relevant patterns and features within data for various tasks. It has proven effective for predictions based on time-series data and typically consists of two fundamental components: the CNN, which extracts and filters the relevant features and the fully connected layer, which generates the predictions using the features extracted by the CNN, taking for granted their assigned relevancy.

<sup>57</sup> In a survey conducted in 2022, the Eurobarometer, indices for media use and for media trust were created. Data can be extracted from and is available at: <https://doi.org/10.4232/1.14012>.

<sup>58</sup> The “[...]analysis of the moderation and recommendation systems employed by social media[...].” The GA alludes to (‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, PART B, p.12) is covered mainly by the overall analysis of the media landscape by examining media and news consumption behaviour of users of social media. The in-depth and cross-country analysis of the – for FERMI interesting – part of D&FN that considers the illegal realm as well, however, has seemingly become obsolete, considering that these proceedings have been largely standardised by now. In cases of illegal goods, content or services in online spreading, the Digital Services Act (DSA) calls for these platforms to put in place countermeasures, such as “[...]to flag such content and for platforms to cooperate with “trusted flaggers”[...]”. See EC. (2023). ‘The impact of the Digital Services Act on digital platforms’. Available at: <https://digital-strategy.ec.europa.eu/en/policies/dsa-impact-platforms>.

The CNN design used in the Dynamic Flows Modeler includes 3 convolutional blocks, each consisting of varying amounts of filters. The initial set employs 500 filters, followed by 250 filters in the second set, and 128 filters in the third set. The filters apply convolutional operations, enhancing the network's capacity to recognise significant patterns in the data. Rectified linear unit activation was employed in each convolutional layer and the model was trained to minimise the mean squared error loss. While training, the model aims to minimise the mean squared error by continually adjusting the parameters to improve accuracy and lower the discrepancies between predictions and target value. The following observations present how mean square error was calculated, with  $n$  being the total number of data points,  $y_i$  the target value for the  $i$ -th data point (the real, unseen by the model, observation), and  $f(x_i)$  the predicted value produced by the model, for the  $i$ -th data point.

Transformers, on the other hand, is a more novel architecture, especially in regard to its use for time-series forecasting. Through self-attention mechanisms, the model focuses on different parts of the input sequence when making predictions. For a sequence of  $N$  elements, denoted  $X = [x_1, x_2, \dots, x_N]$ , these mechanisms then compute a new sequence, often referred to as the contextual or weighted sequence, denoted as  $Z = [z_1, z_2, \dots, z_N]$ . For each variable it is provided, three sets of vectors are computed: (1) query vectors, (2) key vectors, and (3) value vectors. The first represents a given variable's importance, what the model will pay attention to, the second, how much other variables will affect the given one, and the third, represents the content of the variable. These vectors are computed as linear transformations of the input sequence  $X$  using the learned weight matrices. Thus, the self-attention mechanism allows the model to focus on different parts of the input sequence when making a prediction, in turn making it an effective method for capturing long-range dependencies and context in provided sequence data.

The self-attention architecture used within the Dynamic Flows Modeler combines convolutional layers for feature extraction with transformer layers for capturing temporal dependencies in time series data. Transformer layers are stacked to enhance feature representation. Dropout and layer normalisation improve model robustness, followed by dense layers leading to the output layer. The model is trained to minimise mean squared error loss and use mean absolute error for evaluation. This design exhibits the use of transformers in time-series forecasting, enabling precise predictions by capturing nuanced temporal patterns.

An ensemble of the two architectures was also trailed and, as of the writing of this deliverable, is included in the Dynamic Flows Modeler. Ensemble architectures make use of the differing strengths in the included architectures, using either voting or averaging to decide on a final output.<sup>59</sup> In the case of the Dynamic Flows Modeler, averaging was selected as the ideal ensemble method. The average function takes the element-wise average of the predictions produced by the models. The ensemble model is then trained to minimise the mean squared error loss, and mean absolute error is used for evaluation, as is the case for the transformers model.

#### 4.3.1.2 Country Profiles

The technical implementation of the country profiles will be covered by establishing a separate website within the FERMI platform. This website can be accessed by the end-user and will deliver an overview of additional information on media literacy and news consumption at a national level (which, again, is what data availability allows for) for the countries under consideration.

#### 4.3.2 Socioeconomic Analyser

The technical implementation for the Socioeconomic Analyser is mainly achieved by testing one part of the model in Equation 2. This testing comprised statistical means to comply with the GA which aims at

<sup>59</sup> Murali, V. (2021). 'Everything you need to know about Ensemble learning.' *Medium*. And Atiya, A. (2020). 'Why does forecast combination work so well?' *International Journal of Forecasting*. Available at: <https://doi.org/10.1016/j.ijforecast.2019.03.010>.

“[...] applying econometric methods [...]”<sup>60</sup> to achieve the computation of the effect of crime on economic welfare. For that purpose, the statistical software STATA version 18 was used.

To approach this complex matter, for panel data analysis usual estimation method for the Arellano-Bond Generalized Method of Moments (GMM) -based estimation is applied. It takes into consideration possible endogeneity issues in estimation as well as providing opportunities for including explanatory instrumental variables. Endogeneity in Equation 2 may arise since crime might possibly predict the income of an economy (GDP per capita). At the same time, however, this might also work vice versa, i.e. that GDP per capita might explain the occurrence of crime. A second concern is that previous values of GDP per capita might correlate with present values of GDP per capita, giving rise to issues with autocorrelation.

The GMM-Arellano-Bond estimator takes these issues into consideration. First, the estimator is applied to datasets with a relatively small number of time periods while having a comparably larger number of individuals (e.g., regions, countries etc.). This estimator also takes the issue of endogeneity into account. Moreover, it allows explanatory factors that might be related to past and current values of the error term (and would lead to potential endogeneity issues under other circumstances).<sup>61</sup>

Still, for accurately estimating potential effects, BIGS is testing further methods that have been shown to be essential for robust results. Roodman (2009) describes the process to use the GMM-Arellano-Bond on the basis of pooled Ordinary Least Squares (OLS) and the Least-Squares Dummy-Variables (LSDV) estimation that can be seen as the upper and lower bound for the estimation results of the GMM-Arellano-Bond estimator.<sup>62</sup>

Stata allows to create files that makes the reproduction of results easy. These files (Do-Files and Log-Files) are created in the process and serve as the proof for the technical work under the Behaviour Profiler & Socioeconomic Analyser.

The results from the Socioeconomic Analyser are being sent to UCSC in a static format, i.e. UCSC receives the coefficient – one for the countries represented in the consortium of FERMI – as well as the corresponding population numbers in an Excel file.

## 4.4 Results and Demonstration

The results of the Behaviour Profiler & Socioeconomic Analyser are presented in the following. It has to be pointed out that the components still require some further input data that is needed and that will be collected in the further progress of FERMI, as explained in greater depth below.

As it has been described previously, the work being done for Behaviour Profiler & Socioeconomic Analyser is in part divided between the partners. Therefore, the presentation of the results will be presented in this chapter in line with the outline in the previous sections. First, the results from the Behaviour Profiler are presented that come from the Dynamic Flows Modeler. Secondly, results from the country profiles created by Convergence and BIGS are presented. Lastly, preliminary results for the Socioeconomic Analyser will be shown.

With the focus on preliminary and mock results from the components in this chapter a few details need to be given as background information. A main issue that FERMI is confronted with is data availability. Partially, the project works with sensitive data and the sharing of same by the owners of this data is considered

<sup>60</sup> ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021.

<sup>61</sup> Roodman, D. (2009). ‘How to do Xtabond2: An Introduction to Difference and System GMM in Stata.’ *The Stata Journal*. Available at: <https://doi.org/10.1177/1536867X0900900106>.

<sup>62</sup> *Ibid.*, p.103.

and handled with high caution and reservation.<sup>63</sup> In particular, this applies to sensitive crime data, especially as far as data on politically motivated crime is concerned, which in the vast majority of cases either happens to be classified or is not assigned to the different forms of political extremism. Accordingly, the use of preliminary and mock results was embarked on as the best available option.

Nevertheless, the deliverable presents the components and first results because the processes therein are functioning. The code – if applicable – is prepared and the process of data collection is ongoing. Moreover, alternative plans of action are considered by the partners should the data considered in the beginning not be available.

#### 4.4.1 Results Behaviour Profiler

The results from the Behaviour Profiler are twofold. First, one part of Equation 1 is computed by UCSC via the Dynamic Flows Modeler. The presented mock results represent the functioning process of the Behaviour Profiler qua using input data to forecast crimes that are then going into the equation as a measure of likelihood of crimes occurring due to the spread of disinformation.

Secondly, results from the country profiles are presented. Since the whole document is too extensive to be provided for this deliverable only exemplary results are being presented briefly in sub-section 4.4.1.2 and in more detail in the Appendix. The outcome will be made available via a separate website provided in the FERMI platform.

##### 4.4.1.1 Crime Forecast

For demonstration purposes, subsection 4.4.1.1 presents a mock flow of results, from the Dynamic Flows Modeler to the Behaviour Profiler & Socioeconomic Analyser. The initial D&FN object, provided by the end-user to the platform, is firstly analysed by the Spread Analyser (T3.2) which captures said objects spread on social media platforms, specifically X. The metrics of this spread are then passed on to the Dynamic Flows Modeler, which uses them as a proxy of the intensity of the given D&FN's circulation online.

The end-user then selects a crime type and geographical location, at the NUTS-2 level, for the Dynamic Flows Modeler to estimate future occurrences, given the D&FN is circulating online. The produced estimate is then passed on to the Behaviour Profiler & Socioeconomic Analyser which uses it in calculating economic costs to society, from the D&FN. Table 3 presents mock results, serving as examples for those to be generated **by the Dynamic Flows Modeler**. These mock results indicate that for a given NUTS-2 region assaults were predicted for the subsequent two weeks, thus leading to around 13 for the first day and nearly 16 assaults for the last day of the time window under inspection.

**Table 3: Mock predictions for a NUTS-2 region, crime type assault**

Date	NUTS-2 Assault
01/10/2022	12,796977
02/10/2022	11,020569
03/10/2022	14,731657
04/10/2022	11,615809
05/10/2022	13,138142
06/10/2022	15,80698
07/10/2022	15,808635

<sup>63</sup> See Glöckner, P. & Stuchtey, T. (2023). 'Turning Sensitive Data into Knowledge - the Need for a Common Understanding of politically Motivated Crime in Europe.' Available at: <https://fighting-fake-news.eu/articles/turning-sensitive-data-knowledge-need-common-understanding-politically-motivated-crime>.

08/10/2022	12,850382
09/10/2022	12,842892
10/10/2022	15,381706
11/10/2022	12,258244
12/10/2022	12,527813
13/10/2022	11,770602
14/10/2022	15,903208

The results generated by the **Behaviour Profiler** are estimates of the likelihood that observed politically motivated crime is set off by disinformation spread online, taking into account other explanatory variables such as age, education and gender distribution of the population exposed to it. This result cannot be seen directly on the UI but it goes into the measurement of the impact which combines likelihood and severity. This, in turn, is depicted on the UI.

On top of that and as described in chapter 4.2.1.2, the Behavioural Profiler shows country profiles on a webpage accessible from the User Interface which comprises comparative data and information on media literacy and news consumption in various countries, as auxiliary source of information and assistance of situation assessments.

#### 4.4.1.2 Country Profiles

Based on secondary literature, as required by the task description, the aim of the analysis for the country profiles is to examine if and how media literacy affects the spreading of potential disinformation. Since the outcome for the analysis is quite extensive the main results for an overview on the comparison between France, Germany, Sweden, Belgium and Finland is being given in the following. More detailed information are summarised in the Appendix and the full document is to be integrated into the FERMI platform.

On a general and comparative note, it appears that the five target countries have high digital skills, the Internet User Skill data suggests that Finland, Sweden and France have a high media literacy level compared to the EU average while Belgium is slightly above and Germany slightly below the EU average. The majority of the reported people in all targeted countries believe they often come across D&FN and do believe they can identify these. Furthermore, the majority of the reported people in all targeted countries find that D&FN constitutes a problem in their respected countries. Finland is the exception where nearly half of the respondents don't think these constitute a problem for their country. In terms of the European Media Literacy Index, Finland (1st) and Sweden (5th) come first followed by Belgium (10th), Germany (11th) and France (17th) placing them in the clusters of best-performing countries and well-performing European countries respectively.

From the findings some distinct key points are that media literacy appears to be an increasing concern for Germany, while France presents low levels of trust in news compared to other countries, and in Belgium, although Internet user skills are close to the EU average, there are concerns over the high proportion of people lacking essential digital skills. Furthermore, the fragmented media landscape of Belgium is an important concern which affects media literacy.

One could generally reach the conclusion that media literacy does affect the spreading of potential disinformation, or rather, that media literacy could assist in restricting the effects of a wider/broader spread of D&FN. As reflected from the 5 countries researched, the degree of resilience, in relation to media literacy is not straightforward. From the analysis conducted, what can be observed is that in countries with lower ranking in media literacy there have been instances where D&FN found fertile ground e.g. France, Germany and Belgium. The FERMI pilots illustrate this with regards to Germany and Belgium (see D5.1).

Nevertheless, one cannot reach the conclusion that this is attributed solely to media literacy levels. The relation of media literacy and resilience within a society is multifaceted, for instance in the aforementioned cases of France, Germany and Belgium there are other factors that add to the equation, such as, elections and

rise in support for far-right political parties and fringe movements on the extreme right,<sup>64</sup> COVID-19 pandemic<sup>65</sup> and particular territorial and linguistic borders. Nonetheless, there is plethora of evidence that suggests that holding and continuously investing in this ability, i.e. media literacy, is highly beneficial for any society. To invest in media literacy could correspond to the resilience of societies in spreading D&FN since it enhances critical thinking skills, it promotes informed decision-making processes, even more so during crises, supports social cohesion and further advances learning and adaptability skills.

#### 4.4.2 Results Socioeconomic Analyser

The results of the Socioeconomic Analyser, in contrast to the Behavioural Profiler, do not depict the likelihood of politically motivated crimes being set off by disinformation campaigns, but instead the severity of a marginal increase of such crime by one case. It is therefore a quantitative impact estimation, given in monetary terms.

The estimations of this impact on economic prosperity are calculated spatially on NUTS-2 level, and broken down by the perpetrators' underlying motivation (couleur, depending on the granularity and availability of the data in the respective country, the nature of the crime and by degree of violence). In Germany, on which the analysis of the Socioeconomic Analyser at its current state rests upon data can be found within the dataset for politically motivated crimes (*Politisch Motivierte Kriminalität – PMK*). The *PMK* dataset is systematically different from the police crime statistic (*Polizeiliche Kriminalstatistik – PKS*). The German federal states with the State Criminal Police Offices (*Landeskriminalämter*) are responsible for reporting to the Federal Criminal Police Office (*Bundeskriminalamt*) on *PMK*. However, on levels below the federal states the police offices are not obliged to publish the data and often-times the specifics of *PMK* data are classified anyway.

There are several differences between *PKS* and *PMK*.<sup>66</sup> One difference, however, is of interest for the FERMI project. The *PMK* statistic differs between political motivations of perpetrators of the reported crime leading to a separation between right- or left wing, religious, foreign ideology, or not assignable.<sup>67</sup> To a certain degree, namely on NUTS-1 level, this data is publicly available and served as the starting point for the analysis. Moreover, the main categories of crimes are also publicly reported, among them violations of the law for free assembly, damage to property and propaganda. Data on levels below NUTS-1, nevertheless, is more complicated to get access to and receive the right to publish results. BIGS is currently working on that matter.

For the Socioeconomic Analyser the code for STATA is set up with the above-mentioned methods (GMM-Arellano-Bond, pooled OLS and the least-squares dummy-variables (LSDV)) estimation. As it has been mentioned above, data on politically motivated crime is considered sensitive and access to it is restricted. Thereby, the results coming from the Socioeconomic Analyser will be presented to and discussed with the *Bundeskriminalamt*. Relying on the aggregation method described above that ensures that no piece of

<sup>64</sup> Koehler, D. (2016). 'Right-Wing Extremism and Terrorism in Europe. Current Developments and Issues for the Future,' *Prism: The Journal of Complex Operations*, 6 ed. Available at: <https://www.jstor.org/stable/26470450>;

Farinelli, F. (2021). 'Conspiracy theories and right-wing extremism – Insights and recommendations for P/CVE.' *Radicalisation Awareness Network (RAN)*. Available at:

[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwifhoan\\_aDAxUi8rsIHe76CYoQFnoECBQQAQ&url=https%3A%2F%2Fhome-affairs.ec.europa.eu%2Fsystem%2Ffiles%2F2021-04%2Ffran\\_conspiracy\\_theories\\_and\\_right-wing\\_2021\\_en.pdf&usg=AOvVaw1OO-H6UApisrlOHZKHvwMT&opi=89978449](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwifhoan_aDAxUi8rsIHe76CYoQFnoECBQQAQ&url=https%3A%2F%2Fhome-affairs.ec.europa.eu%2Fsystem%2Ffiles%2F2021-04%2Ffran_conspiracy_theories_and_right-wing_2021_en.pdf&usg=AOvVaw1OO-H6UApisrlOHZKHvwMT&opi=89978449)

<sup>65</sup> Lynas, M. (2020). 'COVID: Top 10 current conspiracy theories.' *Alliance for Science*. Available at: <https://allianceforscience.org/blog/2020/04/covid-top-10-current-conspiracy-theories/>.

