Lingua Technica, 1(2), 2025, 125-132

List of contents available at Lingua Technica

Lingua Technica:
Journal of Digital Literary Studies

homepage: https://journal.arjunu.org/index.php/lingtech

Reimagining textuality: digital convergence and literary adaptation in Indonesia

Moh. Atikurrahman [1*]

[1] Indonesian Literature Department, UIN Sunan Ampel Surabaya, Indonesia
** Corresponding author. Email: atiqurrahmann@gmail.com*

Article history:
Received May 21, 2025
Revised May 30, 2025
Accepted Jun 25, 2025
Published Jun 30, 2025

Keywords:
Indonesian literature;
Multimodality;
cyberculture;
adaptation;
convergence media.

A B S T R A C T

Background: This article explores the multimodal circulation of Indonesian literary texts through television and digital adaptations, focusing on their implications for the conceptualization and cultural valuation of literature in the digital age. **Objective:** The technological boom and evolving reading practices have shaped how literature is disseminated, especially through intersemiotic media platforms. **Method:** Drawing on theories of cyberculture and media convergence (David Bell dan Tim Dwyer), this study analyzes examples such as the adaptation of Laskar Pelangi by Andrea Hirata into film and television, *Bumi Manusia* by Pramoedya Ananta Toer into cinema, and *Tenggelamnya Kapal Van Der Wijck* by Hamka into both screen and digital fandoms. **Results:** These cases reveal a cultural ecosystem in which television, internet platforms, and user-generated content converge to sustain literary texts and cultivate new modes of engagement. **Implication:** The role of the intellectual is not to mourn the "loss" of traditional literary values, but to explore the new affordances of digital storytelling, critical fandom, and narrative remixing as legitimate—and increasingly influential—modes of cultural expression. **Novelty:** The shift from print-centered authority to interactive and collaborative reinterpretation challenges traditional notions of originality and authorship while expanding access to literature across social strata.

Keywords:

DOI: https://doi.org/10.1016/j.lingua.2024.101865

*) Copyright © 2025 Moh. Atikurrahman
This work is licensed under Creative Commons Attribution-ShareAlike 4.0 International License which permits use, distribution, reproduction, and adaptation in any medium, provided that the original work is properly cited and any adapted material is distributed under the same license.

INTRODUCTION

The rise of multimodal communication has significantly transformed the way literature is produced, consumed, and valued. Emerging in the late 20th century, the study of multimodality has challenged the traditional centrality of written language in literary discourse, emphasizing the complementary role of image, sound, and digital interactivity in textual meaning-making (Aliagas et al., 2024; Kersting et al., 2024; Pereira et al., 2023). In this context, literature is no longer confined to printed books and passive reading practices but has entered a dynamic space of convergence where multiple semiotic modes interact. This transformation is particularly relevant in Indonesia, where literature—once restricted to school curricula and elite readership—has increasingly reached mass audiences through television, film, and digital platforms.

Indonesia's literary ecosystem offers compelling examples of this shift. Canonical works such as *Laskar Pelangi* by Andrea Hirata (2008), *Bumi Manusia* by Pramoedya Ananta Toer (2005), and *Tenggelamnya Kapal Van Der Wijck* by Hamka (2013) have been adapted into successful films and television productions. These adaptations are not mere reproductions but recontextualizations that bring literary texts into dialogue with contemporary viewers and technological platforms. The digital environment—through YouTube, social media fandoms, streaming services, and online forums—further facilitates the circulation and reinterpretation of these texts, enabling audiences not only to consume but also to remix, review, and respond to literary content.

Within this framework, the definition of a "text" becomes fluid. Literature is no longer a fixed, sacred object preserved in libraries or classrooms but a living, evolving entity shaped by participatory culture. This development echoes Davi Bell (2006) conception of cyberculture as a space where knowledge is collectively constructed and widely disseminated beyond institutional control. The convergence of television and digital media has thus reconfigured literary reception, giving rise to a more interactive and democratized literary culture in Indonesia.

This article aims to investigate this cultural transformation by examining how Indonesian literary works circulate in the era of cyber convergence. Rather than lamenting the decline of the printed word, it argues that new media have revitalized literary engagement by expanding access, enabling reinterpretation, and challenging traditional hierarchies of cultural production. Through this lens, we explore how the adaptation of literature into multimodal formats contributes to its survival and relevance in the digital age.

