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Impact of Intellectual Property Laws on Innovation in the Technology Sector in Netherlands



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#### Abstract

**Purpose:** The aim of the study was to assess the impact of intellectual property laws on innovation in the technology sector in Netherlands.

**Methodology:** This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

**Findings:** Strong IP protections can incentivize innovation by providing legal safeguards and enabling companies to monetize their inventions. This encourages investment in research and development (R&D) and promotes the creation of new technologies. However, studies indicate that overly restrictive IP laws may stifle innovation, particularly in sectors where rapid technological advancement is crucial. Excessive patent litigation and lengthy patent approval processes can create barriers to entry for smaller firms and startups, limiting competition and hindering innovation. Additionally, overly broad patents may discourage collaboration and hinder the development of complementary technologies.

Implications to Theory, Practice and **Policy:** Innovation economics theory. transaction cost economics and resourcebased view of the firm may be used to anchor future studies on assessing the impact of intellectual property laws on innovation in the technology sector in Netherlands. Technology firms should adopt proactive strategies to navigate the complexities of IP laws while fostering a culture of innovation within their organizations. Policymakers should strive to design IP laws that strike an optimal balance between incentivizing innovation and promoting knowledge dissemination.

**Keywords:** Intellectual Property, Laws, Innovation, Technology Sector



# INTRODUCTION

Intellectual property laws play a crucial role in shaping innovation within the technology sector, influencing how companies invest in research and development, protect their creations, and compete in the market. The rate of technological innovation in developed economies such as the USA, Japan, and the UK has been remarkable in recent years. For example, in the USA, according to research by Acemoglu and Restrepo (2018), the adoption of automation and artificial intelligence has contributed to a significant increase in productivity and innovation across industries. Statistics from the U.S. Bureau of Economic Analysis show that investments in information technology and intellectual property have been steadily rising, indicating a robust innovation environment.

Similarly, Japan has been at the forefront of technological advancements, particularly in fields like robotics and renewable energy. Research by Okazaki and Sawada (2021) highlights Japan's focus on fostering innovation through public-private partnerships and targeted R&D investments. Patent data from the Japan Patent Office reveals a surge in filings related to emerging technologies, demonstrating the country's commitment to driving innovation-led growth.

In developing economies, technological innovation has been accelerating, albeit at varying rates. Take China, for instance, where initiatives like "Made in China 2025" have propelled the country towards becoming a global innovation leader. Research by Huang and Tang (2020) illustrates China's rapid progress in areas such as artificial intelligence and biotechnology, supported by substantial investments in R&D and a conducive policy environment. Patent statistics from the State Intellectual Property Office of China underscore the nation's emergence as a major player in technological innovation.

In developing economies, technological innovation is a dynamic force shaping economic growth and societal transformation. For example, in India, initiatives like the "Digital India" campaign have spurred innovation in sectors such as e-commerce, digital payments, and information technology services. Research by Choudhury and Sabnavis (2020) highlights the significant strides made by India in fostering a vibrant startup ecosystem and promoting digital entrepreneurship. Data from the Indian Patent Office underscores the country's increasing focus on innovation, with a rise in patent filings across various technology domains.

In Brazil, technological innovation has become a key driver of competitiveness and industrial development. Studies by Da Silva et al. (2021) emphasize Brazil's efforts to promote innovation through policies supporting research institutions, technology transfer, and industry-academia collaboration. Patent data from the National Institute of Industrial Property of Brazil indicates a growing number of patents granted in areas such as biotechnology, renewable energy, and information technology, reflecting the country's commitment to fostering innovation-led growth.

In other developing economies such as Nigeria, there's a growing recognition of the transformative potential of technological innovation. Initiatives like the "National Strategy for Competitivenesss in Raw Materials and Products Development" have aimed to harness innovation in sectors like agriculture, manufacturing, and information technology. Research by Olayide and Adebowale (2019) highlights Nigeria's efforts to promote innovation-driven entrepreneurship and build a conducive ecosystem for startups and small businesses. Data from the Nigerian Copyright Commission indicates a rise in intellectual property registrations, reflecting the increasing emphasis on innovation and creativity in the country.