<sup>66</sup> For instance, the *PMK* statistic is an entry statistic, i.e. crimes are reported in this data at the onset of the investigation. On the other hand, the *PKS* statistic is an output statistic, i.e. these crimes will be recorded after the investigation process has ended and files have been handed over to the jury or prosecution. More information on German crimes statistics are available at: <https://www.bmi.bund.de/SharedDocs/faqs/DE/themen/sicherheit/pks/pks-und-pmk.html>.

<sup>67</sup> BKA. (2024). 'Politisch Motivierte Kriminalität'. Available at: [https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/pmk\\_node.htmlhttps://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/pmk\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/pmk_node.htmlhttps://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/pmk_node.html)



information on politically motivated crime in NUTS-2 regions in Germany is published the final decision for permission by the *Bundeskriminalamt* is outstanding but is expected to be reached by the end of March 2024.

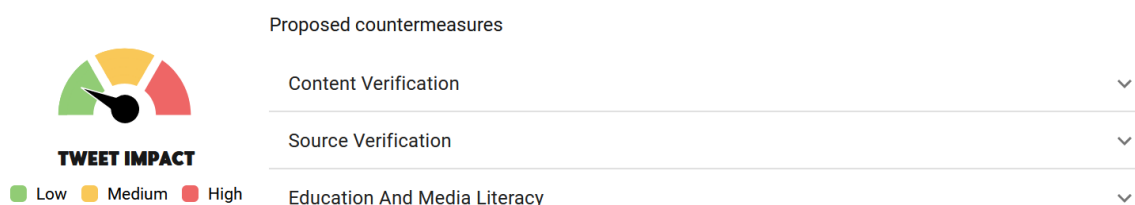
First examinations of datasets of regions in Germany on which data is publicly available indicate the following. The connection between GDP per capita and politically motivated crime is not clear. Different statistical methods are applied and compared and point in different directions in terms of signs and sizes of correlation coefficients. This, however, can be traced back to the relatively small number of observations and some missing values in the publicly available datasets.

Although these results cannot be conclusive for the time being, it seems, however, that there are some characteristics emerging. First, there is an increase in *PMK* over the time. This is in line with the findings from the Federal Criminal Police Office that draws the development of *PMK* for Germany in total.<sup>68</sup> Secondly, there seems to be a peak in *PMK* in the year 2022 in line with what Bretschi et al. (2022) observe.<sup>69</sup> The authors, moreover, argue that this peak in 2022 may be driven by aspects related to COVID-19 and the war in Ukraine.<sup>70</sup> Moreover, quantity in *PMK* is differing across regions, especially between the *Neue Bundesländer* and the *Alte Bundesländer* of Germany.<sup>71</sup>

Another result points towards a different outcome of crimes on GDP per capita according to the motivation by perpetrators. This is not at last due to the fact that for some categories, especially religiously motivated and foreign motivation, rather less observations exist compared to left-wing and right-wing crimes. These first indications will be further examined upon permission to access to and publishing results of a larger dataset of regions in Germany which is currently being worked on at BIGS.

The results will be depicted in a speedometer on the UI visualised by an according colour code from green (low impact) to red (high impact) (see Figure 2). This speedometer presents the combined outcome from severity, i.e. from the Socioeconomic Analyser, and likelihood, i.e. from the Behaviour Profiler.

#### Recommendations / Countermeasures for Community Resilience



**Figure 2: Visualised Output for the Behaviour Profiler & Socioeconomic Analyser**

## 4.5 Next Steps

So far, the first version of the Behaviour Profiler & Socioeconomic Analyser has been shown to work with the above presented preliminary results. In the following steps, further data sources will be tested and the established codes and statistical methods will be applied.

<sup>68</sup> BKA. (2023). ‘Politisch Motivierte Kriminalität im Jahr 2022’. Available at:

[https://www.bka.de/SharedDocs/Downloads/DE/UnsereAufgaben/Deliktsbereiche/PMK/2022PMKFallzahlen.pdf?\\_\\_blob=publicationFile&v=3](https://www.bka.de/SharedDocs/Downloads/DE/UnsereAufgaben/Deliktsbereiche/PMK/2022PMKFallzahlen.pdf?__blob=publicationFile&v=3).

<sup>69</sup> Bretschi, D. et al. (2022). ‘Kriminologische Sozialraumanalysen – Regionalräumliche Wechselwirkungen und Einflüsse sozialer Desorganisation auf politisch (rechts-)motivierte Kriminalität’, in: *MOTRA-Monitor 2022.*, p. 153.

Available at: [https://doi.org/10.53168/ISBN.978-3-9818469-6-6\\_2023\\_MOTRA](https://doi.org/10.53168/ISBN.978-3-9818469-6-6_2023_MOTRA)

<sup>70</sup> Ibid.

<sup>71</sup> Ibid., p. 173.

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Moreover, the Behaviour Profiler as well as the Socioeconomic Analyser will be applied to other countries as well, namely first and foremost the further pilot-hosting countries Belgium and Finland plus the other countries with LEA presence in the consortium, Sweden and France. So far, the main focus was on Germany due to its relatively extensive dataset with regard to political motivation for the crimes. The application of the components will probably be slightly adjusted for other countries to account for the fact that Finland, Sweden, France and Belgium do not have an accessible dataset on political motivated crime.

Next steps for these countries include assigning certain crimes to categories that compare to the ones defined in Germany, i.e. left-wing, right-wing etc. If this will not be possible adequate substitutes will be created with the support of the LEAs in the corresponding countries.

## 5 Community Resilience Management Modeler

The development of the CRMM project falls under the purview of task 3.3: "The Community Resilience Management Modeler: Addressing Challenges towards Community Resilience." It builds on the work done by INOV on ENSURESEC and IMPROVER previous research project and initiatives. ENSURESEC a project aimed to strengthen community resilience in modern e-commerce, addressing threats from malicious activities in online applications to delivery disruptions and fraud. By focusing on common software vulnerabilities and physical sensor interfaces, it safeguards both traditional and virtual transactions ensuring the community remains resilient in the evolving digital landscape. On the other hand, IMPROVER, enhances the resilience of European critical infrastructure by applying resilience concepts to real-life pan-European examples, including cross-border scenarios. This involves developing a methodology that integrates societal, organisational, and technological resilience concepts based on risk evaluation techniques.

The CRMM objective is to create a model that assesses the resilience level of a community in response to identified risks posed by the spread of a particular D&FN event. The component will, in short, output to the end-user (LEAs) countermeasures relevant to each initiated investigation (of disinformation-induced incidents of illegal activities rooted in different forms of political extremism) in the FERMI platform.

The model operates by gauging the community's resilience level based on the impact of the identified risk. As the user, the LEA will receive a message indicating whether to take action, depending on the impact level of D&FN investigation. Affirmative action is recommended in the event of high or extremely high impact risk; the message will include corresponding countermeasures. However, should the risk be of low or medium impact to the community, the LEA will receive no such guidance. The required "socio-economic impact assessment"<sup>72</sup> of the D&FN event on the community involves utilising socioeconomic and behavioural analysis, as well as crime prediction results, developed within Task 3.5 and Task 3.1.

The integration of ISO 31000 facilitates a systematic assessment of risks related to crimes associated with D&FN by receiving a calculated impact index, thus enabling effective risk treatment strategies to mitigate the impact of potential disruptions to the community through an enhance and robust response by the LEAs. This is aligned with the principles of ISO 223XX, ensuring that our development team incorporates business continuity management into decision-making processes, contributing to the overall resilience of a specific community. Equally, the adherence with the ISO 33 XXX underlines quality management, fostering the development of a component that not only meets regulatory requirements but also exceeds industry standards. Furthermore, the compliance with ISO 27xxx family for information security (see below), as required by the GA.<sup>73</sup> Specifically, standardisation 27000 describes guidelines to help organisations establish, implement, maintain, and continually improve security management systems to ensure compliance. The component will consider the core standard contextualising within an LEA organisation as a basis for achieving and demonstrating the regulatory requirements relating to information security in the sense of actively promoting countermeasures that aid the community in recovering from the ramifications of D&FN, which particularly ensures the maintenance and continuity of security management operations.

Further specifics are provided by D4.3, which explains the integration of the components described in this deliverable in greater detail.

### 5.1 Introductory Notes on the Component

In full accordance with the GA, which stipulates that "[t]he task will start with an intense co-creation activity (that includes participatory techniques and gathering exercises, including brainstorming, focus group [...])" such a focus group involving "performed with SSH researchers [and] practitioners"<sup>74</sup> was carried out in

<sup>72</sup> 'Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,' *European Research Executive Agency*, 2021, PART B, p.5.

<sup>73</sup> Ibid, PART A, p.9.

<sup>74</sup> Ibid.

a brainstorming manner in the Lisbon consortium meeting in late March 2023. The focus group addressed the rising challenges of crime related to D&FN and its dynamic. Its focus served as an initial point to understand the specific needs of each community, grasping the specificities of the proposed countermeasures and how they can be applicable in the different EU communities. Another methodological focal point mentioned in the GA, namely a “DELPHI”<sup>75</sup> study, involves the LEAs in pointing out the countermeasures for tackling D&FN that will fill a Multi-Criteria Decision Analysis (MCDA) as options or alternative decisions.

The CRMM serves as valuable tool for LEAs to effectively allocate resources in employing countermeasures based on established criteria. LEAs can use the FERMI platform and, consequently, the CRMM to register investigations and to acquire adequate countermeasures to tackle disinformation events of high impact on a given community that might lead to crime. The component will support the LEA officer decision to resource allocation.

The CRMM is a system component belonging to the FERMI platform, responsible for the output of a set of ranked countermeasures that are in line with both the related standardisation of risk management, particularly ISO family 310xx, as well as the preferences of acting decision-makers, comprised in this case of LEAs. As explained above, it is important to note that the CRMM will only output countermeasures in the instance of a high or extremely high D&FN impact, resulting in a high-risk scenario for the community; the assessment of an instance of a higher or extremely high impact, in turn, is fed by the Behaviour Profiler & Socioeconomic Analyser. All other instances with low or medium impact will output a script of no action to be taken by the user. The ranking of countermeasures will be produced through a value tree where on the top the user will be presented with the most recommended countermeasure and at the bottom the least recommended. The value function will take into consideration the agreed criteria and will contrast each valid option (countermeasure) with each criterion, thus making sure that the top recommended action is indeed the most agreeable. The decision-maker and end-user will be able to swiftly identify what will be the best countermeasure to tackle an instance of crime given the multitude of criteria.

The ranking will be obtained using a Multi-Criteria Decision Method (MCDM), in which the decision-makers are the various LEAs (end-user partners) of FERMI from Sweden, Belgium, Germany, Finland and France who will be required to select a series of options or alternatives to tackle D&FN and a set of criteria, which exceeds the boundaries of T3.3 but covers an important building block of WP4’s follow-up task, T4.4 that aims at developing a “Socioeconomic D&FN Watch to enhance Community Resilience” comprising the CRMM, the Behaviour Profiler and Socioeconomic Analyser. To ensure the resulting tools are as simple and understandable as possible and to facilitate the development thereof, the partners concerned have decided to merge them right away as opposed to embarking on the rather cumbersome process of developing a CRMM that is distinct from all other components only to merge them all into the Socioeconomic D&FN Watch at a later stage. The analysis of the appropriate set of countermeasures will be done interactively by the CRMM.

Moreover, as indicated above, the accuracy of the proposed countermeasures will be confirmed through a DELPHI study, which aims to produce a set of countermeasures that can be applied in each community of the associated EU partners. The delphi Method is a structured communication technique used in MCDA to gather and distil the opinions of a panel of experts or stakeholders. It is particularly valuable when there is uncertainty or lack of consensus regarding criteria weights, performance evaluations, or other aspects of the decision making process. The criteria will be proposed by BIGS and confirmed with the decision-maker through the development of a Conference of Decision, where a smaller group of LEAs will reach a consensus on which criteria to apply to our value matrix. Lastly, MCDA will be applied using a well-known software tool – M-MACBETH. The M-MACBETH (Measuring Attractiveness by Categorical Based Evaluation Technique) method is a decision support approach within the realm of MCDA. It was developed to assist decision-makers in evaluating and ranking alternatives based on multiple criteria. The method aims to capture both quantitative and qualitative aspects of decision problems.

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The GA also alludes to the role of “citizens,” which, however, seems somewhat disconnected from the objective to develop a platform for LEAs based on expert input (an ambition covering the two groups that took part in the focus group in Lisbon).

<sup>75</sup> Ibid.

It is important to underline that the process of conceptualisation has been derived from a previously developed Systematic Literature Review (SLR) that followed the Kitchenham & Charters (2007) guidelines for literature reviews for Software Engineering.<sup>76</sup> The SLR aimed to find the literature terminology and consequent definition of Fake News; moreover, it aimed to identify the main concepts related to D&FN and its correlations and further explore its relationship with the concepts of Digital Risk Management.

Secondly, the research took upon the established SLR to develop a Conceptual Modelling for mitigating high-risk Fake News. The model followed the Design Science Research methodology and consequently was demonstrated using an instance of Fake News from a public repository. Furthermore, the model was evaluated using the Bunge-Wand-Weber model to ensure its consistency and scientific value.<sup>77</sup>

## 5.2 Model Description

The proposed conceptual model is derived from a previously developed SLR where the authors identified important concepts of D&FN in the literature. In Table 4 below, one can see the identified concepts, their definitions according to literature and their references:

**Table 4: Systematic Literature Concepts**

Concept	Definition
Fake News	Usually considered false or misleading information that is spread rapidly, either intentionally or unintentionally, may have drastic consequences for society, especially if widely believed; it may have the potential to polarise the different political spectrums. The SLR identified different terms present in the literature that may refer to D&FN; these include false information and misinformation. Disinformation, untrustworthy, fabricated, misleading, partisan information, digital threat, inaccurate and viral information. As laid out in D2.1 and elsewhere in this project, the disinformation notion in the sense of 1) the factual or misleading nature of the information; 2) the intention of the actors to spread such information they know to be false to obtain economic gain or deceive the public; 3) public harm caused by spreading such allegations is of interest to this research effort. <sup>78</sup>
Impact	These are the effects or consequences of false or misleading information on individuals or society. The impact of D&FN can vary depending on the nature of the content and the audience it reaches. The impact of D&FN can be significant and far-reaching, and it is vital to critically evaluate the information presented to prevent the spread of D&FN and its harmful effects. <sup>79</sup>
Context	Identifies the circumstances, events, or background information surrounding a particular story, report, and news. Understanding the context of a news item is important because it can help the reader or viewer to assess its credibility, reliability, and accuracy. Identifying the

<sup>76</sup> Kitchenham, B. & Charters, S. M. (2007). ‘Guidelines for performing Systematic Literature Reviews in Software Engineering. Available at: <https://www.researchgate.net/publication/302924724>.

<sup>77</sup> Fettke, P. & Loos, P. (2003). ‘Ontological Evaluation of Reference Models Using the Bunge-Wand-Weber Model.’ *AMCIS*. Available at: <https://aisel.aisnet.org/amcis2003/384>.

<sup>78</sup> See for example (Zhang, et al. (2019)), (Habgood-Coote (2019)), (Roozenbeek und van der Linden (2019)), (Bhanu und Bhanu (2020)), (Yerlikaya und Aslan (2020)), (Ferreira, Robertson und Kirsten (2020)), (Scardigno und Mininni (2020)), (Lazar and Paun (2020)), (Alonso-García, et al. (2020)), (Flostrand, Pitt und Kietzmann (2020)), (Aswad (2020)), (Naeem, Bhatti und A. K.-H. I. & Libraries (2021)).

