UNIVERSIDADE FEDERAL DE MINAS GERAIS
FACULDADE DE DIREITO
Programa de Pós-Graduação em Direito

LAW, DEVELOPMENT AND INNOVATION:

THE POWER OF COPYRIGHT IN ACCESS TO KNOWLEDGE

Marcos Henrique Costa Leroy

BELO HORIZONTE
2024

UNIVERSIDADE FEDERAL DE MINAS GERAIS
FACULDADE DE DIREITO
Programa de Pós-Graduação em Direito

LAW, DEVELOPMENT AND INNOVATION:

THE POWER OF COPYRIGHT IN ACCESS TO KNOWLEDGE

Marcos Henrique Costa Leroy

Tese apresentada ao Programa de Pós-Graduação em Direito da Faculdade de Direito da Universidade Federal de Minas Gerais como requisito parcial para a obtenção do título de Doutor em Direito.

Linha de pesquisa: “Poder, Cidadania e Desenvolvimento no Estado Democrático de Direito”.

Área de Estudo: “Direito Econômico e Desenvolvimento”.

Orientador: Prof. Dr. Giuseppe Bellantuono

BELO HORIZONTE
2024

Ficha catalográfica elaborada pela bibliotecária Meire Queiroz - CRB-6/2233.

Leroy, Marcos Henrique Costa
L621l Law, development and innovation [manuscrito]: the power of copyright in access to knowledge / Marcos Henrique Costa Leroy. - 2024.

Orientador: Giuseppe Bellantuono.
Tese (doutorado) - Universidade Federal de Minas Gerais, Faculdade de Direito.

1. Direitos autorais - Teses. 2. Teoria do conhecimento - Teses. 3. Inovações tecnológicas - Teses. I. Bellantuono, Giuseppe. II. Universidade Federal de Minas Gerais - Faculdade de Direito. III. Título.

CDU: 347.78

UNIVERSIDADE FEDERAL DE MINAS GERAIS

PROGRAMA DE PÓS-GRADUAÇÃO EM DIREITO

ATA DA DEFESA DE TESE DO ALUNO

MARCOS HENRIQUE COSTA LEROY

Realizou-se, no dia 30 de setembro de 2024, às 13:00 horas, em Plataforma Virtual, pela Universidade Federal de Minas Gerais, a defesa de tese, intitulada LAW, DEVELOPMENT AND INNOVATION: THE POWER OF COPYRIGHT IN ACCESS TO KNOWLEDGE apresentada por MARCOS HENRIQUE COSTA LEROY, número de registro 2020681638, graduado no curso de DIREITO, como requisito parcial para a obtenção do grau de Doutor em DIREITO, à seguinte Comissão Examinadora: Prof(a). Giuseppe Bellantuono - Orientador (UFMG/ Università degli Studi di Trento), Prof(a). Fabiano Teodoro de Rezende Lara (UFMG), Prof(a). Reinaldo Diogo Luz (UFMG), Prof(a). Roberto Caso (Università degli Studi di Trento), Prof(a). Valentina Moscon (Max Planck Institute for Innovation and Competitio).

A Comissão considerou a tese:

(x) Aprovada, tendo obtido a nota __90__.

( ) Reprovada

Finalizados os trabalhos, lavrei a presente ata que, lida e aprovada, vai assinada por mim e pelos membros da Comissão.
Belo Horizonte, 30 de setembro de 2024.

Prof(a). Giuseppe Bellantuono (Doutor) Nota: 90

Prof(a). Fabiano Teodoro de Rezende Lara (Doutor) Nota: 90

Prof(a). Reinaldo Diogo Luz (Doutor) Nota: 90

Prof(a). Roberto Caso (Doutor) Nota: 90

Prof(a). Valentina Moscon (Doutora) Nota: 90

“If you have knowledge, let others light their candles at it” – Margaret Fuller

RESUMO

Este trabalho examina a relação intrínseca entre direitos autorais, a linguagem e o acesso ao conhecimento científico, particularmente em países em desenvolvimento. Explora como a predominância do inglês na publicação científica, juntamente com regimes de direitos autorais restritivos e recursos limitados de tradução, criam barreiras significativas para a disseminação e utilização do conhecimento. O estudo aprofunda a evolução histórica da lei de direitos autorais, o surgimento de acordos internacionais como a Convenção de Berna e o Acordo TRIPS, e seu impacto na capacidade dos países em desenvolvimento de acessar e traduzir trabalhos científicos.

A pesquisa analisa as complexidades dos direitos linguísticos, os desafios da tradução e o papel do "uso justo" e outras exceções na promoção do acesso ao conhecimento. Além disso, explora o potencial de iniciativas abertas, como publicação em acesso aberto e licenciamento Creative Commons, para fomentar um ecossistema global de conhecimento mais inclusivo e equitativo. Através de uma análise abrangente de marcos legais, estudos de caso e recomendações políticas, este trabalho visa contribuir para o diálogo contínuo sobre a reforma dos direitos autorais e defender uma abordagem mais equilibrada que priorize tanto os direitos dos criadores quanto o direito do público de acessar e se beneficiar do conhecimento científico, especialmente no contexto dos países em desenvolvimento.

PALAVRAS-CHAVE: Direito Autoral; Acesso ao Conhecimento; Desenvolvimento.

ABSTRACT

This work examines the intricate relationship between copyright, language, and access to scientific knowledge, particularly in developing countries. It explores how the dominance of English in scientific publishing, coupled with restrictive copyright regimes and limited translation resources, create significant barriers to knowledge dissemination and utilization. The study delves into the historical evolution of copyright law, the emergence of international agreements like the Berne Convention and the TRIPS Agreement, and their impact on developing countries' ability to access and translate scientific works.

It analyzes the complexities of language rights, translation challenges, and the role of fair use and other exceptions in promoting access to knowledge. Additionally, it explores the potential of open initiatives, such as open access publishing and Creative Commons licensing, to foster a more inclusive and equitable global knowledge ecosystem. Through a comprehensive analysis of legal frameworks, case studies, and policy recommendations, this work aims to contribute to the ongoing dialogue on copyright reform and advocate for a more balanced approach that prioritizes both the rights of creators and the public's right to access and benefit from scientific knowledge, particularly in the context of developing countries.

KEY-WORDS: Copyright; Access to Knowledge; Development.

LIST OF ABREVIATIONS

A2K – Access to Knowledge

AI – Artificial Intelligence

BRIC – Brazil, Russia, India, and China

CC – Creative Commons

DMCA – Digital Millennium Copyright Act

DRM – Digital Rights Management

EFL – English as a Foreign Language

EIL – English as an International Language

ELT – English Language Teaching

EMI – English as a Medium of Instruction

EPI – English Proficiency Index

EU – European Union

FTA – Free Trade Agreement

ICT – Information and Communication Technology

InfoSoc – Information Society Directive of 2001

IP – Intellectual Property

IPRs – Intellectual Property Rights

L&E – Limitations and Exceptions

LASK – Language Access to Scientific Knowledge

NGOs – Non-Governmental Organizations

OECD – Organisation for Economic Co-Operation and Development

PLI – Power Language Index

PRIs – Public Research Institutions

R&D – Research and Development

STF – Brazilian Federal Supreme Court

TPM – Technological Protection Measures

TRIPS – Agreement on Trade-Related Aspects of Intellectual Property Rights

UCC – Universal Copyright Convention

UNESCO – United Nations Educational, Scientific and Cultural Organization

WCT – WIPO Copyright Treaty

WIPO – World Intellectual Property Organization

WPPT – WIPO Performances and Phonograms Treaty

WSIS – World Summit on the Information Society

WTO – World Trade Organization

SUMMARY

1 INTRODUCTION 11

2 LAW, DEVELOPMENT AND INNOVATION: A COPYRIGHT POINT OF VIEW…. 14

2.1 Law, Development and Innovation 16

2.2 Intellectual Property 19

2.3 Copyright and Development 24

2.4 International Copyright Systems 26

2.5 Limitations and Exceptions to Copyright 32

3 COPYRIGHT AND ACCESSING SCIENTIFIC KNOWLEDGE: POTENTIALS AND CHALLENGES 38

3.1 The Power of Knowledge 40

3.2 Knowledge Coloniality 49

3.3 Knowledge: Access and Development 50

3.4 Intellectual Property and Knowledge 56

3.5 Access to Knowledge 66

3.6 Education and Digital Market 77

3.7 Trade Agreement and Licensing 93

3.8 Social Cost and the Public Policies 97

3.9 Open Initiatives and Brazilian Tecnobrega Case 104

4 LANGUAGE EFFECTS ON COPYRIGHT AND ACCESS TO SCIENTIFIC KNOWLEDGE: THE TRANSLATION IMPORTANCE 112

4.1 Language Translation and Scientific Knowledge 119

4.2 Language Translation and Copyright 130

4.3 Language Translation Challenges 142

5 LANGUAGE DATA: IMPACTS ON LANGUAGE AND ACCESS TO SCIENTIFIC PRODUCTION 151

5.1 English dominance in developing countries 151

5.2 The Power Language Index 159

5.3 Ethnologue: Languages of the World 163

5.4 Scientific Production Quantity by Language 169

5.5 Language Data Discussion 172

6 LANGUAGE ACCESS TO SCIENTIFIC KNOWLEDGE: THE LASK INDEX.. 173

6.1 The LASK Index 174

6.2 The Power of Social Indicators in Informing Policy Decisions 180

7 COPYRIGHT POWER: TRANSLATION AS A TOOL PROMOTE ACCESS TO KNOWLEDGE IN DEVELOPING COUNTRIES 181

7.1 Disseminating Access to Knowledge: Rethinking Copyright Incentives.. 184

7.2 Brazilian Panorama: Portuguese Language Barrier and Copyright Limitations and Exceptions 200

7.3 Intellectual Property, Development and Innovation: The Knowledge Approach..... 206

8 FINAL CONSIDERATIONS 215

REFERENCES 219

1. INTRODUCTION

In an era defined by rapid technological advancements and the increasing importance of knowledge-based economies, access to scientific knowledge has become a pivotal factor in fostering innovation, development, and societal progress. However, despite the potential benefits, significant barriers persist in accessing this knowledge, particularly in developing countries. This thesis delves into the intricate interplay between copyright law, language, and access to scientific knowledge, exploring how these elements can either facilitate or hinder knowledge dissemination.

The dominance of English in scientific publishing, combined with the complexities of copyright law, often creates substantial obstacles for researchers, students, and practitioners in non-English speaking regions. These barriers can significantly limit their ability to participate in global scientific discourse, stifle innovation, and perpetuate inequalities in access to knowledge. Translation of scientific works into diverse languages thus emerges as a crucial tool for promoting inclusivity, empowering local communities, and fostering a more equitable global knowledge landscape.

This work argues that a knowledge-centered approach to copyright law, one that prioritizes access, equity, and the social function of knowledge, is indispensable for achieving sustainable development and nurturing a more inclusive global scientific community. This necessitates a nuanced understanding of the challenges posed by language barriers, the crucial role of translation in bridging these divides, and the need for legal frameworks that strike a balance between the interests of creators and the broader societal goal of knowledge dissemination.

To this end, this thesis will critically analyze the legal, economic, and social dimensions of copyright law, examining its impact on the translation and dissemination of scientific knowledge, particularly in developing countries. The decision to focus on copyright stems from its pivotal function in regulating the dissemination and accessibility of information and cultural products, which are of particular significance within the realm of scientific research. It will explore the complex interplay between language, translation, and copyright, investigating how legal frameworks can either facilitate or hinder access to scientific knowledge. Through a critical analysis of existing legal systems and an exploration of

potential solutions, this thesis aims to contribute to the ongoing dialogue on copyright reform and advocate for policies that promote equitable access to knowledge for all.

Using the multifaceted concept of decolonization, this thesis is intrinsically linked to the pursuit of equitable access to knowledge. At its core, decolonization seeks to redress historical injustices and power imbalances, particularly those stemming from colonialism, by challenging dominant narratives and empowering marginalized voices. In the context of knowledge production and dissemination, decolonization calls for a critical examination of the ways in which knowledge systems have been shaped by colonial legacies and the active inclusion of diverse perspectives and epistemologies.

This study has connections between decolonization and access to knowledge, particularly in the realm of scientific research and innovation. It recognizes that the dominance of certain languages and knowledge systems can perpetuate inequalities and hinder the full participation of individuals and communities from diverse linguistic and cultural backgrounds. By advocating for a more inclusive and equitable approach to knowledge creation and dissemination, this work aligns with the broader goals of decolonization.

