

Article history (leave this part):

Submission date: 08-02-2026

Acceptance date: 31-03-2026

Available online: 20-04-2026

Keywords:

Artificial Intelligence, Webtoons, Digital Creative Labor, Hybrid Production Model, Algorithmic Standardization, Neural Machine Translation (NMT), Sentiment Analysis, Macroeconomics, Digital Welfare, Author-Curator Paradigm.

Funding:

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Competing interest:

The author(s) have declared that no **competing interests** exist.

Cite as (leave this part):

Title. Journal of Science and Knowledge Horizons:



The authors (2026). This Open Access article is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0)

(<http://creativecommons.org/licenses/by-nc/4.0/>). Non-commercial reuse, distribution, and reproduction are permitted with proper citation

Journal of Science and Knowledge Horizons
ISSN 2800-1273-EISSN 2830-8379

The Influence of AI on Webtoons: What About the Future? An Ontological and Macroeconomic Perspective.

1-Yasmina LABED

Abdelhamid Mehri University, Constantine2, Algeria yasmina.labeled@univ-constantine2.dz

ORCID iD: 0000-0003-3330-0467

2-Alain VUILLEMIN

Université « Paris-Est », LIS UPEC – Créteil, France

alain.vuillemin@gmail.com

ORCID iD: 0009-0009-0664-349X

Abstract:

The integration of Artificial Intelligence (AI) in the Webtoon industry has fundamentally altered the lifecycle of digital comics, from initial ideation to global distribution. This article investigates how AI technologies—specifically Generative Adversarial Networks (GANs) and Large Language Models (LLMs)—influence narrative and visual production. By examining technical advancements alongside ethical implications regarding intellectual property and representation, we illuminate how AI redefines human creativity. Through a comparative case study of *Lore Olympus*, the hybrid studio model of Solo Levelling and AI-assisted productions such as *The Knight of the Frozen Flower*, this paper evaluates the tension between artistic "soul" and algorithmic efficiency. The study validates a shift toward a "synergetic ontology," where the creator evolves into an "author-curator". Furthermore, we address the macroeconomic impact of Neural Machine Translation (NMT) and sentiment analysis on digital welfare and global market accessibility. The findings suggest that while AI risks stylistic standardization (H1), its strategic use in hybrid pipelines facilitates a new era of globalized storytelling where readers act as data-driven co-creators (H2).

INTRODUCTION

Artificial intelligence has permeated numerous fields, transforming industries and everyday practices within the literary world. A notable sector undergoing this transformation is digital literature, specifically webtoons—digital comics published online in serialized formats. As noted by Kim and Yu (2019), "the platformization of webtoons has established a digital laboratory where creative labor intersects with advanced technological infrastructure". However, this rapid evolution necessitates a profound redefinition of the act of writing. John Warner (2025) argues that we must distinguish between "mechanical output" and the fundamental human act of expression, stating, "*AI mimics the results of thought without actually engaging in the process of thinking*". In the modern webtoon ecosystem, this distinction becomes blurred as algorithms transition from passive tools to semi-autonomous "*co-creators*". Beyond simple automation, the integration of Generative Adversarial Networks (GANs) and Large Language Models (LLMs) triggers a macroeconomic shift, where capital efficiency often competes with artistic authenticity. Furthermore, the emergence of a Hybrid-Assist Model suggests a new industrial standard: a "synergetic ontology" where AI manages technical drudgery while humans retain emotional command.

○ Research Question and Hypotheses

This study addresses a central inquiry: To what extent does the integration of generative AI redefine the creative autonomy of webtoon authors and the traditional economic value chain of digital comics? We propose two testable hypotheses:

- ✓ H1: The adoption of AI-assisted illustration tools significantly reduces production cycles but risks a "standardization" of visual styles due to algorithmic preference for popular trends.
- ✓ H2: AI-driven personalization, supported by sentiment analysis and Neural Machine Translation (NMT), shifts the power dynamic, where readers evolve from passive consumers into "co-creators" within a globalized market.