<sup>79</sup> See for example (Habgood-Coote (2019)), (Scardigno und Mininni (2020)), (Ferreira, Robertson und Kirsten (2020)), (Flostrand, Pitt und Kietzmann (2020)), (Mehta, et al. (2021)), (Petratos (2021)), (Benoliel und Becher (2022)).

	context of a particular D&FN makes it possible to understand its significance and overall implications for the community. <sup>80</sup>
Agent	It refers to the actor, individual, and organisations that deliberately create or spread D&FN to further their interests or agendas and possibly cause public harm too. These agents may use sophisticated techniques to make their D&FN seem more credible, such as making false allegations or creating fake images. <sup>81</sup> Furthermore, the <i>agent</i> is responsible for initiating the propagation of D&FN stories and is usually the main character behind the <i>source</i> (E.g., celebrities, trolls, propagandists, foreign actors, and scammers who intentionally post false content. <sup>82</sup>
Verifiability	The ability to check or confirm the accuracy and reliability of a piece of information. Verifiability is an essential criterion for evaluating news because it helps to determine whether the information presented is accurate, false, or misleading.
Medium	It refers to the platform, channel, or outlet that regularly produces or disseminates false or misleading information under the guise of legitimate news reporting. E.g.-Social Media Platforms, Websites, Blogs, Email Newsletter Tabloids and similar printing material, Television and News Programs, Radio Programs and Podcasts.
Event	The type of occurrence of incident related to D&FN, which can be of different types, often manipulated and misrepresented of the reality, thus creating false or misleading stories.
Source	The source of D&FN refers to the origin of the news. They originate from various sources, including individuals, organisations, and foreign governments. Again, those sources that are of interest to FERMI are the ones that intentionally spread false information to mislead the public or further their agendas. <sup>83</sup>
Content	Identifies the circumstances, events, or background information surrounding a particular story, report, and news. Understanding the context of a news item is important because it can help the reader or viewer to assess its credibility, reliability, and accuracy. Identifying the context of a particular D&FN makes it possible to understand its significance and overall implications for the community. <sup>84</sup>
Intention	It refers to the purpose or motive behind creating and disseminating false or misleading information. The intent of D&FN creators can vary and may include financial gain, the attempt to deceive the public or even cause public harm to further political propaganda, ideological or religious beliefs, and social or personal gain. <sup>85</sup>

<sup>80</sup> See for example (Naeem, Bhatti und A. K.-H. I. & Libraries (2021)), (Mehta, et al. (2021)), (Petratos (2021)), (Huber, Pospisil und Haidegger (2021)), (Marres (2018)), (Baccarella, et al. (2018)), (Habgood-Coote (2019)), (Cifuentes-Faura (2020)), (Rooke (2021)).

<sup>81</sup> Other strategies that fall outside the scope of the project definition are using *misleading* headlines or images or selectively presenting information.

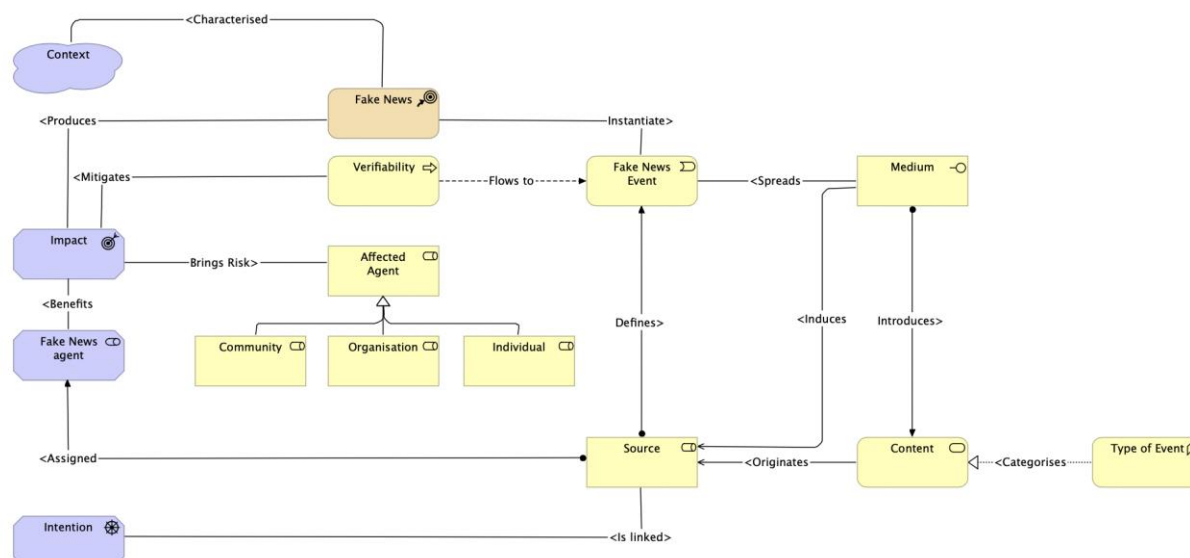
<sup>82</sup> See for example (Yerlikaya und Aslan (2020)), (Ferreira, Robertson und Kirsten (2020)), (Lazar and Paun (2020)), (Petratos (2021)), (Huber, Pospisil und Haidegger (2021)), (Bastick (2021)), (Boyd (2022)).

<sup>83</sup> Other sources, which, however, fall outside the scope of FERMI's definition, may inadvertently share false information without realising its inaccuracies.

<sup>84</sup> See for example (Yerlikaya und Aslan (2020)), (Huber, Pospisil und Haidegger (2021)), (Rooke (2021)), (Macagno (2022)).

<sup>85</sup> See for example (Yerlikaya und Aslan (2020)), (Baccarella, et al. (2018)), (Huber, Pospisil und Haidegger (2021)), (Macagno (2022)).

The Conceptual Model was developed using ArchiMate and Enterprise Architecture language, where the community was modelled as an organisation. Figure 3 below illustrates the developed conceptual model:



**Figure 3. Conceptual Model in ArchiMate**

The ArchiMate modelling language is employed for constructing a model illustrating the mitigation of the impact of D&FN within a community. The conceptual model sought to depict a community as an organisation, again, in full compliance with the task description requiring such an approach,<sup>86</sup> making use of ArchiMate fitting for representing concepts derived from the literature, their relationships, and notations. The colour scheme patent in the model was used to differentiate between the ArchiMate layers. According to the Open Group ArchiMate specification 3.1, the model uses three layers: Business, Strategy and Motivation.

Please note that given that some concepts were decomposed in order to illustrate different meanings that are presented in the scientific literature, e.g., Agent, decomposed as Fake News Agent and Affected Agent.

### 5.3 Technical Implementation

The technical implementation of the CRMM is informed by T3.3’s further requirement that “[t]he model will be made available in a software tool, not only open source but also offered in the cloud.”<sup>87</sup> This requires the development of a system component that is in line with the previously presented conceptual model that is adjusted to the requirements, offering scalability of performance and adherence to industry standards for risk management, particularly ISO family 31 XXX, which provides a framework for organisations to identify, assess, and manage risks. Its applicability can be used to manage any risk, including that of D&FN.

In compliance with the standardisation, the model identifies the risk of a particular instance that is characterised by a given context, producing a given impact that directly benefits an agent of disinformation represented in the model as Fake News Agent.

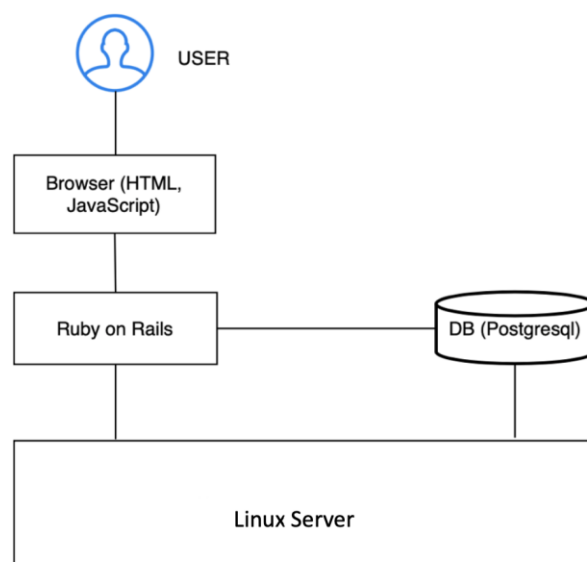
<sup>86</sup> The GA explicitly requires that “[t]he community will be treated as an ‘organization’”, see ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, PART A, p.9.

<sup>87</sup> ‘Grant Agreement: Project 101073980 – FERMI – HORIZON-CL3-2021-FCT-01,’ *European Research Executive Agency*, 2021, PART A, p.9.

On a second layer of compliance there is the verifiability a process of verification of instances of Fake news that in essence proceed to investigate the nature of the Fake News event. The verifiability process mitigates the impact of a given event of disinformation.

It is also important to build a tool that promotes business continuity for the community complying with the standardisation 27XXX family, focusing on information security management providing an adaptable framework for establishing, implementing, and continuity for organisations. To comply with this risk standardisation INOV will actively promote countermeasures that aid the community to swiftly recover from the impact of D&FN.

The component will be based on the Linux Server provided by ITML. It will require access to a database (DB) for stowage of inputs from other components (e.g., Dynamic flows modeler – Crimes Impact Predictor, Socioeconomic Analyser and Behaviour Profiler); the DB will make use of the open-source relational DB management system PostgreSQL. Figure 4 below illustrates the proposed technological architecture



**Figure 4. Component Technological Infrastructure**

The component architecture presented on Figure 4 is going to make use of a browser interface of the FERMI platform for the end-user. The user of the FERMI platform is the LEA responsible for the investigation. The CRMM component is going to be developed on Ruby on Rails and will be associated with the in-house database for stowage of data regarding each investigation.

The CRMM will output a JSON with the suggested ranking of the countermeasures, and an associated description.



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## 6 Conclusions

This deliverable D3.3 presented the functioning of the components, namely the Behaviour Profiler & Socioeconomic Analyser as well as the Community Resilience Management Modeler. It provides the first outputs from these components and their setup as well as their integration between the involved partners as well as the integration into the FERMI platform.

The Behavioural Analyses and Community Resilience Facilitators package provides tools that can be applied to examine the consequences of crimes occurring due to D&FN. Online activities are expected to have an impact on crime rates, more specifically, on politically motivated crime. The Behaviour Profiler with support from the Dynamic Flows Modeler is set up to model this connection. First mock results have been created and were depicted.

The second part of the Behaviour Profiler created country profiles for France, Germany, Belgium, Finland and Sweden concerning news and media consumption as well as media literacy in the countries. The full document on these profiles will be visible in the FERMI platform via a separate website.

The Socioeconomic Analyser created the equation to compute a connection between D&FN induced politically motivated crime and economically measurable factors, such as GDP per capita. For this purpose, the code has been set up and the work on available data is in progress. Limited possibilities to publish preliminary results at this point are an obstacle to present first findings. This topic is also being elaborated on currently to achieve anonymous and applicable results that are also of practical use for the end-users of FERMI.

The Community Resilience Modeler produced its component model with a first extensive literature review. Sophisticated methods like applied DELPHI studies and MCDA guarantee the scientific foundation for the work. To this end, the conceptual model has been set up and the integration of the Community Resilience Modeler into the FERMI platform is on its way.

Ongoing concerns regard finding the right data sources to be exploited and fine tuning the results to give meaningful and significant results that are of practical use to the end-users.

Further specifics are provided by D4.3, which explains the integration of the components described in this deliverable in greater detail.

## 7 References

- Abd El-khalek, A. M. A. 2020. "The Dynamic Relation between Population and Economic Development; a Systematic Analysis Review Considering Developing Countries' Empirical Evidence." *Journal of Economics and Finance*, 11 ed.: 12-21.  
<https://www.academia.edu/download/62936351/C110204122120200413-95721-e1zjt.pdf>.
- Adjin-Tettey, Theodora Dame. 2022. "Combating fake news, disinformation, and misinformation: Experimental evidence for media literacy education." *Cogent Arts & Humanities*, 9 ed.  
 doi:<https://doi.org/10.1080/23311983.2022.2037229>.
- Alonso-García, S., García, G. Gómez, M. Sanz Prieto, A. J. Moreno Guerrero, and C. Rodríguez Jiménez. 2020. "The Impact of Term Fake News on the Scientific Community. Scientific Performance and Mapping in Web of Science." *Social Science*, 9 ed.: 2076-0760.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=143636290&lang=pt-pt&site=eds-live&scope=site>.
- Angrist, J.D., and J.-S. Pischke. 2008. "Mostly Harmless Econometrics: An Empiricist's Companion." [http://diglib.globalcollege.edu.et:8080/xmlui/bitstream/handle/123456789/141/Angrist%20J.D.%20%20Pischke%20J.-S.%20Mostly%20Harmless%20Econometrics%20%28PUP%2C%202008%29%28ISBN%20069112034X%29%28O%29%28290s%29\\_GL\\_.pdf?sequence=1&isAllowed=y](http://diglib.globalcollege.edu.et:8080/xmlui/bitstream/handle/123456789/141/Angrist%20J.D.%20%20Pischke%20J.-S.%20Mostly%20Harmless%20Econometrics%20%28PUP%2C%202008%29%28ISBN%20069112034X%29%28O%29%28290s%29_GL_.pdf?sequence=1&isAllowed=y).
- Aswad, E.M. 2020. "In a World of 'Fake News,' What's a Social Media Platform To Do?" *Utah Law Rev*, 4 ed.: 1009–1028.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=144574921&lang=pt-pt&site=eds-live&scope=site>.
- Atiya, A. 2020. "Why does forecast combination work so well?" *International Journal of Forecasting*.  
<https://doi.org/10.1016/j.ijforecast.2019.03.010>.
- Austin, E., B. Porismitah, and S. Doomgard. 2021. "COVID-19 disinformation and political engagement among communities of color: The role of media literacy." *Harvard Kennedy School Misinformation Review*, 1 ed. <https://doi.org/10.37016/mr-2020-58>.
- Baccarella, C.V., T.F. Wagner, J.H. Kietzmann, and I.P. McCarthy. 2018. "Social media? It's serious! Understanding the dark side of social media." *European Management Journal*, 36 ed.: 431–438.
- Bastick, Z. 2021. "Would you notice if fake news changed your behaviour? An experiment on the unconscious effects of disinformation." *Comput Human Behav*, 116 ed.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=148045922&lang=pt-pt&site=eds-live&scope=site>.
- Benoliel, U., and S.I. Becher. 2022. "Termination Without Explanation Contracts." *Univ Ill Law Rev*, 2022 ed.: 1059–1104.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edo&AN=157538719&lang=pt-pt&site=eds-live&scope=site>.
- Berthon, P., E. Treen, L. P.-N. M. I. Review, and undefined 2018. 2018. "How truthiness, fake news and post-fact endanger brands and what to do about it." *search.proquest.com*. Accessed Jan 25, 2023.  
<https://search.proquest.com/openview/190fabaace240829d6f8ddbaabe1ae93/1?pq-origsite=gscholar&cbl=756365>.
- Bhanu, S., and S.M.S. Bhanu. 2020. "UbCadet: detection of compromised accounts in twitter based on user behavioural profiling." *Multimed Tools Appl*, 79 ed.: 19349–19385.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=145047986&lang=pt-pt&site=eds-live&scope=site>.
- BKA. n.d. *Politisch Motivierte Kriminalität (PMK) - ausländische Ideologie* -. [https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKAI/PMKAI\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKAI/PMKAI_node.html) .
- . n.d. *Politisch Motivierte Kriminalität (PMK) - links* -. [https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKlinks/PMKlinks\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKlinks/PMKlinks_node.html).
- . n.d. *Politisch Motivierte Kriminalität (PMK) - rechts* -. [https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKrechts/PMKrechts\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKrechts/PMKrechts_node.html) .

