The Human Side of Service Engineering, Vol. 221, 2026, 133–142
https://doi.org/10.54941/ahfe1007717

Fight Infodemic and Fake News by AI-Human Driven Approach

Francesco Polese, Luca Carrubbo, Giuliana Sorvillo, and Mario Galderisi

University of Salerno, Dept. DISPS, Fisciano (SA), 84084, Italy

ABSTRACT

Disinformation, commonly referred to as fake news, represents a structural threat to the integrity of information ecosystems. The rapid diffusion of misleading and false content has contributed to an "infodemic" characterized by trust erosion, informational overload, and increasing news avoidance. While technological solutions have been proposed to counter these dynamics, their effectiveness remains limited without the integration of human interpretive capabilities. This study investigates the approach and management of fake news through the ecosystems lens, framing digital information environments as value-oriented ecosystems in which interactions among actors, technologies, and institutions shape informational outcomes. Adopting an interpretive and inductive approach, the paper uses a real co-financed R&D project titled "Trinity" as an empirical illustration of a human-machine configuration designed to manage disinformation. The analysis connects ecosystem value dynamics, with observable information phenomena. In this perspective, fake news and news avoidance are interpreted as interconnected manifestations of value co-destruction that undermine trust and reduce the system's corrective capacity, by reducing the translational gap between theoretical reflections on ecosystem value dynamics and the operational challenges of disinformation management in AI-mediated information environments. The findings suggest that hybrid human-machine interaction models can act as rebalancing mechanisms, combining the scalability of AI-based detection with the contextual judgment and ethical oversight of human actors. Such configurations can drive value co-creation processes by realigning trust, verification, and participation within the ecosystem.

Keywords: Fake news, Value co-destruction, Service ecosystems, Human-machine interaction

INTRODUCTION

Disinformation, commonly referred to as "fake news", poses a structural threat to the integrity of information ecosystems (Herrero et al., 2025). According to Jaster & Lanius (2018), fake news refers to news that deliberately distorts the truth, combining factual inaccuracy with the absence of genuine intent to inform. While the phenomenon is not new in the history of communication, digitalization has significantly accelerated its diffusion.

Based on data provided by Google Trends (accessed January 2026), the term "fake news" has seen a marked increase since 2016, coinciding with reports of Russian interference in the US presidential election (Allcott & Gentzkow, 2017;

Received February 6, 2026; Revised April 20, 2026; Accepted May 4, 2026; Available online July 20, 2026

Aïmeur et al., 2023). A second global peak occurred during the COVID-19 pandemic, when social isolation and the demand for certainties amid scientific uncertainty amplified the circulation of disinformation (Bracciale & Grisolia, 2020). This surge in fake news has been defined by the World Health Organization as an "infodemic" (WHO, 2020), contributing to a broader epistemological crisis (Carrasco-Farré, 2024). The trend is also confirmed in academic literature: a search in the Scopus database for the term "fake news" reveals an exponential growth in publications from 2017 onwards.

Although various technological solutions have been developed to mitigate disinformation, their effectiveness remains limited in the absence of human interpretive engagement (Mele et al., 2019). Addressing this challenge requires approaches capable of integrating technological scalability with contextual judgment.

This paper investigates how to manage fake news through the lens of Service Research, and more specifically Service Science (Maglio & Spohrer, 2008) and Service-Dominant Logic (Vargo & Lusch, 2004), a global framework that enables the analysis of value co-creation within socio-technical systems and the contextualization of disinformation within broader ecosystem dynamics (Mele & Polese, 2011; Polese et al., 2017a).

In this regard, the study seeks to answer the following research questions:

(RQ1) How does the process of fake news generation manifest itself within the digital information ecosystem?

(RQ2) How can human–machine interactions activate mechanisms able to mitigate and manage fake news?

The methodological approach adopted is interpretative and inductive, aimed at contributing to the reduction of the so-called "translational gap" between theoretical elaboration and practical application. To this end, the study analyzes a real co-financed R&D project titled "Trinity", aimed to realize and test a technological platform designed to manage fake news through human–machine collaboration. Rather than testing predefined hypotheses, the paper explores how concepts such as value co-creation and co-destruction manifest within a concrete application.

The paper is structured as follows: the first section outlines the theoretical overview, exploring the issues of fake news, information ecosystems, and value co-destruction processes. The second section describes the methodological framework. The third section presents the results of the case analysis and discusses their implications. Finally, the paper concludes with reflections on theoretical and practical contributions, research limitations, and directions for future investigation.

THEORETICAL OVERVIEW

This section outlines the conceptual framework adopted to interpret fake news and news avoidance as ecosystem-level phenomena. Rather than treating disinformation as an isolated communicative failure or an individual cognitive bias, the paper adopts an ecosystem perspective that emphasizes value dynamics, relational interactions, and value co-creation processes.

