Generative AI's Disruption on Intellectual Property Landscape in Brazil: A Sociotechnical and McLuhan tetrad Analysis

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Abstract. *Generative AI (GenAI) introduces transformative challenges and opportunities to Intellectual Property (IP) processes in countries like Brazil, where existing laws, such as Copyright and IP Laws, do not explicitly account for AI-generated nuances. This paper explores the emerging idea behind GenAI's impact and disruptive potential on the current Brazilian IP landscape. Using a qualitative approach, we apply McLuhan's tetrad analysis, informed by Sociotechnical Theory, to identify potential enhancements, obsolescence, retrievals, and reversals that GenAI can bring to IP management in Brazil. Our contributions include advancing the understanding of the influence of GenAI on IP and offering preliminary insights for stakeholders to address emerging challenges and optimize opportunities in Brazil's evolving IP scenario.*

1. Introduction

Generative Artificial Intelligence (GenAI), which includes technologies such as large language models (LLMs), represents a disruptive leap in computational capabilities for different industries. At its core, GenAI involves algorithms trained on extensive datasets to autonomously create content resembling human-generated outputs, including text, images, music, and other types of content [Feuerriegel et al. 2024]. This technology is highly effective at mimicking patterns and generating new outputs that often resemble those created by humans. This shift presents both challenges and opportunities for Brazil, a country with a rapidly digitalizing economy facing its own socio-economic issues.

The capacity of GenAI to produce original-like works calls into question the adequacy of the current Brazilian legal framework governing Intellectual Property (IP) rights

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and ownership. IP management involves the identification, protection, and enforcement of legal rights associated with creations of the mind, such as inventions, artistic works, designs, and brand identities. In particular, Brazil's Intellectual Property Law (Law No. 9.279/1996) and its Copyright Law (Law No. 9.610/1998) were established long before AI became a mainstream technology, and neither explicitly addresses the nuances of AI-generated content. Although these laws focus on human authorship and originality, GenAI blurs these boundaries by creating outputs derived from massive datasets, some of which may include copyright or culturally sensitive materials [Mariani and Dwivedi 2024].

From an Information Systems (IS) perspective, GenAI has an impact on the interfaces between social and technical dimensions around IP management [Alavi et al. 2024]. The rapid evolution of digital technologies like GenAI poses challenges to traditional IP frameworks, potentially leading to regulatory gaps. To effectively address these challenges, the Sociotechnical Theory, as discussed by Bostrom and Heinen (1977), emerges as a promising approach, highlighting the interdependence between technological advances and the social systems in which they are embedded. In summary, Sociotechnical Theory emphasizes that technology and society are deeply interconnected and successful systems must account for both technical elements (e.g., infrastructure, algorithms) and social aspects (e.g., human behavior, organizational context) to achieve optimal outcomes.

This position paper, grounded in IS research principles, aims to explores the emerging idea behind GenAI's impact and disruptive potential within Brazil's IP context. To achieve this objective, we employ McLuhan's tetrad analysis [McLuhan 1977], informed by sociotechnical theory. The tetrad analysis was chosen for its recognized effectiveness as a framework to analyze the effects of new technologies on society and culture [Jackson et al. 2024]. Specifically, McLuhan's tetrad addresses four key aspects: (i) what the technology *enhances*, (ii) what it renders *obsolete*, (iii) what it *retrieves* from obsolescence, and (iv) what it *reverses* into when pushed to extremes. We provide a preliminary understanding of how GenAI intersects with Brazil's IP landscape, emphasizing its potential to drive change and transformation. Aligned with the Emerging Ideas category in the TIRE track, we aim to enhance understanding and awareness of this topic.

This paper makes a dual contribution to both the academic context and the practical domain of IS. From the academic perspective, it advances the understanding of GenAI's impact on IP by integrating sociotechnical theory with McLuhan's tetrad analysis. This combination provides a structured framework to analyze the complex interplay between technological advancements and societal values within the IP context. For industry, it provides practitioners with a preliminary exploration of GenAI's implications for IP in Brazil, helping to inform future decisions in this emerging and complex scenario.

2. A Sociotechnical and McLuhan tetrad Analysis

In this section, we apply McLuhan's tetrad to examine the impact of GenAI on IP management processes in Brazil, framed by sociotechnical theory. This analysis seeks to explore the four key dimensions of McLuhan's tetrad (enhance, obsolesce, retrieve, and reverse) in the context of GenAI's integration into the IP landscape in Brazil. Our research method was designed using a qualitative approach, with data collection involving the review of academic papers, legal documents, policy reports, and industry insights. The data analysis employed a thematic approach, categorizing the identified factors into

the dimensions of McLuhan's tetrad [McLuhan 1977] while integrating a sociotechnical perspective [Bostrom and Heinen 1977]. Due to space constraints, references for each dimension are available in our open repository [Araújo et al. 2025].