1. LITERATURE REVIEW: FROM ALGORITHMS TO NARRATIVES

1.1. Large Language Models (LLMs) and Scripting

The capacity of machines to handle complex syntax is no longer theoretical. In their seminal 2020 study, Brown et al. demonstrated that Large Language Models (LLMs) like GPT-3 act as "few-shot learners," capable of performing creative writing tasks with minimal human intervention. L'IA Facile (2025) highlights that "the implications of AI in literature allow for a hybridity where

the machine handles the structural logic while the human focuses on emotional nuance."

1.2. Sentiment Analysis as a Narrative Compass

Bing Liu (2012) defines sentiment analysis as "the field of study that analyzes people's opinions, evaluations, and emotions towards entities" (p. 7). For a webtoon creator, this identifies the polarity of audience emotions, allowing for the simulation of alternative plotlines that align with audience expectations, directly supporting H2 .

2. THE TECHNOLOGICAL ARSENAL

The transition from manual drawing to an AI-augmented workflow is predicated on a sophisticated suite of tools that automate visual and structural complexity. This "technological arsenal" reconfigures the labor-time required for high-fidelity digital comics by shifting the artist's role from execution to algorithmic supervision.

2.1. Visual Synthesis and Generative Adversarial Networks (GANs)

Generative Adversarial Networks (GANs) represent the cornerstone of automated visual production in the webtoon industry. These systems, consisting of a "Generator" and a "Discriminator," allow for the rapid synthesis of complex assets. Background Synthesis: GANs can transform simple 3D block-outs into fully rendered architectural environments, ensuring stylistic consistency across hundreds of panels. Automated Rendering: Tools such as the "Webtoon AI Painter" utilize deep learning to automate the colouring process, applying shading and highlights that adhere to a "mathematically optimized" aesthetic.

Standardization Risk (H1): While GANs increase efficiency, they gravitate toward a "statistical mean," which leads to the homogenization of artistic styles and facial features.

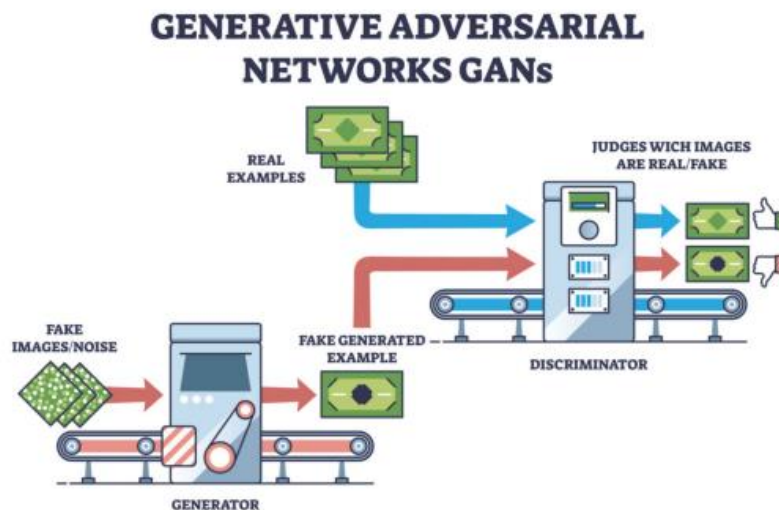


Figure 1

In summary, this figure represents the 'engine' of standardization: an aesthetic factory where technical perfection is achieved at the cost of idiosyncrasy. It empirically supports the concern that purely AI-driven production leads to a stylistic homogenization, sacrificing the unique 'human hand' for market-ready, mathematically optimized consistency. At this stage, the paradigm shifts from traditional human-centric creation to fully automated production.

2.2. From the Page to Sensitive Space: AR as a Narrative Extension

The integration of Intelligent Augmented Reality (AR) systems, while technical in nature, fundamentally redefines the topology of the digital narrative. From a literary perspective, AR should not be viewed merely as a visualization tool, but as a rupture of the "fourth wall" within the digital medium.

- ✓ **The Spatialization of the Logos:** AR allows for the anchoring of diegetic elements—such as character thoughts, fragmented scripts, or poetic markers—directly into the reader's physical environment. This transforms the act of reading from a passive vertical scroll into a spatial performance, where the setting of the reader becomes an extension of the story's world.
- ✓ **Immersion as a Rhetorical Device:** As explored by Westerfield et al. (2015), these systems create immersive narrative layers. In a literary context, this immersion acts as a metaphor for the character's psychological state, blending the virtual and the physical to enhance the reader's aesthetic experience.
- ✓ **Intermediality and Perception:** This device forces a hybridity between the scriptural text and the sensitive environment. It challenges traditional notions of "the frame," requiring the reader to navigate a narrative that

exists both on the screen and in the room, thereby altering the phenomenology of reading.