An Ecosystem Perspective on Digital Information

Digital information environments can be understood as information ecosystems composed of heterogeneous human and non-human actors, including users, journalists, platforms, algorithms, and institutional arrangements. These actors interact through the continuous integration of resources such as information, trust, and knowledge (Akaka et al., 2013). Within this perspective, value does not reside in information per se but emerges from relational and contextual processes of interaction (Vargo & Lusch, 2004; 2008; 2016).

Starting from Service Dominant Logic (Vargo & Lusch, 2004) and Service Science (Maglio & Spohrer, 2008) axioms and foundational premises, a contribution to this view came in terms of ecosystems conceptualization, first as "a relatively autonomous and self-regulating system of resource-integrating actors, connected by shared institutions (institutional arrangements) and mutual value creation through the exchange of services" (Taillard et al., 2016) and then, as "configurations oriented toward value creation and value realization" (Polese & Carrubbo, 2016). When interactions are aligned, transparent, and governed by shared norms and institutions (Koskela-Huotari & Vargo, 2016), ecosystems are characterized by value co-creation processes. Conversely, when interactions are distorted, unclear, or strategically manipulated, ecosystems could be influenced by forms of value co-destruction (Plé & Cáceres, 2010).

Applying the ecosystem lens to digital information environments highlights that informational quality is not solely a technical outcome but comes from the virtuous interactions between actors (Sterman, 2000). The diffusion of reliable information depends on the alignment between actors' intentions (Polese et al., 2017b), technological mediation, and institutional coordination (Vargo & Lusch, 2017). When this alignment weakens, ecosystem equilibrium becomes unstable (Barile et al., 2012).

Value Co-Creation and Value Co-Destruction Processes

Fake news can be interpreted as a point where the virtuous value co-creation processes are broken in information ecosystems.

Disinformation alters the quality of informational resources, undermines trust relationships, and compromises collective sensemaking processes (Lazer et al., 2018; Vosoughi et al., 2018). Through ecosystemic lens, fake news could be seen as an endogenous process due to negative interactions among actors.

Once introduced into the ecosystem, disinformation activates negative feedback loops (Sarno et al., 2025). Distorted information generates further distortions, amplifies epistemic uncertainty, and progressively erodes the perceived value of news consumption. These dynamics could be in line with value co-destruction processes (Plé & Cáceres, 2010). Therefore, resource integration produces net disvalue for multiple actors and for the ecosystem.

In the fake news domain, we can touch on the issue of news avoidance (Skovsgaard & Andersen, 2022). This concept can be interpreted as a systems reaction resulting from the perceived lack of value. Indeed, when

users recognize news environments as unreliable, they strategically disengage by withholding attention and withdrawing trust (Skovsgaard & Andersen, 2020). While this withdrawal may be individually rational, at the ecosystem level it further weakens corrective mechanisms, reduces exposure to verified information, and increases fake news.

As a result, fake news and news avoidance reinforce each other through self-sustaining negative cycles.

Human-Machine Interaction Within Information Environment

From a value-oriented ecosystem perspective then, fake news and news avoidance should therefore be analyzed as interconnected manifestations of value co-destruction. Fake news disrupts the informational resource base of the ecosystem, while news avoidance reduces the system's capacity for self-regulation and collective verification (Polese et al., 2009). Together, they compromise ecosystem resilience and long-term viability (Golinelli, 2000).

This interpretation shifts the analytical focus away from individual blame or purely technological failures. Instead, it emphasizes the relational and systems conditions under which disinformation proliferates. In this view, restoring informational integrity requires interventions capable of re-aligning interactions, rebuilding trust, and reactivating value co-creation processes in the ecosystem.

There, human–machine interaction (HMI) (Carrubbo et al., 2022; Polese et al., 2022) becomes particularly relevant.

HMI can be interpreted as a strategic tool to reverse value co-destruction processes. Artificial Intelligence (AI) provides scalability in detecting patterns and processing large volumes of content, while human actors contribute contextual judgment, ethical reasoning, and interpretative flexibility (Pennycook & Rand, 2021). Only from interactions among human and non-human actors something could happen, up to now at least.

Furthermore, the contextual subtlety and adaptive nature of fake news often elude detection by purely algorithmic systems (Vosoughi et al., 2018). This limitation may produce additional forms of value co-destruction, such as false positives, censorship concerns, or erosion of trust in algorithmic decisions. AI can amplify both co-creation and co-destruction dynamics, depending on how it is embedded within ecosystem interactions (Kaartemo, & Helkkula, 2018).