One specific aspect of decolonization that resonates with this study is the emphasis on self-determination and the agency of developing countries in shaping their own innovation policies. The notion of designing Brazilian innovation policies that prioritize the country's development needs and leverage its unique strengths and resources exemplifies this decolonizing approach. It challenges the notion of a one-size-fits-all model for innovation and recognizes the importance of context-specific solutions that empower developing nations to chart their own path towards progress.

Furthermore, this study highlights the critical role of access to knowledge by examining the barriers to accessing scientific knowledge, particularly those related to language and copyright. This work contributes to a broader understanding of the ways in which knowledge systems can perpetuate inequalities and hinder the full participation of marginalized communities. It advocates for policies and practices that promote equitable access to knowledge, recognizing that this is essential for empowering individuals and communities to challenge dominant narratives and contribute to a more just and inclusive global society.

This thesis aims to achieve a comprehensive understanding of the complex relationship between copyright law, language, and access to scientific knowledge, particularly in the

context of developing countries. It seeks to identify the barriers that hinder knowledge dissemination and explore potential solutions that promote a more equitable and inclusive global knowledge ecosystem. The central thesis of this work is that a knowledge-centered approach to copyright law, one that prioritizes access, equity, and the social function of knowledge, is essential for achieving sustainable development and fostering a more inclusive global scientific community. This approach requires a nuanced understanding of the challenges posed by language barriers, the role of translation in bridging these divides, and the need for legal frameworks that balance the interests of creators with the broader societal goal of knowledge dissemination.

By critically analyzing existing legal systems, exploring the potential of open initiatives, and advocating for policy reforms, this study aims to contribute to the ongoing dialogue on copyright and access to knowledge. It seeks to empower developing countries to navigate the complexities of copyright law and language barriers, enabling them to harness the power of scientific knowledge for their own development and contribute to a more equitable and inclusive global knowledge landscape.

This thesis employs a multifaceted methodological approach that combines legal analysis, historical contextualization, and empirical data analysis. It critically examines the legal frameworks governing copyright, tracing their historical evolution and assessing their impact on access to knowledge, particularly in developing countries. It also delves into the historical and cultural contexts of language and translation, exploring their intricate relationship with copyright and knowledge dissemination. Furthermore, the thesis utilizes empirical data and social indicators to try to quantify the language barriers to scientific knowledge (which is subject to the constraints imposed by the use of secondary research) and assess the effectiveness of various policies and initiatives aimed at promoting access. By integrating these diverse perspectives, the thesis aims to provide a comprehensive understanding of the complex dynamics at play and offer actionable recommendations for fostering a more equitable and inclusive global knowledge ecosystem.

The central problem addressed in this thesis is the disparity in access to scientific knowledge between developed and developing countries, exacerbated by the dominance of English in scientific publishing, restrictive copyright regimes, and limited translation resources. This disparity hinders the ability of researchers, students, and practitioners in non-English speaking regions to participate fully in global scientific discourse, impeding innovation and perpetuating inequalities in knowledge dissemination and utilization. The thesis tackles this

problem by examining the legal, economic, and social dimensions of copyright law, analyzing its impact on the translation and dissemination of scientific knowledge, and exploring the potential of open initiatives and policy reforms to foster a more inclusive and equitable global knowledge landscape. It advocates for a knowledge-centered approach to copyright law that prioritizes access, equity, and the social function of knowledge, recognizing the crucial role of translation in bridging linguistic divides and empowering developing countries to harness the power of scientific knowledge for their own development.

2. LAW, DEVELOPMENT AND INNOVATION: A COPYRIGHT POINT OF VIEW

The intricate relationship between law, development, and innovation has been a subject of scholarly inquiry and pervades policy debate. Law, as a system of rules and regulations, plays a pivotal role in shaping the economic, social, and technological landscape of a society. It can act as a catalyst for development by providing a stable framework for economic activity, protecting property rights, enforcing contracts, and ensuring fair competition.

Innovation, which encompasses the conventional creation and implementation of new ideas, processes, or products but also the broader spectrum of activities, including the adaptation for local contexts, improvement of production methods, and the solutions for specific challenges, is widely recognized as a key driver of economic growth and development. It can lead to increased productivity, improved living standards, and greater social well-being. However, innovation is not a spontaneous process; it is shaped and influenced by various factors, including legal frameworks, economic incentives, and social norms.

Intellectual property (IP) law is a specific area of law that plays a crucial role in fostering and regulating innovation. By granting exclusive rights to creators and inventors over their intellectual creations, IP law aims to incentivize innovation by providing a legal framework for protecting and commercializing new ideas. This protection can encourage investment in research and development, attract funding, and facilitate the transfer of technology.

However, the relationship between IP and innovation is not always straightforward. While IP rights can provide incentives for innovation, they can also create barriers to access and

hinder knowledge dissemination. This is particularly relevant in the context of developing countries, where access to knowledge and technology is essential for economic and social progress.

Copyright, a specific form of IP protection, grants exclusive rights to authors of original works, including literary, artistic, and scientific creations. This protection allows authors to control the reproduction, distribution, and adaptation of their works, thereby ensuring they can benefit financially from their creative endeavors. However, copyright protection can also limit access to knowledge, particularly in educational and research settings where the free flow of information is crucial.

To address this tension, copyright law provides for limitations and exceptions (L&Es) that allow for certain uses of copyrighted material without the need for authorization from the copyright holder. These exceptions are often based on societal interests such as education, research, and cultural preservation. The concept of fair use, for example, allows for limited use of copyrighted works for purposes like criticism, commentary, news reporting, teaching, scholarship, and research.

This chapter will explore the intricate relationship between law, development, and innovation, with a particular focus on intellectual property, more specific the role of copyright in promoting innovation and development, while also examining the crucial role of limitations and exceptions (L&Es) in balancing the rights of creators with the broader public interest exploring international legal frameworks, highlighting the need for a deeper examination on the subject.

While it's important to acknowledge the distinction between copyright and author's rights, as outlined by this author in another study[1], this work will not delve into the specific nuances of this dichotomy. Instead, it will focus on the broader meaning of the word copyright, recognizing that both copyright and author's rights systems share the fundamental concept.

---

[1] LEROY, Marcos. *Evolution and Development of the Limitations and Exceptions in Copyright and Authors Rights*. Belo Horizonte, 2020.

2.1. Law, Development and Innovation

The interplay among law, development, and innovation forms a dynamic triangle, where each element influences and is influenced by the others. Law, as a reflection of societal values and a tool for governance, can either foster or hinder development, shaping the economic, social, and technological landscape of a nation. Innovation, as the engine of progress, is both a product of and a contributor to development, driving economic growth and social change.

As Bellantuono and Lara[2] observe, the precise nature of these interactions remains elusive. While the bilateral relationships between law and development, development and innovation, and law and innovation have been examined, the simultaneous exploration of all three dimensions presents a complex and multifaceted challenge. The intricacies of this triangular relationship necessitate a nuanced understanding of how legal frameworks, economic incentives, and social structures influence the process of innovation and its impact on societal development.

Bellantuono and Lara[3] underscore the crucial importance of examining the triangular relationship among law, development, and innovation, arguing that the institutional environment, encompassing legal frameworks and regulatory mechanisms, is intrinsically linked to both development and innovation. This interconnectedness implies that neither development nor innovation can be fully understood without considering the role of law and the broader institutional context in shaping these processes.

The complex interplay between law, development, and innovation has led to the emergence of multiple theoretical frameworks that attempt to explain the causal relationships among these factors. One perspective posits that legal reforms, often inspired by Western institutions, are the primary drivers of innovation, which subsequently leads to development. Another model suggests that development itself, driven by external factors like technological advancements or globalization, creates a demand for innovation, which in turn spurs the evolution of legal institutions. A third perspective proposes that innovation,

---

[2] BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016. p. 2

[3] BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016. p. 2

driven by factors like imitation or diffusion of technology, precedes legal change, with development emerging as the outcome of the interaction between innovation and law. Bellantuono and Lara[4] suggest that each of these models holds some truth, as the relationship between law, development, and innovation is multifaceted and context-dependent. Understanding these different perspectives is crucial for developing effective policies that foster innovation and promote sustainable development.

The impact of legal institutions on innovation and development is far from linear. Bellantuono and Lara[5] propose several possible scenarios to illustrate this complex relationship. In one scenario, strong legal institutions foster a high rate of innovation, leading to sustained economic development in cyclical periods. However, if these legal institutions weaken over time, innovation and development could decline in tandem[6].

Conversely, strong legal institutions can also have a negative impact on innovation and development. For instance, overly stringent intellectual property rights may stifle innovation by limiting access to knowledge and creating barriers to entry for new actors. This could result in a weaker rate of innovation and, consequently, a slower pace of development[7].

These diverse scenarios demonstrate that the relationship between law, innovation, and development is not uniform but rather context-dependent, varying across different regions and countries[8]. The specific legal and institutional environment, along with the path dependence in economic and social factors, play a crucial role in determining the ultimate impact of law on innovation and development. Therefore, it is essential to consider the broader context in which legal institutions operate when analyzing their role in fostering or hindering innovation and development.

While the relationship between law, innovation, and development is complex, it is further complicated by the fact that the very definition of "innovation" can vary across different

---

[4] BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016. p. 4/5
[5] BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016. p. 6/7
[6] BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016. p. 6/7
[7] BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016. p. 6/7
[8] BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016. p. 6/7

contexts and countries. In developed nations, innovation is often associated with cutting-edge technological advancements and the creation of entirely new products or processes. However, for developing countries, innovation may also encompass the adaptation and adoption of existing technologies, the improvement of local production methods, and the development of solutions that address specific social and environmental challenges.

In this context, it is important to recognize that innovation policy in the Global South must be tailored to the specific needs and resources of each country. A one-size-fits-all approach to promoting innovation is unlikely to be effective, as the challenges and opportunities faced by developing nations differ significantly from those of their developed counterparts.Effective public policies aimed at fostering innovation and development in the economy must consider a multitude of interconnected factors. Martínez-Piva[9] identifies some key determinants of innovation systems, ranging from the availability of research and development centers to the creation of competences or capabilities.

The inherent characteristics of innovation—costly, uncertain, and prone to generating externalities—create a complex challenge for both the public and private sectors. Martínez-Piva[10] emphasizes that innovation is a risky endeavor, with the potential for both success and failure, and its benefits often extend beyond the immediate innovator. The public sector can play a role in mitigating these risks by providing appropriate incentives and support mechanisms.

The private sector, motivated primarily by profit, also plays a crucial role in driving innovation. However, given the inherent risks and costs associated with innovative activities, ensuring that a wide range of private and public actors participate in the innovation process is a challenge[11].

---

[9] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 32/33

[10] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 38

[11] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 38

Martínez-Piva[12] argues that to encourage greater participation in innovation, private agents need incentives that address the high costs, uncertainty, and incomplete appropriability of knowledge. One such incentive is monopolistic power over an invention, which can be achieved through various institutional mechanisms, such as trade secrets, commercial strategies, and, most notably, intellectual property rights (IPRs). By granting exclusive rights to inventors, IPRs aim to ensure a return on investment and encourage further innovation.

2.2. Intellectual Property

Intellectual property (IP) is a cornerstone of modern economies, playing a pivotal role in the interplay between law, development, and innovation. It encompasses a range of intangible creations of the human intellect, including inventions, scientific, literary and artistic works, designs, symbols, and trade secrets. The legal protection of these intellectual assets, through mechanisms like patents, copyrights, trademarks, and trade secrets, is in the center of the discussions on fostering innovation and promoting economic growth.

The relationship between intellectual property (IP) and innovation, as highlighted by Dosi *et al*.[13], is far more complex than often portrayed by proponents of stronger IP regimes. The simplistic notion that stronger IP protection automatically leads to a faster pace of innovation lacks a solid intellectual basis. This is due to the multifaceted nature of both property rights and innovation, which cannot be reduced to a simple linear relationship.

Innovation is a multi-faceted process driven by various factors, and the impact of IP on societal welfare is not always positive. While patents and other forms of IP protection can incentivize certain types of innovation, they can also hinder knowledge diffusion, restrict access to essential technologies, and even exacerbate existing inequalities. Furthermore, IP

---

[12] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 38

[13] DOSI, Giovanni et al. The role of intellectual property rights in the development process, with some lessons from developed countries: an introduction. *Intellectual property rights: Legal and economic challenges for development*, v. 1, p. 1-55, 2014. p. 39

rights can be used to protect and extend monopoly power, potentially stifling competition and limiting the benefits of innovation for the broader society[14].

