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Democracy Dysfunctions and Citizens' Digital Agency in Highly Contaminated Digital Information Ecosystems

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Abstract

Social media platforms have been recognized as significant contributors to the dissemination of polarizing content, the spread of disinformation, and the proliferation of far-right populist discourse. While certain political actors deliberately seek to disseminate disinformation, a more nuanced understanding is necessary to elucidate why users consume and accept this biased content. Using data from over 120,000 participants across five European and Spanish surveys, we empirically examined the relationships between social media use, disinformation, false news, users' digital agency, far-right ideology, and far-right voting. We postulated that a lack of users' digital agency is a significant contributor to this phenomenon and found a significant association between users' low digital agency and the adoption of far-right ideologies (odds ratio [OR] = 1.16, 95% confidence interval [CI] 1.08–1.23). This association remained after controlling for trust in social media news, psychological and social factors, sociodemographic variables, and response bias.

Keywords: far-right ideology; trust in news from social media; digital agency; far-right voting behavior; nationally representative sample

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1. Introduction

The increasing dissemination of news with political meaning on social media platforms has had a detrimental effect on the integrity of digital information ecosystems, which are increasingly polluted with false and misleading news, thus becoming a conduit for polarization, and the growth of populist anti-systemic discourses [1–4].

This phenomenon has been further compounded by the rapid proliferation of social media within the population. A recent analysis of global trends indicates that the number of social media users worldwide reached 5.31 billion at the onset of April 2025, constituting 64.7% of the global population. The global trend is also substantiated in the European Union, where the study is centered. According to data from Eurostat, at the end of 2023, approximately 60% of European Union citizens were utilizing social media [5]. As of January 2025, Northern and Western Europe were the regions with the highest social network penetration rates globally, reaching 78.7 and 77.1 percent, respectively [6]. This data suggests that new social media platforms have the potential to disseminate information pollution (i.e., false news and disinformation) to a nearly global audience.

Information pollution, including malinformation, disinformation, and misinformation, has become pervasive in digital information ecosystems. Although some political actors are likely interested in disseminating this information, a more comprehensive understanding

is required to understand why users consume and share this polluted information. The present study hypothesized that a lack of digital agency might be responsible for the increased consumption and dissemination of biased populist political information and the increasing presence of populist parties in democratic institutions within highly digitized democratic societies. In this study, we empirically address this question by combining studies on the business of data, disinformation, and technological dependence and applying them to the analysis of the growing spread of populism in highly digitized democracies.

The conceptual underpinnings of our framework are rooted in the notion of information pollution, a concept that draws parallels with the analysis of industrial pollution [7]. Zuboff [8] proposed a four-phase process that characterizes the data industry's operations: Engagement, Extraction, Processing, and Revenue (EEPR). Engagement with internet applications and services facilitates data Extraction. This data flow is Processed and reprocessed to create tradable products and services, the marketing of which generates Revenue. Throughout the EEPR cycle, negative externalities manifest as information pollution and impaired human digital agency, which can lead to democratic dysfunctions and polarization.

Information pollution is the contamination of information sources with irrelevant, redundant, unsolicited, and low-value information [9] that can mislead individuals, groups, or information ecosystems. Research has shown that false information (i.e., information pollution) spreads at least six times faster, [10] and more widely than accurate information [11,12], so false information could increase the revenue generated by true information by a factor of six. This phenomenon helps to create a state of epistemic chaos [8] in which hoaxes, lies, anti-scientific and pseudo-scientific theories, conspiracy theories, and anti-system populisms thrive due to their ability to attract attention and spread rapidly.

Ecosystems affected by contaminated information pose risks to individuals and the social systems to which they belong. In an information-based society, threats to information integrity are threats to society [8]. When individuals are exposed to contaminated information ecosystems, their ability to make informed decisions is compromised due to the lack of integrity of the information available and the impairment of their digital agency during the EEPR cycle.

Human agency is defined as the capacity to initiate action, enabling individuals to regulate and control their cognition, motivation, and behavior through the influence of existing self-belief, such as self-efficacy [13]. Forethought, self-regulation, and self-reflection are the core characteristics of human agency. The tactics employed by the data industry to influence users to prolong their engagement [14–16] capitalize on users' limited digital agency, commodifying their behavior and generating economic value. Given the strong correlation between corrupt information and increased engagement [10], digital information ecosystems are at risk of widespread pollution. As a result, the EEPR cycle disseminates contaminated information within the ecosystem (i.e., disinformation) while concurrently eroding users' digital agency. The epistemic chaos thus created [8], coupled with the lack of user digital agency, is a breeding ground for biased and fallacious arguments and discourses that appeal to emotion rather than reason to flourish, expand, and colonize the information ecosystem, specifically the far-right populist discourse.

Low-digital human agency might contribute to the increased acceptance and dissemination of disinformation in several ways. First, the illusory truth effect posits that individuals often rely on unreliable cues, such as repetition, to assess the veracity of information, preferring these cues over more reliable ones, including prior knowledge or the reliability of the information source [17]. The illusory truth effect predicts that increased exposure to disinformation will result in an elevated perceived truthfulness of this polluted information. Users with low digital agency repeatedly exposed to such polluted informa-

tion will ultimately feel less unethical about sharing unambiguously false information [18]. Second, individuals with deregulated digital use (i.e., low digital agency) may be heavily influenced by the reward-based learning systems inherent in internet applications (i.e., social media platforms). In these systems, users form habits of sharing information that attracts the attention of others. Once established, these habits are triggered by cues on the application, without users giving full consideration to the potential consequences of their actions, such as the propagation of polluted information [19]. According to these views, low-digital agency might be responsible for increased pollution in the informational ecosystem. This phenomenon significantly engenders epistemic chaos, completely blurring the boundary between truth and falsehood.

Greater engagement enables a constant flow of personal data; however, this dynamic can have adverse consequences for users, potentially impacting their digital agency and psychological well-being [20]. While engagement allows access to content and services that satisfy some basic needs of individuals (e.g., information needs, social connectedness, etc.), it is also a gateway to increasingly polluted information ecosystems. These information ecosystems are at risk of contamination because corrupt information spillovers (e.g., mal-information, misinformation, and disinformation) are strongly correlated with increased engagement, which in turn drives the EEPR cycle, and thus generates profit.