Understanding these dynamics conceptually is a prerequisite for designing methodological and operational responses, which are addressed in the following sections.

METHODOLOGY

This study adopts an inductive and interpretive research method (Reid et al., 2005) aimed at understanding how disinformation can be managed within information ecosystems through HMI approach. Rather than testing a predefined model, the research uses the "Trinity" project as an empirical case to explore how theoretical concepts related to value dynamics can be observed and interpreted in practice.

The analysis has been guided by the core service ecosystem insights, particularly value co-creation and value co-destruction (Vargo & Lusch, 2004; Plé & Cáceres, 2010). Within this perspective, as seen before, fake news is interpreted as a form of value co-destruction that disrupts informational resources and erodes trust, while HMI is considered a potential mechanism for restoring value co-creation processes.

The "Trinity" project is therefore employed as a case-based illustration to examine how an AI-supported and human-in-the-loop configuration may contribute to the management of disinformation. The case is not used to validate a theory, but to provide a concrete setting in which theoretical concepts can be observed, interpreted, and connected to practical design choices. Through this inductive logic, the study seeks to reduce the translational gap between theoretical reflections on ecosystem value dynamics and the operational challenges of disinformation management in AI-mediated information environments.

RESULTS AND DISCUSSION

In this section we offer a concrete instance of the conceptual translation derived from the analysis.

As mentioned, the objective is not to validate a theory through the case, but to interpret how value dynamics can be observed in a real configuration designed to mitigate the risk of fake news.

Following the inductive logic outlined in the methodology, the "Trinity" project is first described as a HMI configuration within an information ecosystem. Then, the use-case has been interpreted through a conceptual matrix that translates ecosystem-level value dynamics into information-related phenomena.

Trinity Project

The "Trinity" project is an R&D initiative (cod.: Prog n. F/380006/00/X77 – CUP: B69J25000310005 - COR: 25461008) developed through the collaboration between CiaoPeople S.r.l. (https://www.ciaopeople.it/) and the S.I.Ma.S Interdepartmental Research Center (Systems for Innovation and Sustainability Management) of the University of Salerno (https://www.simas.unisa.it/en/index), co-financed by European funds (Decree n. R.0000009.08-01-2026) under an important programme focused on STEPS technologies (https://www.mimit.gov.it/it/incentivi/fondo-per-la-crescita-sostenibile-step-pn-ric-2021-27).

The project aims to design an innovative AI-driven platform capable of fighting disinformation within digital media environments through the integration of artificial intelligence, journalistic expertise, and user interaction.

In the ecosystem perspective adopted in this study, "Trinity" can be interpreted as a hybrid service configuration in which human and artificial actors jointly contribute to informational value processes. The platform does not replace human judgment, but supports it through augmented detection, verification, and visualization tools.

The project combines three interdependent components: i) Data Platform, ii) Editorial Assistant, iii) Interactive Widgets.

i. Data Platform is intended as a centralized infrastructure designed to aggregate, normalize, and analyze heterogeneous data streams (e.g., editorial content, open government data, social media feeds, historical archives, and third-party datasets) ensuring data traceability, quality control, and the discovery of latent patterns.
ii. Editorial Assistant is an AI-powered tool embedded within editorial workflows that provides journalists with real-time support through automated fact-checking, contextual source verification, linguistic proofreading, and the generation of enriched multimedia content (e.g., infographics, timelines, and maps), thereby minimizing errors and accelerating content production.
iii. Interactive Widgets are dynamic, user-centered visualizations, including interactive charts, geospatial maps, and navigable timelines, that transform complex datasets into intuitive and engaging narrative formats, enabling readers to explore information contextually and fostering critical digital literacy.

"Trinity" integrates advanced computational techniques, such as Natural Language Processing (NLP), Large Language Models (LLMs), deep learning, multimodal semantic analysis, and the Situation Awareness (SA) approach (D'Aniello & Gaeta, 2023), to promote the interpretation and contextualization of complex information within journalistic workflows. The system operates on a human-in-the-loop principle: AI functions as an augmentative tool that assists rather than replaces editorial judgment, thereby safeguarding professional autonomy and enabling ethical oversight.

The architecture draws on two established frameworks: SA and User-Centered Design (UCD). It scaffolds three sequential cognitive stages: perception of salient cues, comprehension of contextual meaning, and projection of plausible developments, to enhance both journalistic analysis and public understanding. This structure responds to key challenges in contemporary media environments, including fragmented attention patterns, algorithmic opacity, and the proliferation of disinformation.

By prioritizing verification, transparency, and interactive engagement, "Trinity" aims to strengthen critical media literacy while contributing to broader efforts toward European technological sovereignty in AI-augmented journalism.