Understanding IP as just one component, albeit an important one, of a country's broader innovation system is crucial. Developing countries, in particular, face unique challenges in designing effective IP systems that promote innovation and address their specific developmental needs. The appropriate balance of IP protection will vary depending on a country's specific context, including its level of economic development, technological capabilities, and social priorities. A one-size-fits-all approach to IP protection, often advocated by developed nations, may not be suitable for developing countries.

The expansion of intellectual property protection over the last century has positioned it as a central pillar of legal systems, both domestically and internationally. This expansion encompasses the vast domain of human ingenuity, influencing critical aspects of modern life such as technology, communication, entertainment, and commerce[15].

As Oliar and Stern[16] argue, the determination of what aspects of human creativity and innovation can be owned and the conditions for establishing ownership are pivotal in shaping the direction and composition of society. These overarching questions are ultimately grounded in the specifics of legal doctrine and the underlying conceptual framework that defines intellectual property.

The economic and political significance of intellectual property rights (IPRs) has grown exponentially in recent decades. As Okediji and Prosser[17] emphasize, IPRs have become central to a wide range of discussions and debates, encompassing issues as diverse as public health, food security, education, trade, and industrial policy. This heightened importance is a reflection of the increasing role of knowledge and innovation in modern economies, where

---

[14] DOSI, Giovanni et al. The role of intellectual property rights in the development process, with some lessons from developed countries: an introduction. *Intellectual property rights: Legal and economic challenges for development*, v. 1, p. 1-55, 2014. p. 39

[15] OLIAR, Dotan; STERN, James Y. Right on Time: First Possession in Property and Intellectual Property. *BUL Rev.*, v. 99, p. 395, 2019. p. 457

[16] OLIAR, Dotan; STERN, James Y. Right on Time: First Possession in Property and Intellectual Property. *BUL Rev.*, v. 99, p. 395, 2019. p. 457

[17] OKEDIJI, Ruth L.; PROSSER, William L. The International Copyright System: Limitations, Exceptions and the Public Interest. *Issue Paper*, n. 15, 2006. p. vii

intangible assets like patents, copyrights, and trademarks are often the most valuable resources.

The very term "intellectual property" presents conceptual and practical challenges. As Gordon[18] observes, the "property" aspect of the label can be misleading. Unlike tangible property, which is rivalrous and excludable, intellectual property rights are often non-rivalrous, meaning one person's use does not diminish another's enjoyment. This fundamental difference necessitates a distinct legal approach that balances the interests of creators and the public good.

While the primary goal of intellectual property law is to incentivize innovation by granting rights to creators, it must also consider the equally important goal of ensuring public access to knowledge and ideas. This often involves limiting IP owners' rights in ways that are not typically applied to traditional property, such as fair use exceptions or compulsory licensing provisions[19].

Therefore, understanding intellectual property requires moving beyond the traditional property paradigm. Gordon[20] emphasizes the person-to-person nature of IP law, where the core issue is preventing unauthorized duplication or free riding that could be harmful to both creators and society. The "unfairness" of such actions, stemming from both moral and economic considerations, lies at the heart of intellectual property disputes.

The debate surrounding the optimal level of intellectual property protection often revolves around the concepts of the "tragic commons" and the "tragic anti-commons"[21]. The tragic commons scenario warns that when resources are insufficiently privatized, individuals may overuse or exploit them, ultimately depleting or destroying their value. Conversely, the tragic anti-commons scenario highlights the dangers of excessive privatization. When too

---

[18] GORDON, Wendy J. Intellectual Property. *The Oxford Handbook of Legal Studies, Peter Cane and Mark Tushnet, eds., Oxford University Press*, pp. 617-646, October 2003. Available at SSRN: https://ssrn.com/abstract=413001. p. 619

[19] GORDON, Wendy J. Intellectual Property. *The Oxford Handbook of Legal Studies, Peter Cane and Mark Tushnet, eds., Oxford University Press*, pp. 617-646, October 2003. Available at SSRN: https://ssrn.com/abstract=413001. p. 619

[20] GORDON, Wendy J. Intellectual Property. *The Oxford Handbook of Legal Studies, Peter Cane and Mark Tushnet, eds., Oxford University Press*, pp. 617-646, October 2003. Available at SSRN: https://ssrn.com/abstract=413001. p. 619

[21] GORDON, Wendy J. Intellectual Property. *The Oxford Handbook of Legal Studies, Peter Cane and Mark Tushnet, eds., Oxford University Press*, pp. 617-646, October 2003. Available at SSRN: https://ssrn.com/abstract=413001. p. 640

many individuals or entities hold exclusive rights over a resource, it can become difficult or impossible to obtain the necessary permissions for its use, leading to underutilization and missed opportunities for innovation and development[22].

Intellectual property, as a form of property, carries a social function, as noted by Lara[23]. This social function mandates that IP holders not only protect their innovations but also ensure their responsible management and distribution. While it may not preclude the charging of monopoly prices, it does acknowledge the right of those who cannot afford such prices to access the benefits of the innovation.

In essence, intellectual property fulfills its social function when it contributes to economic development. Even when monopolistic pricing is permitted, the right of access for those excluded from the projected demand should be recognized as a measure of economic efficiency[24].

The recognition of this social function, which includes the right of access for those excluded from the market, helps to resolve the conflict between the right to development (held by IP owners) and the right to development (of society as a whole) in a Pareto-optimal manner[25]. This means that the social function of intellectual property can be fulfilled without making anyone worse off, ensuring that both the rights of creators and the broader societal interests are taken into account.

As Olwan and Fitzgerald[26] highlight, the value of intellectual property regimes for developing countries is a subject of ongoing debate and controversy. There are contrasting perspectives on the role of IP in fostering innovation and development. IP evangelists, often from developed nations, champion strong IP protection as a catalyst for innovation and

---

[22] GORDON, Wendy J. Intellectual Property. *The Oxford Handbook of Legal Studies, Peter Cane and Mark Tushnet, eds., Oxford University Press*, pp. 617-646, October 2003. Available at SSRN: https://ssrn.com/abstract=413001. p. 640

[23] LARA, Fabiano Teodoro. *Propriedade intelectual: uma abordagem pela análise econômica do Direito*. DelRey Editora, 2010. p. 153

[24] LARA, Fabiano Teodoro. *Propriedade intelectual: uma abordagem pela análise econômica do Direito*. DelRey Editora, 2010. p. 153

[25] LARA, Fabiano Teodoro. *Propriedade intelectual: uma abordagem pela análise econômica do Direito*. DelRey Editora, 2010. p. 153

[26] OLWAN. Rami; FITZGERALD, Brian. IP and Development: A Road Map for Developing Countries in the Twenty-First Century. In: FITZGERALD, Brian; GILCHRIST, John (Ed.). *Copyright Perspectives: Past, Present and Prospect*. Springer, 2015. p. 85

economic growth, arguing that it incentivizes creators and investors to develop new technologies and products.

On the other side of the spectrum, IP skeptics or abolitionists question the effectiveness of IP laws in promoting innovation and express concerns about their potential to impede social and economic development, particularly in developing countries[27]. They argue that the costs associated with IP protection, such as licensing fees and enforcement mechanisms, can create barriers to access for those who cannot afford them, hindering knowledge dissemination and technological diffusion.

The concept of "development" itself is a subject of ongoing debate and interpretation. Despite the lack of a universally agreed-upon definition, Olwan and Fitzgerald[28] highlight its significance as a central challenge facing the international community. Development is broadly understood as the improvement of people's lives, both socially and economically, encompassing factors such as education, skills development, income, and employment.

This broad definition encompasses a range of indicators and priorities, reflecting the diverse needs and aspirations of different communities and nations. While economic growth is often considered a key component of development, it is increasingly recognized that social progress, including improvements in health, education, and human rights, is equally important.

The impact of intellectual property on development, particularly in developing countries, is a multifaceted issue. While IP protection can attract foreign direct investment, facilitate technology transfer, and encourage domestic innovation and research and development (R&D), it does not automatically guarantee economic development[29].

---

[27] OLWAN. Rami; FITZGERALD, Brian. IP and Development: A Road Map for Developing Countries in the Twenty-First Century. In: FITZGERALD, Brian; GILCHRIST, John (Ed.). *Copyright Perspectives: Past, Present and Prospect*. Springer, 2015. p. 85

[28] OLWAN. Rami; FITZGERALD, Brian. IP and Development: A Road Map for Developing Countries in the Twenty-First Century. In: FITZGERALD, Brian; GILCHRIST, John (Ed.). *Copyright Perspectives: Past, Present and Prospect*. Springer, 2015. p. 86

[29] OLWAN. Rami; FITZGERALD, Brian. IP and Development: A Road Map for Developing Countries in the Twenty-First Century. In: FITZGERALD, Brian; GILCHRIST, John (Ed.). *Copyright Perspectives: Past, Present and Prospect*. Springer, 2015. p. 88

Intellectual property law, encompassing patents and copyright, establishes ownership of innovations and grants a bundle of rights to creators[30]. The challenge for growth economics is to determine the optimal ownership rules that maximize innovation and ultimately benefit society.

Stronger IP rights, on one hand, incentivize innovation by increasing the potential profits for successful innovators. This "transfer from static activities (consumption and production) to dynamic activities (innovation)" can lead to increased welfare, according to the overtaking theorem. However, stronger IP rights also come with the potential for deadweight loss from licensing restrictions, which can decrease the pace and profitability of innovation[31].

This complex trade-off between the positive and negative effects of IP protection highlights the need for a nuanced approach. The optimal level of IP protection is not a one-size-fits-all solution but rather a delicate balance that must consider various factors, including the type of innovation, the market context, and the broader social impact. The goal is to find a sweet spot where IP rights encourage innovation without unduly restricting access to knowledge or hindering further development.

2.3. Copyright and Development

While intellectual property encompasses a broad spectrum of rights, including patents, trademarks, and trade secrets, this thesis will specifically focus on the relationship between copyright, development and innovation. This choice is motivated by the unique role copyright plays in the dissemination and access to information and cultural works, which are particularly relevant to the scientific research.

Copyright, as a form of intellectual property protection, plays a multifaceted role in the development landscape. While primarily designed to incentivize creativity and reward

---

[30] COOTER, Robert; EDLIN, Aaron. *The Falcon's Gyre: Legal Foundations of Economic Innovation and Growth*. Robert Cooter, 2014. p. 106
[31] COOTER, Robert; EDLIN, Aaron. *The Falcon's Gyre: Legal Foundations of Economic Innovation and Growth*. Robert Cooter, 2014. p. 106

authors for their intellectual labor, copyright law also has broader implications for knowledge dissemination, cultural enrichment, and economic growth.

While copyright primarily functions to grant authors exclusive economic rights over their creations, it also recognizes their moral rights, which are inherently personal and non-transferable. These moral rights, typically encompassing attribution and integrity, are fundamental to safeguarding the author's reputation and ensuring the work's preservation in its intended form[32].

This duality of economic and moral rights reflects the origins of copyright in civil law traditions, where it is seen as a recognition of the inherent value of authorship and creativity. However, copyright law is not solely concerned with protecting individual rights. It is also shaped by broader social and economic forces, as copyrighted works are fundamentally information, the lifeblood of cultural development and exchange[33].

The regulation of copyright, therefore, reflects a society's values and beliefs about the role of information and its importance for human development. By granting creators exclusive rights, copyright law seeks to incentivize the production of valuable information. But it must also needs to balance these rights with the public's need for access to information, which is essential for education, cultural enrichment, and democratic participation.

The current landscape of copyright policy and practice often favors copyright owners to the detriment of broader public access[34]. This imbalance, the authors argue, is rooted in two flawed assumptions: that copyright's sole purpose is to protect owners, and that creators are entitled to absolute control over their works because they are solely responsible for their creation. These misconceptions reinforce each other, leading to an overemphasis on proprietary rights and neglecting the fundamental principle that copyright should ultimately serve the public good.

---

[32] ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016. p. 4
[33] ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016. p. 4
[34] AUFDERHEIDE, Patricia; JASZI, Peter. *Reclaiming fair use: How to put balance back in copyright*. University of Chicago Press, 2018. p. 16

Historically, the adoption of intellectual property laws, including copyright, in developing countries has been framed as a pathway to industrialization and improved well-being[35]. The underlying rationale was that strong copyright protection would stimulate domestic creativity and cultural production, contributing to both economic and social progress. This narrative continues to resonate today, with international trade agreements often emphasizing the link between strong copyright protection and development.