2.3. Narrative Architecture and LLMs: Toward an "Algorithmic Poetics"

The use of Large Language Models (LLMs) like GPT-3 must be analyzed not as a simple automation of the script, but as a profound mutation of the authorial instance and the creative process.

- ✓ **Structural Hybridity:** In this new paradigm, the machine manages the "structural logic"—the narrative syntax, genre tropes, and continuity—while the human author focuses exclusively on "emotional nuance" and symbolic depth. This represents a new form of assisted stylistics, where the AI handles the mechanical scaffolding of the plot.
- ✓ **Few-Shot Learning and the Ontology of the Author:** The ability of AI to generate complex narrative arcs with minimal intervention challenges the classical definition of authorship. The writer evolves into a strategist or curator, manipulating blocks of algorithmic probabilities to refine a unique creative vision.
- ✓ **The Simulation of the Possible:** By integrating Sentiment Analysis, the author can simulate multiple plot branches to test their "emotional polarity" on a potential audience. This transforms the narrative from a fixed linear text into a dynamic, predictive system, where the script is mathematically optimized for reader resonance without losing its human "soul".

3. CRITICAL DISCUSSION: THE ONTOLOGY OF THE NEW CREATOR

The creative act is moving from "execution" to "curation." Warner (2025) warns that outsourcing the struggle of writing to a machine may lead to a loss of insight. This shift reconfigures the author as a "prompter-curator" rather than a "generator."

3.1. Comparative Case Study: *Lore Olympus* vs. *The Knight of the Frozen Flower*

To evaluate H1 (Standardization), we analyze two opposing production models:

A. *Lore Olympus* (Rachel Smythe) – The Human Emotional Signature:



FIGURE 2: "Lore Olympus Hades and Persephone colour palette"

Preface on the second requirement and the issues to be addressed ,
Narrative Visual Semantics in *Lore Olympus* (Smythe, 2018). The use of non-canonical skin tones and watercolor textures serves as a psychological signifier, prioritizing emotional resonance over anatomical realism.

Visual Philosophy: Smythe utilizes an expressionist approach where color dictates the mood (e.g., Hades' blue vs. Persephone's pink). The intentional artistic "imperfections" and brush textures create an emotional resonance that a statistical average-based AI would typically "correct" or smooth out.

Narrative Autonomy: The work deals with complex trauma with a sensitivity that algorithm cannot yet simulate, maintaining a purely "human-centric" authorship.

B. *The Knight of the Frozen Flower* – The Algorithmic Efficiency:

Figure 3. Algorithmic Surface Perfection in *The Knight of the Frozen Flower*. The rendering demonstrates the "Standardization" hypothesized in H1, where lighting, shading, and line-work follow a mathematically optimized aesthetic typical of GAN-based synthesis.



Figure 3

Visual Philosophy: This production utilizes tools like Webtoon AI Painter. The result is a "chilled" technical perfection: mathematically exact perspectives and perfect shading. However, there is a visible "homogenization" of facial features. This confirms our H1: AI-driven production leads to a stylistic standardization where the art becomes an interchangeable commodity.

Production Logic: Optimized for the high-speed consumption habits identified by Faster Capital (2025), allowing for weekly updates that would be impossible for a solo human artist.

3.2. Synthesis of Comparative Findings: Human vs. Algorithmic Creation

The following table summarizes the fundamental divergences observed between the two production models, empirically validating the "Standardization" trend (H1) and the shift toward "Productive Efficiency."