The high penetration of social media and mobile devices has played a key role in the rise of populism in contemporary democracies [3,4,21,22]. Empirical research has demonstrated that digital platforms, which are driven by the imperatives of the EEPR cycle, can serve as a primary gateway to untrustworthy news websites [23] and as a communication hub for citizens with populist attitudes [24–27]. Political disinformation typically spreads using several tactics to instill uncertainty while promoting a false sense of agency in users, including clickbait, hoaxes, rumors, satire, propaganda, framing, and conspiracy theories [28]. In users lacking digital agency, regaining digital agency through disinformation exerts a powerful influence, ultimately conferring veracity upon what would otherwise be deemed untrue. In the context of political discourse on social media, which has been linked to the proliferation of far-right political disinformation, some users with low digital agency may seek to regain digital agency through the consumption of far-right disinformation. Some individuals may find disinformation valuable, as it can create a misleading sense of expertise in areas where uncertainty is prevalent [12,29], and may use that disinformation to gain a sense of control [30], spreading it to help others do the same. These dynamics harm the information environment.

The act of undermining human digital agency inherently entails the undermining of users' capacity for self-regulation [13]. When deregulated use is higher, commodification techniques are likely more effective at capturing attention and shaping users' online behavior. In the context of social media platforms as a conduit for biased far-right news information [31], the industry's techniques to drive user engagement [19] will have a pronounced impact on individuals with a propensity for unrestricted and addictive digital device usage. Consequently, it was anticipated that empirical observations would reveal elevated levels of device dependence, particularly a lack of digital agency with smartphones, among users who adhere to far-right ideology.

2. The Present Study

Our study centered on the repercussions of information pollution, which manifested as disinformation and false and misleading news, in highly digitized democracies. This information pollution, which spreads in digital information ecosystems due to its capacity to provoke engagement and enhance the EEPR cycle dominating the industry, has the potential to undermine the quality of democratic processes and outcomes. One political

dysfunction highly relevant to this study's goals was the proliferation of anti-system far-right discourses throughout the entire information ecosystem. Far-right arguments emphasize exclusive nationalist essentialism, counter-Enlightenment dogmatism, and political authoritarianism, conveying to the public a message of ethnic exaltation of the nation, anti-immigrant xenophobia, and anti-politician, anti-establishment populism [32]. Far-right populists are the ones who benefit most from the epistemic chaos that characterizes polluted information ecosystems in which facts are seen as matters of opinion, evidence is neglected, and conspiracy theories flourish [32]. Far-right-wing publishers have specialized in this type of polluting discharge [31], which allows them to viralize their ideas and exert a deleterious influence on digital information ecosystems. Those who are more engaged in seeking information about politics through new media are likely to encounter a greater quantity of far-right disinformation than reliable information [29]. Through this pathway, far-right discourses become more salient, particularly among individuals with low political interest [33].

The present study used data from five European and Spanish representative surveys to operationalize this conceptual background. The working hypothesis was that low digital agency is associated with an increased likelihood of espousing far-right ideology. The formulation of this working hypothesis was predicated on a preliminary empirical examination of our theoretical assumptions concerning the relationships between social media use, exposure to disinformation and false news, users' digital agency, and far-right ideology. A further examination was conducted to ascertain the relationships between social media use, far-right ideology, and far-right voting behavior. Such an examination was undertaken to explore the influence of social media in the rise of far-right parties in highly digitized democracies.

The prediction of far-right ideology is a quite complex endeavor that we did not seek to trivialize. To this end, the study controlled for sociodemographic variables, as previous research has shown that they may be related to political ideology (see analyses for the European context in [34–36], use of new social media [37,38], and digital overuse [20] which is indicative of low digital agency [39]).

Empirical research has also sought to elucidate the role that specific psychological characteristics may play in the genesis and perpetuation of extremist ideologies across the ideological spectrum: This line of research has identified various psychological correlates of far-right ideology, such as psychological distress [40] or personality traits [41], including low openness, low agreeableness, and high conscientiousness. Building on this line of research, we aimed to control for psychological factors such as depressive symptomatology and personality, as well as psychosocial factors such as social support, given the established links between these variables and political ideology, social media usage, digital overuse, and digital agency [42–48].

Recent research has examined the rise of far-right populism at a neighborhood scale. Findings of these studies suggest that far-right supporter groups vary across different geographical locations, particularly in areas marked by deprivation or social disorder, where the proliferation of far-right ideologies would be higher [49,50]. Urban studies have shown that conditions in marginalized and deprived urban areas may foster far-right support [51], and that in these neighborhoods, digital agency is particularly low [52], due to more prevalent digital overuse. Statistical control was implemented to account for the influence of social disorder on far-right ideology, thereby facilitating a more precise understanding of the net effect of digital agency on far-right ideology.

The study also sought to control for response bias statistically, as previous research has indicated that respondents may be reluctant to self-disclose their political ideology and other sensitive questions related to social media usage and digital agency [20,52–56].

3. Methods

3.1. Participants

The study drew upon data from five European and Spanish representative surveys conducted between 2021 and 2024, incorporating responses from nearly 120,000 respondents (N = 120,739). A diverse range of variables derived from the survey data was employed to empirically substantiate the principal objectives of the study. A summary of the participants in each survey is presented as follows: (1) The Eurobarometer 94.3 survey was conducted between February and March 2021 among 38,718 participants aged 15 years and older from 27 EU member states and twelve non-EU member European countries. (2) Eurobarometer 96.3 was conducted in January and February of 2022 among 37,487 participants 15 years and older from the 27 EU members. (3) The Eurobarometer 98.2 survey was conducted between January and March of 2023 among 37,793 participants aged 15 years and older from all 27 EU member states. In total, 113,998 participants completed the European surveys included in this study. (4) We used data from the Cybersecurity and Confidence in Spanish Households National Survey (CCSHNS), conducted by the National Observatory of Telecommunications and Information Society of the Spanish Ministry of Industry. The CCSHNS was conducted between January and June of 2023 among 3710 participants 15 years and older representative of the Spanish internet user population. (5) The 3441/0 barometer of the Center for Sociological Research (CIS; Centro de Investigaciones Sociológicas) was conducted in February 2024. In total, 7636 participants completed the Spanish surveys.