However, as Okediji[36] notes, the reality is often more complex. The adoption of stringent copyright standards, while potentially incentivizing some forms of creativity, can also have unintended negative consequences. For example, high prices for copyrighted works can limit access to knowledge and information in developing countries, hindering education and research efforts. Moreover, the focus on protecting foreign-owned copyrights may overshadow the need to foster and support local creative industries and cultural expression.

Therefore, while copyright can play a role in promoting development, it is essential to approach its implementation with a nuanced understanding of the specific context and needs of developing countries. This requires a careful balancing act between incentivizing creativity and ensuring equitable access to knowledge and cultural resources. A one-size-fits-all approach to copyright protection may not be the most effective strategy for promoting development, and alternative models that prioritize access and flexibility may be more appropriate in certain contexts.

2.4. International Copyright Systems

As Drahos and Braithwaite[37] aptly point out, the long-term success of economies is often linked to the efficient definition of property rights. Excessive intellectual property protection can lead to "*excessive monopoly costs*", as weak protection can result in "*excessive free-riding and therefore underinvestment in innovation*"[38]. In the realm of

---

[35] OKEDIJI, Ruth L. The Limits of International Copyright Exceptions for Developing Countries. *Vand. J. Ent. & Tech. L.*, v. 21, p. 689, 2018. p. 692
[36] OKEDIJI, Ruth L. The Limits of International Copyright Exceptions for Developing Countries. *Vand. J. Ent. & Tech. L.*, v. 21, p. 689, 2018. p. 692
[37] DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002. p. 13
[38] DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002. p. 13

intellectual property, striking a balance between rules is essential for fostering innovation and development.

The international landscape of copyright law is a complex web of treaties, agreements, and norms that seek to balance the protection of authors' rights with the broader goal of promoting access to knowledge and cultural exchange. It is important to examine the key international copyright systems and their adoptions in countries around the world.

Copyright has a rich and complex history. While the first national copyright codes were enacted in the United Kingdom in 1710 and the United States in 1790, the roots of copyright can be traced back to ancient civilizations, where notions of authorship and ownership were already taking shape. Different societies throughout history have developed their own conceptions of intellectual property, some mirroring the possessive individual ownership prevalent in Western Europe, while others adopted entirely different approaches[39].

The main focus here will be to delve into the key international copyright frameworks:

The Berne Convention[40] is an international agreement that protects the rights of authors in their literary and artistic works. It was established in 1886 and has been revised several times since then. The most recent revision was in 1971. The Convention's purpose is to ensure that authors have their rights protected in all member countries.

The Paris Convention[41] is an international agreement that protects intellectual property (IP) rights, focusing on industrial property. It was established in 1883 and has been revised several times since then. The most recent revision was in 1979. The Convention's purpose is to ensure that IP rights are protected in all member countries.

The Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations[42] is relevant to the broader discussion of intellectual property as it extends protection to performers, producers of phonograms, and broadcasting

---

[39] ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016. p. 3

[40] Berne Convention for the Protection of Literary and Artistic Works. September 9, 1886, and amended on September 28, 1979. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=283698.

[41] Paris Convention for the Protection of Industrial Property. March 20, 1883, and amended on September 28, 1979. Available at: https://www.wipo.int/wipolex/en/treaties/textdetails/12633.

[42] Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations. October 25, 1961. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12656.

organizations, granting them certain exclusive rights over their performances, recordings, and broadcasts.

The Universal Copyright Convention (UCC)[43] was developed as an alternative to the Berne Convention, offering a more flexible framework for countries that did not adhere to all of its provisions. The UCC aims to establish a baseline level of copyright protection worldwide, promoting international cooperation and facilitating the cross-border exchange of creative works. While it shares many similarities with the Berne Convention, it also introduces some differences in terms of formalities and duration of protection.

The TRIPS Agreement (The Agreement on Trade-Related Aspects of Intellectual Property Rights)[44], a cornerstone of the World Trade Organization (WTO), represents a significant shift in the global approach to intellectual property. It establishes comprehensive and enforceable minimum standards for all major forms of IP, including copyright, patents, trademarks, and trade secrets. The agreement aims to create a more harmonized global IP system, but its implementation has been met with controversy, particularly regarding its impact on access to knowledge and essential medicines in developing countries.

The WIPO's Internet Treaties: WIPO Copyright Treaty (WCT)[45] and WIPO Performances and Phonograms Treaty (WPPT)[46] are special agreements under the Berne Convention. WCT addresses copyright protection in the digital environment, expanding the rights of copyright holders to include technological measures that control access to and use of their works. It also clarifies the protection of computer programs and databases as literary works. WPPT focus on the rights of performers and producers of phonograms as it grants them exclusive rights over their performances and recordings, including the right to authorize or prohibit the reproduction, distribution, and communication to the public of their works. This treaty is particularly relevant in the context of digital music and audiovisual recording.

---

[43] Universal Copyright Convention (UCC). Geneva, September 6, 1952. Available at: https://wipolex-res.wipo.int/edocs/lexdocs/treaties/en/unesco1/trt_unesco1.pdf.
[44] TRIPS Agreement on Trade-Related Aspects of Intellectual Property Rights. April 15, 1994. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=305907.
[45] WCT. WIPO Copyright Treaty. December 19, 1996. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12740.
[46] WPPT. WIPO Performances and Phonograms Treaty. December 19, 1996. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12743.

Doha Declaration on the TRIPS Agreement and Public Health[47] is a critical clarification of the TRIPS Agreement, emphasizing the flexibility within the agreement to address public health concerns. It reaffirms the right of WTO members to utilize compulsory licensing and other measures to protect public health, particularly in the context of access to essential medicines. This declaration represents a significant victory for developing countries and public health advocates, as it acknowledges the importance of balancing intellectual property rights with public health needs.

A2K Treaty Proposal, emerging from the WIPO Development Agenda[48], aimed to establish a more balanced international framework for intellectual property that prioritized the needs of developing countries and promoted broader access to knowledge. The treaty sought to clarify and expand limitations and exceptions to copyright, create a "knowledge commons" for publicly funded research, and address issues related to technological protection measures and compulsory licensing. While the treaty was never formally adopted, it represented a significant effort to reframe the global debate on intellectual property and advocate for a more development-oriented approach.

There are other important players in the international panorama. For example, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has a Recommendation on Open Science[49], stating the importance, benefits and set of principles of open science that aim to make scientific research more accessible.

Also, Free Trade Agreements (FTAs) have emerged in the international copyright landscape, often introducing IP provisions that go beyond the minimum standards set by the TRIPS Agreement. These agreements, typically negotiated between developed and developing countries, aim to reduce trade barriers and promote economic integration. However, they often come with increased IP protection requirements, which can have profound implications for access to knowledge, particularly in developing nations. FTAs often mandate stricter copyright terms, limitations on exceptions, and stronger enforcement

---

[47] WTO. DOHA WTO MINISTERIAL: Ministerial Declaration. WT/MIN(01)/DEC/1. November 14, 2001. Available at: https://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm.
[48] WIPO Development Agenda. 45 Adopted Recommendations. 2007, and amended on September 28, 1979. Available at: https://www.wipo.int/ip-development/en/agenda/recommendations.html.
[49] UNESCO. An introduction to the UNESCO Recommendation on Open Science. 2022. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000383771.

measures, potentially hindering the ability of developing countries to tailor their copyright laws to their specific needs and priorities.

The United States copyright system began with the Copyright Act of 1790[50], which aimed to "promote the progress of science and useful arts" by protecting maps, charts, and books, the system has undergone several revisions and expansions. The Copyright Act of 1831[51] extended protection to musical compositions, while the Copyright Act of 1976[52] codified existing laws and established the framework for modern copyright protection in the United States. Further legislative developments have addressed specific challenges arising from technological advancements. The Bayh-Dole Act of 1980[53] facilitated the transfer of federally funded inventions from universities to the private sector, aiming to stimulate commercialization and innovation. The Digital Millennium Copyright Act (DMCA) of 1998[54], in turn, updated copyright law for the digital age, addressing issues such as the protection of digital works and the circumvention of technological protection measures.

The European Union's approach to copyright in the digital age has been shaped by two key directives: the InfoSoc Directive (2001/29/EC)[55] and the Digital Single Market Directive (2019/790)[56]. These directives aim to harmonize copyright laws across member states while addressing the challenges and opportunities presented by digital technologies. The InfoSoc Directive focuses on harmonizing certain aspects of copyright and related rights in the information society, covering issues like reproduction, communication to the public, and exceptions and limitations. The Digital Single Market Directive builds upon this foundation,

---

[50] UNITED STATES OF AMERICA. Copyright Act of 1790. An Act for the encouragement of learning, by securing the copies of maps, Charts, and books, to the authors and proprietors of such copies, during the times therein mentioned. Available at: https://www.copyright.gov/about/1790-copyright-act.html.
[51] UNITED STATES OF AMERICA. Copyright Act of 1831. An Act to amend the several acts respecting copyrights. Available at: https://www.ellenwhite.info/copyright_law_us_1831.htm.
[52] UNITED STATES OF AMERICA. Copyright Act of 1976. An Act for the general revision of the Copyright Law, title 17 of the United States Code, and for other purposes. Available at: https://www.law.cornell.edu/uscode/text/17.
[53] UNITED STATES OF AMERICA. Bayh–Dole Act of 1980. Available at: https://www.law.cornell.edu/uscode/text/35/part-II/chapter-18.
[54] UNITED STATES OF AMERICA. Digital Millennium Copyright Act of 1998. Available at: https://www.copyright.gov/legislation/dmca.pdf.
[55] EUROPEAN UNION. *Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society*. Available at: https://eur-lex.europa.eu/eli/dir/2001/29/oj.
[56] EUROPEAN UNION. *Directive 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC*. Available at: https://eur-lex.europa.eu/eli/dir/2019/790/oj.

introducing measures to facilitate cross-border access to content, adapt copyright exceptions to the digital environment, and address issues like text and data mining and online content-sharing platforms. These directives represent the EU's ongoing efforts to create a balanced and modern copyright framework that supports creativity, innovation, and access to knowledge in the digital age.

The Brazilian copyright system date back to the Imperial Constitution of 1824[57], which recognized intellectual property as a fundamental guarantee. This recognition was further solidified in the Brazilian Federal Constitution of 1988[58], which enshrined copyright as a fundamental right. The Medeiros e Albuquerque Law of 1898[59] marked a significant milestone in Brazilian copyright legislation, establishing a comprehensive framework for protecting authors' rights. The current legal framework for copyright protection in Brazil is primarily governed by the Authors' Right Law 9.610 ("*Lei de Direitos Autorais – LDA*") of 1998[60]. This law, which is based on the principles of author's rights (droit d'auteur), grants authors a wide range of moral and economic rights over their works. In addition to the LDA, the Law 9.609 of 1998[61] also plays a role in the Brazilian copyright system, specifically addressing the legal protection of computer programs. Additionally, it is important to notice that in the Article 150, VI, d of the Brazilian Federal Constitution of 1988[62] it is established a tax immunity for books, newspapers, and periodicals, further emphasizing the importance of access to information and cultural production in Brazilian society.

---

[57] BRAZIL. *Constituição Política do Império do Brasil de 25 de Março de 1824*. Rio de Janeiro, 1824. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao24.htm.
[58] BRAZIL. *Constituição da República Federativa do Brasil de 5 de Outubro de 1988*. Brasília, 1988. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm.
[59] BRAZIL. *Lei n° 496 de 1 de Agosto de 1898*. Lei Medeiros e Albuquerque. Coleção de Leis do Brasil, Página 4 Vol. 1, Capital Federal, 1898. Available at: https://www2.camara.leg.br/legin/fed/lei/1824-1899/lei-496-1-agosto-1898-540039-publicacaooriginal-39820-pl.html.
[60] BRAZIL. *Lei n° 9.610 de 19 de Fevereiro de 1998*. Altera, atualiza e consolida a legislação sobre direitos autorais e dá outras providências. Brasília, 1998. Available at: http://www.planalto.gov.br/ccivil_03/leis/l9610.htm.
[61] BRAZIL. *Lei n° 9.609 de 19 de Fevereiro de 1998*. Dispõe sobre a proteção da propriedade intelectual de programa de computador, sua comercialização no País, e dá outras providências. Brasília, 1998. Available at: http://www.planalto.gov.br/ccivil_03/leis/l9609.htm.
[62] BRAZIL. *Constituição da República Federativa do Brasil de 5 de Outubro de 1988*. Brasília, 1988. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm.