METHOD

This study employs a qualitative, descriptive-analytical method grounded in cultural and media studies, with a specific focus on the intersection between literature, television, and digital media in the Indonesian context. Rather than testing hypotheses through empirical measurement, this research investigates meaning-making practices and socio-cultural transformations through textual interpretation and discourse analysis. The theoretical framework draws on cyberculture (Bell, 2006) and media convergence (Dwyer, 2010) to explore how literary works circulate and transform across media.

The primary data sources consist of selected Indonesian literary texts and their adaptations, including *Laskar Pelangi* (novel and film), *Bumi Manusia* (novel and film), and *Tenggelamnya Kapal Van Der Wijck* (novel, film, and online engagement). These cases were selected purposively to represent diverse modes of literary adaptation and user interaction. Supplementary materials such as social media posts, user comments, fan videos, and streaming platforms were analyzed to understand how audiences engage with these texts in the digital environment. The study also considers educational and popular discourse around these works, including classroom use, fan fiction production, and commentary on platforms such as YouTube, Wattpad, and TikTok.

To conduct the analysis, the study follows a multimodal discourse analysis (MDA) approach that interprets visual, textual, and interactive elements as part of an integrated meaning-making process (Kress & Bezemer, 2023). This approach enables an examination of how traditional literary narratives are reconfigured through audiovisual storytelling, digital fragmentation, and participatory reappropriation. Rather than privileging one mode or medium, the study treats them as interrelated sites where literature is continuously reimagined and socially negotiated. Through this method, the research seeks to capture the evolving forms of literary reception and production in Indonesia's convergent media culture.

RESULTS

Cyberculture and media

Defining cyberculture, like defining literature itself, is a complex and often contested endeavor. Rather than offering fixed definitions, this study emphasizes the need to understand how technological transformations shape human interaction with cultural texts. Cyberculture, as envisioned by thinkers like David Bell and Tim Dwyer, refers to a dynamic environment where users, platforms, and cultural products intersect, creating new modes of access, participation, and meaning-making. In Indonesia, this convergence is evident in how literature travels across different media—from printed novels to televised melodramas, from cinema to online fan communities.

Tim Dwyer' concept of convergence culture is particularly useful in analyzing the Indonesian context. Convergence, as Dwyer (2010) argues, is not just a technological process but also a cultural one, shaped by the active participation of users. Television and the internet no longer function in isolation but collaborate to deliver hybrid experiences. For instance, when the film *Bumi Manusia* (2019) was released, it was not only promoted through traditional film trailers and newspaper reviews but also through YouTube reactions, Instagram fan art, and Twitter discussions. These digital forms of engagement extend the life and influence of the literary work far beyond its original format.

The immersive experience provided by digital platforms allows users to develop a sense of agency—what can be called *cyber-agency*. Audiences no longer remain passive consumers of televised adaptations; instead, they become co-creators, whether by sharing clips, writing fanfiction, or remixing soundtracks with their own commentary. The popularity of literary-inspired TikTok videos and Wattpad fan-narratives in Indonesia illustrates how cyberculture enables aesthetic pleasure, interactivity, and shared authorship.

Television, which marked the entrance of Indonesia into the electronic media era during the mid-20th century, continues to play a significant role despite the rise of digital media. Through the 1990s and early 2000s, literary adaptations like *Siti Nurbaya* and *Salah Asuhan* were serialized on TVRI and private stations. These programs combined visual storytelling with literary narration, appealing to diverse audiences while also raising questions about fidelity to the original text. Today, the distinction between television and the internet has blurred, with streaming platforms like Vidio, Netflix, and YouTube offering both serialized dramas and user-generated content that interact with literary culture.

As Zhu et al. (2022) observed, media function as extensions of human perception. Television, once considered a "cool medium" requiring active sensory engagement, has become even more interactive with the addition of digital interfaces and real-time audience feedback. Similarly, the internet dissolves geographical boundaries, allowing literature to circulate beyond its national origin. For example, Indonesian diaspora communities abroad often access literary films and series through digital channels, contributing to the global visibility of Indonesian narratives.

In this convergence-driven media ecology, literature gains renewed relevance. Rather than being displaced by new technologies, it is remediated—given new life and formats that resonate with contemporary audiences. The interplay between television and cyberspace, particularly in Indonesia's increasingly connected society, fosters new forms of storytelling and repositions literature within a broader cultural network.

Literature and multimodality in the digital space

The digital turn has redefined the way literature is accessed, interpreted, and shared. As David Bell (2006) observed, information technologies offer new cognitive modes and reconfigure the very architecture of knowledge. In Indonesia, this shift is particularly visible in how literary engagement is no longer confined to printed books or formal education but increasingly mediated by digital tools, social media platforms, and audiovisual storytelling.

