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Extraction and Analysis of Information Disorder Components in the Formation of Extra-Informationalism

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ABSTRACT

Information disorder, as one of the main challenges of the digital age, leads to the formation of repeated and repeated information seeking behaviors, known as Extra-informationalism. This phenomenon is the result of a complex interaction between four main components: sender, content, channels and receivers. Senders with political, economic and ideological motives, along with the use of opaque actors and the production of content based on artificial intelligence, try to manipulate public perception. Information content, with its inaccurate, emotional, complex and multimedia characteristics, increases cognitive load and ambiguity and leads audiences to repeatedly search for information. Digital channels, including content personalization algorithms and weaknesses in information monitoring and governance, facilitate the rapid and pervasive spread of disruptive information. Receivers are also more likely to be caught in the cycle of Extra-informationalism due to weaknesses in information and media literacy, cognitive biases and emotional and psychological states. Qualitative data analysis with MAXQDA software showed that these factors simultaneously reinforce multi-source and frequent search behaviors. The findings highlight the importance of designing information literacy programs, promoting digital well-being, and formulating effective policies on information governance, and provide a conceptual framework for understanding the mechanisms that create Extra-informationalism. **©authors**.

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1. Introduction

Today, information is continuously increasing and expanding in human daily activities—both in terms of the time spent accessing it and the diversity of information devices and services. This growth trend of information sometimes reaches a level where individuals' ability to process and effectively use information becomes limited, creating disruptions in their ability to respond to information needs. In the present era, information has become a confusing, contradictory, and sometimes disruptive factor due to the massive volume of data, the development of communication platforms, constant access to information, and high cognitive load. In such circumstances, information not only fails to facilitate understanding but also becomes a source of crisis in judgment, decision-making, and the interpretation of reality (Bawden & Robinson, 2009).

In the 21st century, information disorder has emerged as a prominent challenge in information behavior. Wardle and Derakhshan (2017), the first researchers to systematically classify this phenomenon, define information disorder as the spread of false or misleading information within the information environment. They identify three distinct types:

- **Misinformation**: Content that is untrue, but the person sharing it does not realize it is false and has no intention to cause harm.
- **Disinformation**: Content that is intentionally false and designed to cause harm, motivated by financial, political, or psychological factors.
- **Malinformation**: Information shared with the intent to cause harm, often involving private information released to damage a person or reputation.

Information disorder disrupts cognitive processing by creating ambiguity, contradiction, and complexity in messages, leading individuals to seek information more frequently and intensively .One of the key phenomena related to the crisis of the information age is extra-informationalism. This phenomenon occurs when the need to acquire information increases unprecedentedly among a segment of society or all individuals, creating an obsessive and extreme tendency to continuously search for information for decision-making or to prevent real or perceived risks. Hassanzadeh (2020) first introduced this concept in an article titled "Extra-informationalism: The Challenge of Turning a Recession into a Boom." In this article, the researcher highlights the necessity of extra-informationalism in light of shifting social conditions and the consequent transformation of social entities—illustrated through the example of the global spread of COVID-19. Accordingly, the widespread outbreak of COVID-19 imposed a new order on the world, profoundly affecting social mechanisms, governance structures, and human interactions. Many businesses closed, while some adapted and began to offer their services in new forms within the online space. Consequently, citizens faced major changes in how they carry out their activities. Facing the contemporary global crisis, together with the widespread lack of information and the confusion of citizens about it, gave rise to difficult conditions. Therefore, both ordinary citizens and information and knowledge centers must have increasingly essential information needs readily available in crisis situations (Hassanzadeh, 2020). Based on this, extra-informationalism is achieved when the need to know increases unprecedentedly among some or all citizens. From the perspective of Hassanzadeh (2020), information centers can provide citizens with optimized access to information. For the purposes of this study, extra-informationalism is defined as a layered, complex, and multifaceted inclination toward knowing and searching for information that goes beyond rational and logical needs, arising from an obsessive desire to acquire information (Hassanzadeh, 2020). This tendency can be both a tool for understanding and decision-making, and a factor in disrupting a person's psychological and cognitive balance .In a causal context, extra-informationalism stems from a combination of several main causes: high levels of anxiety and intolerance of ambiguity, serious crises and challenges faced by individuals, and metacognitive beliefs about knowing (Hassanzadeh, 2020). These causes, in interaction with environmental conditions such as contradictory information or large volumes of information, lead to the formation of extreme information-seeking behaviors. In a functional context, the main consequences of extra-informationalism include unnecessary search repetition, cognitive fatigue, decision-making delay, and behavioral addiction to information (Hassanzadeh, 2020).

Given the research gap identified in the literature, the present study seeks to answer the following research question:

What are the components of information disorder—organized by sender, content, channel, and receiver—that contribute to the formation of extra-informationalism?