2.5. Limitations and Exceptions to Copyright

While copyright law grants exclusive rights to authors and creators, it also recognizes the importance of balancing these rights with broader societal interests, such as access to information, education, and freedom of expression. This balance is achieved through limitations and exceptions (L&Es) to copyright protection. L&Es are specific provisions within copyright law that permit the use of copyrighted material without the authorization of the copyright holder under certain conditions.

Limitations and exceptions to copyright are a cornerstone of ensuring that copyright protection does not impede the exercise of fundamental rights and freedoms. Senftleben[63] highlights that L&Es primarily serve to protect rights like freedom of expression, which includes the right to receive information, and the right to privacy. By allowing certain uses of copyrighted material without the permission of the copyright holder, L&Es create space for critical commentary, parody, educational use, and other activities that are essential for a democratic society.

The importance of limitations and exceptions in copyright law cannot be overstated. Okediji and Prosser[64] emphasize that an unrestricted grant of copyright protection, without appropriate limitations and exceptions, can have detrimental long-term consequences. This is not only harmful to development priorities, but also to the very creative and innovative processes that copyright aims to foster. L&Es act as crucial safety valves within the copyright system, ensuring that copyright protection does not impede the free flow of information, stifle creativity, or hinder access to knowledge.

The public domain, that vast reservoir of knowledge and creativity freely available for use and adaptation, is essential for fostering innovation and cultural development. As Okediji[65] notes, a robust public domain provides the "building blocks of creativity," allowing authors and creators to draw upon existing works and ideas to create new ones. This underscores

---

[63] SENFTLEBEN, Martin. *Copyright, limitations, and the three-step test: an analysis of the three-step test in international and EC copyright law*. Kluwer Law International BV, 2004. p. 23

[64] OKEDIJI, Ruth L.; PROSSER, William L. The International Copyright System: Limitations, Exceptions and the Public Interest. *Issue Paper*, n. 15, 2006. p. x

[65] OKEDIJI, Ruth L. The Limits of International Copyright Exceptions for Developing Countries. *Vand. J. Ent. & Tech. L.*, v. 21, p. 689, 2018. p. 726

the importance of a disciplined copyright system that carefully balances protection with access, ensuring that the public domain remains rich and diverse.

This balance is particularly crucial for developing countries, where access to existing knowledge and cultural resources can be a significant factor in driving innovation and economic growth. A copyright system tailored to the specific formal and informal structures of a local community can help to maximize the size, quality, and diversity of the public domain, thereby enhancing the potential for creative expression and knowledge production.

The fair use doctrine, a cornerstone of copyright law in the United States, has become a focal point of debate in international copyright discussions. As Hughes[66] highlights, fair use represents an open-ended approach to balancing copyright protection with the public's right to access and use copyrighted works. This flexibility, however, has raised concerns among copyright holders who fear its potential to undermine their exclusive rights.

In response, the "three-step test," enshrined in the Berne Convention and other international agreements, has emerged as a countervailing force to fair use. This test, as Hughes[67] describes, has become the "evil twin" of fair use, favored by copyright interests as a safeguard against the perceived erosion of copyright protection through exceptions and limitations.

The "three-step test," a provision in international copyright law, has gained prominence in recent years. This test, consisting of three abstract criteria, has been incorporated into key international agreements such as the Berne Convention, the TRIPS Agreement, and the WIPO Internet Treaties[68]. Despite its widespread adoption, the three-step test had not garnered much academic attention until recently, highlighting its silent yet pervasive influence on international copyright law.

---

[66] HUGHES, Justin. Fair Use and Its Politics – at Home and Abroad. In: OKEDIJI, Ruth L. (Ed.). *Copyright law in an age of limitations and exceptions*. Cambridge University Press, 2017. p. 235
[67] HUGHES, Justin. Fair Use and Its Politics – at Home and Abroad. In: OKEDIJI, Ruth L. (Ed.). *Copyright law in an age of limitations and exceptions*. Cambridge University Press, 2017. p. 235
[68] SENFTLEBEN, Martin. *Copyright, limitations, and the three-step test: an analysis of the three-step test in international and EC copyright law*. Kluwer Law International BV, 2004. p. 1

The three-step test, enshrined in international copyright agreements, functions as a framework for balancing the exclusive rights of copyright holders. Senftleben[69] describes it as a gradual approximation of copyright's core balance. The three-step test sets specific criteria for determining the permissibility of limitations and exceptions to copyright, requiring that they be applied in certain special cases, not conflict with a normal exploitation of the work, and not unreasonably prejudice the legitimate interests of the author.

The first step, a general requirement that limitations be confined to "certain special cases," serves as a preliminary filter. Limitations that fail to meet this broad criterion are automatically deemed impermissible.

The second step, stating that limitations must not conflict with "normal exploitation" of the work, further refines the permissible scope. This step focuses on preventing actions that would undermine the copyright holder's primary economic interests. If a limitation violates this principle, it cannot be justified[70].

The third step, requiring that limitations not "unreasonably prejudice the legitimate interests of the author," is the most crucial and flexible part of the test. This step allows for a nuanced balancing of competing interests, taking into account factors like the nature of the work, the purpose and character of the use, and the potential impact on the author's economic and moral rights. The possibility of equitable remuneration, or fair compensation for the author, becomes a key consideration in this balancing act[71].

As Senftleben[72] concludes, the third step is the "kingpin" of the three-step test. It is the ultimate arbiter in determining whether a limitation or exception is permissible, ensuring that copyright protection is balanced with broader societal interests in accessing and utilizing knowledge.

---

[69] SENFTLEBEN, Martin. *Copyright, limitations, and the three-step test: an analysis of the three-step test in international and EC copyright law*. Kluwer Law International BV, 2004. p. 286/287
[70] SENFTLEBEN, Martin. *Copyright, limitations, and the three-step test: an analysis of the three-step test in international and EC copyright law*. Kluwer Law International BV, 2004. p. 286/287
[71] SENFTLEBEN, Martin. *Copyright, limitations, and the three-step test: an analysis of the three-step test in international and EC copyright law*. Kluwer Law International BV, 2004. p. 286/287
[72] SENFTLEBEN, Martin. *Copyright, limitations, and the three-step test: an analysis of the three-step test in international and EC copyright law*. Kluwer Law International BV, 2004. p. 286/287

While intended to provide a framework for balancing competing interests, the three-step test has been criticized for its potential to restrict the scope of fair use and other flexibilities in copyright law, especially in developing countries where access to knowledge is a pressing concern.

The tension between fair use and the three-step test reflects a broader ideological divide in international copyright law. Hughes[73] observes that those advocating for lower levels of copyright protection often champion the adoption and expansive interpretation of fair use. Conversely, copyright holders, seeking to safeguard their rights, typically oppose any expansion of fair use and favor the stricter three-step test. This test, already integrated into the international IP regime, is seen by copyright holders as a bulwark against the perceived erosion of their rights through exceptions and limitations.

Beyond the ideological divide, the practical application of both fair use and the three-step test presents challenges. Cotter[74] highlights that fair use, while intended to promote socially beneficial uses of copyrighted works, can be underutilized due to the inherent uncertainty and potential risks associated with it. Even when a use might clearly fall under fair use, users may be hesitant to exercise this right due to the fear of litigation, potential damages, and general risk aversion. This can lead to a chilling effect on legitimate uses of copyrighted material, particularly in educational and research settings where the free flow of information is crucial.

The problem, according to Cotter[75], is that fair use, much like the absence of copyright protection, can create a situation where potential users who could generate positive externalities through their use of copyrighted works may be discouraged from doing so. This underutilization of fair use can ultimately hinder the creation and dissemination of knowledge, as valuable uses are forgone due to fear of legal repercussions.

---

[73] HUGHES, Justin. Fair Use and Its Politics – at Home and Abroad. In: OKEDIJI, Ruth L. (Ed.). *Copyright law in an age of limitations and exceptions*. Cambridge University Press, 2017. p. 235

[74] COTTER, Thomas F. Fair Use and Copyright Overenforcement. *Iowa L. Rev*., v. 93, p. 1271, 2007. p. 1274/1275

[75] COTTER, Thomas F. Fair Use and Copyright Overenforcement. *Iowa L. Rev*., v. 93, p. 1271, 2007. p. 1274/1275

The digital age has intensified the debate surrounding fair use and its applicability in the context of new technologies. Depoorter and Parisi[76] highlight the stark contrast between the perspectives of copyright holders and proponents of new technology on the proper scope of fair use. While technology advocates argue for a broader interpretation of fair use to accommodate the evolving ways in which information is accessed and shared online, copyright holders often resist such expansion, fearing it could erode their exclusive rights.

This tension has led to a new argument positing that fair use may become obsolete in a future where one-click technology enables seamless communication between copyright holders and users. In this scenario, it is suggested that copyright holders could easily charge licensing fees for every use of their works, eliminating the transaction costs that traditionally justified fair use[77]. However, this vision of a frictionless licensing system raises questions about affordability, access, and the potential for over-commercialization of knowledge.

The landmark case Sony Corporation of America v. Universal City Studios (1984)[78] in the United States sparked a lasting debate over the scope of permissible copying in the digital age. The Supreme Court's narrow 5-4 decision ruled that private copying of television programs onto video cassettes for personal use (time-shifting) constituted fair use[79]. This ruling emphasized the importance of considering the public's interest in accessing copyrighted works and the potential for new technologies to facilitate legitimate uses.

The case also highlighted the inherent tension in balancing the interests of copyright holders with those of the public, especially when new technologies emerge. The lower court decisions, as Mills[80] notes, reflected this tension, with the district court prioritizing public access and the appeals court favoring copyright owner protection. The Supreme Court's

---

[76] DEPOORTER, Ben; PARISI, Francesco. Fair use and copyright protection: a price theory explanation. *International Review of Law and Economics*, v. 21, n. 4, p. 453-473, 2002. p. 454

[77] DEPOORTER, Ben; PARISI, Francesco. Fair use and copyright protection: a price theory explanation. *International Review of Law and Economics*, v. 21, n. 4, p. 453-473, 2002. p. 454

[78] UNITED STATES OF AMERICA.*Sony Corporation of America v. Universal City Studios*, 464 U.S. 417 (1984). Available at: https://supreme.justia.com/cases/federal/us/464/417/.

[79] ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016. p. 104/105

[80] MILLS, Mary L. New technology and the limitations of copyright law: An argument for finding alternatives to copyright legislation in an era of rapid technological change. *Chi.-Kent L. Rev.*, v. 65, p. 307, 1989. p. 320

divided decision further underscores the difficulty of navigating this balance in a rapidly evolving technological landscape.

The technological advances also enabled the emergence of alternative models of knowledge production and dissemination, such as open source software and open access journals, creating alternative zones of knowledge sharing outside the traditional confines of copyright protection[81]. Creative Commons (CC) licenses have played a crucial role in facilitating this shift by providing a legal framework that allows creators to retain copyright while granting others permission to use their work under specific conditions.

This approach allows for greater flexibility and customization in how knowledge is shared and used, empowering creators to choose the level of control they wish to retain over their work. By offering a spectrum of licenses, ranging from those that permit only non-commercial use to those that allow for unrestricted use and modification, Creative Commons provides a valuable tool for navigating the tension between copyright protection and access to knowledge.

Launched in 2002, CC aimed to combat the "supply constriction" caused by copyright holders exercising their exclusive rights to limit competition or punish infringement[82].

Creative Commons, differently from other types of normal contracts, offers a range of standardized licenses that allow authors to release their works to the public with specific permissions for use, while still retaining their rights. These licenses, freely available on the CC website, require attribution but vary in terms of whether they permit commercial use and derivative works.

By affixing a CC license to their work, creators essentially give advance permission for certain uses, creating a "permission-free" environment where individuals can use and share the work without seeking additional authorization, as long as they comply with the license

---

[81] AUFDERHEIDE, Patricia; JASZI, Peter. *Reclaiming fair use: How to put balance back in copyright*. University of Chicago Press, 2018. p. 13

[82] ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016. p. 125/126

terms. The goal is to foster a thriving "commons" of information, facilitating the legal dissemination of works and promoting a culture of sharing and collaboration[83].

This model represents a significant departure from traditional copyright practices, offering a more flexible and adaptable approach to knowledge sharing in the digital age. By empowering creators to choose the level of control they wish to retain over their works, Creative Commons offers a valuable tool for navigating the complex landscape of copyright law and promoting greater access to information.