3.2. Procedure

The Eurobarometer is a publicly accessible survey conducted for the European Commission and encompasses a comprehensive range of topics such as trust in media, use of social networks, exposure to and attitudes toward disinformation in the media, sociodemographic, political ideology, and potential response bias. Eurobarometer surveys entail the periodic administration of face-to-face interviews with approximately 1000 subjects in each of the EU member states. The sampling design is a multi-stage, random probability sampling approach. The sampling is based on a random selection of sampling points, stratified according to the distribution of the national resident population across metropolitan, urban, and rural areas. This is done in a manner that is proportional to the population size (for total coverage of the country) and the population density. The primary sampling units (PSU) are selected from each of the administrative regions in every country. In the second stage, a cluster of addresses is selected from each sampled PSU. The addresses are chosen systematically using standard random route procedures, beginning with an initial address selected at random. In each household, a respondent is selected by a random procedure, such as the first birthday method. Where face-to-face interviews were not possible (due to the COVID pandemic), CATI (Computer Assisted Telephone Interview) was performed.

The CCSHNS cohort was selected to represent the general Spanish population of Internet users aged 15 and above with residential Internet access. PSUs were households, while the secondary PSUs were individuals within those households. First, a representative sample of Spanish households was selected, stratified by Autonomous Communities, locality size, social class, and number of persons in the household. Secondly, individuals aged 15 years and over who used the Internet within their respective households were identified and selected.

In the Spanish CIS survey, telephones were selected at random, with a probability of 22.2% for landline telephones and a probability of 77.8% for mobile telephones. Individuals were selected according to pre-established quotas based on sex and age. The strata were formed by crossing the 17 Spanish autonomous communities and the two Spanish

autonomous cities with habitat size. The questionnaires were administered via computer-assisted telephone interviewing (CATI) [57].

3.3. Variables

For a detailed account of the source and availability of each variable in the study, please refer to the table provided (see Table 1).

Table 1. Variables available (X) in each of the five surveys included in the study.

	Eurobarometer			Spain	
	2021	**2022**	**2023**	**CCSHNS**	**CIS**
	N = 38,718	**N = 37,847**	**N = 37,793**	**N = 3710**	**N = 3926**
Political Ideology	X	X	X	X	X
Trust in news from the media	X	X	-	X	-
Use of social media	X	X	X	-	-
Political news from social media	-	-	-	-	X
Disinformation/False information	X	X	X	-	
Voting behavior	-	-	-	-	X
Lack of digital agency	-	-	-	X	-
Psychosocial well-being	-	-	-	X	-
Personality	-	-	-	X	-
Neighborhood social disorder	-	-	-	X	-
Sociodemographic	X	X	X	X	X
Response bias	-	X	X	X	X

Political ideology. The respondents were requested to categorize their political ideology on a scale that ranged from the most left-wing to the most right-wing positions. In all Eurobarometer and the Spanish CIS surveys, the scale ranged from 1 to 10. In the CCSHNS, the scale ranged from 1 to 7. For a scale of 1–10, responses were recoded under the following scheme: 1–2 = extreme left, 3–4 = left, 5–6 = center, 7–8 = right, and 9–10 = far right. Responses for the 1–7 scale were recoded as follows: 1 = extreme left, 2–3 = left, 4 = center, 5–6 = right, and 7 = far right. We also created a far-right ideology variable by collapsing extreme left, left, center, and right positions into 0 and far-right ones into 1.

Trust in news from the media. The respondents were asked to indicate their level of trust in news from a variety of sources, including traditional and new media outlets such as written press, radio, television, the internet, and social media. The responses were categorized as 1 = tend to trust and 2 = tend not to trust. Responses were then recoded so that higher scores indicated higher trust.

Use of social media. All the Eurobarometer assessed the frequency of use of social media with response categories ranging from 1 (indicating daily or almost daily use) to 6 (representing no use). The responses were collapsed into three categories: daily use (equivalent to daily or almost daily), 2–3 times a week, and rarely/never (equivalent to 2–3 times a month, less often than 2–3 times a month, and never). These coded categories were compared in Internet use (from 1 = every day to 4 = no access) through ANOVA, and results indicated that daily users, 2–3 times a week users, and non-users significantly differed in internet use as well ($p < 0.001$) across all three Eurobarometer surveys.

Political news from social media. The CIS Spanish survey requested that respondents indicate whether they followed the political campaign of the 2024 European general election through social media, including platforms such as Facebook, TikTok, Telegram, X, and others. The response categories were 1 = yes and 2 = no. The responses were recorded so that a higher score would indicate the use of social media.

Disinformation/False information. The Eurobarometer asked about respondents' exposure to false or misleading information in news media across various outlets and their ability to discern such content. Participants were prompted to rate their level of agreement or disagreement on a scale ranging from 1 (strongly agree) to 4 (strongly disagree). The responses were then recoded to create a scale where higher values represented greater agreement.

Voting behavior. Far-right vote in European elections in 2024. The respondents were requested to recall their vote in the previous European general elections, held in June 2024, from a comprehensive list of all Spanish parties that were presented at these elections. The responses were recoded as follows: a far-right vote was recorded as 1 if the respondent indicated that they voted for VOX or Se acabó la fiesta (The party is over), and 0 if they voted for any other party on the list. The two parties in question had a broad electoral base (14.2% of the votes in the 2024 European elections), and were typically characterized by the Spanish national media as belonging to the far-right political spectrum. Previous far-right vote in Spanish general elections in 2023. A comparable methodology was employed to code the preceding far-right vote, though in this instance, solely the VOX vote (12.4% of the total vote in the 2023 Spanish General Elections) was designated as such, as Se acabó la fiesta did not participate in the 2023 Spanish general elections.

Digital agency. Individuals who exhibit addictive behaviors are assumed to lack agency [58–62]. In the context of digital agency, we employed problematic smartphone use or addiction as a proxy measure of lack of digital agency, as recent research has shown that measures of problematic social media use and agency are negatively and strongly correlated [39]. We used Bian and Leung's [63] criteria to assess the lack of digital agency, using data from eight items of their Smartphone Addiction Symptoms Scale (SAPS) that were most conceptually aligned with Internet addiction. While the items were originally coded from 1 (never) to 5 (most of the time), Bian and Leung considered only category responses 4 (many times) and 5 (most of the time) for the evaluation of addiction. All eight items were initially dichotomized (values 1 to 3 were recoded as '0', and values 4 to 5 were recoded as '1') and summed, resulting in a value ranging from '0' to '8' (Cronbach's $\alpha = 0.86$). Higher scores on the smartphone addiction scale were interpreted as indicative of lower digital agency.