To address this gap, the present study focuses on the four fundamental components of information systems:

1. Sender – sources and producers of information
2. Content – the message and its characteristics
3. Channel – the medium and algorithms of transmission
4. Receiver – the audience and their cognitive characteristics

By systematically examining the characteristics of information disorder across these four components, this study aims to explain the mechanisms through which extra-informationalism emerges as a cognitive and behavioral consequence of exposure to disruptive information

2. Literature Review

As established in the introduction, information disorder refers to the spread of false or misleading information within the information environment (Wardle & Derakhshan, 2017), encompassing three distinct types: misinformation (unintentionally false content), disinformation (intentionally false content designed to cause harm), and malinformation (true information shared with malicious intent) (Kandel, 2020). To clarify the conceptual distinctions and prevent overlap or confusion of this construct with nearby and common concepts in the literature, its boundaries are explained in Table 1.

Table 1. *Explanation of the conceptual boundaries of Extra-informationalism*

Concept	Definition	Conceptual Focus	Relationship with Extra-informationalism
Information Seeking	A purposeful and conscious process of searching for information to fill a knowledge gap or solve a problem (Wilson, 1999)	Information behavior	Foundational or preparatory level for extra-informationalism
Extra-informationalism	An extreme tendency to search for and acquire information when needing clear decision-making in a complex, multifaceted, and ambiguous situation (Hassanzadeh, 2020)	Obsession with knowing and information behavior	Central concept of the research
Information Overload	A condition in which the volume or complexity of received information exceeds processing capacity (Shahrzadi et al., 2024)	Perceptual pressure	A possible consequence
Information Addiction	Pathological dependence on continuously receiving information (Duke& Montag, 2024)	Pathological use of digital platforms	A possible consequence
Digital Hoarding	Continuous accumulation of digital content without effective processing (Liu & Liu, 2025)	Collection of digital content	A possible consequence

Based on the distinctions in Table 1, extra-informationalism is distinguished from natural information seeking in four key features:

1. Motivation: Rooted in anxiety, obsession, or internal compulsion, not merely a cognitive need.
2. Behavioral pattern: Repetitive, uninterrupted, and lacking a clear end point.
3. Consequence: Leads to information saturation, mental fatigue, and functional impairment.
4. Function: A maladaptive and potentially harmful pattern, not an adaptive mechanism.

A review of selected studies shows that information disorder in digital environments and social networks is a complex and multidimensional phenomenon that involves the characteristics of content, sender, channel, and receiver, and affects individuals' information-seeking behaviors (Nasidi, 2022; Asaad et al., 2025; Chakrabarti et al., 2025)

From the perspective of information disorder, Gaeta et al. (2025) showed that the characteristics of information, even in the form of text and content, can disrupt individuals' cognitive processes and create the basis for complex and repetitive information-seeking behaviors. Focusing on online social networks and media, the study identified a variety of cognitive weapons used by malicious actors, including the dissemination of misleading political news, fake science, and conspiracy theories. Using text analysis, extracting features related to information disorder and evaluating them through machine learning methods, Rough Set

Theory, and Explainable Artificial Intelligence (XAI), the researchers demonstrated that features in the areas of readability, psychology, and language play a significant role in classifying and identifying information disorder. This study shows that in cognitive warfare, information can act as a cognitive weapon and that the psychological, linguistic, and readability characteristics of content play a decisive role in causing disorder.

Dewitz (2025) examined digital information behavior and mental well-being in individuals with social anxiety disorder. This research suggests that individuals' digital information environments are shaped by psychological and social factors, and that individuals use digital tools to improve or regulate their mental well-being. In this study, information seeking was identified as a key factor for self-care and increased mental well-being, while disruptive phenomena such as information overload and information anxiety can limit mental well-being and lead to information avoidance.

This study focuses on the recipient dimension and shows how people with social anxiety disorder exhibit frequent and intensive information-seeking behaviors under information pressure and information overload to maintain their mental well-being.

Wu et al. (2024) studied the contextual information needs of people with obsessive-compulsive disorder (OCD) during life transitions. The study shows that the information needs of people with OCD at different stages of life, including understanding, negotiating, and problem solving, are very complex and dynamic, and are constantly changing. The research data were collected from a content analysis of 1,500 online posts in a dedicated OCD forum and analyzed through two stages of open-coding. These findings indicate that recipients in complex information environments and under cognitive pressure require contextual and specific information, and exposure to large volumes or disruptive information can make their information-seeking behavior intensive, repetitive, and even obsessive.

Yap et al. (2025) examined the professional identity and knowledge-based practices of librarians in the context of information disorder. This research demonstrates that in complex and disruptive information environments, librarians, as educational institutions and information authorities, play a critical role in ensuring the accuracy and trustworthiness of information.