The success of Creative Commons lies in its ability to work within the existing copyright framework, offering a pragmatic solution that bridges the gap between copyright advocates and those who favor a more open approach to knowledge sharing. By providing a range of standardized licenses, Creative Commons allows copyright holders to retain ownership while granting specific permissions for use and distribution, creating a "middle way" that fosters a more vibrant and accessible public domain[84].

In conclusion, intellectual property law, while a cornerstone of modern economies and a usually seen as powerful incentive for innovation, presents a complex landscape with inherent tensions and challenges. The evolving nature of public goods require a nuanced and adaptable approach to IP protection. While incentivizing creations remains a key objective, it is equally important to ensure that IP rights do not become an impediment to development and innovation.

3. COPYRIGHT AND ACCESSING SCIENTIFIC KNOWLEDGE: POTENTIALS AND CHALLENGES

The intersection of scientific work and copyright law is a complex and multifaceted terrain. Scientific research, often characterized by its public good nature, stands in a unique position within the intellectual property (IP) landscape. While copyright is traditionally associated

---

[83] ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016. p. 125/126

[84] ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016. p. 126

with creative works, it also extends its protective umbrella to encompass scientific writings, including articles, books, and research reports.

This inherent connection between scientific work and copyright raises critical questions about the balance between protecting the rights of authors and fostering the dissemination of knowledge. On the one hand, copyright provides a crucial incentive for researchers to invest time and resources in their work. It grants exclusive rights to authors, enabling them to control the reproduction, distribution, and adaptation of their scientific outputs. This protection can foster innovation by ensuring a return on investment and preventing unauthorized exploitation.

However, the public good dimension of scientific research introduces a countervailing force. The advancement of knowledge is contingent on the free flow of information, and copyright can inadvertently impede this process. As aptly observed by Shaver, the assumption that authors are primarily motivated by financial gain oversimplifies the complex motivations behind scientific endeavor. The pursuit of knowledge, recognition, and societal impact often outweigh pecuniary considerations[85].

This chapter delves into the complexities of this relationship by examining the intricate interplay between copyright law and the broader landscape of scientific advancement. It explores how copyright can both facilitate and hinder the creation, dissemination, and utilization of scientific knowledge. By analyzing the power of knowledge in driving development (Section 3.1), the impact of knowledge coloniality (Section 3.2), the challenges of accessing and leveraging knowledge (Section 3.3), and the role of intellectual property in this dynamic (Section 3.4), this chapter seeks to understand how copyright is configured in the dual objectives of incentivizing scientific research and maximizing the benefits of scientific progress for society. Further, it will examine the intersection of education, digital markets, trade agreements, licensing, social cost and public policies in shaping access to scientific knowledge (Sections 3.5-3.8). Finally, the chapter will explore the potential of open initiatives and innovative models like Brazil's Tecnobrega to address the challenges of access to knowledge (Section 3.9).

---

[85] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 163

3.1. The Power of Knowledge

The concept of "knowledge" is as old as humanity itself. Its definition and understanding have evolved over centuries, influenced by philosophical, scientific, and societal shifts. As D'Hulst and Gambier assert[86], "knowledge" encompasses both cognitive understanding and practical expertise. This multifaceted nature of knowledge has profound implications for its creation, dissemination, and utilization.

Historically, knowledge was predominantly philosophical and contemplative, rooted in metaphysical and epistemological inquiries. With the advent of the scientific revolution, the empirical method emerged as a dominant paradigm for knowledge acquisition. The Enlightenment further emphasized reason and critical thinking as cornerstones of knowledge production.

In recent centuries, technological advancements have accelerated knowledge creation and dissemination. The printing press, the internet, and digital technologies have transformed how knowledge is produced, accessed, and shared. This rapid evolution has led to an explosion of information, posing both opportunities and challenges for individuals and societies.

Knowledge manifests in diverse forms, each with distinct characteristics and implications. Subramanian and Shaver[87] highlight that knowledge encompasses inventions, ideas, and information. Beyond its intellectual value, knowledge holds practical utility. It can drive advancements in fields like medicine through new treatments or scientific breakthroughs. Similarly, in commerce and education, knowledge, in the form of technology or accessible resources, can empower individuals and businesses to thrive. These varied expressions of knowledge underscore its dynamic and multifaceted nature, shaping societies and driving progress in countless ways.

---

[86] D'HULST, Lieven; GAMBIER, Yves. General introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 4
[87] SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011. p. 2

Frischmann, Madison, and Strandburg[88] define "*knowledge commons*" as a shorthand term that encompasses an approach (commons) to governing the management or production of a specific type of resource (knowledge). This type of governance is utilized by diverse communities to manage a wide array of resources, and it addresses various challenges to sustainable sharing and cooperation, arising from both the nature of the resources and external factors[89].

Knowledge, in this context, refers to a broad spectrum of intellectual and cultural resources, including information, science, creative works, and data. The authors emphasize that "*knowledge commons*" is a concise way to describe the institutionalized community governance of the sharing, and in some instances, the creation, of these diverse intellectual and cultural resources[90]. This concept highlights the importance of community-based approaches to managing and fostering the creation of knowledge, recognizing that it is not solely a matter of individual ownership or control.

Knowledge has been a dynamic force shaping civilizations throughout history. As Montgomery[91] emphasizes, knowledge transcends geographical and cultural boundaries, propelled by factors such as conquest, trade, and intellectual curiosity. This mobility of knowledge has been instrumental in building societies, particularly those we consider "modern."

The transfer of knowledge, whether through the dissemination of scientific principles, legal systems, or artistic techniques, has conferred upon societies new capacities for organization, governance, and innovation. It is evident that the flow of knowledge is not merely an intellectual exercise but a catalyst for societal transformation.

The Universal Declaration of Human Rights[92] enshrines the right of everyone to participate in cultural life and benefit from scientific advancement. While this declaration affirms

---

[88] FRISCHMANN, Brett M.; MADISON, Michael J.; STRANDBURG, Katherine J. Governing Knowledge Commons. Oxford University Press, 2014. p. 14
[89] FRISCHMANN, Brett M.; MADISON, Michael J.; STRANDBURG, Katherine J. Governing Knowledge Commons. Oxford University Press, 2014. p. 14
[90] FRISCHMANN, Brett M.; MADISON, Michael J.; STRANDBURG, Katherine J. Governing Knowledge Commons. Oxford University Press, 2014. p. 14
[91] MONTGOMERY, Scott L. *Science in translation: Movements of knowledge through cultures and time*. University of Chicago Press, 2000. p. 2
[92] UNITED NATIONS GENERAL ASSEMBLY. *The Universal Declaration of Human Rights (UDHR)*. New York: United Nations General Assembly, 1948.

knowledge as a fundamental human right, it overlooks the critical issue of accessibility. As Vathitphund[93] highlights, the right to enjoy knowledge does not inherently guarantee free access. This discrepancy underscores the complex interplay between knowledge as a human right and the economic realities shaping its distribution.

The process of transforming research findings into actionable knowledge for society, often termed "knowledge transfer", is a multifaceted and context-dependent endeavor. Leadbeater, Banister, and Marshall[94] uses the terminology surrounding this process as diverse and evolving. While the specific label may vary, the core concept remains consistent: bridging the gap between research and practice.

Knowledge transfer mechanisms vary across different contexts. In policy-making, intermediaries often play a crucial role in connecting researchers with policymakers, translating complex research into actionable insights. Conversely, in sectors like non-profit organizations, schools, and communities, a more collaborative approach involving community members in the research process can enhance knowledge exchange and utilization[95].

Knowledge, as a fundamental component of human existence and in a more advanced society, transcends mere data processing. While artificial intelligence (AI) has demonstrated remarkable capabilities in handling and manipulating information, it remains fundamentally limited in capturing the essence of human knowledge.

Thrane[96] shows that human language faculty is intricately linked to broader cognitive processes. Unlike AI systems, which operate on representational structures, human knowledge is grounded in lived experiences, cultural contexts, and embodied cognition.

---

[93] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 9

[94] LEADBEATER, Bonnie J.; BANISTER, Elizabeth M.; MARSHALL, E. Anne. How-what-we-know-becomes-more-widely-known is context dependent and culturally sensitive. In*: Knowledge Translation in Context*. University of Toronto Press, 2011. p. 3

[95] LEADBEATER, Bonnie J.; BANISTER, Elizabeth M.; MARSHALL, E. Anne. How-what-we-know-becomes-more-widely-known is context dependent and culturally sensitive. In*: Knowledge Translation in Context*. University of Toronto Press, 2011. p. 5

[96] THRANE, Torben. Representing interpreters' knowledge: Why, what, and how. In: *V. Dam, H., Engberg, J., and Gerzymisch-Arbogast, H.(Eds.), Systems and translation*, 2005. p. 55

This interplay between language, thought, and human experience creates a depth and richness that AI, with its reliance on data-driven patterns, is unable to fully replicate.

Knowledge forms the bedrock upon which language and translation are constructed. As Dam, Engberg, and Gerzymisch-Arbogast[97] elucidate, knowledge is multifaceted and can be categorized in various ways to illuminate the intricacies of human communication.

A fundamental distinction lies between world knowledge and linguistic knowledge. World or encyclopedic knowledge represents our understanding of the world, independent of language, encompassing facts, concepts, and experiences. Linguistic knowledge, on the other hand, pertains to the structure and rules of a specific language. While these two domains are interconnected, they are conceptually distinct. For instance, the concept of "mother" is part of world knowledge, while its linguistic representation varies across languages[98].

Another crucial distinction is between explicit and tacit knowledge. Explicit knowledge is consciously accessible and can be articulated, codified, and shared. It includes factual information, rules, and procedures. Tacit knowledge, conversely, is implicit, often acquired through experience and difficult to articulate. It is deeply embedded in an individual's cognitive processes and plays a significant role in translation and interpreting, where intuitive judgments and problem-solving are essential[99].

Furthermore, knowledge can be categorized as procedural or declarative. Procedural knowledge relates to knowing how to perform tasks, such as translating or interpreting, while declarative knowledge pertains to factual information about the world. Both types are essential for language professionals, as they interact and influence each other in the translation process[100].

---

[97] DAM, Helle V.; ENGBERG, Jan; GERZYMISCH-ARBOGAST, Heidrun (Ed.). *Knowledge systems and translation*. Walter de Gruyter, 2005. p. 2/3
[98] DAM, Helle V.; ENGBERG, Jan; GERZYMISCH-ARBOGAST, Heidrun (Ed.). *Knowledge systems and translation*. Walter de Gruyter, 2005. p. 2/3
[99] DAM, Helle V.; ENGBERG, Jan; GERZYMISCH-ARBOGAST, Heidrun (Ed.). *Knowledge systems and translation*. Walter de Gruyter, 2005. p. 2/3
[100] DAM, Helle V.; ENGBERG, Jan; GERZYMISCH-ARBOGAST, Heidrun (Ed.). *Knowledge systems and translation*. Walter de Gruyter, 2005. p. 2/3

The interplay between these various forms of knowledge highlights the complexity of human language and the challenges inherent in translation. Understanding these distinctions is crucial for developing effective translation and interpreting strategies[101].

The pursuit of knowledge is intrinsically linked to human creativity and innovation. As Vathitphund[102] posits, knowledge serves as a catalyst for generating new ideas and solutions. By expanding our understanding of the world, knowledge empowers us to think critically, make connections, and develop novel approaches to challenges.

The acquisition of knowledge is often driven by a desire to create and innovate. A deep understanding of a subject matter provides the foundation for generating original ideas and pushing the boundaries of human knowledge. Creativity, in turn, can lead to further knowledge creation, forming a cyclical relationship between knowledge and innovation.

The landscape of knowledge acquisition has undergone a dramatic transformation in recent times. Traditional methods, such as reading, travel, and oral storytelling, have been complemented by the rapid growth of digital information and communication technologies. This shift has had profound implications for the creation and dissemination of knowledge. The abundance of information available in the digital age has not necessarily translated into a corresponding increase in groundbreaking innovations. The question arises as to why our era has produced fewer iconic works compared to previous periods[103].

In contemporary economies, knowledge has emerged as a pivotal driver of economic growth and competitiveness. As Martínez-Piva[104] asserts, knowledge has become an integral component of product value, with its generation, appropriation, and transformation into new technologies serving as cornerstones of economic prosperity.

---

[101] More on theory, methodology and types of translation: DAM, Helle V.; ENGBERG, Jan; GERZYMISCH-ARBOGAST, Heidrun (Ed.). *Knowledge systems and translation*. Walter de Gruyter, 2005.