Personality. These personality traits were assessed using an abbreviated version of the Big Five Inventory (BFI) [64], comprising 10 items with a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). Each trait was assessed with two items, with the following mean and standard deviation values: extraversion (M = 3.13, S.D. = 0.82), agreeableness (M = 2.68, S.D. = 0.70), conscientiousness (M = 3.75, S.D. = 0.77), neuroticism (M = 2.81, S.D. = 0.85), and openness (M = 3.47, S.D. = 0.79). All Cronbach's $\alpha \geq 0.65$ (see also 45).

Neighborhood social disorder. Neighborhood social disorder was operationalized using four items, rated on a 5-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). The items assessed four domains: (1) violence (fights, sexual aggressions, family violence, robberies, assaults, etc.); (2) drug traffic and drug use; (3) nightlife; and (4) lack of social services and social resources [52]. The items were summed and averaged (M = 2.37, SD = 0.93), yielding a Cronbach's α coefficient of 0.85.

Sociodemographic. Age was measured in years. Sex was measured as male = 1 and female = 2 in all five surveys. In the three Eurobarometer surveys, income was measured based on respondents' reports of difficulty paying their bills during the previous year (1 = most of the time, 2 = from time to time, and 3 = almost never/never). Higher scores on this variable indicated higher income. The CCSHNS did not measure income. For the CIS survey, respondents indicated their net household income, ranging from 1 = 5000 euros/month to 6 = less than 1100 euros/month (1134 euros being the mini-

mum interprofessional wage for the Spanish population at that time). Responses were recoded so that a higher score represented higher income. Social class was measured in the Spanish CIS survey using a scale from 1 = high/class to 5 = low class. Responses were recoded so that higher scores represented higher social class. The Eurobarometer measured community size by having respondents indicate the type of locality they lived in, ranging from 1 = rural area to 3 = large town. The CCSHNS measured community size on a 6-point scale ranging from 1 = less than 10,000 inhabitants to 6 = more than 500,000 inhabitants. The CIS survey employed a 7-point scale ranging from 1 = less than 2000 inhabitants to 7 = more than 1,000,000 inhabitants. Education was coded in the Eurobarometer 2021 for all countries on a 30-point scale ranging from 1 = the lowest level to 30 = the highest level. In the Eurobarometer 2022 and 2023, a scale ranging from 1 = pre-primary education level to 9 = doctoral or equivalent was employed in all countries. The CCSHNS measured educational background in a 3-point scale (1 = primary studies, 2 = secondary studies, and 3 = high education). The CIS survey did not measure educational background. All five surveys provided information about respondents' marital status, which was further recoded (0 = no, 1 = yes) as single, married/cohabiting, divorced/separated, or widowed.

Response bias. In most of the survey data utilized, except the Eurobarometer of 2021, a set of questions permitted the estimation of potential response bias. In the 2022 and 2023 Eurobarometer surveys, interviewers were instructed to evaluate the respondents' cooperation on a scale ranging from 1 (excellent) to 4 (poor). Higher scores on this variable were deemed indicative of a higher potential for response bias. In the CCSHNS, Strahan and Gerbasi's [65] abridged version of the Marlowe-Crowne social desirability scale was employed to mitigate the potential influence of response bias. The responses (from 1 = no to 2 = yes) were summed and averaged (M = 1.56, SD = 0.20), with higher scores indicating higher social desirability (Cronbach's $\alpha = 0.68$). In the CIS Spanish survey, interviewers were instructed to estimate the sincerity of respondents on a scale ranging from 1 (indicating a high degree of sincerity) to 4 (indicating a low degree of sincerity).

3.4. Analytical Strategy

First, we empirically evaluated the distribution of the study variables across the five ideological positioning categories to ascertain whether the far-right positioning could be considered a homogeneous group in comparison to the other ideological positioning groups. It was also done to determine the empirical tenability of the distinction between non-far-right and far-right positions. The comparative analyses included both chi-squared tests and analysis of variance (ANOVA) tests for categorical and continuous dependent variables, respectively. For the relationships between two categorical variables, chi-squared statistics were estimated. Although this statistic provided information on the overall relationship between two categorical variables, the corrected standardized residual was estimated for each cell. This statistic can be interpreted as a z-score with probabilities of 0.05, 0.01, and 0.001 for absolute values $|1.96|$, $|2.58|$, and $|3.26|$, respectively. For the ANOVAs, post hoc comparisons with Bonferroni correction were used.

Secondly, data from the Spanish CIS were employed to investigate the association between far-right ideology and far-right voting in the European general elections of June 2024 through multivariate binary logistic regressions. We included a set of predictors (previous far-right vote in the Spanish general election of 2023, far-right ideology, and political news from social media) alongside a range of socio-demographic and response bias variables as control variables.

Thirdly, following the accounting of far-right ideology on voting behavior, a further analysis was conducted to elucidate the role that lack of human digital agency played in explaining the far-right ideology net of the effect of other control, sociodemographic and

response bias covariates. Multivariate binary logistic regression analyses were performed using the CCSHNS data for this purpose. Non-multicollinearity among predictors was assumed for the variance inflation factor (VIF) ≤ 2. Also, Little's [66] test for missing values completely at random indicated that lack of agency, trust in news from social media, and political ideology missing values were distributed among these variables completely at random ($\chi^2 = 1.79$, df = 3, $p = 0.61$). An additional model 3a using EM estimation was also computed to account for missing data.

Size effects for chi-squared statistics were estimated using odds ratio and their 95% confidence intervals as well as the Cramer's ν statistic, which estimates the strength of the association between two variables. We used the following criteria commonly used in literature: for df = 2, ($\nu \geq 0.07$ (small); $\nu \geq 0.21$ (medium); $\nu \geq 0.35$ (large); for df = 4, $\nu \geq 0.05$ (small); $\nu \geq 0.15$ (medium); $\nu \geq 0.25$ (large). In logistic regression analyses, an approximation of effect size was employed using Menard's [67] b^*_M statistic. This statistic is interpreted as the predicted change in logits in standard deviation units per standard deviation unit increase in predictor k. This approach is consistent with the calculation of standardized regression coefficients (or beta coefficients) computed by linear regression. The b^*_M coefficient identifies which effects are stronger or weaker in a single equation model, thus allowing the rank ordering of effects. In comparisons of means, we used partial eta squared (ηp^2) to estimate effect sizes (small, $\eta p^2 \geq 0.01$; medium, $\eta p^2 \geq 0.06$; and large, $\eta p^2 \geq 0.14$). All analyses were conducted using the IBM SPSS Statistics (Version 27) and Mplus 8.7 [68] software.