The conceptual framework presented emphasizes the interaction between professional identity, civic responsibilities, and knowledge-based practices, and suggests that the way senders produce, reproduce, and manage information can determine the quality of information and the degree of information disorder. These findings are of great importance for the present study because the sender and content components in information systems can be analyzed precisely within the framework of these interactions. The aforementioned study shows that knowledgeable and professional senders can reduce information disorder and maintain a healthy flow of information, which is very helpful for the systematic analysis of the four components of the present study.

Rödl and Haider's (2025) study examined how information disorders are organized in alternative media networks, with a particular focus on networks related to environmental issues and climate change in Sweden. The researchers showed that the use of performative links in search engines plays an important role in shaping and spreading information disorder. These performative links encourage users to "do their own research" and, through keyword suggestions, create and reinforce data voids. These findings are important for the present study, as they show that information channels and digital technologies can directly reinforce information disorder and shape frequent and intensive information-seeking behaviors. The findings from the reviewed studies suggest that extra-informationalism—the frequent, intensive, and sometimes obsessive desire to access information in the face of ambiguous, disruptive, or cognitively overloading information—is the product of a complex

interaction of four components of information systems (table 2).

Table 2. *The four information system components and their roles in extra-informationalism*

Component	Role in Extra-informationalism
Sender	Information sources and producers that can produce disruptive or healthy information
Receiver	Individuals with complex and sensitive information needs who are under cognitive strain
Content	The psychological, linguistic, readability, and quality characteristics of information that can be disruptive
Channel	The digital tools and networks that enhance or inhibit information disorder

A systematic review of selected studies reveals that most existing research has examined only one component of information systems in isolation. No existing study has systematically examined the interaction among all four components simultaneously and linked them to the phenomenon of extra-informationalism. Specifically, the following interactions remain unexplored**:**

- How sender characteristics interact with content features to trigger extra-informationalism
- How channel algorithms moderate the relationship between disruptive content and receiver behavior
- The combined effect of all four components on repetitive information-seeking patterns

The present study fills this gap by providing an integrated framework that explains how disruptive characteristics of information across all four components contribute to the formation of extra-informationalism.

3. Method

The present study is fundamental-exploratory in terms of its purpose and qualitative in terms of approach. This study aims to extract and analyze the components of information disorder in the formation of the phenomenon of extra-informationalism, with a focus on identifying the conceptual and cognitive mechanisms effective in this phenomenon.

For data analysis, this study employed the directed qualitative content analysis method (Hsieh & Shannon, 2005). This approach is appropriate when existing theory or prior research provides initial coding categories. The four-component framework (sender, content, channel, and receiver) served as the theoretical starting point, while allowing new categories to emerge from the data.

Research data were collected from scientific articles published in the Scopus database between 2021 and 2025. The search was used the following keywords: "Information Disorder," "Disinformation," "Malinformation," and "Misinformation." The search was limited to articles written in English, published in peer-reviewed journals, and within the subject areas of social sciences, computer science, and psychology. The selection process followed a four-stage systematic screening procedure. Table 3 summarizes the reduction process at each stage.

Table 3. *Article selection and screening process*

Stage	Description	Number of Articles
Initial search (Scopus)	Articles identified using specified keywords	308
Stage 1: Duplicate removal	Removal of duplicate records	298
Stage 2: Title and abstract screening	Exclusion based on relevance criteria	185
Stage 3: Full-text review	Application of inclusion/exclusion criteria	120
Stage 4: Quality assessment and saturation	Methodological quality evaluation	65

Stage 1 (Duplicate removal)

After the initial search, 10 duplicate records were removed, leaving 298 articles.

Stage 2 (Title and abstract screening)

Two reviewers (the author and a PhD candidate in information science) independently screened titles and abstracts based on the following inclusion criteria:

- Relevance to information disorder concepts
- Focus on at least one of the four components (sender, content, channel, receiver)

- Publication in peer-reviewed journals

Disagreements (n=23) were resolved through discussion. At this stage, 113 articles were excluded, leaving 185 articles.

***Stage 3 (Full-text review)*:** Full texts of the remaining 185 articles were assessed against the following exclusion criteria:

- Conference proceedings without full-text availability
- Preprints not yet peer-reviewed
- Studies focusing exclusively on technological solutions without behavioral components
- Opinion pieces or editorials

After full-text review, 65 articles were excluded, leaving 120 articles for further analysis.

Stage 4 (Quality assessment and theoretical saturation)

After the quality assessment, 55 articles were excluded (for not meeting the citation or CASP criteria), and the remaining 65 articles were included in the final analysis. The remaining 65 articles were analyzed. Theoretical saturation was reached when no new codes emerged in the final 10 articles analyzed. This process ensured that the research was based on the latest findings and the most reliable scientific sources, while data duplication was minimized and the content of the studies had appropriate theoretical and methodological diversity. The 65 selected articles were imported into MAXQDA 2020 software for qualitative data analysis.