One of the most compelling illustrations of this change is the adaptation of *Laskar Pelangi*, originally a novel by Andrea Hirata, into a successful film (2008), a musical, and a television series. These versions did more than reproduce the narrative; they transformed it into a multisensory, multimodal experience involving image, sound, text, and performance. This intersemiotic transfer extended the reach of the literary work to audiences

who may never have read the original book. Likewise, *Tenggelamnya Kapal Van Der Wijck*, adapted into a popular film in 2013, found additional life in social media fan pages, Instagram reels, and TikTok clips where users quoted lines, debated characters, or reenacted scenes.

Multimodality here does not merely refer to the co-existence of words and images but to a fundamental shift in how meaning is produced. Reading is no longer a linear, solitary act; it is now dialogic and often participatory. As Coiro (2021) argues, contemporary screens present both text and image simultaneously, creating a hybrid reading practice that mirrors the fragmented, interactive rhythm of digital life. In Indonesia, this can be seen in the way students read excerpts of *Bumi Manusia* alongside film clips in class discussions or how YouTubers analyze literary symbols while displaying relevant visuals from adaptations.

Moreover, digital literature has fostered new forms of collective authorship. Platforms such as Wattpad and Storial.co allow Indonesian readers to not only consume literature but also write their own. Some of these user-generated stories eventually gain popularity and are adapted into web series or even films, creating a reverse flow from digital writing to audiovisual production. This participatory literary culture expands the definition of literature and challenges hierarchical distinctions between "high" and "low" art.

While printed literature was once synonymous with cultural authority, it is now one among many formats in a constellation of semiotic systems. As Klarer (2023) points out, not all literary works originated in printed form, and not all printed texts are literary. In Indonesia, traditional oral narratives (*hikayat, pantun, wayang* stories) have long existed in performative and visual modes. The digital age, rather than erasing these forms, provides new channels for their rearticulation. Podcasts retelling folklore, YouTube channels dramatizing *Cerita Rakyat Nusantara*, and Instagram pages that serialize contemporary poetry all exemplify this expanded ecology of literary expression.

Consequently, multimodality should not be seen as a threat to literature but as an opportunity to reimagine it. By traversing new platforms and reaching diverse audiences, literature in Indonesia is becoming more inclusive and adaptable. These transformations demand a reconsideration of how we teach, study, and value literary texts—not only as static artifacts but as evolving, interactive processes.

Television adaptations of literature in Indonesian cyberspace

The relationship between literature and television in Indonesia dates back to the early decades of the country's broadcast media. As early as the 1980s and 1990s, national and private television networks such as TVRI, RCTI, and SCTV began adapting literary works into serial formats. Iconic titles like *Sitti Nurbaya* by Marah Rusli, *Salah Asuhan* by Abdoel Moeis, and *Azab dan Sengsara* by Merari Siregar were reimagined for television audiences. These adaptations introduced classical Indonesian literature to millions of viewers—many of whom might not have encountered the original texts in formal education.

With the digital expansion of the 2000s, television productions have increasingly entered cyberspace, forming a new ecosystem of multimedia engagement. Platforms such as Vidio.com and YouTube host full episodes, trailers, behind-the-scenes content, and fan-made edits of literary adaptations. For instance, *Tenggelamnya Kapal Van Der Wijck*, initially a novel by Hamka and later a widely viewed film, has become a source of online content ranging from music video tributes to analytical vlogs discussing its Islamic moral themes and tragic romance narrative. Users often share and repurpose these materials in creative, unauthorized ways—contributing to what David Bell (2006) refers to as "participatory culture" and what Gundersen (2021) theorized as the technological reproducibility of the artwork.

In this digital context, the original work and its adaptations blur. A user may first encounter *Laskar Pelangi* not through the novel, but via memes, short clips on Instagram, or the film soundtrack on TikTok. These fragmentary yet interconnected encounters reshape the consumption of literary content into a non-linear, multimodal experience. As Benjamin noted, technological reproduction detaches the artwork from its ritualistic aura, making it accessible and relatable in new ways. For many Indonesian youths, literature enters their lives not through a school textbook but through a movie trailer or a tweet quoting a powerful passage.