- . n.d. *Politisch Motivierte Kriminalität (PMK) - religiöse Ideologie -*.  
[https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKreligioes/PMKreligioes\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/PMKreligioes/PMKreligioes_node.html).
- . 2024. *Politisch Motivierte Kriminalität*.  
[https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/pmk\\_node.html](https://www.bka.de/DE/UnsereAufgaben/Deliktsbereiche/PMK/pmk_node.html).
- BKA. 2023. “Politisch Motivierte Kriminalität im Jahr 2022.”  
[https://www.bka.de/SharedDocs/Downloads/DE/UnsereAufgaben/Deliktsbereiche/PMK/2022PMKFallzahlen.pdf?\\_\\_blob=publicationFile&v=3](https://www.bka.de/SharedDocs/Downloads/DE/UnsereAufgaben/Deliktsbereiche/PMK/2022PMKFallzahlen.pdf?__blob=publicationFile&v=3).
- BMI. 2023. “Politisch Motivierte Kriminalität im Jahr 2022.”  
[https://www.bmi.bund.de/SharedDocs/downloads/DE/veroeffentlichungen/nachrichten/2023/05/pmk2022-factsheets.pdf?\\_\\_blob=publicationFile&v=5](https://www.bmi.bund.de/SharedDocs/downloads/DE/veroeffentlichungen/nachrichten/2023/05/pmk2022-factsheets.pdf?__blob=publicationFile&v=5).
- Boyd, K. 2022. “Trusting scientific experts in an online world.” *Synthese*, 2021 ed.: 1–21.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=155329210&lang=pt-pt&site=eds-live&scope=site>.
- Bretsch, D., S. Michaelis, S. Bitschnau, and U. Kemmesis. 2023. “Kriminologische Sozialraumanalysen – Regionalräumliche Wechselwirkungen und Einflüsse sozialer Desorganisation auf politisch (rechts-)motivierte Kriminalität.” In *MOTRA-Monitor 2022*, by U. Kemmesis, P. Wetzels, B. Austin, C. Büscher, A. Dessecker, S. Hutter and D. Rieger. Wiesbaden.
- Bundesamt für Verfassungsschutz. n.d. *Begriff und Erscheinungsformen*.  
[https://www.verfassungsschutz.de/DE/themen/rechtsextremismus/begriff-und-erscheinungsformen/begriff-und-erscheinungsformen\\_artikel.html](https://www.verfassungsschutz.de/DE/themen/rechtsextremismus/begriff-und-erscheinungsformen/begriff-und-erscheinungsformen_artikel.html).
- Caramancion, K.M. 2021. “The Role of Subject Confidence and Historical Deception in Mis/Disinformation Vulnerability.” *2021 IEEE 12th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON), Information Technology, Electronics and Mobile Communication Conference (IEMCON), 2021 IEEE 12th Annual*, 0541–0546.  
doi:10.1109/IEMCON53756.2021.9623138.
- Chiang, T.H.C., Liao, C.-S., and W.-C. Wang. 2022. “Impact of Artificial Intelligence News Source Credibility Identification System on Effectiveness of Media Literacy Education.” 14 ed.: 2071-1050.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=156596850&lang=pt-pt&site=eds-live&scope=site>.
- Choi, Jihyang, and Jae Kook Lee. 2015. “Investigating the effects of news sharing and political interest on social media network heterogeneity.” *Computers in Human Behavior*, 44 ed.: 258-266.
- Cifuentes-Faura, J. 2020. “Fake news during COVID-19: how to detect them?” *Fake news durante la COVID: ¿Cómo detectarlas?*, 42 ed.: 100–103.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=145744806&lang=pt-pt&site=eds-live&scope=site>.
- Clark, K. A. 2005. “The Phantom Menace: Omitted Variable Bias in Econometric Research.” *Conflict management and peace science*. <http://www.saramitchell.org/clarke05.pdf>.
- Communities, Commission of the European. 2007. “Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions.” Brussels. <https://www.cedefop.europa.eu/en/news/european-approach-media-literacy-digital-environment>.
- D. Mehta, D., A. Dwivedi, A. Patra, and M. M. Anand Kumar. 2021. “A transformer-based architecture for fake news classification.” *Soc Netw Anal Min*, 11 ed.: 1–12.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=153703247&lang=pt-pt&site=eds-live&scope=site>.
- De Magistris, G., S. Russo, P. Roma, J.T. Starczewski, and C. Napoli. 2022. “An Explainable Fake News Detector Based on Named Entity Recognition and Stance Classification Applied to COVID-19.” *Information*, 13 ed.: 2078-2489.  
<https://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=156019008&lang=pt-pt&site=eds-live&scope=site>.
- de Regt, A., M. Montecchi, and S. Lord Ferguson. 2020. “A false image of health: how fake news and pseudo-facts spread in the health and beauty industry.” *Journal of Product & Brand Management*, 29 ed.: 168–179.

- <https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=142065244&lang=pt-pt&site=eds-live&scope=site>.
- Eady, G., T. Pashkalis, J. Zilinsky, R. Bonneau, J. Nagler, and J.A. Tucker. 2023. "Exposure to the Russian Internet Research Agency foreign influence campaign on Twitter in the 2016 US election and its relationship to attitudes and voting behavior." *Nature Communications*.  
<https://www.nature.com/articles/s41467-022-35576-9>.
- EC. 2023. *The impact of the Digital Services Act on digital platforms*. 3 Nov. <https://digital-strategy.ec.europa.eu/en/policies/dsa-impact-platforms>. .
- Endtricht, Rebecca, and Janosch Kleinschnittger. 2023. "Wahrnehmung extremistischer Aktivitäten und subjektives Bedrohungsleben in Deutschland: Verbreitung und Einflussfaktoren." In *Kriminalität und Kriminologie im Zeitalter der Digitalisierung*, by L. Deyerling, A. Dreißgacker, I. Henningsmeier, M. Neumann, J. Schemmel, C. P. Schröder & L. Treskow T. Bliesener, 243-264. Mönchengladbach: Forum Verlag Godesberg GmbH.
- Espaliú-Berdud, C. 2022. "Legal and criminal prosecution of disinformation in Spain in the context of the European Union." *El Profesional de la Información*, 31 ed.: 1-14.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=157531992&lang=pt-pt&site=eds-live&scope=site>.
- European Parliament. 2022. *Flash Eurobarometer FL011EP: Media & News Survey 2022*. Brussels.  
[https://data.europa.eu/data/datasets/s2832\\_fl011ep\\_eng?locale=en](https://data.europa.eu/data/datasets/s2832_fl011ep_eng?locale=en).
- European Union. 2022. "Standard Eurobarometer STD96: Standard Eurobarometer 96 - Winter 2021-2022."  
[https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).
- EUROSTAT. n.d. <https://ec.europa.eu/eurostat/web/regions/data/database-tbd>.
- Farinelli, F. n.d. "Conspiracy theories and right-wing extremism – Insights and recommendations for P/CVE." *Radicalisation Awareness Network (RAN)*, 6 ed.  
[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwifhoan\\_aDAXUi8rsIHe76CYoQFnoECBQQAQ&url=https%3A%2F%2Fhome-affairs.ec.europa.eu%2Fsystem%2Ffiles%2F2021-04%2FFran\\_conspiracy\\_theories\\_and\\_right-wing\\_2021\\_en.pdf&usg=AOvVaw1OO-H6UApi](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwifhoan_aDAXUi8rsIHe76CYoQFnoECBQQAQ&url=https%3A%2F%2Fhome-affairs.ec.europa.eu%2Fsystem%2Ffiles%2F2021-04%2FFran_conspiracy_theories_and_right-wing_2021_en.pdf&usg=AOvVaw1OO-H6UApi).
- Ferguson, Neil, Johannes Rieckmann, and Tim H. Stuchtey. 2019. *Die Kosten des Extremismus*. 9. Vol. BIGS Standpunkt zivile Sicherheit. February. [https://www.bigs-potsdam.org/app/uploads/2020/06/BIGS-Standpunkt\\_Nr.-9-2019\\_Kosten-des-Extremismus\\_WEB.pdf](https://www.bigs-potsdam.org/app/uploads/2020/06/BIGS-Standpunkt_Nr.-9-2019_Kosten-des-Extremismus_WEB.pdf).
- Ferreira, C.C., J. Robertson, and M. Kirsten. 2020. "The truth (as I see it): philosophical considerations influencing a typology of fake news." *Journal of Product & Brand Management*, 29 ed.: 150–158. Available: <https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=142065238&lang=pt-pt&site=eds-live&scope=site>.
- Fettke, P., and P. Loos. 2003. "Ontological Evaluation of Reference Models Using the Bunge-Wand-Weber Model." *AMCIS*. Accessed Sep 17, 2023. <https://aisel.aisnet.org/amcis2003/384>.
- Flostrand, A., L. Pitt, and J. Kietzmann. 2020. "Fake news and brand management: a Delphi study of impact, vulnerability and mitigation." *Journal of Product & Brand Management*, 29 ed.: 246–254.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=142065241&lang=pt-pt&site=eds-live&scope=site>.
- Glöckner, P, and T. Stuchtey. 2023. "Turning Sensitive Data into Knowledge - the Need for a Common Understanding of politically Motivated Crime in Europe." <https://fighting-fake-news.eu/articles/turning-sensitive-data-knowledge-need-common-understanding-politically-motivated-crime>.
- Goodman, E. 2021. "Media literacy in Europe and the role of EDMO." <https://edmo.eu/wp-content/uploads/2022/02/Media-literacy-in-Europe-and-the-role-of-EDMO-Report-2021.pdf>.
- Grafe, Silke. 2011. "'media literacy' und 'media (literacy) education' in den USA: ein Brückenschlag über den Atlantik." *Medienpädagogik*, September 13, 20 ed.: 59-80.  
doi:<https://doi.org/10.21240/mpaed/20/2011.09.13.X>.
- Gruppi, M., B.D. Horne, and S. Adalı. 2021. "NELA-GT-2020: A Large Multi-Labelled News Dataset for The Study of Misinformation in News Articles." *arXiv preprint*.  
<https://doi.org/10.48550/arXiv.2102.04567>.

- . 2022. "NELA-GT-2021: A Large Multi-Labelled News Dataset for The Study of Misinformation in News Articles." *arXiv preprint*. <https://doi.org/10.48550/arXiv.2203.05659>.
- . 2023. "NELA-GT-2022: A Large Multi-Labelled News Dataset for The Study of Misinformation in News Articles." *arXiv preprint*. <https://doi.org/10.48550/arXiv.2203.05659>.
- Habgood-Coote, J. 2019. "Stop talking about fake news!" *Inquiry*, 62 ed.: 1033–1065. <https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=138754216&lang=pt-pt&site=eds-live&scope=site>.
- Harvard Kennedy School Misinformation Review*. 2022. "Mapping the website and mobile app audiences of Russia's foreign communication outlets, RT and Sputnik, across 21 countries." 3 ed. <https://doi.org/10.37016/mr-2020-110>.
2023. *History of Election Fraud Claims Does Repeat Itself – and May Lead to Crimes*. <https://fighting-fake-news.eu/articles/history-election-fraud-claims-does-repeat-itself-and-may-lead-crimes>.
- Huber, E., B. Pospisil, and W. Haidegger. 2021. "Modus Operandi in Fake News : Invited Paper." *2021 IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA), Cognitive Computational Aspects of Situation Management (CogSIMA), 2021 IEEE Conference on*, 127–132. doi:10.1109/CogSIMA51574.2021.9475926.
- INKAR. n.d. <https://www.inkar.de/>.
- Islam, M.R., S. Liu, and X., Xu, G. Wang. 2020. "Deep learning for misinformation detection on online social networks: a survey and new perspectives." *Soc Netw Anal Min*, 10 ed. <https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=146149934&lang=pt-pt&site=eds-live&scope=site>.
- Jain, D.K., A. Kumar, and A. Shrivastava. 2022. "CanarDeep: a hybrid deep neural model with mixed fusion for rumour detection in social data streams." *Neural Comput Appl*, 34 ed.: 15129–15140. doi:10.1007/S00521-021-06743-8.
- Karnowski, Veronika, Larissa Leonhard, and Anna Sophie Kümpel. 2018. "Why Users Share the News: A Theory of Reasoned Action-Based Study on the Antecedents of News-Sharing Behavior." *Communication Research Reports*, 91-100. [https://anna-kuempel.de/publication/karnowski-why-2018/karnowski-et-al\\_2018.pdf](https://anna-kuempel.de/publication/karnowski-why-2018/karnowski-et-al_2018.pdf).
- Kitchenham, B., and S. M. Charters. 2007. "Guidelines for performing Systematic Literature Reviews in Software Engineering." <https://www.researchgate.net/publication/302924724>.
- Koehler, D. 2016. "Right-Wing Extremism and Terrorism in Europe: Current Developments and Issues for the Future." *Prism*, 6 ed.: 84-105. <https://www.jstor.org/stable/26470450>.
- Koohikamali, M., and A. Sidorova. 2017. "Information Re-Sharing On Social Network Sites In The Age Of Fake News." *Inf Sci*, 20 ed.: 215–235. <https://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=127807392&lang=pt-pt&site=eds-live&scope=site>.
- Kousika, N., Deepa. S, Deephika. C: Dhatchaiyine. B M, and J. Amrutha. 2021. "A System for Fake News Detection by using Supervised Learning Model for Social Media Contents." *5th International Conference on Intelligent Computing and Control Systems (ICICCS), Intelligent Computing and Control Systems (ICICCS)*, 1042–1047. Accessed 2021. doi:doi: 10.1109/ICICCS51141.2021.9432096.
- Lawson, M.A., and H. Kakkar. 2022. "Of pandemics, politics, and personality: The role of conscientiousness and political ideology in the sharing of fake news." *J Exp Psychol Gen*, 151 ed.: 1154–1177. doi:10.1037/xge0001120.
- Lazar, I. M., and A. C. Paun. 2020. "A predictive model for estimating citizens' beliefs regarding the risk perception of dissemination and dispersal of fake content." *Cogn Brain Behav*, 24 ed.: 271–293. doi:doi: 10.24193/cbb.2020.24.15.
- Lessinski, M. 2023. *'Bye, bye, birdie': Meeting the challenges of Disinformation. The Media Literacy Index*. Sofia: Open Society Institute.
- Livingstone, S. 2004. "Media literacy and the challenge of new information and communication technologies." *Communication Review*, 1 ed.: 3-14. <http://eprints.lse.ac.uk/1017>.
- Lynas, M. n.d. *COVID: Top 10 current conspiracy theories*. <https://allianceforscience.org/blog/2020/04/covid-top-10-current-conspiracy-theories/>.

- Macagno, F. 2022. "Argumentation profiles and the manipulation of common ground. The arguments of populist leaders on Twitter." *J Pragmat*, 191 ed.: 67-82.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=155851433&lang=pt-pt&site=eds-live&scope=site>.
- Marres, N. 2018. "Why We Can't Have Our Facts Back." *Engag Sci Technol Soc*, 4 ed.: 423–443.  
 doi:10.17351/ests2018.188.
- Mehta, D., Dwivedi, A., A. Patra, and M. Anand Kumar. 2021. "A transformer-based architecture for fake news classification." *Soc Netw Anal Min*, 11 ed.: 1-12.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=153703247&lang=pt-pt&site=eds-live&scope=site>.
- Moore, R., and J. Hancock. 2022. "A digital media literacy intervention for older adults improves resilience to fake news." *Scientific Reports*, 12 ed. <https://www.nature.com/articles/s41598-022-08437-0>.
- Müller, K., and C. Schwarz. 2020. "Fanning the Flames of Hate: Social Media and Hate Crime." June 5: 1-37. <https://doi.org/10.1093/jeea/jvaa045>.
- Murali, V. 2021. "Everything you need to know about Ensemble learning." *Medium*.
- Naeem, S., R. Bhatti, and and undefined A. K.-H. I. & Libraries. 2021. "An exploration of how fake news is taking over social media and putting public health at risk." *Wiley Online Library*, 38 ed.: 143–149. Accessed June 2020. doi:doi: 10.1111/hir.12320.
- NAMLE. 2023. *Resources-Media Literacy defined*. <https://namle.net/resources/media-literacy-defined/>.
- Obadã, Daniel-Rares, and Dan-Christian Dabija. 2022. "'In Flow'! Why Do Users Share Fake News about Environmentally Friendly Brands on Social Media?" *Environmental Research and Public Health*, 19 ed. <https://doi.org/10.3390/ijerph19084861>.
- OSIS. n.d. *Media Literacy Index*. Edited by Open Society Institute. Sofia. <https://osis.bg/?p=4491&lang=en>.
- Owens, Emily, and Bocar Ba. 2021. "The Economics of Policing and Public Safety." *Journal of Economic Perspective*, 35 ed.: 3–28.
- Pedriza, Samia Benaissa. 2021. "Sources, Channels and Strategies of Disinformation in the 2020 US Election: Social Networks, Traditional Media and Political Candidates." *Journalism and Media*, 2 ed.: 605–624. <https://doi.org/10.3390/journalmedia2040036>.
- Pennycook, Gordon, and David G. Rand. 2021. "The Psychology of Fake News." *Trends in Cognitive Sciences*, 25 ed.: 388-402. <https://doi.org/10.1016/j.tics.2021.02.007>.
- Pérez, T., and J. Manuel. 2006. "Current trends on Media Literacy in Europe. Approaches – existing and possible – to media literacy." [https://ec.europa.eu/assets/eac/culture/library/studies/literacy-trends-report\\_en.pdf](https://ec.europa.eu/assets/eac/culture/library/studies/literacy-trends-report_en.pdf).
- Pérez-Escoda, A., L. Pedron-Esteban, J. Rubio-Romero, and C. Jiménez-Nerros. 2021. "Fake News Reaching Young People on Social Networks: Distrust Challenging Media Literacy." <https://doi.org/10.3390/publications9020024>.
- Petratos, P.N. 2021. "Misinformation, disinformation, and fake news: Cyber risks to business." *Bus Horiz*, 64 ed.: 763–774.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edselp&AN=S000768132100135X&lang=pt-pt&site=eds-live&scope=site>.
- Prskawetz, A., T. Fent, and W. Barthel. 2007. "The Relationship between Demographic Change and Economic Growth in the EU." *Vienna Institute of Demography*.  
<https://www.oeaw.ac.at/fileadmin/subsites/Institute/VID/PDF/Publications/Forschungsberichte/FB32.pdf>.
- Ristea, Alina, Mohammad Al Boni, Bernd Resch, Matthew S. Gerber, and Michael Leitner. 2020. "Spatial crime distribution and prediction for sporting events using social media." *International Journal of Geographical Information Science*, 34 ed.: 1708-1739.  
<https://doi.org/10.1080/13658816.2020.1719495>.
- Roodman, D. 2009. "How to do Xtabond2: An Introduction to Difference and System GMM in Stata." *The Stata Journal*, 9 ed. <https://doi.org/10.1177/1536867X09000900106>.
- Rooke, M. 2021. "Alternative media framing of COVID-19 risks." *Current Sociology*, 69 ed.: 584–602.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=151266773&lang=pt-pt&site=eds-live&scope=site>.