Two coders (the author and a PhD candidate in information science) independently coded 20% of the articles (n=13) using an initial codebook derived from the four-component framework (sender, content, channel, receiver). The initial codebook contained 45 descriptive codes. Through constant comparison and weekly consensus meetings, codes were refined, merged, or split. Disagreements were discussed until consensus was reached. The final codebook contained 61 subcategories organized within 14 main categories. The remaining 52 articles were coded using the final codebook. Coding was organized in a hierarchical structure (child-parent) based on the conceptual role of the components in the theoretical model of the research. Table 4 provides an example of the coding structure.

Table 4. *Example of coding structure (excerpt from final codebook)*

Parent Code	Child Code	Definition	Example from Data
Sender	Targeted senders with political motives	Senders who intentionally spread false information to influence political outcomes	"Political campaigns responding to information disorder" (Ibrahim, 2025); "Political authorities originating disinformation" (Charney, 2025); "State and non-state actors in hybrid warfare" (Morejón-Llamas, 2022)
	Non-transparent actors	Anonymous accounts, trolls, bots, and hacker groups	"Anonymous accounts, political interest pages, foreign websites" (Giomelakis, 2024); "Bots and automated accounts" (Palau-Sampio et al., 2024); "Hacker groups" (Caramancion, 2022)
	Technology-centric production	Use of AI and deepfake technologies to generate misleading content	"AI-generated fake news and deepfakes" (Saeed & Almotairi, 2025); "Deepfakes using AI and machine learning" (Gregory, 2022)
	Violation of professional ethics	Lack of transparency, no fact-checking, media self-censorship	"Weak content management policies" (de-Lima-Santos, 2024)
Content	False and distorted nature	Misinformation, fake information, misleading content	"Fake news, hoaxes, distorted information" (affan, 2025); "Fake quotes, fabricated endorsements, distorted facts" (Ibrahim, 2025)
	Emotionally charged and polarized	Fear-mongering, angry content, hate speech	"Fear and sadness emotions" (Affan ,2025); "Negative emotions like fear and anger" (tay, 2025); "Hate speech with gender bias" (Blanco-Alfonso, 2022)
	Content complexity	Conspiratorial content, pseudoscience, post-truth narratives	"Conspiracy theories with blurred lines between fact and opinion" (Carvalho, 2025); "Pseudoscience and conspiracy theories" (affan, 2025)
	Multifaceted and realistic content	Combination of text, images, audio; high similarity to real content	"Manipulated videos, images, and reproduced sounds" (Palau-Sampio et al., 2024); "Deepfakes combining audio, video, and text" (Gregory, 2022)

Channel	Algorithmic amplification	Personalization algorithms, emotional hashtags, rapid spread	"Personalization algorithms and automated bots" (Saeed & Almotairi, 2025); "Engagement-reinforcing algorithms (emotional hashtags)" (Palau-Sampio, 2023)
	Lack of governance	Inauthentic platforms, weak content management policies	"Facebook's insufficient measures against information disorder" (de-Lima-Santos 2024); "Lack of digital service laws" (Navarro, 2024); "Weak moderation policies" (de-Lima-Santos, 2024)
	Alternative and closed platforms	Performative links, data voids, WhatsApp groups	"Closed digital environments like WhatsApp","Alternative media networks and performative links" (Palau-Sampio, 2023)
Receiver	Information literacy deficiency	Inability to verify sources, lack of familiarity with verification tools	"Low media literacy and lack of awareness" (Giomelakis, 2024); "Insufficient critical thinking skills" "Poor digital literacy" (Tomassi, 2024);
	Cognitive biases	Confirmation bias, false truth effect, in-group influence	"Confirmation bias and negative emotions" (Pillai & Kumar, 2025); "Cognitive biases like overconfidence" "Multilayer bias (gender and race)" (Martínez-Costa, 2023)
	Emotional and psychological states	Fear, anxiety, cognitive fatigue, news fatigue	"Fear, confusion, and reduced public trust" (Ibrahim, 2025); "Confusion due to topic complexity" "Helplessness, fatigue, and frustration" (de-Lima-Santos, 2024)
	Inability to process complexity	Conceptual confusion, inability to distinguish opinion from reality	"Difficulty distinguishing conspiracy theories from opinion articles" (Carvalho, 2025); "Inability to properly interpret messages" (Gaeta et al., 2025); "Confusion and reduced trust" (Thurston., & Fernández-Götz, 2021)

To ensure the reliability of the qualitative analysis, inter-coder reliability was calculated using Cohen's kappa (1960) coefficient. A random sample of 15 articles (23% of the total) was selected for this calculation.