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Similarly, in Vietnam, technological innovation has emerged as a strategic priority for driving economic modernization and global competitiveness. Policies like the "National Technology Innovation Program" have supported R&D activities and technology adoption across industries. Studies by Nguyen et al. (2022) underscore Vietnam's progress in areas such as digital transformation, renewable energy, and biotechnology, fueled by investments in education, infrastructure, and research institutions. Patent statistics from the National Office of Intellectual Property of Vietnam demonstrate a growing number of patent applications, signaling the country's growing innovation capacity.

In Mexico, technological innovation has become increasingly central to fostering economic competitiveness and sustainable development. The government's "National Strategy for Science, Technology and Innovation" aims to strengthen the country's innovation ecosystem by promoting collaboration between academia, industry, and government. Research by López and Ramírez (2020) highlights Mexico's progress in areas such as advanced manufacturing, biotechnology, and renewable energy, supported by investments in research infrastructure and human capital development. Data from the Mexican Institute of Industrial Property reveals a growing number of patents granted, indicating the country's expanding innovation landscape.

In South Africa, technological innovation is viewed as essential for addressing socioeconomic challenges and driving inclusive growth. Initiatives like the "National System of Innovation" prioritize R&D investment and technology commercialization to stimulate industrial competitiveness and job creation. Studies by Maharaj (2021) underscore South Africa's strides in areas such as information and communication technology (ICT), green technology, and healthcare innovation. Patent data from the Companies and Intellectual Property Commission reflects an uptick in patent applications, signaling the country's commitment to fostering a culture of innovation and entrepreneurship.

In Argentina, technological innovation has emerged as a key driver of economic diversification and competitiveness. The government's "National Plan for Science, Technology and Innovation" aims to promote innovation-led growth through investments in research infrastructure, human capital development, and technology transfer initiatives. Research by Belingheri and Peres (2020) highlights Argentina's progress in areas such as biotechnology, renewable energy, and information technology, supported by a vibrant startup ecosystem and public-private partnerships. Data from the National Institute of Industrial Property of Argentina shows an increase in patent filings, indicating a growing focus on innovation and intellectual property protection.

In Indonesia, technological innovation is seen as instrumental in achieving sustainable development goals and enhancing global competitiveness. The government's "Making Indonesia 4.0" roadmap prioritizes the adoption of digital technologies and advanced manufacturing to drive industrial transformation and innovation-driven growth. Studies by Effendi and Djajadikerta (2022) illustrate Indonesia's advancements in areas such as digital infrastructure, fintech, and agritech, facilitated by supportive regulatory frameworks and investments in innovation infrastructure. Patent statistics from the Directorate General of Intellectual Property of Indonesia reflect a rising trend in patent applications, underscoring the country's growing innovation capabilities.

In sub-Saharan Africa, despite facing challenges such as limited infrastructure and funding constraints, there's a growing emphasis on leveraging technology for economic development. A study by Ayyagari, Demirgüç-Kunt, and Maksimovic (2019) highlights the transformative impact

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of mobile money and digital platforms on financial inclusion and entrepreneurship in the region. Data from the World Bank indicates a steady increase in internet connectivity and mobile subscriptions, laying the foundation for further technological innovation and socioeconomic progress.

The stringency of intellectual property (IP) laws refers to the extent to which legal frameworks protect intellectual property rights, including patents, copyrights, trademarks, and trade secrets. Stringent IP laws typically entail strong enforcement mechanisms, clear guidelines for IP protection, and severe penalties for infringement. Such robust legal protections can incentivize innovation by providing creators and innovators with confidence in their ability to retain ownership of their intellectual assets (Maskus, 2019). For example, countries with stringent patent laws may experience higher levels of innovation in sectors heavily reliant on intellectual property, such as pharmaceuticals and technology, as inventors are motivated to invest in research and development to secure patent protection for their inventions (Shapiro, 2018).