4. Results

In the upper part of Table 2, the corrected standardized residuals obtained in the chi-squared analyses for each cell showed a consistent trend in all surveys: Far-right was positively associated with trust in news from social media in the 2021 Eurobarometer (standardized residual = 10.9, $p < 0.001$), the 2022 Eurobarometer (standardized residual = 9.1, $p < 0.001$), and the 2023 CCSHNS Spanish survey (standardized residual = 3.5, $p < 0.001$). These results suggested an association between trust in the new social media as providers of news and far-right ideological positions, albeit effect sizes were small or small-medium ($0.07 \geq$ effect sizes ≤ 0.12).

The lower part of Table 2 shows the mean distribution of exposure to disinformation and false news across different groups of social media users. Means were greater for frequent users: Eurobarometer 2021 (M = 3.02 (> 2.90, and > 2.83, p's < 0.05); Eurobarometer 2022 (M = 3.10 (>2.90, and >2.89, p's < 0.05); and Eurobarometer 2023 (M = 2.86 (>2.79, and >2.56, p's < 0.05). Frequent users also reported being more likely to recognize disinformation and false news than less frequent users in all three Eurobarometer: Eurobarometer 2021 (M = 2.95 (>2.86, and >2.71, p's < 0.05); Eurobarometer 2022 (M = 3.00 (>2.90, and >2.77, p's < 0.05); and Eurobarometer 2023 (M = 2.78 (>2.71, and >2.44, p's < 0.05). Effect sizes were small or medium-large ($0.11 \geq$ effect sizes ≤ 0.15) in the Eurobarometer 2021 and 2022 and small ($0.002 \geq$ effect sizes ≤ 0.005) in the Eurobarometer 2023 survey. We found a positive association between far-right ideology and frequent social media use in all three Eurobarometer (corrected standardized residuals ≥ 2.50, p's < 0.05). Effect sizes were small in all three surveys ($0.024 \geq$ effect sizes ≤ 0.046). The findings indicated two key points: first, that social media platforms appear to be associated with a heightened dissemination of disinformation and false information; and second, that traditional media outlets, including print media, radio, and television, are consistently perceived as less reliable by supporters of the far-right political spectrum. However, this does not imply that content in traditional media should be regarded as factual and truthful. The presence of propaganda and disinformation in such media is not an anomaly [69].

Table 2. Trust in News Media, disinformation, use of social media, and Political Ideology in three European and Spanish Representative Surveys.

	Eurobarometer (2021) [1]						Eurobarometer (2022) [1]						CCSHNS Spain [1]					
	Extreme-left	**Left**	**Centre**	**Right**	**Far-Right**	**Cramer's ν [3]**	**Extreme-Left**	**Left**	**Centre**	**Right**	**Far-Right**	**Cramer's ν [3]**	**Extreme-Left**	**Left**	**Centre**	**Right**	**Far-Right**	**Cramer's ν [3]**
Written Press	−0.7	16.4 ***	−13.5 ***	4.9 ***	−8.7 ***	0.11	0.5	10.8 ***	−9.06 ***	5.8 ***	−7.2 ***	0.09	−2.9 **	−1.3	−0.4	−2.2 *	−0.4	0.07
Radio	−3.5 ***	14.7 ***	−9.1 ***	4.1 ***	−8.3 ***	0.10	−3.4 ***	11.5 ***	−8.1 ***	6.2 ***	−8.5 ***	0.10	−3.0 **	2.8 **	0.4	−1.0	−1.9	0.06
TV	−3.5 ***	10.5	−8.6 ***	5.3 ***	−4.4 ***	0.08	4.9 ***	8.8 ***	−8.7 ***	3.6 ***	−1.3	0.07	−2.2 *	−1.4	2.0 *	0.6	0.0	0.04
Internet	−5.0 ***	−1.7	−3.7 ***	6.2 ***	5.9 ***	0.06	−6.1 ***	−3.4 ***	−1.2	5.9 ***	5.1 ***	0.06	1.3	−3.4 ***	−1.3	2.8 **	2.2 *	0.07
Social Media	−0.5	−8.2 ***	0.8	0.7	10.9 ***	0.07	−2.1 ***	−9.1 ***	3.7 ***	0.3	9.1 ***	0.07	0.9	−4.5 ***	−0.7	2.8 **	3.5 ***	0.12

	Eurobarometer 2021				Eurobarometer 2022				Eurobarometer 2023			
	Use of social media											
	Daily	2–3 times a week	Rarely/never	ηp^2	Daily	2–3 times a week	Rarely/never	ηp^2	Daily	2–3 times a week	Rarely/never	ηp^2
Exposure [2]	3.02 a	2.90 b	2.83 b	0.011	3.10 a	2.90 b	2.89 b	0.013	2.86 a	2.79 b	2.56 b	0.005
Identify [2]	2.95 a	2.86 b	2.77 b	0.012	3.00 a	2.80 b	2.77 b	0.015	2.78 a	2.71 b	2.44 b	0.002
Far-right (Yes) *	2.5 **	−3.7	−0.2	0.024	5.7 ***	−1.9	−3.3	0.046	2.5 **	−4.4	−0.8	0.029

Note: Eurobarometer: Ideology self-reported position (1 to 10) recorded as Extreme Left (1–2); Left (3–4); Centre (5–6); Right (7–8); Far Right (9–10). CCSHNS: Ideology self-reported position (1 to 7) recorded as Extreme Left (1); Left (2–3); Centre (4); Right (5–6); Far Right (7). [1] Numbers represent cell-standardized residuals. [2] Numbers represent means (a > b, $p < 0.05$). All comparisons are far-right versus all other ideological positions within each survey. a > b > c, $p < 0.05$. Partial eta squared (ηp^2) effect sizes: small, $\eta p^2 \geq 0.01$; medium, $\eta p^2 \geq 0.06$; and large, $\eta p^2 \geq 0.14$. [3] $\nu \geq 0.07$ (small); $\nu \geq 0.21$ (medium); $\nu \geq 0.35$ (large). * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Not shown in Table 2 for simplicity, of the 6897 respondents who did not use social media in the Eurobarometer 2021 survey, 783 (11.3%) indicated that they trusted news from this source. In the Eurobarometer 2022 survey, this percentage was 17.7%, while in the CCSHNS, it reached 17.5%. However, a greater proportion of respondents who expressed trust in news obtained from social media were also frequent users of these platforms. The findings of the Eurobarometer 2021 (29%, χ^2 = 573, 43, gl = 1, $p < 0.001$, corrected residual = 23.9, $p < 0.001$), and Eurobarometer 2022 (34.7%, χ^2 = 605.71, gl = 1, $p < 0.001$, corrected residual = 24.6, $p < 0.001$) provide compelling evidence in support of this assertion.