[102] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 7

[103] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 8

[104] MARTÍNEZ-PIVA, Jorge Mario. *Knowledge Generation and Protection*. New York: Springer, 2009. p. xv

The capacity to harness knowledge effectively has become a distinguishing factor between developed and developing nations. Countries that excel in knowledge creation and innovation often enjoy higher levels of economic growth and improved standards of living. This underscores the imperative for nations to invest in research, education, and infrastructure that support knowledge generation and utilization.

The role of knowledge extends beyond industrial goods, permeating agriculture and services as well. This underscores the broad-based nature of knowledge-driven economies. Consequently, understanding the mechanisms for generating, protecting, and utilizing knowledge has become a critical issue for developing countries seeking to enhance their economic competitiveness[105].

Contemporary discourse often frames knowledge as a commodity, subject to the same market dynamics as other goods and services. This perspective, influenced by the prevalence of private transactions in knowledge-based industries, has led to a focus on individual incentives and market mechanisms for driving knowledge creation and dissemination.

However, as Rizk *et al.*[106] argue, this commodification of knowledge obscures its fundamental nature as a global public good. Unlike traditional private goods, knowledge exhibits characteristics of non-rivalry and non-excludability, meaning its consumption by one individual does not diminish its availability to others, and it is difficult to prevent its spread. This unique nature of knowledge creates a tension between the need to incentivize innovation through intellectual property rights and the imperative to ensure widespread access for the public good.

The OECD's (Organisation for Economic Co-Operation and Development)[107] exploration of innovation sources identifies four key drivers: science, users and doers, modular

---

[105] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 27

[106] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 2/3

[107] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 8/9

structures, and information and communication technologies (ICTs). These elements, while distinct, are often interconnected and mutually reinforcing.

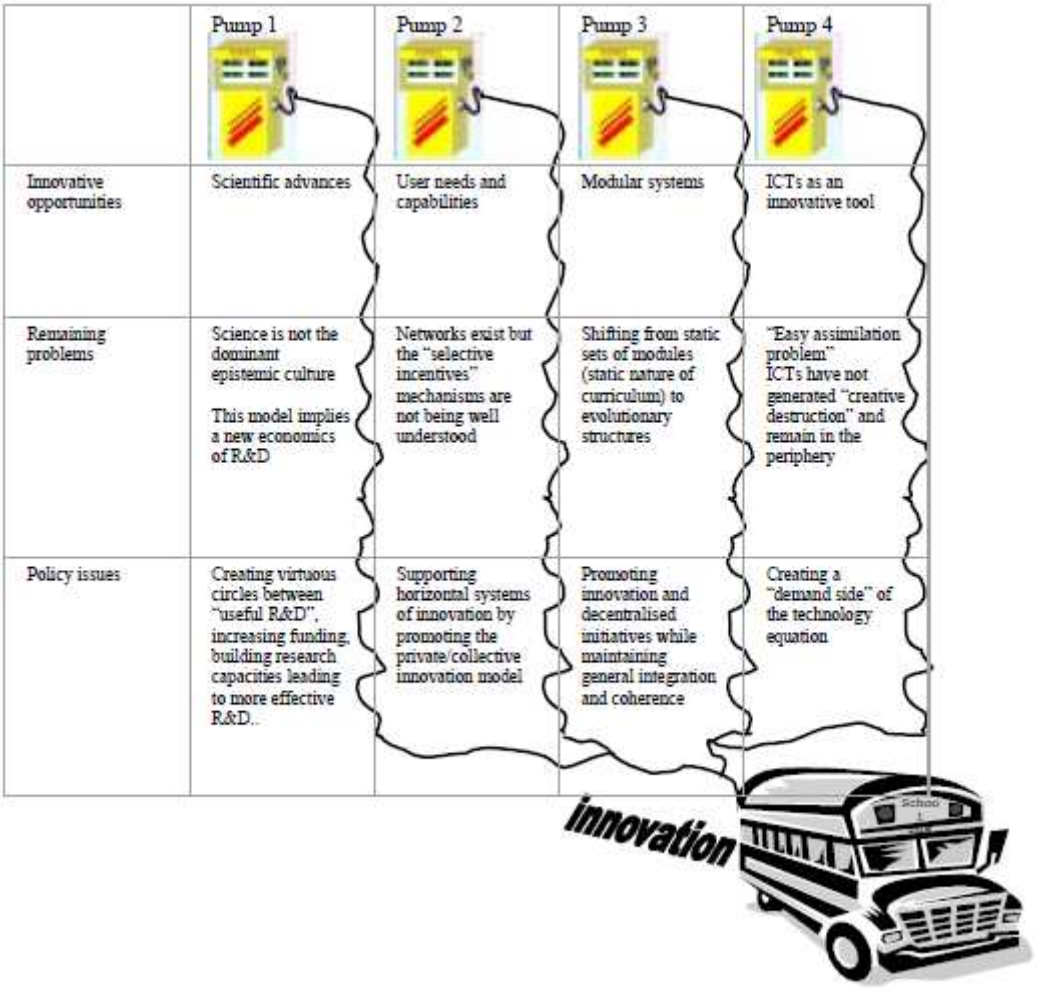
Science serves as a foundational pillar, providing the theoretical underpinnings for technological advancement. However, the OECD emphasizes the importance of translating scientific knowledge into practical applications. User involvement and collaboration are increasingly recognized as vital to the innovation process. By actively engaging with users, innovators can better understand their needs and preferences, leading to more relevant and impactful solutions. Modular structures facilitate innovation by creating flexible and adaptable systems. These structures allow for experimentation and rapid adaptation to changing market conditions. Finally, ICTs have emerged as a pervasive force, enabling new forms of innovation and transforming industries across the board[108].

The OECD[109] also highlights the public nature of knowledge as a critical factor in innovation. The free flow of information and ideas fosters collaboration, creativity, and the development of new solutions. This underscores the importance of promote knowledge sharing and dissemination as a public dimension of knowledge.

In sum, the OECD's[110] exploration of innovation sources highlights four key drivers: science, user involvement, modular systems, and ICTs. Science underpins technological advancements, while user needs and capabilities drive demand and shape solutions. Modular systems foster adaptability and flexibility, and ICTs provide tools for innovation across sectors. These elements interrelate, with knowledge sharing and collaboration being central to their effectiveness. The image below effectively visualizes these drivers as interconnected "pumps" fueling the innovation journey. Policymakers should aim to balance these elements by strengthening science-industry links, cultivating user-centric approaches, promoting modular systems, and leveraging ICTs to create a conducive innovation ecosystem.

---

[108] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 10
[109] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 8
[110] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 10



Source: OECD[111]

The contemporary economic landscape is characterized by a profound shift towards knowledge-intensive activities. This "knowledge economy" is marked by rapid advancements in knowledge creation, dissemination, and application. In contrast to historical models of economic growth, innovation in the 21st century is driven by a complex interplay of factors that extend beyond traditional industrial paradigms. The creation of a 21st-century microelectronic product bears little resemblance to the methods employed in producing 19th-century light bulbs. This evolution underscores the dynamic nature of knowledge and its increasing centrality to economic prosperity[112].

---

[111] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 73
[112] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 9

The knowledge economy emphasizes the creation and exploitation of intangible assets such as intellectual property, human capital, and organizational know-how. The transition to this model is marked by a surge in innovation, with knowledge serving as both the catalyst and the product of economic activity. This transformation necessitates a reorientation of economic, social, and educational systems to harness the full potential of knowledge. It requires fostering environments conducive to creativity, research, and the development of human capital[113].

The OECD report[114] underscores a critical distinction between knowledge and information. While both are essential components of the knowledge economy, they possess fundamentally different characteristics.

Information represents structured data that requires interpretation and processing to become knowledge. Knowledge, on the other hand, is the ability to understand, apply, and create information. It is inherently linked to human cognition and is more challenging to replicate or transfer than mere data. The ease of information replication through technology contrasts sharply with the complexities involved in knowledge transfer, highlighting the unique value of human expertise. This distinction emphasizes the importance of investing in human capital development and fostering environments that facilitate knowledge creation and sharing.

Access to information is a critical prerequisite for knowledge acquisition and creation. The OECD[115] highlights the symbiotic relationship between human knowledge and information, emphasizing that meaningful information access is essential for expanding individual knowledge beyond personal experiences.

However, the digital divide underscores the uneven distribution of information resources globally. While the internet has revolutionized information access, it has also exacerbated existing inequalities. The persistence of traditional media in many developing countries

---

[113] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 13/14
[114] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 18
[115] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 27

reflects the challenges of bridging this digital divide and ensuring equitable access to information.

3.2. Knowledge Coloniality

The intellectual framing of modernity has produced a perspective and mode of knowledge production that reflects the nature of global power structures: colonial/modern, capitalist, and Eurocentric. This perspective, recognized as Eurocentrism, is a specific rationality that has become globally hegemonic, colonizing and overshadowing other forms of knowledge[116]. It is intertwined with the specific bourgeois secularization of European thought and the needs of the capitalist world order established from the Americas.

The concept of the "knowledge coloniality" is central to decolonial discussions and is closely linked to the idea of a colonial and geopolitical difference of knowledge[117]. The notion of epistemic violence is deemed insufficient to capture the silencing and denial of non-European epistemologies.

The critique of Eurocentrism and its role in perpetuating the coloniality of knowledge is particularly relevant to the Latin American experience, but it has broader implications for understanding knowledge production and access globally. By recognizing the historical and ongoing power imbalances in knowledge systems, we can begin to challenge dominant narratives and create space for diverse perspectives and epistemologies. This decolonial lens is crucial for understanding the complexities of knowledge access and the role of copyright in shaping the global knowledge landscape. It highlights the need to move beyond Eurocentric models and embrace a more inclusive and equitable approach to knowledge creation and dissemination.

In the scope of this work, the proposition is to discuss some of its questions more directly linked to the historical experience of Latin America, but which, obviously, do not refer only to it. The objective is to demonstrate how the issue of access to knowledge is inserted in this context, also addressing the inequalities produced by the current models of knowledge

---

[116] QUIJANO, Aníbal. Colonialidade do poder, eurocentrismo e América Latina. A Colonialidade do Saber: etnocentrismo e ciências sociais. Perspectivas Latinoamericanas. Buenos Aires: Clacso, p. 107-126, 2005. p. 126

[117] BALLESTRIN, Luciana. América Latina e o giro decolonial. Revista Brasileira de Ciência Política, nº11. Brasília, maio - agosto de 2013, pp. 89-117. p. 126

production and how copyright can contribute to this process. The focus will be promote the developing countries connecting with the decolonization debate to show that there are many ways to interpret it, including the access to knowledge.

3.3. Knowledge: Access and Development

The pivotal role of knowledge in driving economic growth is widely acknowledged. As Rizk *et al.*[118] assert, knowledge has supplanted traditional resources like oil and labor as the primary catalyst for development. The twenty-first century economy is characterized by its reliance on intellectual capital and innovation.

The transition to a knowledge-based economy necessitates a fundamental shift in economic strategies. Investment in research, development, and education emerges as a cornerstone for fostering economic growth and competitiveness. By harnessing the power of knowledge, nations can unlock new opportunities, improve productivity, and enhance overall well-being.

Developing countries face significant challenges in accessing and utilizing knowledge. Limited resources, infrastructure gaps, and the dominance of English as the language of knowledge production contribute to a persistent knowledge divide between the developing and developed countries. This disparity hampers their ability to innovate, develop human capital, and participate fully in the global economy[119].

Moreover, the commodification of knowledge through intellectual property rights can exacerbate these challenges. While copyright law aims to incentivize creativity, its overprotection can restrict access to essential knowledge in developing countries, hindering their ability to build upon existing knowledge and develop their own innovative capacities.

> "Access to knowledge is critical for developing countries that seek to educate their masses who are already behind in the knowledge base. Knowledge, which is supposed to be 'common goods' for people in general

---

[118] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 2
[119] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 6

> has been turned into private property to gain economic benefit for a few (…) in the digital environment"[120].

The Universal Declaration of Human Rights[121] in art. 27 enshrines the right of individuals to participate in cultural life and benefit from scientific advancement. This principle underpins the access to knowledge movement, which advocates for equitable access to information and knowledge as a fundamental human right.