Conversely, overly stringent IP laws can also hinder innovation by creating barriers to entry and stifling competition (Stiglitz, 2019). Excessive protection of intellectual property may lead to monopolistic practices, limiting access to knowledge and impeding the diffusion of technology (Boldrin & Levine, 2018). Additionally, stringent IP laws can discourage collaboration and knowledge sharing, as firms may be reluctant to disclose proprietary information for fear of infringement lawsuits. Therefore, striking a balance between protecting intellectual property rights and promoting innovation is essential for fostering dynamic and competitive innovation ecosystems (Maskus, 2019).

# **Problem Statement**

The impact of intellectual property (IP) laws on innovation in the technology sector remains a topic of significant concern and debate. While stringent IP laws are intended to incentivize innovation by providing creators with legal protection for their intellectual assets, there is growing evidence to suggest that these laws may have unintended consequences on technological progress. For example, some scholars argue that overly restrictive IP laws can lead to monopolistic practices and hinder competition, thereby stifling innovation (Boldrin & Levine 2018). Furthermore, the complexity and ambiguity of IP laws may create uncertainty for innovators, potentially deterring investment in research and development (Shapiro, 2018). Additionally, the enforcement of IP laws, particularly in the digital realm, presents unique challenges that may impede the free flow of knowledge and ideas essential for innovation (Maskus, 2019).

# **Theoretical Framework**

# **Innovation Economics Theory**

Originated by Joseph Schumpeter, this theory emphasizes the role of entrepreneurship and innovation in driving economic growth. Schumpeter posited that innovation is central to the dynamic process of creative destruction, whereby new technologies and business models disrupt existing markets and create new ones (Schumpeter, 2018). In the context of the impact of intellectual property laws on innovation in the technology sector, this theory suggests that strong IP protections can incentivize innovation by providing creators with the assurance that they can profit from their inventions. However, it also raises questions about the potential negative effects of overly stringent IP laws, such as stifling competition and hindering technological progress.



# **Transaction Cost Economics**

Developed by Ronald Coase and further elaborated by Oliver Williamson, transaction cost economics focuses on the costs associated with coordinating economic activities within organizations and markets. The theory suggests that the choice between hierarchical (internal) and market (external) coordination depends on minimizing transaction costs, which include the costs of negotiating, monitoring, and enforcing contracts (Williamson, 2019). In the context of intellectual property laws and innovation in the technology sector, this theory highlights the importance of understanding the transaction costs involved in acquiring and protecting intellectual property rights. It underscores the relevance of IP laws in reducing transaction costs related to knowledge sharing and innovation collaboration.

# Resource-Based View (RBV) of the Firm

Originating from the work of Edith Penrose and further developed by scholars such as Jay Barney, the RBV of the firm posits that a firm's competitive advantage stems from its unique bundle of resources and capabilities (Barney, 2018). In the context of intellectual property laws and innovation in the technology sector, this theory suggests that IP assets constitute valuable resources that can contribute to a firm's competitive advantage. However, it also raises questions about the effectiveness of IP laws in protecting and leveraging these assets to stimulate innovation and maintain competitiveness in rapidly evolving technological landscapes.

#### **Empirical Review**

Smith (2019) examined the intricate relationship between intellectual property (IP) laws and innovation within the software industry. Employing sophisticated econometric techniques, the study revealed that jurisdictions with stronger IP protections witnessed a considerable surge in patenting activities, indicative of heightened innovation endeavors within the software sector. Furthermore, the research highlighted the pivotal role of robust IP regimes in fostering an environment conducive to innovation by providing firms with the necessary legal assurances to invest in research and development initiatives. Consequently, the findings underscored the critical importance of well-designed IP laws in incentivizing innovation and driving technological progress, thereby enhancing the competitiveness and growth potential of the software industry.

Chen (2020) delved into the intricate dynamics between IP laws and innovation within the semiconductor industry. Through in-depth interviews with industry experts and meticulous analysis of legal documentation, the study unearthed compelling insights into the profound impact of robust IP protections on innovation outcomes. Specifically, the research illuminated how clear and enforceable IP laws provided semiconductor firms with the necessary confidence to engage in collaborative research and development efforts, consequently fostering the rapid advancement of semiconductor technologies. Moreover, the findings elucidated the critical role of IP laws in mitigating the risks associated with knowledge appropriation and facilitating technology diffusion within the semiconductor sector, thus underlining the indispensable nature of well-crafted IP regimes in nurturing innovation and sustaining technological progress.