Table 5. *Inter-coder agreement (Cohen's kappa) by category*

Category	Cohen's κ	Level of Agreement
Sender	0.85	Almost perfect
Content	0.79	Substantial
Channel	0.81	Almost perfect
Receiver	0.83	Almost perfect
Overall	0.82	Almost perfect

The overall κ = 0.82 (95% CI: 0.78-0.86) indicates almost perfect agreement according to Landis and Koch (1977).

To ensure the validity (trustworthiness) of the qualitative analysis, the following criteria were addressed based on Lincoln and Guba's (1985) framework (table 6):

Table 6*. validity of the qualitative analysis,*

Criterion	Implementation
Credibility (internal validity)	Prolonged engagement with data; Peer debriefing (3 review sessions with information science faculty); Member checking with two cited authors
Transferability (external validity)	Thick description of context, including temporal (2021-2025) and disciplinary scope of included articles
Dependability (reliability)	Audit trail maintained in MAXQDA 2020; All analytical steps documented; Codes reviewed by two information science experts
Confirmability (objectivity)	Reflexivity journal maintained; Triangulation across multiple coders and expert reviewers

Code frequencies were visualized using the Line Width Reflect feature of MAXQDA 2020 software. In this method, the thickness of the radial lines connecting the main themes to the central phenomenon is proportional to the frequency and intensity of each theme in the data. Thicker lines represent themes with higher frequency or more prominent contribution to shaping the phenomenon under study; thinner lines represent themes with lower presence or more limited role.

4. Findings

Based on the findings of the present study, 14 main categories and 61 subcategories were identified through the directed qualitative content analysis of 65 articles. Four main domains—sender, content, channel, and receiver were used to organize the components. This categorization provides a coherent framework for explaining the patterns of association between disruptive

factors and creates the necessary context for designing a four-domain conceptual model.

Table 7 presents the main categories and subcategories extracted from the analysis of the qualitative research data.

Table 7. *Main categories and subcategories of information disorder components in the emergence of extra-informationalism*

Row	Category	Subcategory
Sender	1. Targeted senders	Political motivations; Economic/profit motives; Ideological motivations; Manipulation of public opinion; Cultural invasion; Hybrid warfare/digital populism; Psychological operations
	2. Non -transparent and unreliable actors	Anonymous accounts; Trolls; Robots; Hacker groups; Influencers without professional responsibility; Fake websites and media; Fake pseudo-news agencies
	3.Technology-centric message production	Generating fake news with artificial intelligence; Deepfake (image, audio, video); Fake quotes; Stock images; Data and statistics manipulation
	4. Violation of ethics and professional responsibility	Lack of transparency; Lack of fact-checking; Media self-censorship; Guided narrative creation
Content	5. False and distorted nature	Misinformation; Fake information; Misleading information; Pseudoinformation; Selective deletion of information; Distorted narratives
	6.Emotionally charged and polarized	Fear-mongering content; Angry content; Hate speech; Negative stereotypes; Sentimental and sensationalist titles
	7. Content complexity	Conspiratorial content; Pseudoscience; Blurred line between fact and opinion; Data of uncertain accuracy; Post-truth narratives
	8.Multifaceted and realistic content	Combination of text, images and audio; High similarity to real content; Use of professional media formats; Superficial signs of credibility
Channel	9. Intensifying technical and algorithmic structures	Content Personalization Algorithms; Enhancing Interaction with Emotional Hashtags; Speed and Spread (Infodemic)
	10. Lack of oversight and information governance	Inauthentic channels and platforms; Lack of standards and digital services law; Weak content management policies and late removal
Receiver	11.Deficiency in information and media literacy	Inability to verify sources; Lack of familiarity with verification tools; Deficiency in digital literacy and information security
	12. Cognitive biases and vulnerabilities	Confirmation bias; False truth effect; Influence from in-group sources
	13. Emotional and psychological states	Fear, anger, anxiety, hopelessness; Cognitive fatigue and news frustration; Polarization and tendency towards partisan content
	14. Inability to process complexity	Conceptual confusion; Inability to distinguish between opinion and reality; Weakness in critical and independent thinking

To determine the relative importance of each component in the formation of extra-informationalism, code frequencies were calculated using MAXQDA 2020 software. In Figure 1, thicker lines indicate a higher frequency of codes, while thinner lines indicate a lower frequency of each component. This visualization helps to clarify the relative importance of the components and their role in the formation of extra-informationalism.