- Roozenbeek, J., and S. van der Linden. 2019. "The fake news game: actively inoculating against the risk of misinformation." *J Risk Res*, 22 ed.: 570-580.  
<https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=136537868&lang=pt-pt&site=eds-live&scope=site>.
- Rosenbaum, P. R. 1999. "Choice as an Alternative to Control in Observational Studies." *Statistical Science*, 14 ed.: 259-304. <https://projecteuclid.org/journals/statistical-science/volume-14/issue-3/Choice-as-an-Alternative-to-Control-in-Observational-Studies/10.1214/ss/1009212410.pdf>.
- RSF. n.d. *Press Freedom Index*. <https://rsf.org/en/index>.
- . n.d. *Who are we?* <https://rsf.org/en/who-are-we>.
- Scardigno, R., and G. Mininni. 2020. "The Rhetoric Side of Fake News: A New Weapon for Anti-Politics?" *World Futures: The Journal of General Evolution*, 76 ed.: 81-101.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=142285036&lang=pt-pt&site=eds-live&scope=site>.
- Schroeder, D.T., K. Pogorelov, and J. Langguth. 2019. "FACT: a Framework for Analysis and Capture of Twitter Graphs." *019 Sixth International Conference on Social Networks Analysis, Management and Security (SNAMS), Social Networks Analysis, Management and Security (SNAMS), 2019 Sixth International Conference on.*, 131-141. doi:10.1109/SNAMS.2019.8931870.
- Silverman, Craig. 2016. *www.buzzfeednews.com*. November 16.  
<https://www.buzzfeednews.com/article/craigsilverman/viral-fake-election-news-outperformed-real-news-on-facebook>.
- Terren, Ludovic, and Rosa Borge. 2021. "Echo Chambers on Social Media: A Systematic Review of the Literature." *Review of Communication Research*, 100-118.
- Van Bavel, J.J., E.A. Harris, P. Pärnamets, S. Rathje, K.C. Doell, and J.A. Tucker. 2022. "Political psychology in the digital (mis)information age: A model of news belief and sharing." *Soc Issues Policy Rev*, 16 ed.: 310-311. doi:10.1111/sipr.12078.
- Vasconcellos-Silva, P.R., and L.D. Castiel. 2020. "COVID-19, fake news, and the sleep of communicative reason producing monsters: the narrative of risks and the risks of narratives." *Cad Saude Publica*, 36 ed. doi:10.1590/0102-311x00101920.
- Viviani, M., Pasi, G. 2017. "Credibility in social media: opinions, news, and health information-a survey." *WIREs: Data Mining & Knowledge Discovery*, 7 ed.  
<https://search.ebscohost.com/login.aspx?direct=true&db=lxh&AN=124545337&lang=pt-pt&site=eds-live&scope=site>.
- W. S. Paka, W.S., R. Bansal, A. Kaushik, S. Sengupta, and T. Chakraborty. 2021. "Cross-SEAN: A cross-stitch semi-supervised neural attention model for COVID-19 fake news detection." *Appl Soft Comput*, 107 ed.  
<https://search.ebscohost.com/login.aspx?direct=true&db=edo&AN=150717236&lang=pt-pt&site=eds-live&scope=site>.
- Williams, Thomas James Vaughan, and Calli Tzani. 2022. "How does language influence the radicalisation process? A systematic review of research exploring online extremist communication and discussion." *Behavioural Sciences of Terrorism and Political Aggression*.  
 doi:<https://doi.org/10.1080/19434472.2022.2104910>.
- Yang, J., and Y. Tian. 2021. "Others are more vulnerable to fake news than I Am': Third-person effect of COVID-19 fake news on social media users." *Comput Human Behav*, 125 ed.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=152062444&lang=pt-pt&site=eds-live&scope=site>.
- Yerlikaya, T., and S.T. Aslan. 2020. "Social Media and Fake News in the Post-Truth Era: The Manipulation of Politics in the Election Process." *Insight Turkey*, 22 ed.: 177-196.  
<https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=144289050&lang=pt-pt&site=eds-live&scope=site>.
- Zhang, C., A. Gupta, C. Kauten, A.V. Deokar, and X Qin. 2019. "Detecting fake news for reducing misinformation risks using analytics approaches." *Eur J Oper Res*, 279 ed.: 1036-1052.  
<https://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=138754216&lang=pt-pt&site=eds-live&scope=site>.

## Appendix A Results Country Profiles

### Republic of Finland: Facts<sup>88</sup>

- Capital: Helsinki
- Area: 338,455 sq km
- Population: 5.6 million
- Languages: Finnish, Swedish plus Sami, Karelian, Finnish Kalo

### Media & Media Literacy in Finland

TV is the most popular medium in Finland however, news media are diverse. The public broadcaster Yle holds almost half of both TV and radio audiences, there are some privately owned domestic broadcasters, as well as, an increasing number of online news outlets, and several regional and local newspapers. Most media outlets are totally independent of political parties and politicians, as aforementioned, state-owned Yle is the only exception, nonetheless, politicians play no role in appointing or dismissing its journalists and reported attempts by politicians to influence media content are rare and generally not tolerated. Finland is the leading EU country in terms of press readership, and 58% of Finns say they read a press title daily<sup>89 90</sup>. The state of media freedom is rated highly by international press freedom organisations<sup>91</sup> and more specifically Finland ranked fifth, after Sweden, in the 2023 Reporters Without Borders (RSF) global media freedom index<sup>92</sup>.

### Main findings Finland

Finland holds a comparatively high media literacy level and this is likely a reflection of their approach in education and their efforts in endorsing media freedom. Finland has been ranked as a world leader in education for various reasons e.g., promoting critical thinking above tests, common-sense practices and a holistic teaching environment that strives for equity over excellence<sup>93 94</sup>. Finland ranks at the top of 41 European countries in their resilience to false allegations<sup>95 96</sup>, critical thinking and media literacy skills in Finland are initiated already at preschool across all teaching subjects.

<sup>88</sup> **Political System:** Finland is a parliamentary republic with a head of government (the prime minister) and a head of state (the president). Sauli Niinistö won the presidential election in 2012 and became the country's first conservative head of state in five decades, he won a second term in the January 2018 election. Conservative leader Petteri Orpo won a close three-way election in April 2023, defeating the centre-left incumbent Sanna Marin. He leads a coalition of the conservative NCP, nationalist Finns, the minority-language Swedish People's Party and the Christian Democrat. Finland scores consistently well on international ratings for stability, freedom, public safety and social progress. Its parliament was the first to adopt full gender equality, granting men and women the right not only to vote but also to stand for election in 1906.

<sup>89</sup> European Union, *Finland – EU member country profile* | European Union. Available at: [https://european-union.europa.eu/principles-countries-history/country-profiles/finland\\_en](https://european-union.europa.eu/principles-countries-history/country-profiles/finland_en)

<sup>90</sup> RSF – Reporters without borders, *Finland*. Available at: <https://rsf.org/en/country/finland>

<sup>91</sup> European Union, *Finland – EU member country profile* | European Union. Available at: [https://european-union.europa.eu/principles-countries-history/country-profiles/finland\\_en](https://european-union.europa.eu/principles-countries-history/country-profiles/finland_en)

<sup>92</sup> RSF - Reporters without borders, *Press freedom index - 2023*. Available at: <https://rsf.org/en/index?year=2023>

<sup>93</sup> Center for an Informed Public - University of Washington, *What we can learn from Finland*, March 01, 2023. Available at: <https://www.cip.uw.edu/2023/03/01/finland-media-literacy/>

<sup>94</sup> Mike Colagrossi, *10 reasons why Finland's education system is the best in the world*, World Economic Forum, Sept. 10 2018. Available at: <https://www.weforum.org/agenda/2018/09/10-reasons-why-finlands-education-system-is-the-best-in-the-world>

<sup>95</sup> Marin Lessenski, *How It Started, How It is Going: Media Literacy Index 2022*, Policy Brief 57, October 2022, Open Society Institute – Sofia. Available at: <https://osis.bg/?p=4243&lang=en>

<sup>96</sup> Marin Lessenski, Statistical processing: Petia Brainova, Dragomira Belcheva, *“Bye, bye, birdie”: Meeting the*



According to the European Media Literacy Index (MLI) Report for 2023<sup>97</sup>, Finland is placed 1<sup>st</sup> out of 41 countries in total in the respective ranking, with a score of 74 points out of 100. Finland is included in the 1<sup>st</sup> cluster of “best-performing countries”, Finland is followed by Denmark, Norway, Estonia, Sweden and Ireland.

Finland’s comprehensive approach has become the go-to example for many governments and supranational bodies for addressing D&FN<sup>98</sup>. Evidence suggests that Finland is really invested in media literacy and the problem of fake news and disinformation, it has taken various measures and initiatives in preparing and educating citizens of all ages for the complex digital landscape of the present and the future.

From the data presented in the document for the Country Profiles some key takeaways are: online

- **In terms of daily media consumption**, news on the internet remain predominant (70%), and is followed by TV (67%), use of social networks (60%), and almost equally by the written press (51%) and the radio (50%). Interestingly, 18% of the population has no access to social networks.<sup>99</sup>
  - Ages 15-24 use online social networks at a striking percentage (100%) at least once a week and read news on the internet (89%) at least once a week, while only 45% read the written press at least once a week.<sup>100</sup>
  - Ages 25-39 prefer to read news on the internet (95%) and use online social networks (91%); 64% read the written press.<sup>101</sup>
  - Ages 40-54 also prefer to read news on the internet (94%) and use online social networks (91%); written press, although the lowest in their preference, is still a popular mean (80%).<sup>102</sup>
  - Ages 55+ also have a high preference in watching television on a TV set (96%), while their second almost equal preference is the written press (93%); social networks appear to be the less popular mean (55%).<sup>103</sup>
- As regards to the use of social media platforms in particular:
  - ages 15-24 mostly use Whatsapp (87%), Instagram (79%), followed by Youtube and Snapchat (76%)<sup>104</sup>
  - ages 25-39 also prefer Whatsapp (90%), followed by Facebook (80%) and Youtube (69%)<sup>105</sup>
  - ages 40-54 again prefer Whatsapp (84%), followed by Facebook (77%) and Youtube (65%)<sup>106</sup>
  - ages 55+ present the least, yet relatively high use of social media, where Whatsapp is preferred by 69%, Facebook by 66% and Youtube (45%)<sup>107</sup>
- **As regards to accessing news**, a 67% of the population shows an equal preference for TV and online news platforms, while Radio is preferred by 33% and social media platforms by 88%. Podcasts remain the least popular mean (4%).<sup>108</sup> In particular:
  - ages 15-24 prefer online news platforms (61%), social media platforms (51%) and the TV (48%)<sup>109</sup>

*Challenges of Disinformation. The Media Literacy Index 2023. Measuring Vulnerability of Societies to Disinformation.* Policy brief. Media Literacy Index 2023 Report. Open Society Institute – Sofia. Available at: <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>.

<sup>97</sup> Ibid.

<sup>98</sup> Ibid, p.3.

<sup>99</sup> European Union (2022). ,Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022’. Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>100</sup> Ibid.

<sup>101</sup> Ibid.

<sup>102</sup> Ibid.

<sup>103</sup> Ibid.

<sup>104</sup> European Parliament (2022). ,Flash Eurobarometer FL011EP: Media & News Survey’. Available at: [https://data.europa.eu/data/datasets/s2832\\_fl011ep\\_eng?locale=en](https://data.europa.eu/data/datasets/s2832_fl011ep_eng?locale=en).

<sup>105</sup> Ibid.

<sup>106</sup> Ibid.

<sup>107</sup> Ibid.

<sup>108</sup> Ibid.

<sup>109</sup> Ibid.

- ages 25-39 again prefer online news platforms (81%), followed by the TV (48%) and social media platforms (43%) at a much lower percentage<sup>110</sup>
- ages 40-54 also have a clear preference for online news platforms (73%), while some use the TV (63%) and lesser listen to the radio (35%)<sup>111</sup>
- ages 55+ have a clear preference for TV (86%), followed by a much lower percentage for the online news platforms (57%) and the written press (37%).<sup>112</sup>
- **As regards to trust in news sources**, interestingly the public TV and radio stations, as well as the written press (including online presence), seem to be the most trusted means across age groups.<sup>113</sup>
  - Public TV/Radio is trusted by 86% (highest) in ages 55+ and 49% (lowest) in ages 15-24.<sup>114</sup>
  - The written press is trusted by 62% (highest) in ages 55+ and 50% (lowest) in ages 15-24.<sup>115</sup>
  - Influencers on social media, Youtube/video platforms and other online news platforms (podcasts, blogspots etc) seem to enjoy the least trust by all age groups, with their preferences ranging from 1% in ages 55+ to 15% by ages 15-24.<sup>116</sup>
  - In terms of trust towards the Finnish media (“providing trustworthy information”) in particular, ages 55+ show the highest percentage of undisputable trust (37%), followed by ages 25-39 (33%), ages 40-54 (30%) and last – yet close enough- by ages 15-24 (29%).<sup>117</sup>
- **As regards to the acknowledgment of D&FN and their existence within the country**, only 14% strongly consider it as an actual issue for Finland, 38% tends to believe it is an issue, while 44% in total either tend to, or totally disagree that this constitutes an issue.<sup>118</sup> Furthermore, 58% of the population agree/or tend to agree that they often come across D&FN, while only 5% totally disagrees with that statement.<sup>119</sup> Moreover, 77% feel or tend to feel confident in identifying D&FN, while 20% feel less or no confidence at all in this regard.<sup>120</sup> In terms of confidence,
  - Considering the respondents placement in the political spectrum, people placing themselves on the left (83%) feel most confident in this regard, followed by the people on the right (77%) and last the people in the centre (72%).<sup>121</sup>

### Kingdom of Sweden: Facts<sup>122</sup>

- Capital: Stockholm
- Area: 450,295 sq km
- Population: 10.4 million

<sup>110</sup> Ibid.

<sup>111</sup> Ibid.

<sup>112</sup> Ibid.

<sup>113</sup> Ibid.

<sup>114</sup> Ibid.

<sup>115</sup> Ibid.

<sup>116</sup> Ibid.

<sup>117</sup> European Union (2022). ‘Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022’.

Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>118</sup> Ibid.

<sup>119</sup> Ibid.

<sup>120</sup> Ibid.

<sup>121</sup> Ibid.

<sup>122</sup> Political system – Leaders: Sweden is a constitutional monarchy and King Carl XVI Gustaf is the head of state. The monarch has primarily ceremonial and representative duties. The Head of State is the foremost representative of the Kingdom and is kept informed on issues of national importance. In accordance with representative and parliamentary democracy, the parliament enacts the laws and makes the decisions, which the government and its agencies implement. Public-private partnership is at the core of "the Swedish model", which was developed by the Social Democrats, who have governed for most of the time since the 1920s. Ulf Kristersson is the prime minister since 2022 general election and heads a coalition government between the Moderate Party, Christian Democrats and Liberals, with external support from the far-right Sweden Democrats. Relative to its population size, Sweden has taken in far more migrants and refugees than any other EU country since the beginning of the refugee crisis in 2015. As reported, this has put pressure on public services, and has prompted a rise in support for the far-right Sweden Democrats party.

- Languages: Swedish, plus Sami, Finnish, Meankieli, Romani, Yiddish

### Media & Media Literacy in Sweden

Sweden was the world's first country to have adopted a press freedom law (1766) and it tends to hold media independence in great respect nevertheless, journalists have been targeted by threats, online hate campaigns and abusive lawsuits<sup>123</sup>. There are currently five media companies that own a large majority of all newspapers in the country. In the audiovisual sector the market is dominated by four television and three radio groups (including publicly owned media). Swedes have traditionally been keen newspaper readers nonetheless the press is facing pressure from digital rivals. Regarding internet-digital use, on December 2021 there were 9.6 million internet users which comprise 96% of the population<sup>124</sup>. TV is the most popular medium, with radio and online media following closely. Sweden rates comparatively high for media freedom, specifically Sweden ranked fourth, after Denmark, in the 2023 RSF global media freedom index<sup>125</sup>.