Jones (2018) undertook a nuanced qualitative research endeavor to unravel the complex interplay between IP laws and innovation dynamics within the open-source software community. Through a rigorous analysis of community interactions and legal frameworks, the study shed light on the intricate nuances of innovation within open-source ecosystems and the nuanced impacts of IP laws on collaborative innovation endeavors. Contrary to conventional wisdom, the research unearthed



how overly stringent IP laws could inadvertently impede collaboration and knowledge sharing among developers, thereby stifling innovation within open-source ecosystems. Consequently, the findings underscored the imperative of crafting IP laws that strike an optimal balance between protecting intellectual property rights and fostering a collaborative innovation environment, thereby ensuring the sustained vibrancy and dynamism of open-source software communities.

Garcia (2021) conducted a longitudinal analysis to scrutinize the impact of changes in intellectual property (IP) laws on innovation outcomes within the biotechnology sector. Leveraging a rich dataset spanning several years, the study discerned that revisions to patent laws elicited a notable uptick in patent filings and research investments by biotechnology firms. This surge in innovation activity underscored the profound influence of IP reforms in stimulating innovation within the biotech industry. Furthermore, the research unveiled a positive correlation between the strength of IP protections and the level of collaboration between biotech firms and research institutions, indicative of the pivotal role played by clear IP laws in facilitating knowledge exchange and innovation diffusion. Consequently, the findings underscored the crucial importance of robust IP regimes in shaping innovation dynamics and fostering a conducive environment for biotechnological advancement.

Kim (2018) elucidated the impact of IP laws on innovation performance across diverse technology sectors. Employing sophisticated econometric techniques and drawing upon data from multiple nations, the study discerned a compelling positive relationship between the strength of IP protections and innovation output. Specifically, countries boasting robust IP regimes exhibited markedly higher levels of innovation across various technology domains, underscoring the pivotal role played by IP laws in fostering technological advancement. Moreover, the research unraveled a positive correlation between the strength of IP protections and foreign direct investment (FDI) inflows into the technology sector, indicative of the profound influence of IP regimes on investment decisions and innovation-driven growth.

Wang (2019) unraveled the intricate nexus between IP laws and innovation strategies among technology startups. Combining quantitative analysis with qualitative insights gleaned from indepth interviews, the study provided a nuanced understanding of how robust IP protections influence the strategic behavior of technology startups. The findings elucidated how startups operating in jurisdictions with robust IP regimes were more inclined to pursue patenting and licensing strategies to safeguard their intellectual assets. Furthermore, the research unearthed how IP laws played a pivotal role in shaping investment decisions among venture capitalists, with investors exhibiting a pronounced preference for startups operating in environments characterized by strong IP protections.

Liu (2022) synthesized existing evidence on the impact of IP laws on innovation dynamics across various technology sectors. Drawing upon a diverse array of scholarly publications, the review illuminated the complex interplay between IP laws and innovation outcomes, underscoring the multifaceted nature of this relationship. Furthermore, the review identified several critical factors that mediate the influence of IP laws on innovation, including sector-specific characteristics, institutional environments, and technological complexities. Consequently, the findings underscored the imperative of adopting a nuanced and contextually sensitive approach to crafting IP policies that effectively balance incentives for innovation with the promotion of competition and knowledge diffusion.



# METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

# RESULTS

**Conceptual Gaps:** Despite the studies' focus on the relationship between intellectual property (IP) laws and innovation, there is a need for further exploration into the nuanced mechanisms through which IP laws influence innovation dynamics. For instance, while Smith (2019) and Chen (2020) provide insights into the overall impact of IP regimes on innovation outcomes, they primarily focus on quantitative and qualitative aspects of IP protections. Future research could delve deeper into understanding specific channels through which IP laws incentivize or hinder innovation, such as the role of licensing agreements and technology transfer mechanisms. Additionally, an in-depth analysis of the impact of IP laws on emerging technologies like artificial intelligence and blockchain could uncover novel insights into innovation dynamics in contemporary industries.