This convergence of literature, television, and the internet also redefines the notion of authorship and cultural ownership. When fan communities re-upload episodes of a series, create subtitles, or modify opening credits, they engage in a form of collaborative authorship—even if it exists outside formal copyright structures. One such example can be seen in the online circulation of older adaptations like *Siti Nurbaya*,

whose full episodes were archived and redistributed by fans long after they disappeared from mainstream television. While these actions raise questions about intellectual property, they also reveal the public's emotional investment and desire to preserve cultural narratives.

Furthermore, production companies and networks have begun to integrate this participatory ethos into their promotional strategies. For example, web series based on Wattpad novels often include interactive polls, fan competitions, and hashtag campaigns to engage audiences across platforms. Such practices exemplify what Fischer et al. (2021) identify as media strategies aimed at sustaining narrative consumption beyond the original screen.

As a result, literature in Indonesia is no longer a fixed object tied to its original form. It becomes an adaptable, mobile text—capable of being reshaped by both commercial forces and fan labor. The adaptation of literary works for television, followed by their digital reproduction and circulation, marks a shift not only in media but in cultural behavior. Viewers are no longer passive recipients; they are active participants in the construction, distribution, and evolution of meaning.

DISCUSSION

The convergence of television and cyberspace has significantly expanded the reach and cultural role of Indonesian literature. No longer confined to printed formats and academic settings, literary works now thrive in digital ecosystems that include film adaptations, streaming services, fan communities, and social media (Otor et al., 2021; Song et al., 2022; Zwitter, 2024). This shift has redefined literature as a participatory experience, transforming it into a dynamic cultural form that is reinterpreted, circulated, and repurposed by diverse audiences. The implication is profound: literature in the digital age is not merely surviving—it is being reborn through multimodal, collaborative, and algorithmically mediated engagement (Osula et al., 2022; Zhao et al., 2023; Zhou et al., 2024).

This transformation suggests an underlying shift in the structure of literary consumption. Previously, access to literature was restricted by educational gatekeeping and the authority of the printed canon. With the emergence of digital platforms, however, hierarchical boundaries between "high" and "low" culture, and between "original" and "derivative," have eroded (Fontes et al., 2024; Ning et al., 2022). Readers and viewers now move fluidly between formats, encountering a text first as a meme, a YouTube edit, or a film trailer before approaching the printed book. These pathways reflect a nonlinear, decentralized, and user-driven mode of engagement that disrupts traditional literary hierarchies and privileges reinterpretation over preservation.

A second implication of this convergence is the broadening of access to literature for previously marginalized communities. Digital and visual adaptations make canonical works such as *Bumi Manusia* and *Tenggelamnya Kapal Van Der Wijck* accessible to new generations who may not engage with print (Wang, 2024; Weiss & Biermann, 2023). The circulation of literary texts through short videos, social media commentary, and streaming platforms diversifies not only the readership but also the forms of interaction with the text. Literature becomes a tool for social expression, emotional connection, and cultural participation in ways not previously possible within the confines of the printed medium.

This expanded access is structurally enabled by the nature of cyberspace itself, which transcends geographic and institutional limitations. Online platforms collapse temporal and spatial boundaries, allowing Indonesian literary works to circulate globally and continuously (Aung et al., 2023; Fahey, 2024). These platforms also foster participatory cultures that validate reader contributions—through fanfiction, visual adaptations, or commentary—as part of the text's evolving meaning. Thus, the infrastructure of digital media supports an ethos of collaboration and co-authorship, in which literary value is generated through collective engagement rather than expert curation.

A third implication lies in how the reproducibility of literary texts through digital and audiovisual media challenges conventional notions of authorship and intellectual property. As users repurpose, remix, or redistribute adaptations without formal authorization, literature becomes part of a shared cultural archive rather than a protected artifact (Garibaldi & Deane, 2023; Haig, 2021). While this raises legal and ethical concerns, it also points to a new form of cultural ownership grounded in community and affective investment. The text no longer belongs exclusively to the author or publisher—it is collectively animated by its audience.

This tension reflects a deeper structural contradiction within convergence culture: the democratization of access versus the commercialization of platforms. While users can creatively engage with texts, their interactions are often mediated by algorithms, monetization strategies, and platform governance (Hwang et al., 2022; Wu, 2022). As a result, the same systems that empower users can also constrain or commodify their expressions. Understanding this duality is essential for assessing the cultural stakes of digital literary circulation in Indonesia today, as well as for anticipating how literature might continue to evolve within and against platform capitalism.