Comparison Criteria	Lore Olympus (Human-Centric)	AI-Assisted Model (e.g., Frozen Flower)
Visual Philosophy	Expressionist: Prioritizes symbolic color palettes and narrative-driven moods.	Hyper-realistic: Aiming for technical perfection and a "chilled" aesthetic.
Line & Stroke	Organic: 4.3.3. Synthesis of Comparative Findings: Human, Hybrid, and Algorithmic Models The following table provides a multidimensional comparison of the three primary production paradigms currently shaping the webtoon industry. This tri-partite analysis validates the shift toward "Productive Efficiency" while highlighting the persistent value of "Artistic Soul". Comparison Criteria Lore Olympus (Human-Centric) Solo Leveling / Studios (Hybrid-Assist) AI-Assisted Model (e.g., Frozen Flower) Visual Philosophy Expressionist: Prioritizes symbolic color and narrative moods. Technological High-	Mathematical: Standardized line-work, algorithmically corrected for total uniformity.

	<p>Polish: Cinematic aesthetics with human art direction. Hyper-realistic: Aiming for technical perfection and a "chilled" aesthetic. AI Role & Utility None/Minimal: Creation is purely artisanal and human-led. Efficiency Catalyst: AI manages repetitive assets (3D backgrounds, crowds, lighting effects). Primary Generator: AI acts as the main engine for rendering and character consistency. Line & Stroke Organic: Intentional imperfections and unique artistic signatures. Refined Industrial: High-precision lines with manual character corrections. Mathematical: Standardized line-work, algorithmically corrected for uniformity. Production Speed Low: Requires extensive cognitive lead time and manual labor. High: Streamlined through studio pipelines and AI-assisted background rendering. Very High: Full algorithmic optimization allowing for rapid publication cycles. Emotional Resonance High: Strong reader identification through a unique and daring voice. High-Commercial: Engagement driven by "blockbuster" quality and dynamic action. Moderate: Narrative efficiency based on generic genre tropes and "Genre Satisfaction". Adaptability (H1) Strong: High capacity for creative stylistic shifts. Moderate: Balanced between studio standards and narrative innovation. Weak: Dependency on training datasets, limiting pure aesthetic innovation. Intentional imperfections, textured lines, and unique artistic signatures.</p>	
<p>Production Speed</p>	<p>Low: Requires a full team of human assistants and extensive cognitive lead time.</p>	<p>Very High: Algorithmic optimization allowing for</p>

		intensive weekly publication cycles.
Emotional Resonance	High: Strong reader identification through a unique and daring artistic voice.	Moderate: Narrative efficiency based on generic genre tropes (Isekai/Romance).
Adaptability (H1)	Strong: High capacity for creative stylistic shifts tailored to specific plot points.	Weak: Dependency on training datasets, limiting pure aesthetic innovation.

3.3. Tri-Partite Analysis: The Evolution of Creative Workflows

The comparative data presented in the restructured table reveals a sophisticated stratification of the webtoon market, moving beyond a simple binary opposition between man and machine. This analysis highlights three critical dimensions of the current industrial transition:

A. The Hybrid Model as a Strategic "Middle Ground"

As suggested by the inclusion of the Hybrid-Assist model (e.g., Redice Studio), the industry is gravitating toward a synthesis where AI acts as an Efficiency Catalyst. In this paradigm, AI manages "mechanical drudgery"—such as 3D background rendering and lighting effects—while human creators maintain Creative Sovereignty over character acting and narrative pacing. This model effectively mitigates the "Standardization" risk hypothesized in H1 by using technology to amplify, rather than replace, the human artistic signature.

B. Socio-Economic Scalability and Digital Welfare

The "Production Speed" and "AI Role" metrics underscore a major macroeconomic shift. While the Human-Centric model (e.g., Lore Olympus) remains high-risk due to its artisanal constraints, the Hybrid Model offers a scalable "Blockbuster" quality that meets global demand without falling into the "Uncanny Valley" of purely mathematical AI art. This alignment with high-speed consumption habits, identified by Faster Capital (2025), allows platforms to sustain digital welfare and economic growth while preserving a level of "Symbolic Adaptability" that purely algorithmic models lack.

C. The Displacement of Creative Labor (H1 & H2)

The transition across the three columns illustrates the changing ontology of the creator.

- The Artisan (Human): Focuses on "Expressionist" emotional resonance.
- The Director (Hybrid): Manages a complex pipeline where AI assists in "Technological High-Polish".
- The Curator (Algorithmic): Oversees "Mathematical" outputs, prioritizing efficiency over unique voice.