### Main findings Sweden

Sweden has been promoting media literacy and online safety through formal and informal learning. The government agency “the Swedish Media Council (Statens medieråd)” is gathering, interpreting and disseminating research on children's and young people's use of media. Through this channel, information and teaching materials are produced on Media and Information Literacy (MIL) for schools and libraries. The effort is part of the EU Commission's project Safer Internet, to promote a safer and better use of the internet and mobile technologies among children and young people<sup>126</sup>.

According to the European Media Literacy Index (MLI) Report for 2023<sup>127</sup>, Sweden is placed 5<sup>th</sup> out of 41 countries in total in the respective ranking, with a score of 71 points out of 100. Sweden is included in the 1<sup>st</sup> cluster, “best-performing countries”, where Finland is first followed by Denmark, Norway, Estonia, Sweden and Ireland<sup>128</sup>.

From the data presented in the document for the Country Profiles some key takeaways are:

**In terms of daily media consumption**, the majority read news on the internet (69%) online followed by social networks (61%), many watch television on a TV set (60%), followed by radio (50%) and those who read the written press (39%) and watch TV via internet (33%) and lastly podcasts (15%).<sup>129</sup>

- Ages 15-24 more often use online social networks (98%) at least once a week and read news on the internet (88%) at least once a week, while almost half of that age group listen to the radio (49%) at least once a week followed closely by those who watch television on a TV set (48%) at least once a week and read the written press (48%) at least once a week.<sup>130</sup>
- Ages 25-39 prefer to read news on the internet (91%) at least once a week and use social networks (90%) at least once a week, many listen to the radio (70%) at least once a week and watch television on a TV set (51%) at least once a week, while 43% read the written press at least once a week.<sup>131</sup>

<sup>123</sup> RSF – Reporters without borders, *Sweden*. Available at: <https://rsf.org/en/country/sweden>

<sup>124</sup> Internet World Stats – Usage and Population Statistics, *European Union Internet Users, Population and Facebook Statistics*. Available at: <https://www.internetworldstats.com/stats9.htm>

<sup>125</sup> RSF - Reporters without borders, *Press freedom index - 2023*. Available at: <https://rsf.org/en/index?year=2023>

<sup>126</sup> European Commission – Youth Wiki, *Sweden- Education and Training - Media literacy and safe use of new media*. Last update: 28 November 2023. Available at:

<https://nationalpolicies.eacea.ec.europa.eu/youthwiki/chapters/sweden/68-media-literacy-and-safe-use-of-new-media>.

<sup>127</sup> Marin Lessenski, Statistical processing: Petia Brainova, Dragomira Belcheva, “Bye, bye, birdie”: *Meeting the Challenges of Disinformation. The Media Literacy Index 2023. Measuring Vulnerability of Societies to Disinformation*. Policy brief. Media Literacy Index 2023 Report. Open Society Institute – Sofia. Available at: <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>.

<sup>128</sup> Ibid.

<sup>129</sup> European Union (2022). ,Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022’. Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>130</sup> Ibid.

<sup>131</sup> Ibid.

- Ages 40-54 present similarly share a high preference in reading news on the internet (95%) consumed at least once a week, and using social networks (84%) at least once a week, many listen to the radio (82%) at least once a week and watch television on a TV set (74%) at least once a week, use online networks (85%) at least once a week and read news on the internet (82%) at least once a week, while 58% read the written press at least once a week.<sup>132</sup>
- Ages 55+ demonstrate a clear preference in watching television on a TV set (94%) consumed at least once a week, while their second preference is the radio (87%) consumed at least once a week; written press holds the highest percentage in this age group (86%) consumed at least once a week, followed by online news (79%) consumed at least once a week; use of social networks appears to be the less popular mean (59%) consumed at least once a week.<sup>133</sup>
- As regards to the use of social media in particular:
  - ages 15-24 mostly use Snapchat (86%), Instagram (85%), followed by Youtube (79%)<sup>134</sup>
  - ages 25-39 mostly use Facebook (84%) followed by Instagram (76%) and messenger (75%)<sup>135</sup>
  - ages 40-54 also prefer Facebook (79%), followed by YouTube (58%), Instagram (58%) and Messenger (57%)<sup>136</sup>
  - ages 55+ similarly prefer Facebook (74%), followed by Instagram (48%) and Messenger (43%)<sup>137</sup>
- **As regards to accessing news**, 65% of the population shows a clear preference for TV and online news platforms (60%), while Radio is preferred by 35% and social media and blogs by 25% and the written (printed) press by 23%.<sup>138</sup> In particular:
  - ages 15-24 prefer online news platforms (57%), social media platforms (47%) and TV (45%)<sup>139</sup>
  - ages 25-39 similarly prefer online news platforms (70%), followed by TV (47%) and then social media (34%)<sup>140</sup>
  - ages 40-54 have a preference for TV (69%) followed by online news platforms (64%) and the radio (39%)<sup>141</sup>
  - ages 55+ similarly have a clear preference for TV (82%) followed by online news platforms (53%) and the radio (43%)<sup>142</sup>
- **As regards to trust in news sources**, interestingly the public TV and radio stations, as well as the written press, seem to be the most trusted means across age groups.
  - Public TV/Radio is trusted by 78% (highest) in ages 55+ and 54% (lowest) in ages 15-24;<sup>143</sup>
  - the written press is trusted by 56% (highest) in 25-39 age group and 48% (lowest) in ages 40-54.<sup>144</sup>
  - Other online news platforms (12% at 40 -54 age group) Youtube/video platforms (16% at the 15-24 age group) and groups or friends I follow on social media or messaging platforms (10% by 50+ age group) while interestingly 15% of 25-39 age group don't know if they trust in news sources in general<sup>145</sup>
- **As regards to the acknowledgment of D&FN and their existence within the country**, 36% strongly consider it as an actual issue for Sweden, 40% tend to believe it is an issue, while 17% tend to disagree,

<sup>132</sup> Ibid.

<sup>133</sup> Ibid.

<sup>134</sup> European Parliament (2022). 'Flash Eurobarometer FL011EP: Media & News Survey'. Available at: [https://data.europa.eu/data/datasets/s2832\\_fl011ep\\_eng?locale=en](https://data.europa.eu/data/datasets/s2832_fl011ep_eng?locale=en).

<sup>135</sup> Ibid.

<sup>136</sup> Ibid.

<sup>137</sup> Ibid.

<sup>138</sup> Ibid.

<sup>139</sup> Ibid.

<sup>140</sup> Ibid.

<sup>141</sup> Ibid.

<sup>142</sup> Ibid.

<sup>143</sup> Ibid.

<sup>144</sup> Ibid.

<sup>145</sup> Ibid.

5% totally disagree that this constitutes an issue.<sup>146</sup> Furthermore, 67% of Swedes agree/or tend to agree that they often come across D&FN, while 7% totally disagree with that statement.<sup>147</sup> Moreover, 74% feel confident in identifying D&FN, while 25% feel less or no confidence at all in this regard.<sup>148</sup> In terms of confidence,

- Considering the respondents' level of education, people in the 20+ age group are the most confident (78%), those who are still studying feel slightly less confident (69%) while ages 15-19 range from 58% to 63%.<sup>149</sup>

## Media Literacy Analysis France

### French Republic: Facts<sup>150</sup>

- Capital: Paris
- Area: 643,801 sq km
- Population: 67.8 million
- Language: French

### Media & Media Literacy in France

France has a free press and more than 100 daily newspapers, most of these are privately owned and are not linked to political parties. Even though France's legal and regulatory framework is favourable to press freedom and editorial independence, it is reported that the mechanisms aimed at combating conflicts of interest in the media are insufficient. The independence of public broadcast media has been characterized as undermined due to the lack of long-term funding since the domestic TV licence fee's elimination in 2022. While France has adopted some "new set of policing regulations that takes more account of journalists' rights during demonstrations, reporters continue to be subjected to police violence as well as physical attacks by demonstrators".<sup>151</sup>

The media landscape of France offers a wide range of choices in all categories at both national and local level, France is a force in international broadcasting. The daily Ouest-France is the best-selling newspaper and the public television channels and radio stations of France are Télévisions and Radio France. Television is France's most popular medium. Public Radio France serves a domestic audience and French overseas territories and command large audiences<sup>152</sup>.

France rates comparatively low for media freedom, specifically France ranked 24<sup>th</sup> in the 2023 Reporters Without Borders (RSF) global media freedom index<sup>153</sup>. Regarding internet-digital use, on December 2021 there were approximately 60 million internet users which comprise 92% of the population<sup>154</sup>.

## Main findings France

<sup>146</sup> European Union (2022). ,Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022'. Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>147</sup> Ibid.

<sup>148</sup> Ibid.

<sup>149</sup> Ibid.

<sup>150</sup> **Political System and Leaders:** France operates within a framework of a semi-presidential system, it is a republican State and a parliamentary democracy. The Parliament is bicameral and is made up of the National Assembly (Assemblée nationale) and the Senate (Sénat). Emmanuel Macron is the president of France since the May 2017 presidential election. In 2018 President Macron's popularity witnessed a fall "as he tried to overhaul the economy, with major street protests in November 2018 over his attempt to wean the public off fossil fuels through price hikes". President Macron has appointed Elisabeth Borne as prime minister in May 2022, she is France's second woman to hold the position of prime minister (the first was Edith Cresson in 1991-1992).

<sup>151</sup> RSF – Reporters without borders, *France*. Available at: <https://rsf.org/en/country/france>

<sup>152</sup> BBC News, *France media guide*, June 19, 2023. Available at: <https://www.bbc.com/news/world-europe-17299010>

<sup>153</sup> RSF - Reporters without borders, *Press freedom index - 2023*. Available at: <https://rsf.org/en/index>

<sup>154</sup> Internet World Stats – Usage and Population Statistics, *European Union Internet Users, Population and Facebook Statistics*. Available at: <https://www.internetworldstats.com/stats9.htm>

Media literacy education in France is perceived as vital in preserving democracy, promoting critical thinking and as such, it begins at a young age. At a national level, CLEMI (Le centre pour l'éducation aux médias et à l'information) is responsible for Media and Information Literacy (MIL) in the French education system, it reports to the Ministry of Education, Youth and Sport (Ministère de L'Éducation, de la Jeunesse et des Sports). The approach used is based on skills rather than on tools with the aim of providing children with critical thinking; being able to question and verify the information they are exposed to. Apart from the national curriculum and official media policies there are several media literacy initiatives from various stakeholders taking place in France<sup>155156</sup>.

Internet user skills in France are slightly above the EU average, according to the 2022 European Commission DESI index.

The Reuters Institute Digital News Report 2022 found low levels of trust in news compared to other countries, finding which agrees with the evidence presented in this analysis. Furthermore, what was specified was that trust was particularly low for online news and news on social media. What EDMO reports is that according to the 2021 Media Pluralism Monitor, this lack of trust is related to a rise in conspiracy theories. The Media Pluralism Monitor reports (2021 and 2022), as cited by EDMO, concluded that media literacy programs in France are strong however these are unequally implemented across the country<sup>157</sup>.

According to the European Media Literacy Index (MLI) Report for 2023<sup>158</sup> France is placed 17<sup>th</sup> out of 41 countries in total in the respective ranking, with a score of 57 points out of 100. France is included in the 2<sup>nd</sup> cluster consisting in the “well-performing countries”, while Belgium (10<sup>th</sup>) and Germany (11<sup>th</sup>) are also included in this cluster.

From the data presented in the document for the Country Profiles some key takeaways are:

- **In terms of daily media consumption**, TV remains predominant (73%), and is followed by radio (48%); next to follow are the use of social networks (39%) and the online news (35%). A rather surprising element is that 40% of the population has no access to social networks.<sup>159</sup>
  - Ages 15-24 have a clear preference for online social networks (92%) to consume at least once a week, as well as for reading news on the internet (86%), while only 27% read the written press also at least once a week.
  - Ages 25-39 have an equal preference for TV and the use of online social networks (79%) to consume at least once a week, while the news on the internet are almost equally popular (78%) to consume at least once a week; written press is again last in their preference (38%) to consume at least once a week.
  - Ages 40-54 also prefer the TV (87%) to consume at least once a week and the radio (75%) to consume at least once a week; written press again comes last (39%) to be consumed at least once a week.
  - Ages 55+ also have a high preference in watching television on a TV set (94%) to consume at least once a week, while their second preference is the radio (68%) to consume at least once a week; social networks appear to be the less popular means (32%) to be consumed at least once a week.
- As regards to the **use of social media platforms** in particular:

<sup>155</sup> EDMO, *France – Media Literacy country profile*-. Available at: <https://edmo.eu/country-profile/france/>

<sup>156</sup> European Commission – Youth Wiki, *France- Education and Training - Media literacy and safe use of new media*.

Last update: 28 November 2023. Available at: <https://national-policies.eacea.ec.europa.eu/youthwiki/chapters/france/68-media-literacy-and-safe-use-of-new-media>

<sup>157</sup> EDMO, *France – Media Literacy country profile*-. Available at <https://edmo.eu/country-profile/france/>

<sup>158</sup> Marin Lessenski, Statistical processing: Petia Brainova, Dragomira Belcheva, “Bye, bye, birdie”: *Meeting the Challenges of Disinformation. The Media Literacy Index 2023. Measuring Vulnerability of Societies to Disinformation*. Policy brief. Media Literacy Index 2023 Report. Open Society Institute – Sofia. Available at: <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>

<sup>159</sup> European Union (2022). ‘Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022’. Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

- ages 15-24 mostly use Instagram (74%), Youtube (73%), followed by Facebook (46%)<sup>160</sup>
- ages 25-39 prefer Facebook (73%), followed by Youtube (59%) and Instagram (52%)<sup>161</sup>
- ages 40-54 again prefer Facebook (69%), followed by Youtube (47%) and Whatsapp (43%)<sup>162</sup>
- ages 55+ present the least, yet relatively high use of social media, where Facebook is preferred by 57%, Whatsapp by 43% and Youtube (30%)<sup>163</sup>
- **As regards to accessing news**, 78% of the population shows a clear preference for TV, while Radio comes second (45%); online news platforms are third (29%) and Podcasts are last (4%).<sup>164</sup> In particular:
  - ages 15-24 prefer the TV (67%), and their second equal preferences are Youtube/video platforms and social media platforms (37%)<sup>165</sup>
  - ages 25-39 again prefer the TV (70%), followed by the radio (42%) and online news platforms (31%) at a much lower percentage<sup>166</sup>
  - ages 40-54 also have a clear preference for the TV (80%), while some use the radio (52%) and lesser use the online news platforms (29%)<sup>167</sup>
  - ages 55+ have again a clear preference for TV (86%), followed by a much lower percentage for the radio (48%) and the written press (30%).<sup>168</sup>
- **As regards to trust in news sources**, interestingly the public TV and radio stations, as well as the written press (including online presence), seem to be the most trusted means across age groups.<sup>169</sup>
  - Public TV/Radio is trusted by 56% (highest) in ages 55+ and 39% (lowest) in ages 15-24.<sup>170</sup>
  - the written press is trusted by 49% (highest) in ages 55+ and 36% (lowest) in ages 15-24.<sup>171</sup>
  - Influencers on social media, Youtube/video platforms, people-groups/friends followed on social media, and other online news platforms (podcasts, blogspots etc) seem to enjoy the least trust by all age groups, with their preferences ranging from 1% in ages 55+ to 21% by ages 15-24.<sup>172</sup>
- **As regards to the acknowledgment of D&FN and their existence within the country**, 37% strongly consider it as an actual issue for France, 48% tend to believe it is an issue, while only 10% in total either tend to, or totally disagree that this constitutes an issue.<sup>173</sup> Furthermore, 85% of the population agree/or tend to agree that they often come across D&FN, while only 3% totally disagrees with that statement.<sup>174</sup> Moreover, 61% feel or tend to feel confident in identifying D&FN, while 33% feel less or no confidence at all in this regard.<sup>175</sup> In terms of confidence,
  - Considering the respondents' age group, ages 15-24 feel more confident in their capacity to identify D&FN (67%), followed by ages 25-39 (66%) and ages 40-54 (62%); ages 55+ are the least confident in this regard (55%).<sup>176</sup>

<sup>160</sup> European Parliament (2022). 'Flash Eurobarometer FL011EP: Media & News Survey'. Available at: [https://data.europa.eu/data/datasets/s2832\\_fl011ep\\_eng?locale=en](https://data.europa.eu/data/datasets/s2832_fl011ep_eng?locale=en).

<sup>161</sup> Ibid.

<sup>162</sup> Ibid.

<sup>163</sup> Ibid.

<sup>164</sup> Ibid.

<sup>165</sup> Ibid.

<sup>166</sup> Ibid.

<sup>167</sup> Ibid.

<sup>168</sup> Ibid.

<sup>169</sup> Ibid.

<sup>170</sup> Ibid.

<sup>171</sup> Ibid.

<sup>172</sup> Ibid.

<sup>173</sup> European Union (2022). 'Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022'. Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>174</sup> Ibid.

<sup>175</sup> Ibid.