CONCLUSION

From a scholarly perspective, the convergence of media opens rich ground for interdisciplinary inquiry. Literature is no longer solely the concern of philologists and literary theorists; it now invites collaboration with media studies, education, sociology, and digital humanities. In this context, the role of the intellectual is not to mourn the "loss" of traditional literary values, but to explore the new affordances of digital storytelling, critical fandom, and narrative remixing as legitimate—and increasingly influential—modes of cultural expression.

In conclusion, the Indonesian experience demonstrates that literature in the 21st century is not in decline but in transformation. Television, film, and digital platforms do not compete with literature—they become its new vessels. Embracing this multiplicity allows for a more expansive, interactive, and resonant literary culture—one where the boundaries between reader, viewer, and creator are continually negotiated in the shared space of convergence.

ACKNOWLEDGMENTS

The author thanks the reviewers and editorial team for their constructive feedback on this manuscript.

FUNDING INFORMATION

Author states no funding involved.

AUTHOR CONTRIBUTIONS STATEMENT

Moh. Atikurrahman: conceptualization, methodology, formal analysis, writing – original draft; writing – review and editing**,** data curation, formal analysis; writing – review and editing (supporting).

CONFLICT OF INTEREST STATEMENT

Author states no conflict of interest.

AI USE DECLARATION

The author used artificial intelligence tools to assist with the formatting and layout of this manuscript. AI was not used to generate the substantive content, conceptualization, data, analysis, or conclusions of the research, all of which remain the sole responsibility of the authors.

INFORMED CONSENT

Not applicable – this study did not involve direct human participants. Data consisted solely of publicly accessible documents, platform policies, and governance materials.

ETHICAL APPROVAL

This research did not involve human or animal subjects; it analyzed publicly available documentary records concerning machine co-authorship, and therefore no institutional review board approval was required. Where research does involve human subjects, the authors affirm that such research would be conducted in full compliance with all relevant national regulations and institutional policies, in accordance with the tenets of the Declaration of Helsinki, and would be approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

The corpus/data analyzed in this study are available from the corresponding author upon reasonable request.

REFERENCES

Aliagas, C., Correro, C., & Fittipaldi, M. (2024). Digital Fiction in Literary Education: What do secondary-school teachers think about this multimodal artform as a pedagogical resource? *L1-Educational Studies in Language and Literature*, *24*(3), 1–27. https://doi.org/10.21248/l1esll.2024.24.3.594

Aung, N., Dhelim, S., Chen, L., Ning, H., Atzori, L., & Kechadi, T. (2023). Edge-enabled metaverse: The convergence of metaverse and mobile edge computing. *Tsinghua Science and Technology*, *29*(3), 795–805. https://doi.org/10.26599/TST.2023.9010052

Bell, D. (2006). *An introduction to cybercultures*. Routledge. https://doi.org/10.4324/9780203192320

Coiro, J. (2021). Toward a multifaceted heuristic of digital reading to inform assessment, research, practice, and policy. *Reading Research Quarterly*, *56*(1), 9–31. https://doi.org/10.1002/rrq.302

Dwyer, T. (2010). *Media convergence*. McGraw-Hill Education (UK). https://archive.org/details/mediaconvergence0000dwye

Fahey, E. (2024). The evolution of EU–US cybersecurity law and policy: On drivers of convergence. *Journal of European Integration*, *46*(7), 1073–1088. https://doi.org/10.1080/07036337.2024.2411240

Fischer, D., Reinermann, J.-L., Mandujano, G. G., DesRoches, C. T., Diddi, S., & Vergragt, P. J. (2021). Sustainable consumption communication: A review of an emerging field of research. *Journal of Cleaner Production*, *300*, 126880. https://doi.org/10.1016/j.jclepro.2021.126880

Fontes, C., Carpentras, D., & Mahajan, S. (2024). Human digital twins unlocking Society 5.0? Approaches, emerging risks and disruptions. *Ethics and Information Technology*, *26*(3), 54. https://doi.org/10.1007/s10676-024-09787-1

Garibaldi, S., & Deane, F. (2023). Cyberspace as a fifth dimension of national security: Trade measure exceptions. *Journal of International Trade Law and Policy*, *22*(2), 67–88. https://doi.org/10.1108/JITLP-01-2023-0004

Gundersen, O. E. (2021). The fundamental principles of reproducibility. *Philosophical Transactions of the Royal Society A*, *379*(2197), 20200210. https://doi.org/10.1098/rsta.2020.0210

Haig, Z. (2021). Relationships between cyberspace operations and information operations. *Advances in Military Technology*, *16*(1), 91–105. https://doi.org/10.3849/aimt.01466