This progression confirms H2, as the speed and data-driven nature of the Hybrid and Algorithmic models allow for tighter feedback loops where reader sentiment directly informs the "mathematically optimized" aesthetic.

3.4. The Hybrid Synthesis: Studio Redice and the "Blockbuster" Pipeline

The emergence of the Hybrid Model, exemplified by high-tier production houses such as Redice Studio (responsible for the global phenomenon Solo Leveling), represents the current economic and aesthetic "sweet spot" in the digital comic industry. This model provides a vital counter-argument to the pure standardization feared in H1.

A. Strategic Automation vs. Creative Sovereignty

Unlike the fully AI-assisted model, the Hybrid approach utilizes AI as an Efficiency Catalyst rather than a primary generator. In this workflow, generative tools are relegated to "mechanical drudgery"—the rendering of complex architectural backgrounds, the management of particle effects (lighting, sparks, aura), and the filling of massive crowd scenes. By offloading these labor-intensive tasks to algorithmic processes, the lead artist can dedicate a higher percentage of cognitive resources to Character Acting and Narrative Pacing.

B. The "Studio Brand" as a Quality Guarantee

From a macroeconomic perspective (Luh, 2021), the Hybrid Model shifts the value of the work from the "Individual Signature" to the "Studio Brand." While Lore Olympus relies on Rachel Smythe's idiosyncratic style, the Hybrid Model

creates a "cinematic" standard that is both highly polished and industrially scalable. This validates our H2 regarding personalization: the studio can use AI to maintain a consistent "High-Polish" look across hundreds of chapters, meeting the rapid consumption demands of the global market without falling into the "Uncanny Valley" of purely mathematical AI art.

C. Human Oversight and Symbolic Adaptability

The defining characteristic of the Hybrid Model is Human Oversight. Even when AI generates a background or a lighting effect, a human art director performs the final "curation." This ensures that the visual output remains subservient to the story's emotional beats. This model proves that AI, when integrated into a sophisticated human pipeline, does not necessarily lead to stylistic decay but can instead facilitate a level of visual density and "spectacle" that was previously unattainable for solo human creators.

4 .ECONOMIC IMPLICATIONS: GROWTH, WELFARE, AND GLOBALIZATION

The integration of Artificial Intelligence within the webtoon industry transcends mere technical utility, triggering a profound macroeconomic shift in how digital creative assets are valued, produced, and exported. As Chia-Hui Luh (2021) argues, "the impact of AI on economic growth and welfare is multifaceted," acting as a double-edged sword that simultaneously increases capital efficiency while displacing traditional labor structures.

4.1. Capital Efficiency and the Redistribution of Creative Labor The primary economic driver for AI adoption is the drastic reduction in marginal costs per episode. By automating labour-intensive tasks such as background rendering and flat colouring through GAN-based systems, production houses can achieve a "Very High" production speed that was previously unattainable. **Asset Scalability:** AI allows for the reuse and algorithmic adaptation of digital assets, turning a one-time creative effort into a scalable industrial resource. **Labor Displacement vs. Evolution:** While traditional assistants may see their roles diminished, a new class of "Prompter-Curators" is emerging. However, this shift creates a "New Creator" ontology where the author must manage algorithmic outputs rather than engaging in the traditional "mechanical execution" of art.

4.2. Digital Welfare and Consumer Accessibility From a welfare perspective, AI democratization enables a higher volume of content to reach diverse audiences at lower price points. **Market Saturation:** The ability to sustain weekly or even bi-

weekly updates satisfies the "rapid content consumption habits" identified by Faster Capital (2025). Reader-Creator Feedback Loops: As hypothesized in H2, sentiment analysis (Liu, 2012) allows platforms to tailor narratives to audience desires in real-time, theoretically increasing "Digital Welfare" by maximizing consumer satisfaction through data-driven storytelling.

4.3. Globalization through Neural Machine Translation (NMT)

The globalization of the webtoon medium is perhaps the most visible economic victory of AI integration. The deployment of Google's Neural Machine Translation (NMT) systems has effectively "bridged the gap between human and machine translation". Instantaneous Distribution: NMT enables near-instant international distribution across linguistic boundaries, allowing a Korean webtoon to gain a global audience in North America or Europe within hours of its original release. Cultural Export Efficiency: By reducing the cost and time of localization, platforms can test the "cultural portability" of a title in multiple markets simultaneously, maximizing the intellectual property's global valuation.