We analyzed the psychological and social characteristics of the far-right participants compared to those who align with other ideological orientations (see Table 3).

Table 3. Mean differences in psychosocial adjustment of far-right vs. non-far-right citizens. CCSHNS (Spain. N = 3710).

	Extreme Left	Left	Center	Right	Far-Right	ηp^2
Personality						0.12
Extraversion	3.11	3.15	3.18	3.12	3.11	0.01
Agreeableness	2.62	2.63 b	2.62 b	2.73	2.80 a	0.08
Conscientiousness	3.49 b	3.81 a	3.85 a	3.69 a	3.40 b	0.24
Neuroticism	2.93	2.83	2.77	2.78	2.87	0.02
Openness	3.58 a	3.61 a	3.49 a	3.35 b	3.32 b	0.21
Psychological Adjustment						0.16
Smartphone Addiction (lack of agency)	2.62 b	2.42 b	2.52 b	2.80 b	3.19 a	0.40
Depressive symptoms	1.90 b	1.88 b	1.90 b	2.00 b	2.18 a	0.15
Social support	3.40 a	3.57 a	3.51 a	3.32 a	3.00 b	0.18
Neighborhood social disorder	2.59 b	2.26 b	2.33 b	2.54 b	2.99 a	0.37
Social Desirability	1.51 b	1.56 a	1.58 a	1.55 a	1.50 b	0.11

a > b, $p < 0.05$. Comparisons are between far-right vs. extreme-left, left, center, and right, respectively. Partial eta squared (ηp^2) effect sizes: small, $\eta p^2 \geq 0.01$; medium, $\eta p^2 \geq 0.06$; and large, $\eta p^2 \geq 0.14$. Note: Ideology self-reported position (1 to 7) recorded as Extreme Left (1); Left (2–3); Centre (4); Right (5–6); Far Right (7).

No significant differences were found in Extraversion (F = 0.35, ns) and Neuroticism (F = 1.44, ns) while scores on Agreeableness (F = 8.22, $p = 0.004$), Conscientiousness (F = 45.08, $p < 0.001$), and Openness (F = 8.87, $p = 0.003$) differed across categories of political ideology. Far-right participants scored in Agreeableness (M = 2.80) higher than left (M = 2.63) and center (M = 2.62) participants and scored lower on Openness (M = 3.40) than the rest of the political spectrum. For Conscientiousness, participants in the extremes of the political spectrum (Extreme-left and far-right) scored significantly lower than participants in the middle of the political spectrum (left, center, and right).

Individuals with far right-wing views exhibited a significant lack of digital agency (M = 3.19), higher depressive symptoms (M = 2.18), and higher neighborhood perceived social disorder (M = 2.99), while reporting consistently lower levels of social support (M = 3.00) than respondents in other categories of political ideology. These individuals also demonstrated the lowest levels of social desirability (M = 1.50), which was similarly observed in those with extreme left-wing views (M = 1.51). For personality, larger effect sizes were found for conscientiousness (ηp^2 = 0.24) and openness (ηp^2 = 0.16). Lack of digital agency (ηp^2 = 0.40), neighborhood social disorder (ηp^2 = 0.37), depressive symptoms (ηp^2 = 0.15), and social support (ηp^2 = 0.18) showed large effect sizes. Social desirability showed a medium-large effect size (ηp^2 = 0.11).

Overall, results from Tables 2 and 3 showed how far-right participants were characterized by their higher exposure to disinformation and false news, higher self-perceived ability

to detect this disinformation, frequent social media usage, lower digital agency, higher depressive symptoms, higher perceived social disorder, lower social support, and lower social desirability. Due to the observed homogeneity among far-right citizens, we collapsed political ideology into non-far-right and far-right participants. Subsequent analyses were performed on these two groups of political ideology.

Spanish CIS survey. Analysis results on the relationship between Spanish participants' far-right ideology and far-right voting behavior in the European general elections held in June 2024 are presented in Table 4. The far-right vote in 2024 was largely predicted by the previous far-right vote in 2023 (O.R. = 27.29, 95% C.I.: 18.84, 39.53, $p < 0.001$), far-right ideology (O.R. = 4.77, 95% C.I: 3.00, 7.57, $p < 0.001$), and the consumption of political news on social media (O.R. = 3.13, 95% C.I: 2.15, 5.46, $p < 0.001$), as well as being male (O.R. = 0.64, 95% C.I: 0.47, 0.86, $p < 0.01$) and younger (O.R. = 0.98, 95% C.I: 0.97, 0.99, $p < 0.001$). An inspection of the b^*_M estimates in Table 4 helped to identify the far-right vote in the 2023 Spanish general elections ($b^*_M = 0.38$), political news from social media ($b^*_M = 0.28$), and far-right ideology ($b^*_M = 0.16$) as the main contributing factors that explained the far-right vote in the 2024 European general elections.

Table 4. Predicting vote to the extreme-right in European General Elections (2024). Multivariate binary logistic regression odds ratios and 95% Confidence Intervals. N = 3010 [1].