Hamka, H. (2013). *Tenggelamnya Kapal Van Der Wijck*. Balai Pustaka. https://archive.org/details/TenggelamnyaKapalVanDerWijck_201801

Hirata, A. (2008). *Laskar Pelangi*. Bentang. https://archive.org/details/AndreaHirataLaskarPelangi_201805

Hwang, S.-Y., Shin, D.-J., & Kim, J.-J. (2022). Systematic review on identification and prediction of deep learning-based cyber security technology and convergence fields. *Symmetry*, *14*(4), 683. https://doi.org/10.3390/sym14040683

Kersting, M., Danielsson, K., Fleury Mortimer, E., Olander, C., Siry, C., & Tang, K.-S. (2024). From founding voices to future visions: Languages and literacies in science education. *International Journal of Science Education*, 1–18. https://doi.org/10.1080/09500693.2024.2377424

Klarer, M. (2023). *An introduction to literary studies*. Routledge. https://doi.org/10.4324/9781003133025

Kress, G., & Bezemer, J. (2023). Multimodal discourse analysis. In *The Routledge handbook of discourse analysis* (pp. 139–155). Routledge. https://doi.org/10.4324/9781003035244-12

Ning, H., Lin, Y., Wang, W., Wang, H., Shi, F., Zhang, X., & Daneshmand, M. (2022). Cyberology: Cyber–physical–social-thinking spaces-based discipline and interdiscipline hierarchy for metaverse (general cyberspace). *IEEE Internet of Things Journal*, *10*(5), 4420–4430. https://doi.org/10.1109/JIOT.2022.3217821

Osula, A.-M., Kasper, A., & Kajander, A. (2022). EU common position on international law and cyberspace. *Masaryk University Journal of Law and Technology*, *16*(1), 89–123. https://doi.org/10.5817/MUJLT2022-1-4

Otor, S. U., Akinyemi, B. O., Aladesanmi, T. A., Aderounmu, G. A., & Kamagaté, B. (2021). An improved bio-inspired based intrusion detection model for a cyberspace. *Cogent Engineering*, *8*(1), 1859667. https://doi.org/10.1080/23311916.2020.1859667

Pereira, Í. S. P., Gil, M., & Sylla, C. M. (2023). Meeting the challenges of designing multimodal texts to promote multiliteracies pedagogy. *Comunicação e Sociedade*, *43*, e023008. https://doi.org/10.17231/comsoc.43(2023).4481

Song, L., Hu, X., Zhang, G., Spachos, P., Plataniotis, K. N., & Wu, H. (2022). Networking systems of AI: On the convergence of computing and communications. *IEEE Internet of Things Journal*, *9*(20), 20352–20381. https://doi.org/10.1109/JIOT.2022.3172270

Toer, P. A. (2005). *Bumi Manusia*. Lentera Dipantara.

Wang, C. (2024). Exploring Students' Generative AI-Assisted Writing Processes: Perceptions and Experiences from Native and Nonnative English Speakers. *Technology, Knowledge and Learning*. https://doi.org/10.1007/s10758-024-09744-3

Weiss, M., & Biermann, F. (2023). Cyberspace and the protection of critical national infrastructure. *Journal of Economic Policy Reform*, *26*(3), 250–267. https://doi.org/10.1080/17487870.2021.1905530

Wu, J. (2022). Cyberspace endogenous safety and security. *Engineering*, *15*, 179–185. https://doi.org/10.1016/j.eng.2021.05.015

Zhao, C., Dai, X., Lv, Y., Tian, Y., Ren, Y., & Wang, F.-Y. (2023). Foundation models for transportation intelligence: ITS convergence in TransVerse. *IEEE Intelligent Systems*, *37*(6), 77–82. https://doi.org/10.1109/MIS.2022.3221342

Zhou, Y., Tiwari, M., Bernot, A., & Lin, K. (2024). Metacrime and cybercrime: Exploring the convergence and divergence in digital criminality. *Asian Journal of Criminology*, *19*(3), 419–439. https://doi.org/10.1007/s11417-024-09436-y

Zhu, Y., Kwon, M., & Zhao, Y. (2022). A Study on Visual Perception Differences between Hot Media and Cool Media Focusing on Image News and Text News Reading. *Sch J Eng Tech*, *9*, 235–244. https://doi.org/10.36347/sjet.2022.v10i09.002

Zwitter, A. (2024). Cybernetic governance: Implications of technology convergence on governance convergence. *Ethics and Information Technology*, *26*(2), 24. https://doi.org/10.1007/s10676-024-09763-9