<sup>176</sup> Ibid.

- Considering the respondents' level of education, people that are still studying (67%) and people 20+ (66%) feel almost equally confident, while people 16-19 (56%) and 15- (53%) appear to be less confident.<sup>177</sup>

### Media Literacy Analysis Belgium

#### Kingdom of Belgium: Facts<sup>178</sup>

- Capital: Brussels
- Area: 30,528 sq km
- Population: 11.5 million
- Languages: Dutch, French, German

### Media & Media Literacy in Belgium

Belgium's complex institutional organization lies on both regional and linguistic grounds, with three regions, i.e. the Flemish (Flanders), Walloon (Wallonia) and Brussels (capital region) and three official languages, i.e. Dutch, French and German; the Dutch-speaking Flemish community comprises about almost 60% of the population, the French-speaking community comprises about 40% and German-speaking community just under 1% of the population (in Ostbelgien). The respective language lines also affect the educational and cultural policies, as the latter are decided at a community level. This particularity directly relates to the current division of the media markets into separate segments and inevitably increases cross-border influence from strong neighbouring language media (i.e. France and the Netherlands). Similarly, media literacy policies are also segmented, as they tend to address either one community or the other; each Community has its own (audiovisual) media law and a separate media regulator with sometimes varying tasks and competences.<sup>179</sup>

The country's distinctiveness regarding its territorial and linguistic borders and their effects on the media landscape has also shaped the flow of disinformation. In particular, the issue of migration has been instrumentalized, especially by right-wing political parties; by using particular events (e.g. the terrorist attacks claimed by ISIS in 2015, the Syrian migration wave etc), the latter exacerbated the given facts in their media campaigns to reinforce their xenophobic narratives. Similarly, political parties instrumentalized the given prejudice between Dutch-speaking and French-speaking communities (also triggered by the rise of independence movements in Flanders), by spreading disinformation messages aggravating identity divisions and overall tensions. Furthermore, the COVID-19 pandemic revealed a growing presence of online communities opposing mandatory vaccination, whose online disinformation campaigns (mainly via social media platforms) were followed by violent demonstrations in Brussels against the health pass and restrictions. These communities' narratives also included messages relevant to technology scepticism, e.g. the allegedly damaging effects of 5G on health.<sup>180</sup>

### Main findings Belgium:

According to the European Media Literacy Index (MLI) Report for 2023, Belgium is placed 10<sup>th</sup> out of 41 countries in total in the respective ranking, with a score of 61 points out of 100. Belgium is included in the 2<sup>nd</sup> cluster consisting in the "well-performing" countries. Comparing the Index 2023 results and the Index 2022 results, Belgium demonstrated one of the biggest improvements as it managed to move 3 positions up

<sup>177</sup> Ibid.

<sup>178</sup> Political System – Leaders: Belgium, located in North-western Europe, is a federal constitutional monarchy with a parliamentary system; King Philippe is the head of state, and Alexander De Croo the Prime Minister, a liberal Flemish politician who leads a seven-party coalition of liberals, socialists, greens and Christian democrats.

<sup>179</sup> EUMEPLAT project (GA 101004488), "D1.2: Patterns in media consumption: regional models", October 2021, [https://www.eumeplat.eu/wp-content/uploads/2021/12/D1.2\\_Patterns-in-media-consumption\\_regional-models.pdf](https://www.eumeplat.eu/wp-content/uploads/2021/12/D1.2_Patterns-in-media-consumption_regional-models.pdf)

<sup>180</sup> EU DisinfoLab / EDMO BELUX, Disinformation landscape in Belgium, May 2023, [https://edmo.eu/wp-content/uploads/2023/05/20230509\\_BE\\_DisinfoFS.pdf](https://edmo.eu/wp-content/uploads/2023/05/20230509_BE_DisinfoFS.pdf)



the ranking; it should be noted though that this was not due to the improvement of the country's actual score, as that remained the same, but rather to deterioration of the other countries' respective performances<sup>181</sup>.

According to the 2023 Media Pluralism Monitor (MPM),<sup>182</sup> the country's overall scores are considered to be positive, as the efforts in the field of media literacy are continuous. However, the main two language communities demonstrate a notable difference; while the Flemish Community has had media literacy included in formal and non-formal educational settings for some time, this process is still under development in the French Community. Moreover, concerns arise regarding the market plurality, also related to the different language communities, due to the high concentration level of the media actors and the increasing market consolidation. In this regard, available information on the market share and/or ownership of digital native news media is particularly limited, as the latter are not (yet) obliged to follow the same media transparency rules imposed by their community regulators. The limited scope of action for each legislator – based on the country's institutional structure – leads to the lack of cross-media ownership restrictions, as well as lack of thresholds in media legislation.

The COVID-19 pandemic had its inevitable impact on the Belgian media landscape as well, where freelance journalists and smaller media outlets experienced the greatest losses, despite the State and Community government additional support measures. Also related to the role of the media throughout the pandemic, the report highlights an ongoing “worrisome general atmosphere of distrust and even hostility towards country's journalists in general, regardless of ideology or affiliation”<sup>183</sup>, while particular attention is drawn to cases of online aggression against female journalists and “more notably those of ethnic background of a minority group”<sup>184</sup>. It further clarifies that this trend has not yet reached levels of violence, yet it points out the necessity of preventing further escalation.

The fragmented media landscape similarly affects social inclusiveness, as the efforts to guarantee inclusion of minorities and marginalised groups has proven particularly challenging. In this regard, the existing legal framework against hate speech appears to be problematic in terms of enforcement, as additional amendments to the Constitution are deemed necessary. Currently UNIA,<sup>185</sup> the country's competent institute for monitoring and acting against discrimination, has been particularly active the past few years in prosecuting several hate speech cases in the online environment. In terms of gender equality, it should be noted that females appear to be underrepresented in management, board or CEO positions in the media industry, and similarly underrepresented in the news media, both as ‘news subjects’ and as ‘reporters/presenters’.

Political independence of the available traditional media seems to be at a high level. Although the legal safeguards on political control and influence only apply to the broadcasting sector (radio and television), in contrast to newspapers and media distribution, the different media practitioners seem to adhere to the informal mechanisms in place maintaining their political independence, including the general constitutional protection of freedom of expression and press freedoms, and the effective self-regulatory codes of ethics for journalists. This, however, does not seem to be the case for the digital native media; considering the lack of transparency regarding ownership and/or control, affiliations to political groups cannot be confirmed, nor denied.

According to the RSF's World Press Freedom 2023 Index, Belgium is placed 31<sup>st</sup> out of 180 countries in total, with a score of 76.47 points, demonstrating an 8-positions drop in comparison to the 2022 Index (23<sup>rd</sup> in 2022, with a score of 78.86 points). The report re-affirms that public broadcasting is, in principle, protected against political pressure and the media in general enjoy solid legal and constitutional guarantees. The level of public trust towards the Belgian press appears to be high, especially in Flanders. Nevertheless, the COVID-19 pandemic brought to light several cases of disinformation, as well as intense criticism towards the Flemish

<sup>181</sup> The Media Literacy Index 2023 – Measuring Vulnerability of Societies to Disinformation, June 2023, <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>

<sup>182</sup> Centre for Media Pluralism and Media Freedom, *Monitoring Media Pluralism in the Digital Era: Belgium Country Report*, June 2023, Available at: [https://cadmus.eui.eu/bitstream/handle/1814/75715/Belgium\\_results\\_mpm\\_2023\\_cmpf.pdf?sequence=1&isAllowed=y](https://cadmus.eui.eu/bitstream/handle/1814/75715/Belgium_results_mpm_2023_cmpf.pdf?sequence=1&isAllowed=y)

<sup>183</sup> Ibid, p.7.

<sup>184</sup> Ibid, p.9.

<sup>185</sup> UNIA, For equality, against discrimination. Available at: <https://www.unia.be/en>

media, as the latter were accused of covering the health emergency from a pro-government perspective. Moreover, journalists covering demonstrations against COVID-19-related measures were subjected to intimidation and threats by protesters; this, along with cases of police violence, as well online threats on racist and/or sexist grounds, led to an increased sense of lack of safety among journalists. Following these events, and in an effort to address the growing public distrust, Belgium officials announced the establishment of an experts' group to investigate the massive dissemination of fake news by the anti-vaccine movement; in addition, the Wallonia-Brussels Federation adopted, in early 2022, a media education curriculum to develop students' capabilities in critical analysis<sup>186</sup>.

Although Internet user skills in Belgium are very close to the EU average, there seem to be concerns over the high proportion of people lacking essential digital skills. In 2021, 46% of 16–74-year-olds in Belgium were classified as “digitally vulnerable”, with the largest share found in Wallonia (49%), while in Flanders the share equals to 46%. Brussels residents appear to be slightly less vulnerable, while 39% are considered to be “at risk”. A noteworthy remark is that the most “digitally vulnerable” people tend to be Belgians from low-income groups and those with low levels of education. This group also has the least access to so-called “essential” digital services, such as banking, health portals, government sites, or e-commerce. Furthermore, although younger people are considered to be “digitally vulnerable”, they are also dealing with issues related to digital access and skills; out of the 90% of Belgians who own a phone, one in five internet users only owns a smartphone to go online.<sup>187</sup>

From the data presented in the document for the Country Profiles some key takeaways are:

- **In terms of daily media consumption**, TV remains predominant (75%), and is followed by radio (52%), social networks (47%), online media (44%), written press (28%) and podcasts (6%). Interestingly, 20% of the population has no access to social networks.<sup>188</sup> in particular:
  - Ages 15-24 more often use online social networks (91%) at least once a week and read news on the internet (87%) at least once a week, while only 36% read the written press at least once a week.<sup>189</sup>
  - Ages 25-39 almost equally watch television on a TV set (83%) at least once a week, use online networks (85%) at least once a week and read news on the internet (82%), while 46% read the written press at least once a week.<sup>190</sup>
  - Ages 40-54 present similarly high preferences in watching television on a TV set (89%) consumed at least once a week, listening to the radio (86%), reading news online (83%) at least once a week and using social networks (87%) at least once a week; written press is the lowest in their preference (57%) consumed at least once a week.<sup>191</sup>
  - Ages 55+ demonstrate a clear preference in watching television on a TV set (97%) at least once a week, while their second preference is the radio (86%) consumed at least once a week; written press holds the highest percentage in this age group (63%) consumed at least once a week, followed by online news (61%) consumed at least once a week; use of social networks appears to be the less popular mean (47%) consumed at least once a week.<sup>192</sup>
- **As regards to the use of social media in particular:**
  - ages 15-24 mostly use Instagram (78%), followed by Facebook (76%) and Youtube (75%)<sup>193</sup>
  - ages 25-39 mostly use Facebook (76%) followed by Whatsapp (65%)<sup>194</sup>

<sup>186</sup> Reporters Without Borders, *Word Press Freedom 2023 Index: Belgium Country Profile*, <https://rsf.org/en/country/belgium>

<sup>187</sup> The Brussels Times, *Digital divide: Half of Belgians lack essential online skills*, 2/9/2022, <https://www.brusselstimes.com/282545/half-of-belgians-lack-essential-digital-skills>

<sup>188</sup> European Union (2022). ‘Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022’. Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>189</sup> Ibid.

<sup>190</sup> Ibid.

<sup>191</sup> Ibid.

<sup>192</sup> Ibid.

<sup>193</sup> European Parliament (2022). ‘Flash Eurobarometer FL011EP: Media & News Survey’. Available at: [https://data.europa.eu/data/datasets/s2832\\_fl011ep\\_eng?locale=en](https://data.europa.eu/data/datasets/s2832_fl011ep_eng?locale=en).

<sup>194</sup> Ibid.

- ages 40-54 also prefer Facebook (77%), followed by a lesser use of Whatsapp (53%)<sup>195</sup>
- ages 55+ present the least use of social media, where Facebook is preferred by 68% and Whatsapp by 43%.<sup>196</sup>
- **As regards to accessing news**, 70% of the population shows a clear preference for TV, while Radio is preferred by 48% and online news platforms by 37%. Podcasts remain the least popular mean (3%).<sup>197</sup> In particular:
  - ages 15-24 prefer social media platforms (49%) and TV (46%)<sup>198</sup>
  - ages 25-39 prefer the TV (58%), while the radio (42%) and online news platforms are next (40%)<sup>199</sup>
  - ages 40-54 also have a clear preference for TV (75%), while some use the radio (58%)<sup>200</sup>
  - ages 55+ similarly have a clear preference for TV (83%) and the radio (54%).<sup>201</sup>
- **As regards to trust in news sources**, interestingly the public TV and radio stations, as well as the written press, seem to be the most trusted means across age groups.<sup>202</sup>
  - Public TV/Radio is trusted by 64% (highest) in ages 55+ and 40% (lowest) in ages 15-24.<sup>203</sup>
  - the written press is trusted by 55% (highest) in ages 55+ and 47% (lowest) in ages 25-39.<sup>204</sup>
  - Other online news platforms (podcasts etc), Youtube/video platforms and influencers seem to enjoy the least trust by all age groups, ranging from 1% to 12%.<sup>205</sup>
  - only within ages 15-24 the trust percentage is slightly higher, ranging from 14% to 18%.<sup>206</sup>
- **As regards to the acknowledgment of D&FN and their existence within the country**, only 19% strongly consider it as an actual issue for Belgium, 49% tend to believe it is an issue, while 30% in total either tend to, or totally disagree that this constitutes an issue.<sup>207</sup> Furthermore, 77% of Belgians agree/or tend to agree that they often come across D&FN, while 22% totally disagree with that statement.<sup>208</sup> Moreover, 64% feel confident in identifying D&FN, while 34% feel less or no confidence at all in this regard.<sup>209</sup> In terms of confidence,
  - Considering the respondents' age groups, ages 15-24 feel confident at 69% (highest) and ages 55+ at 61% (lowest), while the other age groups are located in between.<sup>210</sup>
  - Considering the respondents' level of education, people that are still studying are the most confident (70%), ages 20+ feel slightly less confident (67%), while ages 15-19 range from 55% to 60%.<sup>211</sup>
  - Considering the respondents placement in the political spectrum, interestingly 65%-68% from all positions (left, centre, right) feel equally confident in this regard.<sup>212</sup>

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<sup>195</sup> Ibid.

<sup>196</sup> Ibid.

<sup>197</sup> Ibid.

<sup>198</sup> Ibid.

<sup>199</sup> Ibid.

<sup>200</sup> Ibid.

<sup>201</sup> Ibid.

<sup>202</sup> Ibid.

<sup>203</sup> Ibid.

<sup>204</sup> Ibid.

<sup>205</sup> Ibid.

<sup>206</sup> Ibid.

<sup>207</sup> European Union (2022). ,Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022’.

Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>208</sup> Ibid.

<sup>209</sup> Ibid.

<sup>210</sup> Ibid.

<sup>211</sup> Ibid.

<sup>212</sup> Ibid.

## Federal Republic of Germany: Facts<sup>213</sup>

- Capital: Berlin
- Area: 357,022 sq km
- Population: 83.6 million
- Language: German

## Media & Media Literacy in Germany

Media regulation is under the states, while each of the latter has its own state media law and press law. Among the few exceptions of federal regulations are the State Media Treaty (where the federal states concluded on a state treaty) and the Network Enforcement Act (federal law); these two examples display a trend in the current regulatory frameworks to increasingly take digital platforms into account. The German federal government faced challenges in the area of media and digital policy, due to disagreements within the coalition, also related to the European Commission's draft AI Regulation and the discussion on chat control. Furthermore, the Russian war of aggression in Ukraine, its social consequences and the energy crisis also affected the press sector, particularly due to the increased costs of paper and energy.<sup>214</sup>

Germany's competitive television market is the largest in Europe (more than 38 million TV households), while the country is home to some of the world's largest media clusters. The numerous regional and national public broadcasters - organised in line with the federal political structure - compete for audiences with powerful commercial operators, while each of Germany's 16 regions regulates its own private and public broadcasting. TV networks Das Erste and ZDF, and Deutschlandradio are the national public broadcasters, while each household pays a "broadcasting contribution". Deutsche Welle (DW) is the country's international broadcaster. Newspapers and the non-tabloid press are particularly popular and, despite the many national newspapers, the press is strongest at the regional and local level. The German constitution enshrines media freedom and the press is considered to be independent; the display of swastikas and statements endorsing Nazism are illegal.<sup>215</sup>

## Main findings Germany

According to the European Media Literacy Index (MLI) Report for 2023, Germany is placed 11<sup>th</sup> out of 41 countries in total in the respective ranking, with a score of 61 points out of 100. Germany is included in the 2<sup>nd</sup> cluster consisting in the "well-performing" countries. Comparing the Index 2023 results and the Index 2022 results, Germany experienced a drop by 2 positions in the ranking (9<sup>th</sup> in 2022), accompanied by the loss of one point in the respective score (62/100 in 2022)<sup>216</sup>.