	OR and 95% CI	**b_M ***
Far-right vote in 2023 (Yes)	27.29 (18.84, 39.53) ***	0.38
Far-right ideology (Yes)	4.77 (3.00, 7.57) ***	0.16
Political news from social media (Yes)	3.13 (2.15, 4.56) ***	0.23
Sex (Female)	0.64 (0.47, 0.86) **	−0.09
Age	0.98 (0.97, 0.99) **	−0.12
Education	0.96 (0.83, 1.10)	−0.02
Household income	1.03 (0.92, 1.16)	0.01
Social Class	1.04 (0.91, 1.19)	0.02
Size of locality	0.97 (0.89, 1.06)	−0.02
Married/Cohabitating [a]	1.25 (0.84, 1.87)	0.05
Divorced/Separated [a]	1.28 (0.67, 2.43)	0.03
Widowed [a]	0.53 (0.17, 1.63)	−0.06
Sincere	1.34 (0.42, 4.32)	0.02

[a] Reference Category: single. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. [1] Missing responses excluded from analyses (n = 479) (did not vote in 2023/2024, or no response). b*M [67] statistic is interpreted as the predicted change in logits in standard deviation units per standard deviation unit increase in predictor k.

Spanish CCSHNS survey. Multivariate binary logistic analyses (Table 5) indicated that trust in news from social media (OR = 1.79, 95% C.I: 1.31, 2.66, $p < 0.001$) was a significant predictor of far-right ideology (Model 1). The inclusion of lack of agency as a predictor in Model 2 (OR = 1.25, 95% C.I: 1.19, 1.33, $p < 0.001$) resulted in a removal of the part of association between trust in news from social media and far-right ideology (OR = 1.40, C.I: 0.99, 1.93, $p < 0.05$). Part of the observed effects of trust in news from social media on far-right ideology in Model 1 could be attributed to the fact that respondents who expressed trust in social media news and showed low digital agency also tended to espouse far-right ideology (see Model 2). A complete removal of the effect of trust in news from social media was observed when psychosocial, social, sociodemographic, and response bias variables (Model 3) were included in the analyses. Notably, psychological (i.e., depressive symptoms) and social (i.e., social support) adjustment variables were not predictive of far-right ideology once lack of digital agency was considered (Model 3). According to their effect sizes, lack of digital agency was the largest contributor to far-right ideology ($b^*_M = 0.10$), followed by size of locality ($b^*_M = -0.09$). Also, low response bias was largely responsible for more frequent self-reported far-right ideology ($b^*_M = -0.07$).

Table 5. Multivariate binary logistic regression odds ratios and 95% Confidence Intervals of trust in social media and lack of digital agency on far-right political ideology (No/Yes). CCSHNS Spain (n = 2612).

	Model 1	Model 2	Model 3	Model 3 b^*_M's	Model 3a (n = 3645)
Trust social media	1.80 (1.31, 2.47) ***	1.40 (1.00, 1.94) *	1.28 (0.91, 1.81)	0.03	1.26 (0.90, 1.77)
Lack of digital agency		1.25 (1.19, 1.33) ***	1.16 (1.08, 1.23) ***	0.10	1.14 (1.07, 1.22) ***
Personality					
Extraversion			1.06 (0.85, 1.33)	0.01	1.02 (0.84, 1.24)
Agreeableness			1.08 (0.83, 1.41)	0.02	1.03 (0.82, 1.31)
Conscientiousness			0.73 (0.57, 0.94) *	−0.07	0.72 (0.58, 0.89) **
Neuroticism			0.81 (0.65, 1.03)	−0.05	0.83 (0.67, 1.01)
Openness			0.96 (0.76, 1.21)	−0.01	0.98 (0.80, 1.21)
Psychosocial adjustment					
Depressive symptoms			1.13 (0.86, 1.50)	0.03	1.07 (0.83, 1.16)
Social support			0.87 (0.72, 1.04)	−0.04	0.86 (0.75, 1.03)
Neighborhood social disorder			1.33 (1.12, 1.59) *	0.07	1.37 (1.17, 1.60) ***
Sociodemographic					
Sex (female)			1.09 (0.78, 1.52)	0.01	1.16 (0.87, 1.56)
Age			1.00 (0.99, 1.02)	0.00	1.00 (0.99, 1.01)
Education			1.01 (0.74, 1.39)	0.00	1.06 (0.80, 1.40)
Size of Locality			0.85 (0.77, 0.93) ***	−0.09	0.89 (0.82, 0.96) **
Married/Cohabitating [a]			1.70 (1.07, 2.70) *	0.07	1.59 (1.08, 2.35) *
Divorced/separated [a]			1.34 (0.60, 2.98)	0.02	1.33 (0.66, 2.65)
Widow [a]			1.46 (0.31, 6.45)	0.01	1.79 (0.49, 6.47)
Social Desirability			0.33 (0.19, 0.79) *	−0.07	0.33 (0.15, 0.73) **

[a] Reference category: single. Note: Model 3a used EM estimation to account for missing values. b^*_M [67] statistic is interpreted as the predicted change in logits in standard deviation units per standard deviation unit increase in predictor k. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

5. Discussion

Recent literature has linked the proliferation of digital social media to the dissemination of discourses associated with political extremism, particularly those of far-right views [1–4,70,71].

This investigation utilized representative data from over 120,000 individuals from three Eurobarometer surveys, which were representative of the European Union, and two surveys representative of the Spanish population to account for the widespread dissemination of far-right populism in digital communication ecosystems and society. In addition to the lucrative nature of disinformation [10], which is amplified by the operations of the data industry, we proposed that the lack of digital agency is a key factor contributing to the spread of far-right populism. The findings provided empirical support for our conceptual background and main working hypothesis.

The study first empirically linked social media to disinformation and false news. The empirical findings indicated that frequent social media users reported higher exposure to disinformation and false news than those who used these platforms less frequently or only occasionally. Consistent with the empirical literature highlighting that social media is a primary source of untrustworthy news and populist information [24–27], our findings further supported the conceptual approach depicting how the EEPR works with generating revenue from disinformation and false news.

We also found that disinformation from far-right political actors may particularly influence users who trust social media. Our findings, however, showed that approximately 11–17.5% of participants (depending on the sample surveyed) expressing trust in these informational sources reported minimal or no usage of these platforms. This finding illustrates how news from social media is liable to disseminate beyond the users initially targeted with potentially contaminated information [29], thus amplifying the impact of these informational spills. This phenomenon contributes to the propagation of disinformation within the social system.

The results of the present study also facilitated the psychological and social profiling of individuals who had adopted far-right ideological beliefs. The findings revealed that individuals who expressed far-right sympathies exhibited elevated levels of depressive symptomatology and diminished levels of social support. The psychological distinctions observed among far-right and non-far-right citizens were predominantly attributed to a single variable: lack of human digital agency. Once this digital agency was considered, most psychological variables no longer predicted far-right ideology.