4.4. The Risks of Algorithmic Monoculture

Despite these growth metrics, the macroeconomic "Standardization" hypothesized in H1 poses a long-term threat to the diversity of the digital welfare landscape. If algorithmic preferences for popular trends dictate production, the market risks becoming a "Commodity Model" (AI-Assisted) that prioritizes high-frequency updates over unique, culturally significant intellectual property like Lore Olympus. This transition could lead to a "Stylistic Homogenization" where the medium's unique artistic "hand" is sacrificed for market-ready consistency.

CONCLUSION

TOWARD A SYNERGETIC ONTOLOGY OF DIGITAL CREATION

The integration of Artificial Intelligence within the webtoon ecosystem represents a definitive rupture in the traditional paradigm of literary and visual production. As this study has demonstrated, the transition from a human-centric creative process to an AI-augmented framework—typified by the "platformization" of creative labs—reconfigures the very nature of authorship. The tension between the "expressionist" soul of human-led works like Lore Olympus and the "mathematical" efficiency of AI-assisted models serves as a microcosm for the broader challenges facing the Fourth Industrial Revolution. Our analysis validates that while AI significantly accelerates production cycles and optimizes capital efficiency, it introduces a substantial risk of stylistic standardization (H1). However, the emergence of the Hybrid-Assist Model, exemplified by production houses like Redice Studio, offers a strategic "middle ground". This model proves

that AI can act as an efficiency catalyst for mechanical tasks while preserving the human "captain" at the wheel of emotional depth and narrative pacing. Furthermore, the macroeconomic shift facilitated by Neural Machine Translation (NMT) has effectively bridged the gap between human and machine translation, enabling near-instant international distribution. This globalization, coupled with real-time sentiment analysis, fulfils the promise of Digital Welfare by maximizing consumer accessibility and satisfaction (H2). Yet, as John Warner (2025) identifies, the "struggle of writing" remains essential to prevent a transition into a purely "commodity model" of disposable digital assets. Ultimately, the survival of the webtoon as a profound art form depends on a synergetic ontology. In this emerging landscape, AI serves as a "compass" to navigate the vast technical requirements of digital labor, while the human creator retains command over the idiosyncratic and incomputable artistic voice. The future of the industry will be dictated by our ability to balance industrial throughput with the preservation of the unique human spirit that remains the heart of every story.

References

- Brown, T. B., et al. (2020). Language Models are Few-Shot Learners. arXiv:2005.14165.
- Faster Capital. (2025). The Impact of AI on Content Consumption Habits. [Online].
- Kim, J. H., & Yu, J. (2019). Platformizing Webtoons: Creative and Digital Lab in South Korea. *Social Media + Society*, 5(4). doi:10.1177/2056305119880174 .
- Ju Ha,J. (2017). The Knight of the Frozen Flower ,Titre original : Eoreumkkot Gisa / 얼음꽃 기사.Origine : Corée du Sud Corée du Sud -Webnovel Genres : Fantasy - Romance. Éditeurs VO : Kakao, RidibooksPublished in : Kakao, Nb of chapitres VO : 179
- L'IA Facile. (2025). The Implications of AI in the Field of Literature. [Online].
- Liu, B. (2012). *Sentiment Analysis and Opinion Mining*. Morgan & Claypool Publishers.
- Luh, C. H. (2021). The Impact of Artificial Intelligence on Economic Growth and Welfare. *Journal of Macroeconomics*, 69, 103342.
- Smythe, R. (2018-présent). Lore Olympus [Webtoon]. WEBTOON.
https://www.webtoons.com/fr/romance/lore-olympus/list?title_no=1829
- Warner, J. (2025). *Redefining Writing in the Age of AI: Insights from John Warner*. Stewdy.
- Westerfield, G., et al. (2015). Intelligent Augmented Reality Training. *International Journal of Artificial Intelligence in Education*, 25, 157–172.
- Wu, Y., Schuster, M., et al. (2016). Google's Neural Machine Translation System. arXiv:1609.08144.