<sup>213</sup> Political System – Leaders: Germany, Europe's largest economy and the most populous country in the EU, is located in the western region of central Europe and is a federal, parliamentary, representative democratic republic. The president Frank-Walter Steinmeier is the head of state, and the chancellor Olaf Scholz is the head of government since December 2021; the latter formed a coalition with the Greens and business-friendly Free Democrats, becoming the first Social Democrat chancellor since 2005, while taking over from the Christian Democrat Angela Merkel, Germany's first female chancellor, who governed for 16 years (in coalition with either the Free Democrats or the Social Democrats). The main characteristic of Germany's federal state is that responsibilities for certain subject areas are divided between the federal government and the individual states .

<sup>214</sup> Centre for Media Pluralism and Media Freedom, Monitoring Media Pluralism in the Digital Era: Germany Country Report, June 2023, [https://cadmus.eui.eu/bitstream/handle/1814/75723/Germany\\_results\\_mpm\\_2023\\_cmpf.pdf?sequence=1&isAllowed=y](https://cadmus.eui.eu/bitstream/handle/1814/75723/Germany_results_mpm_2023_cmpf.pdf?sequence=1&isAllowed=y)

<sup>215</sup> BBC, Germany Media Guide, updated 28/08/2023, <https://www.bbc.com/news/world-europe-17301193>

<sup>216</sup> Marin Lessenski, Statistical processing: Petia Brainova, Dragomira Belcheva, "Bye, bye, birdie": Meeting the Challenges of Disinformation. The Media Literacy Index 2023. Measuring Vulnerability of Societies to Disinformation. Policy brief. Media Literacy Index 2023 Report. Open Society Institute – Sofia. Available at: <https://osis.bg/wp-content/uploads/2023/06/MLI-report-in-English-22.06.pdf>

According to the 2023 Media Pluralism Monitor (MPM)<sup>217</sup> the country's overall scores are considered to be satisfactory, as media diversity benefits from strong public broadcasting. However, major digital communication platforms are seen as a threat to media diversity, due to their large share of advertising budgets and their increasing role as gatekeepers for news and channels for disinformation. German lawmakers began to introduce legal regulations to counter these risks, prescribing transparency and non-discrimination for media intermediaries (e.g., social networks, search engines) and extending journalistic due diligence to all distribution channels of information services (Instagram, YouTube, etc.). However, some of these risks are still considered to be high in the digital environment, particularly in the areas of Fundamental Protection, Political Independence and Social Inclusiveness; although recent media law legislation has been focused on the digital sphere, concerns have risen that some critical issues have not been addressed, such as equal opportunities in online election campaigns and insufficient media concentration law.

Regarding the protection of Freedom of Expression, this is protected by law and the German state does not apply arbitrary censorship on the Internet. In 2022, the "Act to Combat Right-Wing Extremism and Hate Crime" came into force, while the "Network Enforcement Act/NetzDG" (effective since 2018) obliges social networks to report certain content to the Federal Criminal Police Office if there are concrete indications relevant to criminal law that pose a threat to the democratic constitutional state, a violation of public order, child pornography, threats against life, sexual self-determination, physical integrity or personal freedom and are not justified. However, in 2022 the Cologne Administrative Court ruled that some provision of the NetzDG violate the country-of-origin principle of the E-Commerce Directive and that the Federal Office of Justice is not independent enough to monitor compliance with the obligations under the NetzDG as the competent authority. Likewise, in 2023 the OVG Münster also exempted Meta from the application of the new cross-appeal procedure on similar grounds.

In terms of Social Inclusiveness, public broadcasters in Germany currently have a clear mandate to promote integration and social cohesion. Although there are no fixed public broadcasting times for certain groups, plurality is guaranteed by the internal bodies of the broadcasters; in addition, although minorities not recognized by law do not have systematic access to public airtime, they can do so through other programs and collaborations. As regards to Gender Equality, in recent years more and more females have been appointed to management positions, while Deutsche Welle for example achieved a weighted female representation of 50%. A noteworthy remark in terms of inclusiveness is that, as the reform of public broadcasting relies on digital transformation and the conversion of certain programs to online offerings, concerns arise on whether this reform will be at the expense of the older generation, since the latter continues to watch mainly classic TV.

Media Literacy on the other hand appears to be an increasing concern in the country, although it is currently considered to be a "medium" risk. The state media authorities are responsible for promoting media literacy (which is financed by the broadcasting contribution paid by households), projects aimed at improving media literacy are being funded, while combating hate speech and disinformation are highly prioritized. However, the ground for current critique is that media competence has traditionally been assigned to the individual state media authorities as a "state matter"; nationwide issues, such as disinformation, are therefore addressed in a federal "patchwork quilt" with varying degrees of intensity. Furthermore, promoting media competence in schools can also be assigned to the area of voluntary curricula; federal differences can be found here as well, as this remains a critical issue throughout Germany. Regarding the digital environment in particular, the two digital laws, the Network Enforcement Act and the Interstate Media Treaty, address the main issues of disinformation and hate speech (including deletion obligations, journalistic due diligence obligations, and transparency and non-discrimination), yet the extent to which the laws can provide a remedy has not yet been proven.

According to the RSF's World Press Freedom 2023 Index<sup>218</sup> Germany is placed 21<sup>st</sup> out of 180 countries in total, with a score of 81.91 points, demonstrating a 5-positions drop in comparison to the 2022 Index (16<sup>th</sup> in 2022, with a score of 82.04 points). Although Germans in general are favourable towards

<sup>217</sup> Centre for Media Pluralism and Media Freedom, *Monitoring Media Pluralism in the Digital Era: Germany Country Report*, June 2023,

[https://cadmus.eui.eu/bitstream/handle/1814/75723/Germany\\_results\\_mpm\\_2023\\_cmpf.pdf?sequence=1&isAllowed=y](https://cadmus.eui.eu/bitstream/handle/1814/75723/Germany_results_mpm_2023_cmpf.pdf?sequence=1&isAllowed=y)

<sup>218</sup> Reporters Without Borders, *Word Press Freedom 2023 Index: Germany Country Profile*, <https://rsf.org/en/country/germany>

journalism, violence and verbal attacks seem to be on the rise. Economic reasons have led to the erosion of media pluralism since the 1990s, where local newspapers were most affected. Previously large selling tabloids and quality papers lost a great share of their readers as the online versions became increasingly popular. Although the internet and social networks created new possibilities for independent reporting, big companies sometimes use Strategic Lawsuits Against Public Participation (SLAPPs) to intimidate the press. Moreover, female journalists and people of colour covering gender issues and racism deal with increasing hostility on social networks. Similarly, journalists covering the COVID-19-related measures were also increasingly accused of being pro-government, while some were also subjected to attacks during demonstrations. Most attacks against journalists in general are attributable to right-wing or far-right actors, while some are perpetrated by individuals close to the radical left, as well as the police.

Moreover, although the level of basic digital skills and basic digital content creation skills is lower than the EU average, the proportion of specialists in information and communications technology (ICT) exceeds the EU average; 49% of individuals have at least basic digital skills (EU 54%) and 65% have at least basic digital content creation skills (EU 66%). ICT specialists make up 4.9% of the labour force (compared to the EU average of 4.5%), and 4.9% of all graduates (compared to the EU average of 3.5%) are ICT graduates. The proportion of female ICT specialists is equal to the EU average, at 19%. In 2020, 24% of German businesses provided specialised ICT training for their employees. Furthermore, several reforms are incorporated into the digital transition as part of Germany's recovery and resilience plan and, regarding Digital skills, the plan includes investments in four components: providing teachers with digital devices; creating a national skills platform; creating educational competence centres; and modernising educational facilities of the national military. Investments relating to the Digitalisation of enterprises and the development and integration of digital technologies are also included in several measures.<sup>219</sup>

Whatsapp is the leading actively used service in Germany the past few years, were almost 84% of users confirmed this statement. Although WhatsApp is mainly a messaging service, certain features indicate similarities with social media networks, as sharing and posting between users still occurs, just not necessarily on a publicly accessible website. Facebook (61%) and Instagram (57.3%) are the next most popular platforms for the Germans<sup>220</sup>.

Furthermore, regarding the matter of influence of online actions in the following case on twitter (now known as X), what has been reported for a particular German far-right party, Alternative für Deutschland (AfD), is its digital activism using the *hashjacking strategy* (hijacking a hashtag, defined as using someone else's hashtag to promote one's own social media activity<sup>221</sup>). Hashtags were designed and utilised to create a "virtual community of interested listeners" when directing users to a particular topic. As reported by Eksi<sup>222</sup>, in the "research by the Alexander von Humboldt Institute for Internet and Society showed that the Far-right AfD supporters hijacked rising hashtags in 2020, including #FlattenTheCurve or #CoronaVirusDE (Fox, 2020). Most of the right-wing politicians use both their own party hashtags as well as the hashjacking method to strategically target opponent campaigns and to effectively polarize political discourse. As a result of their digital political communication strategy, they succeed not only online but also in elections (Darius & Stephany, 2019<sup>223</sup>)<sup>224</sup>. One can find supporting evidence to assert that parties, movements and the like, can organise and mobilise people through social media channels. Nonetheless, as analysed in a similar relevant article,

<sup>219</sup> Digital Skills & Jobs Platform, Germany: a snapshot of digital skills, 21/6/2023, <https://digital-skills-jobs.europa.eu/en/latest/briefs/germany-snapshot-digital-skills>

<sup>220</sup> Statista, Leading active social media and messaging platforms in Germany in 2022,

<https://www.statista.com/statistics/867539/top-active-social-media-platforms-in-germany/>

<sup>221</sup> Darius, Philipp & Stephany, Fabian. (2019). "Hashjacking" the Debate: Polarisation Strategies of Germany's Political Far-Right on Twitter. 10.1007/978-3-030-34971-4\_21.

<sup>222</sup> Sena Eksi (2022), *Digital Populism: The Internet and the Rise of Right-wing Populism*, ECPS. Available at: <https://www.populismstudies.org/digital-populism-the-internet-and-the-rise-of-right-wing-populism/>.

<sup>223</sup> Darius, Philipp & Stephany, Fabian. (2019). "Hashjacking" the Debate: Polarisation Strategies of Germany's Political Far-Right on Twitter. 10.1007/978-3-030-34971-4\_21.

<sup>224</sup> Sena Eksi (2022), *Digital Populism: The Internet and the Rise of Right-wing Populism*, ECPS. Available at: <https://www.populismstudies.org/digital-populism-the-internet-and-the-rise-of-right-wing-populism/>.

“disentangling the causal relation between online activities and the public sphere is notoriously difficult”<sup>225</sup>, what could be observed however is a “possible reinforcement process” among similar online communication strategies and “reactions of the audience: more radical posts lead to more user reactions and more reactions might eventually lead to more radicalized posts by the movement.”

From the data presented in the document for the Country Profiles some key takeaways are:

- **In terms of daily media consumption**, TV remains predominant (70%), and is followed by radio (58%), online news (42%), social networks (38%), written press (35%) and TV via internet (23%). Interestingly, 33% of the population has no access to social networks.<sup>226</sup>
  - Ages 15-24 more often use online social networks (89%) at least once a week and read news on the internet (77%) at least once a week, while only 33% read the written press at least once a week.<sup>227</sup>
  - Ages 25-39 prefer to read news on the internet (86%) at least once a week and watch television on a TV set (79%) at least once a week, followed by similar use of online social networks (75%) at least once a week; 50% read the written press at least once a week.<sup>228</sup>
  - Ages 40-54 present high preferences in watching television on a TV set (92%) consumed at least once a week; this is followed by listening to the radio (84%) at least once a week, reading news online (81%) at least once a week and using social networks (70%) at least once a week; written press is again the lowest in their preference (59%) consumed at least once a week.<sup>229</sup>
  - Ages 55+ also have a clear preference in watching television on a TV set (95%) at least once a week, while their second preference is the radio (84%) consumed at least once a week; written press holds the highest percentage in this age group (80%) consumed at least once a week; online news (45%) and social networks appear to be the less popular mean (32%) consumed at least once a week.<sup>230</sup>
- **As regards to the use of social media platforms in particular:**
  - ages 15-24 mostly use Whatsapp (88%), equally Youtube and Instagram (80%), followed by Snapchat (53%)<sup>231</sup>
  - ages 25-39 also prefer Whatsapp (80%), followed by Youtube (66%) and Facebook (63%)<sup>232</sup>
  - ages 40-54 again prefer Whatsapp (78%), followed by Facebook (57%) and Youtube (51%)<sup>233</sup>
  - ages 55+ present the least use of social media, where Whatsapp is preferred by 67%, Facebook by 48% and Youtube (35%)<sup>234</sup>
- **As regards to accessing news**, 73% of the population shows a clear preference for TV, while Radio is preferred by 47% and online news platforms by 38%. Podcasts remain the least popular mean (6%).<sup>235</sup> In particular:
  - ages 15-24 prefer TV (46%) Youtube/other video platforms (40%) and social media platforms (49%)<sup>236</sup>
  - ages 25-39 again prefer the TV (59%), while online news platforms (48%) and the radio (44%) are next<sup>237</sup>

<sup>225</sup> Schwemmer, C. (2021). The Limited Influence of Right-Wing Movements on Social Media User Engagement. *Social Media + Society*, 7(3). <https://doi.org/10.1177/20563051211041650>, p.10.

<sup>226</sup> European Union (2022). ‘Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022’. Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>227</sup> Ibid.

<sup>228</sup> Ibid.

<sup>229</sup> Ibid.

<sup>230</sup> Ibid.

<sup>231</sup> European Parliament (2022). ‘Flash Eurobarometer FL011EP: Media & News Survey’. Available at: [https://data.europa.eu/data/datasets/s2832\\_fl011ep\\_eng?locale=en](https://data.europa.eu/data/datasets/s2832_fl011ep_eng?locale=en).

<sup>232</sup> Ibid.

<sup>233</sup> Ibid.

<sup>234</sup> Ibid.

<sup>235</sup> Ibid.

<sup>236</sup> Ibid.

<sup>237</sup> Ibid.

- ages 40-54 also have a clear preference for TV (74%), while some use the radio (50%) and online news platforms (42%).<sup>238</sup>
- ages 55+ similarly have a clear preference for TV (87%) and the radio (48%) and some for the written press (34%).<sup>239</sup>
- **As regards to trust in news sources**, interestingly the public TV and radio stations, as well as the written press (including online presence), seem to be the most trusted means across age groups.<sup>240</sup>
  - Public TV/Radio is trusted by 70% (highest) in ages 55+ and 53% (lowest) in ages 25-39.<sup>241</sup>
  - the written press is trusted by 45% (highest) in ages 55+ and 38% (lowest) in ages 15-24 and 25-39.<sup>242</sup>
  - Other online news platforms (podcasts etc) and influencers seem to enjoy the least trust by all age groups, ranging from 1% to 13%.<sup>243</sup>
  - Ages 15-24 however show some trust also in Youtube/video platforms (17%) and people/groups followed on social media/messaging platforms (16%).<sup>244</sup>
- **As regards to the acknowledgment of D&FN and their existence within the country**, 34% strongly consider it as an actual issue for Germany, 38% tend to believe it is an issue, while 20% in total either tend to, or totally disagree that this constitutes an issue.<sup>245</sup> Furthermore, 57% of Germans agree/or tend to agree that they often come across D&FN, while 9% totally disagree with that statement.<sup>246</sup> Moreover, 65% feel or tend to feel confident in identifying D&FN, while 29% feel less or no confidence at all in this regard.<sup>247</sup> In terms of confidence,
  - Considering the respondents age groups, ages 15-24 (71%) and ages 40-54 (72%) feel equally confident, while ages 55+ are the least confident (58%).<sup>248</sup>
  - Considering the respondents' level of education, people that are still studying are the most confident (75%), ages 20+ feel slightly less confident (73%), while ages 15-19 range from 49% to 60%.<sup>249</sup>
  - Considering the respondents' placement in the political spectrum, interestingly people placing themselves on the right (69%) and the left (71%) feel almost equally confident from all positions, while people in the centre (62%) are slightly less confident.<sup>250</sup>

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<sup>238</sup> Ibid.

<sup>239</sup> Ibid.

<sup>240</sup> Ibid.

<sup>241</sup> Ibid.

<sup>242</sup> Ibid.

<sup>243</sup> Ibid.

<sup>244</sup> Ibid.

<sup>245</sup> European Union (2022). ,Standard Eurobarometer STD96: Standard Eurobarometer 96 – Winter 2021-2022'.

Available at: [https://data.europa.eu/data/datasets/s2553\\_96\\_3\\_std96\\_eng?locale=en](https://data.europa.eu/data/datasets/s2553_96_3_std96_eng?locale=en).

<sup>246</sup> Ibid.

<sup>247</sup> Ibid.

<sup>248</sup> Ibid.

<sup>249</sup> Ibid.

<sup>250</sup> Ibid.