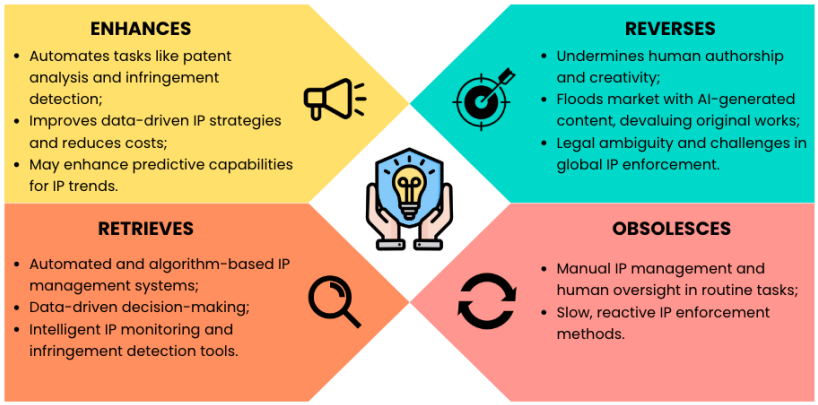

Figure 1. Sociotechnical and McLuhan tetrad Analysis.

- **Enhances** (*How does GenAI enhance IP management in Brazil?*): GenAI could go beyond simple automation and has the potential to transform IP analytics. For example, GenAI may facilitate complex tasks such as patent analysis, predictive infringement detection, and patent writing. By processing large datasets, GenAI would enable Brazilian organizations to develop more data-driven approaches to IP protection and monetization. Additionally, it could reduce operational costs and minimize human error in traditionally labor-intensive processes, potentially enhancing the overall efficiency and accuracy of IP management;
- **Obsolesces** (*Which IP management processes in Brazil become obsolete due to GenAI?*): GenAI could render certain traditional IP management processes obsolete, particularly those that rely heavily on manual intervention or time-consuming processes. For example, tasks such as reviewing patent applications, managing copyright claims, and monitoring IP infringements could be largely automated, reducing the need for human oversight. Conventional IP enforcement methods, which tend to be reactive and slow, might become outdated as AI-driven tools could enable more proactive and real-time violation detection;
- **Retrieves** (*What previous IP management processes could GenAI bring back to the foreground in Brazil?*): GenAI could bring back practices that were previously sidelined due to technological limitations, such as limited automation and the complexity of monitoring and enforcing IP rights. One example is the revival of data-driven IP audits, where large datasets are analyzed to uncover patterns in patent filings, infringement trends, and market use. GenAI could potentially empower the use of data analytics for IP valuation and strategy, similar to earlier approaches in industries like finance, where algorithms were used to assess risk and forecast trends. These revived practices could enhance the efficiency of IP portfolio management and decision-making;
- **Reverses into** (*If overly relied upon, how could GenAI disrupt IP management processes in Brazil?*): The widespread automation of content creation through GenAI could complicate the identification and differentiation of human-created works, creating challenges in IP attribution and enforcement. An over-reliance on

AI to enforce IP could create legal ambiguities, weakening the clarity and trust in the IP system. Furthermore, the global scope of GenAI may make it increasingly challenging to enforce IP rights across borders, complicating international cooperation and protection efforts. Lastly, unchecked use of AI could introduce privacy risks and result in the inadvertent infringement of existing rights.

This McLuhan tetrad analysis, framed by sociotechnical theory, emphasizes the interplay between technological advancements, such as GenAI's capabilities, and the social systems they operate within, including legal frameworks and cultural dynamics. Key implications include the need for organizations to strategically integrate AI while maintaining ethical standards, the necessity for policymakers to develop adaptive regulatory frameworks, and the shift for IP professionals towards AI-augmented strategic roles.

3. Concluding Remarks

Generative AI (GenAI) introduces transformative challenges and opportunities to Intellectual Property (IP) processes in Brazil. Through a McLuhan tetrad analysis informed by sociotechnical theory, we explored the multifaceted impact of GenAI on IP management in Brazil. This idea allowed us to understand the potential enhancements, obsolescence, retrievals, and reversals that GenAI might bring to the Brazilian IP landscape. The combined use of McLuhan tetrad and sociotechnical theory was particularly valuable, as it provided an understanding of how technological advancements, legal frameworks, and social values are interconnected. Moreover, addressing Information Systems (IS) research is critical in this context, as IS is fundamental to developing the systems, tools, and processes necessary to monitor, manage, and enforce IP rights in the era of AI.

Based on our analysis, future research could examine the processes within the Instituto Nacional da Propriedade Industrial (INPI) to assess its readiness to address challenges posed by AI-driven content creation in Brazil. Furthermore, studies could explore the development of adaptive legal frameworks and guidelines for practitioners, policymakers, and entrepreneurs that integrate GenAI while analyzing the role of IS in facilitating compliance with IP regulations. Another promising avenue for research is the investigation of ethical implications associated with GenAI in IP management.

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