Linking Ecosystem Dynamics and Information Phenomena

To make the analytical logic explicit, the analysis is structured through a matrix that connects ecosystem value dynamics with observable information-related phenomena.

In Table 1 we represent the core outcome of the study. It shows how fake news can be interpreted as a form of value co-destruction that disrupts informational resources and undermines trust relationships (Lazer et al., 2018; Vosoughi et al., 2018). News avoidance emerges as a systemic feedback

mechanism that reduces the ecosystem's capacity for correction, thus reinforcing negative value cycles (Sterman, 2000; Skovsgaard & Andersen, 2020; 2022).

Table 1: Information processes and systems outcomes (Authors interpretation).

Ecosystem Insights	Information Phenomenon	System Effect
Value co-creation	Verified and trusted information	Ecosystem stability
Value co-destruction	Fake news and disinformation	Trust erosion
Negative feedback loop	News avoidance	Reduced corrective capacity
Rebalancing mechanism	Human–machine interaction (Trinity)	Restoration of trust and verification

From this perspective, the "Trinity" configuration can be interpreted as a rebalancing mechanism. Its HMI structure addresses both sides of the cycle: it reduces the production and circulation of disinformation and supports renewed user engagement through transparency and interpretability.

This interpretation allows the research questions to be addressed conceptually.

RQ1: How does the process of fake news generation manifest itself within the digital information ecosystem?

The analysis shows that fake news operates as a system element that triggers value co-destruction dynamics. When distorted or misleading content circulates, informational resources lose coherence and reliability, undermining trust relationships among actors. This erosion of trust weakens collective sensemaking processes and activates negative feedback loops, such as news avoidance, which further reduce the ecosystem's corrective capacity. In this perspective, fake news is not an isolated anomaly, but a structural manifestation of misaligned interactions within the information ecosystem.

RQ2: How can human–machine interactions activate mechanisms able to mitigate and manage fake news?

The "Trinity" project illustrates how HMI can act as a rebalancing mechanism within the ecosystem. By combining AI-based detection with human verification and user-centered interfaces, the system integrates technological scalability with contextual human judgment. This hybrid configuration helps limit the diffusion of distorted information while supporting renewed user engagement and transparency. In value terms, such arrangements contribute to restoring value co-creation processes by realigning trust, verification, and participation within the information ecosystem.

These findings suggest that fake news and news avoidance should be interpreted not as isolated phenomena, but as interconnected expressions of value co-destruction that emerge from misaligned or dysfunctional service interactions.

Trinity's configuration demonstrates the potential of HMI to restore balance in this ecosystem. Human-in-the-loop configurations mitigate these risks by distributing decision-making across human and artificial actors. In such systems, AI performs preliminary detection and aggregation tasks, while humans retain interpretative authority and ethical oversight (Graves, 2018). This separation of roles enables more balanced resource integration and supports ecosystem-level value restoration.

CONCLUSION

This study interprets fake news and news avoidance as interconnected manifestations of value co-destruction within information ecosystems. By adopting an ecosystem's point of view, the paper moves beyond technological or individual-level explanations and highlights the relational and system nature of disinformation dynamics.

From a theoretical standpoint, the study contributes to service ecosystem literature by extending the insights of value co-creation and value co-destruction to the domain of digital information environments. It also offers implications for adjacent fields, such as media studies, information systems, and digital communication.

From a practical perspective, the findings suggest that managing disinformation requires ecosystem-oriented solutions rather than isolated technical fixes. Hybrid human–machine configurations can offer a more balanced solution, combining algorithmic detection with human verification and user-centered information design.

Despite these contributions, the study presents limitations, indeed the analysis is based on a single illustrative case, which limits the generalizability of the findings. Future research could conduct comparative studies across different ecosystems, institutional contexts, or technological configurations. Furthermore, the study adopts a conceptual and interpretive approach, without quantitative validation of the proposed value dynamics. Subsequent research could develop metrics and empirical models to assess co-creation and co-destruction processes in different ecosystems.

Finally, the focus is limited to the information domain. Future work could explore how similar dynamics emerge in other service ecosystems, such as healthcare, education, or public administration.

In conclusion, the study highlights the importance of interpreting disinformation as an ecosystem-level phenomenon shaped by value dynamics. By linking theoretical constructs with an empirical illustration, the paper contributes to closing the gap between conceptual understanding and practical approaches to disinformation management.

ACKNOWLEDGEMENTS

The University of Salerno is Partner of Trinity R&D co-financed Project, and for this we have the chance to publish some results and findings.

We'd like to thank CiaoPeople S.r.l. for sustaining and promoting this Research activity, as leader.

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