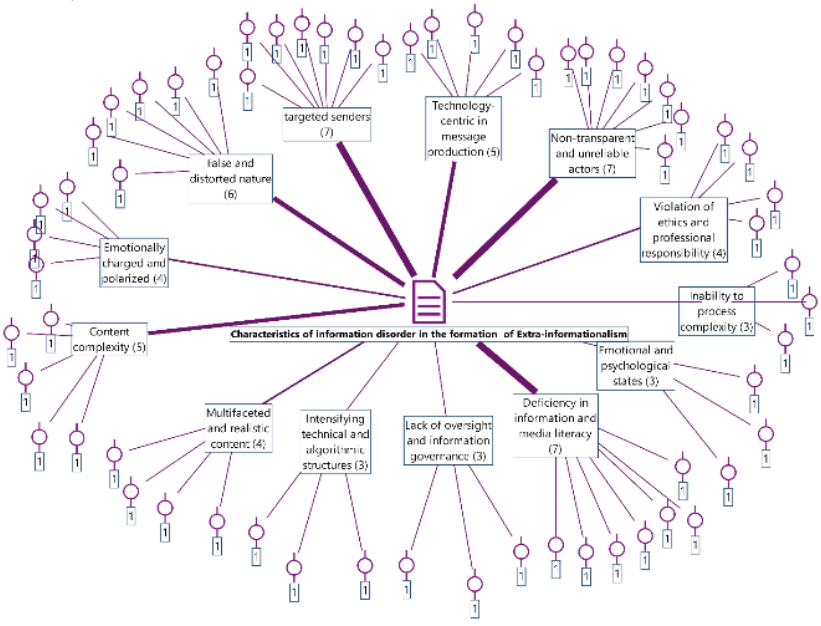

Figure 1. *Frequency of information disorder components in the emergence of extra-informationalism*

To determine the relative importance of each component in the formation of extra-informationalism, the frequency of each category across the 65 analyzed articles was calculated using MAXQDA 2020. Table 8 presents the distribution of categories based on the number of articles in which each category appeared.

Table 8. *Distribution of categories by frequency across 65 analyzed articles*

Category	Frequency (n articles)	Percentage
Targeted senders	52.65	80%
Emotionally charged and polarized content	48.65	74%
Cognitive biases and vulnerabilities	46.65	71%
Deficiency in information literacy	44.65	68%
False and distorted content	42.65	65%
Algorithmic structures	41.65	63%
Non-transparent actors	38.65	58%
Content complexity	35.65	54%
Emotional/psychological states	33.65	51%
Lack of governance	30.65	46%
Technology-centric production	28.65	43%
Multifaceted content	25.65	38%
Violation of ethics	22.65	34%
Inability to process complexity	20.65	31%

The frequency analysis reveals a clear hierarchy of components:

High-frequency components (≥60%):

- Targeted senders (80%) – the most documented component
- Emotionally charged content (74%)
- Cognitive biases (71%)
- Deficiency in information literacy (68%)
- False/distorted content (65%)

These findings indicate that sender characteristics and receiver vulnerabilities are the most extensively documented components in the existing literature.

Medium-frequency components (40-59%): Algorithmic structures (63%), non-transparent actors (58%), content complexity (54%), emotional/psychological states (51%), lack of governance (46%), technology-centric production (43%). These appear in approximately half of the articles, suggesting they are important but more context-dependent.

Low-frequency components (<40%): Multifaceted content (38%), violation of ethics (34%), inability to process complexity (31%). These represent potential gaps for future research

5. **Discussion**

The present study aimed to identify and explain the dimensions and components of extra-informationalism based on the characteristics of information disorder, through content analysis of selected articles in the Scopus database. The proposed model outlines the internal structure of this phenomenon based on in-depth qualitative data analysis and multi-stage coding. As illustrated in Figure 2, at the center of the model is the key phenomenon of extra-informationalism, with four main axes and 14 main themes organized around it as rays with a common origin. This arrangement shows the conceptual dependence and direct connection of each theme with the central phenomenon. The numbers inserted next to the themes provide a quantitative index of the frequency of concept appearance, allowing the model to describe both the semantic network of the phenomenon and the relative intensity of each concept.

Based on the results obtained, extra-informationalism is formed from a combination of conceptual, behavioral, and contextual factors. The interaction of these factors is associated with consequences such as the tendency to use, hoard, or reproduce information. Furthermore, the phenomenon of extra-informationalism is not simply an individual behavior or disorder but can also be considered a descriptive structure in the field of the philosophy of information science—a structure in which information is not only a passive element but also an active element in human and non-human networks.

- Sender-Level Components

Targeted senders: The findings indicate that a significant portion of information disorder is associated with purposeful senders whose activities are based on predefined motives

(political, economic, ideological). These patterns suggest that information disorder at the sender level is purposeful and strategic in nature. Such purposeful action creates an environment of ambiguity and information uncertainty, which may be associated with increased frequent and intensive information-seeking behaviors among recipients.