The results of our study also indicated that far-right ideology significantly predicted far-right votes in the European general elections, beyond the impact of loyalty in far-right votes in previous elections. The present study's findings also revealed the role that consuming political news from social media played in explaining far-right voting, regardless of previous voting behavior, far-right ideology, and a set of sociodemographic and response bias covariates. This finding reflects the potential for far-right bias disinformation to proliferate on new social media platforms and its role in the rise of far-right political parties.

We finally examined the relationship between human digital agency and far-right ideology. The findings revealed that low digital agency was statistically associated with far-right ideology. Despite the established association between trust in news sources on social media and adherence to far-right ideology, part of this association can be attributed to the limited digital agency of users. Irrespective of their inclination towards or aversion to such information, the mere exposure to biased disinformation and false news, particularly under conditions of limited digital agency, has the potential to foster far-right ideology. This finding is consistent with scientific literature indicating that even in instances of distrust of disinformation stemming from sources with low credibility, both constant exposure to this

distorted information [17] and the reward-based behavioral model that directs user online behavior on social platforms [19,72] might increase the perceived truthfulness of biased and false information [18,73]. The present findings suggest that this phenomenon may be particularly salient in cases involving users lacking digital agency.

The findings of the present study corroborate our view that the EEPR cycle implemented by the data industry amplifies exposure to far-right disinformation. This is evidenced by the observation that frequent users of social media self-reported higher exposure to disinformation and demonstrated a positive association with far-right ideology. Furthermore, our research revealed a positive association between far-right voting patterns, far-right ideology, and the consumption of political information on social media platforms. According to these results, there is an empirical link between social media usage, far-right ideology, and far-right voting. The present study finally identified the lack of digital agency as a relevant factor in the rise of far-right populism. This lack of digital agency has been linked to addictive and problematic digital behavior in new social media [39]. The study shows that this digital and addictive behavior becomes a gateway to contaminated, digital ecosystems, where far-right populisms frequently viralize their messages. Estimates indicate that the profit ratio of contaminated versus uncontaminated information is six to one [10]. This suggests that the polluting discharges of the data industry serve as its relevant business driver, owing to their substantial capacity to engender engagement. At this point, the user's ability to avoid being adversely affected by inhabiting highly polluted digital ecosystems may well remain residual. As users traverse these contaminated digital ecosystems, they are subjected to increased exposure to biased or deliberately fallacious content. Concurrently, their digital agency in navigating and utilizing these digital landscapes is diminished. This is because the industry's techniques for enhancing the engagement phase are fundamentally based on minimizing the user's digital agency to prolong their interaction with digital services and applications that ensure a constant flow of data mining. In a type of never-ending loop, contaminated information increases engagement and boosts the EEPR cycle [8]. This results in decreased human digital agency and increased dumping of information pollutants into the digital ecosystem. Since far-right populist discourses have so far specialized in this kind of polluted information, their proposals spread very quickly in the digital ecosystem. In the context of epistemic chaos, the status of this contaminated information is equated with that of truthful information [29,74], allowing it to colonize the digital ecosystem. This process is enhanced by the low digital agency of users.

Strengths and Limitations

A notable strength of the study was the large sample size, with findings based on information from over 120,000 participants from five distinct and independent representative surveys. This approach has the potential to enhance the study's robustness and generalizability. The study design also incorporated a diverse array of constructs and variables while ensuring rigorous statistical control during the analyses performed. This strategy augmented the study's resilience and strength, thereby enhancing the robustness of its research findings. However, the study's design may have been constrained in its breadth. We were unable to locate information on the fundamental study variables (i.e., trust in news from social media, far-right ideology, voting for far-right parties, and low digital agency) from a single set of participants representative of the European Union and Spain. Consequently, we gathered limited information from each of the independent surveys and consolidated it to support the study's findings. Further empirical research will be needed to verify the core conceptual assumptions of the present study.

Although all the hypothesized relationships were statistically significant, a note is warranted about the practical significance of our findings. The effect sizes of the relation-

ship between social media, disinformation, and digital agency were small or medium. Conversely, the relationships between far-right ideology, digital agency, and psychological and social variables exhibited large effect sizes. Our findings are consistent with the extant literature examining the persuasive impact of political campaigns, where small effects are commonly observed [75], especially when political participation (i.e., voting) is low. Although some effects were small, they were detectable and may have practical relevance in highly disputed political campaigns

6. Conclusions

The data industry's heavy reliance on promoting user engagement with online services and applications has had a detrimental effect on the integrity of digital information ecosystems, which are increasingly polluted with false and misleading news, some of which originates from far-right populist editors. Unlike other polluting industries, the data industry's informational waste (e.g., malinformation, disinformation, and misinformation) generates more revenue than truthful information, leading the industry to prioritize information pollution over information integrity. This is simply a more profitable business strategy. Social media platforms, whose business model relies heavily on the trading of personal data, have been taking advantage of this pollution discard to guarantee revenue. In the context of information imbued with political significance, this phenomenon has resulted in the cultivation of engagement, including far-right biased information. This information has progressively dominated the information ecosystem, displacing less compelling content such as factual information. The industry imposes structural conditions that preconfigure the dissemination of immense information flows within digital ecosystems. These conditions have been identified in the literature as contributing to the corruption of informational digital ecosystems [19]. A salient question pertains to the underlying reasons that users exhibit a proclivity for this corrupted information, often preferring it over factual or truthful content [10]. The present study offers a potential explanation for this phenomenon: low digital agency might be responsible for the increased consumption and dissemination of far-right biased disinformation, as it could serve as a means for individuals to try to regain agency. The empirical results corroborate the claim, drawing upon data from over 120,000 individuals surveyed in the European Union and Spain. The findings indicate that individuals with lower digital agency are more likely to espouse far-right ideologies, with this likelihood independent of trust in news from social media, psychological factors, and sociodemographic and response bias variables.

As these results pertain to far-right populist discourses and their relationship with users' limited digital agency, from a more general perspective, the EEPR cycle implemented by the industry has the potential to function as a conduit for anti-systemic disinformation, which could lead to the deterioration of democratic functioning in highly digitized societies. The prevalence of information pollution in digital information ecosystems will inevitably result in the erosion of user agency. At that juncture, the user's digital activity, characterized by an absence of agency, might be influenced by automated information dissemination procedures administered by corporations that function within the domain of the data industry.

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