**Contextual Gaps:** The studies predominantly examine the impact of IP laws on innovation within specific industry sectors, such as software, semiconductor, and biotechnology. However, there is a dearth of research exploring differential effects of IP laws on innovation across various sectors and innovation ecosystems. Furthermore, while Jones (2018) sheds light on challenges posed by stringent IP laws in open-source communities, there is limited understanding of how different forms of IP protections affect collaborative innovation in diverse organizational settings. Future studies could address these gaps by investigating how variations in IP laws and enforcement mechanisms shape innovation outcomes across different industry sectors and organizational contexts.

**Geographical Gaps:** The studies primarily focus on innovation dynamics within developed economies, with limited attention given to experiences of emerging economies and developing countries. Although Kim (2018) hints at positive correlations between strong IP protections and innovation output, there is a lack of research exploring potential trade-offs between IP rights enforcement and broader societal goals. Moreover, studies like Garcia's (2021) longitudinal analysis provide insights into IP reforms' impact on innovation within specific sectors, yet broader geographical comparisons are needed to understand how IP laws influence innovation across diverse socio-economic contexts. Future research could address these gaps by conducting comparative studies across different geographical regions, taking into account institutional contexts and policy environments.

# CONCLUSION AND RECOMMENDATIONS

# Conclusion

The impact of intellectual property (IP) laws on innovation in the technology sector is a complex and multifaceted phenomenon that requires careful consideration of various factors. Across numerous empirical studies conducted in recent years, it has become evident that IP laws play a crucial role in shaping innovation dynamics within the technology sector. These laws provide firms with the necessary legal assurances to invest in research and development initiatives, thereby



fostering an environment conducive to innovation. However, the relationship between IP laws and innovation is not without its challenges. While strong IP protections can incentivize firms to innovate and invest in new technologies, overly stringent laws may hinder collaboration and knowledge sharing, particularly in open-source communities. Moreover, the impact of IP laws on innovation outcomes can vary across different industry sectors, organizational contexts, and geographical regions, highlighting the need for nuanced policy interventions. In conclusion, while intellectual property laws serve as essential drivers of innovation in the technology sector, policymakers must strike a delicate balance between protecting intellectual property rights and fostering a collaborative innovation environment. Future research and policy efforts should aim to address the identified research gaps, thereby ensuring that IP laws continue to promote innovation while also contributing to broader societal goals of equitable access to knowledge and technology.

#### Recommendations

The following are the recommendations based on theory, practice and policy:

#### Theory

Further research should focus on developing and refining theoretical frameworks that elucidate the nuanced mechanisms through which IP laws influence innovation dynamics. This includes exploring the differential effects of IP protections on various types of innovation (e.g., incremental vs. radical innovation) and examining how contextual factors mediate these relationships. Theoretical models should also consider the role of IP laws in shaping collaborative innovation ecosystems, particularly in emerging fields such as open-source software development and collaborative research initiatives. This entails integrating insights from organizational theories and innovation studies to understand how IP regimes influence knowledge sharing, collaboration networks, and innovation diffusion.

# Practice

Technology firms should adopt proactive strategies to navigate the complexities of IP laws while fostering a culture of innovation within their organizations. This includes investing in IP management capabilities, such as patent analytics and IP portfolio optimization, to strategically leverage IP assets for competitive advantage. Collaboration platforms and innovation intermediaries can play a crucial role in facilitating knowledge exchange and collaborative innovation efforts, particularly in sectors where IP sharing is essential for technological advancement. By fostering partnerships and providing legal frameworks for IP sharing, these entities can promote innovation while mitigating the risks associated with IP disputes.

#### Policy

Policymakers should strive to design IP laws that strike an optimal balance between incentivizing innovation and promoting knowledge dissemination. This involves revisiting existing IP regimes to ensure they are aligned with the evolving needs of the technology sector, including emerging technologies such as artificial intelligence, blockchain, and biotechnology. Policy interventions should prioritize fostering a conducive environment for innovation, with measures to address issues such as patent thickets, patent trolls, and overly broad patent claims that may stifle innovation and hinder competition. Moreover, policymakers should consider promoting alternative IP mechanisms, such as open innovation platforms and collaborative licensing arrangements, to facilitate technology diffusion and address societal challenges.



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