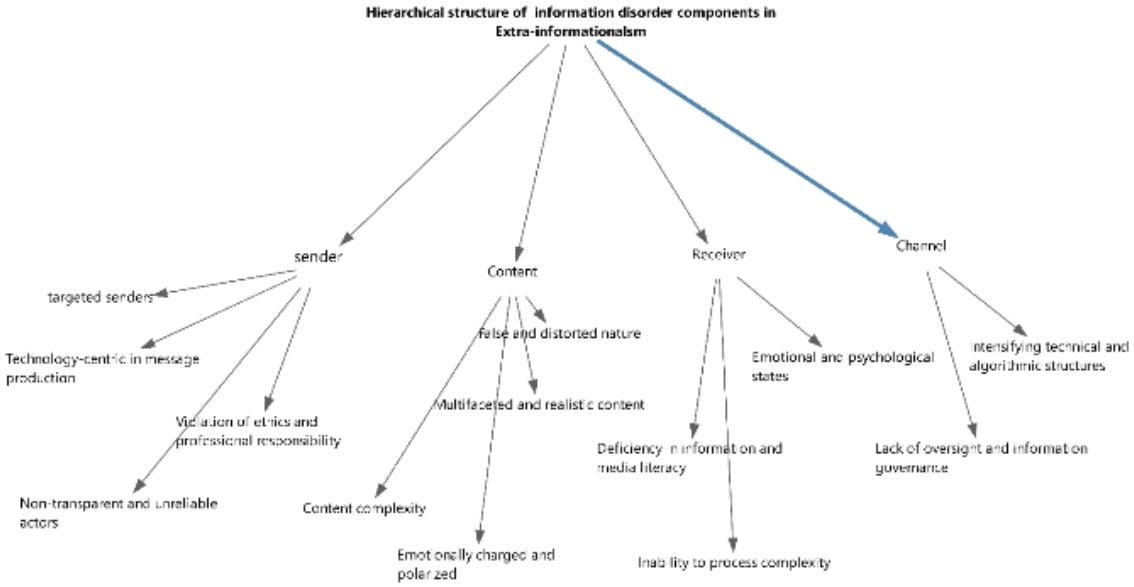

Figure 2. *Hierarchical structure of information disorder components in Extra-informationalsm*

Non-transparent and unreliable actors: The data point to the widespread presence of anonymous accounts, trolls, bots, hacker groups, and influencers without professional responsibility. A lack of transparency and accountability at the sender level appears to be a key factor associated with information disorder, making it difficult for recipients to distinguish between credible and unreliable sources.

Technology-centric message production: The use of artificial intelligence, deepfake technologies, and data manipulation enhances the apparent credibility of messages and makes it harder for recipients to assess information accuracy. The technical complexity of produced messages raises informational uncertainty and may push recipients toward repeatedly evaluating sources.

Violation of ethics and professional responsibility: Lack of transparency, absence of fact-checking, media self-censorship, and guided narrative creation weaken information trust. These practices foster an information environment where recipients may repeatedly seek information from multiple sources to attain cognitive certainty.

- Content-Level Components

False and distorted nature: Information disorder at the content level is associated with misinformation, fake information, misleading information, selective deletion, and distorted narratives. Distorted content increases information uncertainty, which is associated with frequent and multi-source searches.

Emotionally charged and polarized: Content based on fear, anger, hate speech, and negative stereotypes intensifies emotional reactions. Continuous exposure to such content is associated with increased emotional tension and cognitive uncertainty, leading recipients to repeatedly search for and confirm information.

Content complexity: Conspiratorial content, pseudoscience, and blurred lines between fact and opinion create cognitive confusion. This complexity is associated with increased anxiety about knowing and repeated searches for multiple sources.

Multifaceted and realistic content: Multimedia content with high similarity to real information reduces the audience's ability to detect fake messages. This apparent realism forces recipients to

repeatedly search for and verify multiple sources**.**

- Channel-Level Components

Algorithmic structures: Content personalization algorithms and emotional hashtags increase the reach, speed, and intensity of disruptive messages, providing conditions associated with extra-informationalism.

Lack of governance: Weaknesses in information governance, inauthentic platforms, and poor content management policies allow inaccurate content to spread widely. This results in increased ambiguity and continuous need for repeated information searches.

- Receiver-Level Components

Deficiency in information literacy: Many audiences lack the ability to verify sources and are deficient in digital literacy. This skill deficit is associated with repeated and extensive searches for new information.

Cognitive biases: Confirmation bias, false truth effect, and in-group influence play important roles in information processing. These biases are associated with repeated and multi-source searches to evaluate and confirm information.

Emotional and psychological states: Fear, anger, anxiety, cognitive fatigue, and news frustration increase cognitive vulnerability. These states are associated with continuous and multiple searches for information to reduce ambiguity.

Inability to process complexity: Conceptual confusion and weakness in critical thinking are associated with repeated and multi-source searches to achieve information certainty**.**

In summary, the findings suggest that extra-informationalism emerges from a complex interaction between sender, content, channel, and receiver components. Targeted senders use opaque, distorted, and emotional content production tactics to attract audience attention. Content with false, emotional, complex, and realistic characteristics increases ambiguity and cognitive pressure. At the channel level, personalization algorithms, emotional hashtags, high dissemination speed, and lack of governance facilitate rapid spread. Recipients with poor information literacy, cognitive biases, and psychological vulnerabilities are more likely to engage in repeated searches, comparing multiple sources, and continuously pursuing information to reduce ambiguity.

6. Conclusion

A systematic review of 65 reputable articles (2021-2025) and their analysis based on the communication framework (sender, content, channel, receiver) revealed that information disorder, as a harmful environmental context in encountering extra-informationalism, disrupts an individual's normal interaction with information and traps them in a dysfunctional cycle. This function can be explained at four interactive levels:

At the sender level: Much ambiguous or false information is not random but is produced by targeted senders with political, economic, or ideological motives. The use of techniques such as hybrid warfare, psychological operations, bots, and AI-generated fake news (deepfakes) blurs the line between reality and fiction. The first function of extra-informationalism is the individual's defensive reaction against systematic manipulation.

At the content level: The complexity and emotional polarization of content make rational processing difficult. Components such as emotional charge (fear-mongering, hate speech), content complexity (conspiracy theories, pseudoscience), and realism (multimedia simulation) prevent individuals from easily assessing source credibility, driving them toward confirmation bias and the false truth effect.

At the channel level: Personalized algorithms and infodemics spread false information faster than accurate information. Lack of governance, oversight, and weak content management policies pollute the information space, exposing individuals to massive volumes of contradictory information and exacerbating decision-making paralysis.

At the receiver level

Weaknesses in information literacy, cognitive vulnerabilities (confirmation bias), and negative emotional states (fear, anger, anxiety) prevent individuals from processing

environmental complexities. In response, individuals develop dysfunctional behaviors such as aimless exploration and excessive searching, which increase cognitive load and intensify the disorder.

Therefore, the function of extra-informationalism when encountering information disorder is a reaction to the environment.

While previous studies have examined individual components of information disorder—such as content characteristics (Gaeta et al., 2025), receiver dimensions (Dewitz, 2025; Wu et al., 2024), sender dimensions (Yap et al., 2025), and channel dimensions (Rödl & Haider, 2025)—no existing study has systematically examined the interaction among all four components simultaneously. The present study fills this gap by providing an integrated framework that explains how disruptive characteristics of information across all four components (sender, content, channel, receiver) contribute to the formation of extra-informationalism. In summary, the findings confirm that exposure to information disorder is the primary driving mechanism of extra-informationalism. However, unlike previous studies that emphasized only the "volume" or "quality" of information, this study demonstrates that "intentional engineering" and "algorithmic structures" play a more critical role in activating this cycle. The concept of the "receiver as a participant in the dysfunctional cycle"and the detailed analysis of targeted senders offer a novel perspective for managing information in disorder conditions.

Based on the findings of this study, the following directions for future research are suggested:

Operationalization of Extra-informationalism

Future studies should operationalize extra-informationalism using behavioral, cognitive, and emotional indicators. The operational definition provided in this study can serve as a starting point for developing measurement instruments.

Methodological Approaches

- Mixed methods (qualitative-quantitative) to validate and extend the proposed framework
- Experimental methods to examine causal relationships between information disorder components and extra-informationalism
- Longitudinal designs to track how extra-informationalism patterns change over time

Comparative Studies

- Different digital platforms (e.g., TikTok vs. Twitter vs. WhatsApp)
- Different cultural contexts
- Diverse user groups (by age, education, profession)

These comparisons would help assess the generalizability of the proposed conceptual framework.

Role of Technology

- The role of algorithms in exacerbating or reducing extra-informationalism
- Artificial intelligence mechanisms in content personalization
- The interaction between human users and AI-driven content recommendation systems

The research findings suggest that managing the consequences associated with extra-informationalism—including information overload and repetitive searching—may require multilevel interventions.

For Policymakers and Digital Platforms

It is recommended that policymakers and digital platform developers consider:

- Strengthening information governance mechanisms
- Enhancing sender transparency and accountability
- Monitoring content personalization algorithms to prevent reinforcement of repetitive search cycles
- Implementing clear standards for content moderation and timely removal of invalid information

For Information Literacy Programs

Designing and implementing advanced information and media literacy programs should focus on:

- Recognizing complex, emotional, and multimedia content
- Increasing awareness of cognitive biases (e.g., confirmation bias, false truth effect)
- Teaching strategies for critical evaluation of information sources
- Managing repetitive search behaviors

For Information Professionals

- The role of librarians, information specialists, and media educators should be strengthened in:
- Teaching strategies for critical evaluation of information
- Helping users manage repetitive search behaviors
- Promoting digital well-being and healthy information-seeking habits
- Serving as trusted intermediaries in complex information environments

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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