Proponents of this movement argue that widespread access to knowledge is essential for addressing global challenges such as poverty, inequality, and disease. They contend that by treating knowledge as a common good rather than a private commodity, societies can unlock innovation, promote economic growth, and foster democratic participation.[122]

Access to knowledge is intrinsically linked to the exercise of fundamental human rights. As Talagala[123] highlights, the ability to access and utilize information is essential for individuals to fully participate in society and to make informed choices. Freedom of expression, a cornerstone of democratic societies, is deeply intertwined with access to knowledge. The capacity to form and express opinions is contingent upon access to diverse information and perspectives. Conversely, restrictions on knowledge access can impede the exercise of freedom of expression, limiting the ability of individuals to participate in public discourse and hold power structures accountable.

The access to knowledge movement is rooted in the belief that knowledge is essential for both individual empowerment and societal progress. Proponents argue that equitable access to information is fundamental to democratic participation, economic justice, and addressing global challenges. By framing knowledge as a common human heritage rather than a private commodity, the movement challenges the notion of "intellectual enclosure" and advocates

---

[120] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 15

[121] UNITED NATIONS GENERAL ASSEMBLY. *The Universal Declaration of Human Rights (UDHR)*. New York: United Nations General Assembly, 1948. Art. 27.

[122] SHAVER, Lea. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, 2010. p.4

[123] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 5

for policies that promote knowledge sharing and dissemination. This perspective underscores the interconnectedness of knowledge, human rights, and democratic values[124].

Developing countries face a significant knowledge gap in comparison to their developed counterparts. This disparity is particularly pronounced in the realms of science and technology, where a concentration of knowledge and expertise exists primarily in developed nations. This imbalance creates a dependency on developed countries for access to critical scientific and technical information, hindering the innovation and development capacities of developing nations[125].

The disparity in scientific and technological knowledge between developed and developing countries is pronounced. This knowledge gap manifests in various forms, including a significant imbalance in the production of books, journals, and digital resources[126]. Developing countries often have limited access to the cutting-edge research and information generated elsewhere, hindering their ability to innovate and develop their knowledge economies.

Talagala[127] highlights the stark disparity in scientific and technological knowledge production between developed and developing countries, as evidenced by the distribution of academic journals. Developed nations dominate the landscape of journal publication, possessing a significantly greater number of journals and a concentration of high-impact publications. This imbalance reflects the unequal distribution of resources, research infrastructure, and expertise, further exacerbating the global knowledge divide.

The pivotal role of science and technology in achieving national development goals is a globally recognized phenomenon. Nations across the world increasingly view scientific advancement and technological innovation as indispensable tools for progress.

---

[124] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 17
[125] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 6/7
[126] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 7
[127] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 8

Developing countries face significant challenges in accessing and utilizing scientific and technological knowledge. To bridge this gap, they must enhance access to the existing body of knowledge generated in developed countries and bolster their own scientific and technical education and expertise[128].

Beyond ensuring access to information and resources, Liu and Racherla[129] emphasize the importance of fostering a conducive environment for knowledge sharing requires addressing underlying social disparities: the social gap. Factors such as caste, class, gender, and geography can create significant barriers to participation in knowledge-based activities. Overcoming these social divisions is essential for maximizing the benefits of a knowledge-based economy. Additionally, language barriers and biases against knowledge creators from outside established research and innovation circles can further hinder knowledge exchange and innovation.

This broader understanding of access to knowledge is essential for fostering creativity, innovation, and cultural exchange. The demand for access to knowledge extends beyond mere consumption, embracing the right to participate in its creation, modification, and expansion. It extends to a broad spectrum of human creations, encompassing data, information, tools, inventions, literature, art, and various forms of intellectual expression, more than just education and learning opportunities[130].

Overall, innovation has emerged as a cornerstone of economic development, with countries around the world recognizing its pivotal role in achieving national progress. Building innovation capacity is essential for both developed and developing nations. While developed countries often possess a strong foundation for innovation, developing countries must focus on incremental innovation and adapting foreign technologies to their specific

---

[128] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 10
[129] LIU, Kung-Chung; RACHERLA, Uday S. *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*. Springer Nature, 2019. p. 507
[130] SHAVER, Lea. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, 2010. p.4

needs. This requires a concerted effort to strengthen education systems, invest in research and development, and create supportive ecosystems for innovation to thrive[131].

Developing countries often face significant challenges in accessing the advanced research infrastructure necessary for cutting-edge scientific inquiry. While some developing countries possess skilled researchers, they may lack access to expensive research equipment and facilities prevalent in developed nations.

However, advancements in telecommunications offer potential solutions. Remote access to research instruments and data sharing through high-speed networks can mitigate the need for costly on-site infrastructure. This digital connectivity can partially bridge the physical divide and enable researchers in developing countries to engage more actively in global knowledge production[132].

Nevertheless, challenges such as limited internet access, digital literacy disparities, and power outages can hinder the effective utilization of these technologies in many parts of the developing world[133].

The movement of skilled scientific and engineering personnel from developing to developed countries, often termed "brain drain," poses significant challenges for developing nations. This outflow of talent can deprive these countries of crucial human capital, hindering their capacity for research, innovation, and development.

As the OECD[134] highlights, developed countries often attract top talent from developing nations through more favorable research environments and career opportunities. While this migration can benefit the receiving countries, it can have detrimental consequences for the countries of origin. This dynamic underscores the need for policies aimed at retaining talent and fostering knowledge creation within developing countries.

---

[131] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 3

[132] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 3

[133] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 28

[134] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 28/29

Knowledge often exhibits the characteristics of a public good, meaning its consumption by one individual does not diminish its availability to others, and exclusion is difficult. This is particularly evident in areas such as scientific discoveries, fundamental research findings, and publicly funded innovations.

However, the increasing privatization of knowledge raises concerns about its accessibility and impact on public welfare. The tension between the public good nature of knowledge and its private appropriation has significant implications for innovation, economic growth, and social equity. Striking a balance between incentivizing knowledge creation and ensuring widespread access is crucial for maximizing the benefits of knowledge for society.

As the OECD[135] highlights, the commodification of knowledge can inadvertently limit access and hinder the public good aspects of knowledge. This underscores the need for policies that promote both innovation and equitable knowledge distribution.

The public sector plays a pivotal role in constructing and maintaining the knowledge infrastructure essential for innovation. Governments often establish institutions like libraries, archives, and research facilities to foster knowledge creation and dissemination, serving as foundational elements for both private and public sector innovation. Furthermore, the public sector is instrumental in defining standards and regulations, which shape the broader knowledge ecosystem. While these functions may have originated for various reasons, their ongoing importance in supporting innovation is undeniable[136].

The increasing privatization of knowledge has raised concerns about its accessibility and impact on the public good. This trend has led to a situation where knowledge, once considered a common good, is increasingly treated as a private commodity. This privatization has significant implications for various sectors, including education. The education sector is particularly vulnerable to the effects of knowledge privatization. [137] The potential for increased costs of educational materials and restricted access to knowledge can hinder the quality and inclusivity of education. Striking a balance between incentivizing

---

[135] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 78
[136] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 81
[137] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 10

knowledge creation and ensuring public access is crucial for the education sector to fulfill its role in fostering informed and engaged citizens – more on that later.

3.4. Intellectual Property and Knowledge

Intellectual property (IP) rights encompass a set of rules and regulations governing the appropriation, transfer, and utilization of knowledge and intangible assets. Patents, copyrights, and trademarks are examples of IP rights that grant exclusive privileges to creators and inventors.

Merges[138] emphasizes that not all information can be subject to IP rights. Copyright law, for instance, excludes historical and factual information from protection, while patents do not extend to fundamental scientific principles or mathematical formulas. Similarly, trademark law prevents the appropriation of common words as brand names.

This distinction between protectable and non-protectable information is rooted in the understanding that certain knowledge is inherently public and should remain accessible to all. This "*stock of common knowledge*"[139] is considered essential for societal progress and individual creativity. Allowing private ownership of such fundamental knowledge would hinder innovation and limit the ability of others to build upon existing ideas, as the free exchange of information is crucial for advancing knowledge and fostering new discoveries.

The rationale behind IP protection is to incentivize innovation by providing exclusive rights to knowledge creators, thus encouraging further investment in research and development. However, the relationship between IP and innovation is complex and contested. While IP rights can stimulate innovation, they can also create barriers to knowledge sharing and diffusion, potentially hindering technological progress[140].

In addition to patents, companies employ various strategies to safeguard their intellectual property and maintain a competitive advantage. These include industrial secrets, which

---

[138] MERGES, Robert P. *Justifying intellectual property*. Harvard University Press, 2011. p. 142
[139] MERGES, Robert P. *Justifying intellectual property*. Harvard University Press, 2011. p. 142
[140] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 5

protect confidential business information, and first-mover advantages gained through rapid market entry.[141] Moreover, complementary manufacturing capabilities and other proprietary assets can contribute to a company's overall innovation ecosystem.

This diversity of protection mechanisms highlights the complex nature of intellectual property management and the need for a comprehensive approach to safeguarding innovation.

Patents play a crucial role in shaping the innovation ecosystem by defining the conditions for knowledge utilization and transfer. By granting exclusive rights to inventors, patents incentivize innovation and facilitate technology transfer between specialized firms. This system fosters specialization, enabling firms to focus on their core competencies and collaborate with others to bring products and services to market. However, the effectiveness of patents in promoting innovation and facilitating technology transfer depends on various factors, including the patent system's design, enforcement mechanisms, and the broader economic and institutional context[142].

This system facilitates the transfer of technology between firms with complementary capabilities, driving technological advancement and economic growth. However, it's essential to recognize that the patent system is not static. The dynamics of innovation and the broader economic landscape are constantly evolving, giving rise to new business models and knowledge commercialization strategies that may challenge the traditional patent-based paradigm[143].

---

[141] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 6

[142] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 9

[143] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 9/10

The realm of intellectual property and innovation encompasses distinct yet interconnected markets. Cimoli and Primi[144] identify three primary market types: the technology market, the science market, and liquid and derivative knowledge markets.

The technology market centers around the creation, protection, and transfer of patented technologies. Firms specialize in research, development, and licensing, driving innovation through a division of labor. Universities and research institutions operate within the science market, generating new knowledge through basic and experimental research. Patents may be utilized to protect intellectual property emerging from these activities. Liquid and derivative knowledge markets involve the commercialization of knowledge through various means, including licensing, spin-offs, and knowledge-intensive services. Patents may be strategically deployed to enhance market position and competitive advantage[145].

Enhancing the science market, the traditional role of universities as pure knowledge generators has evolved to encompass a more entrepreneurial orientation. The expansion of intellectual property rights has incentivized universities to patent their research findings, creating a "science market" where these intellectual assets can be commercialized[146].

The Bayh-Dole Act[147] in the United States exemplifies this shift, granting universities and research institutions ownership of federally funded inventions. This legislation has fostered a culture of technology transfer and entrepreneurship within academia[148].

However, it's essential to recognize that not all university research translates directly into commercial products or services. Basic research often serves as a foundation for future

---

[144] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 10

[145] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 10

[146] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 12

[147] UNITED STATES OF AMERICA. Bayh–Dole Act of 1980. Available at: https://www.law.cornell.edu/uscode/text/35/part-II/chapter-18.

[148] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 12

innovations, contributing to the broader knowledge base without necessarily generating immediate economic returns[149].

In addition to the traditional markets for technology and science, a third category of knowledge markets has emerged: derivative markets. These markets are characterized by companies acquiring and holding patents without actively licensing or commercializing them[150].

This phenomenon gives rise to patent portfolios, where companies may accumulate patents for strategic reasons, such as blocking competitors, preventing market entry, or positioning themselves for future licensing opportunities. While patent portfolios can be valuable assets, they also raise concerns about potential anti-competitive practices and the overall efficiency of the innovation ecosystem[151].

The interplay between intellectual property rights and innovation is complex. While patents serve as a crucial mechanism for incentivizing research and development, their excessive proliferation can inadvertently stifle innovation and create significant economic burdens.

The patent portfolios creates the phenomenon of patent thickets: characterized by overlapping and complex patent landscapes that can hinder market entry, increase litigation costs, and ultimately discourage investment in research and development. This highlights the need for a balanced approach to intellectual property protection that promotes innovation while safeguarding competition and market dynamics.

Moreover, the strong protection afforded to intellectual property rights can lead to increased market concentration, as firms with extensive patent portfolios may gain dominant

---

[149] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 12

[150] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 14

[151] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 14

positions. This raises concerns about potential anti-competitive practices and the overall health of the innovation ecosystem[152].

The emergence and effective utilization of patent systems are closely intertwined with a nation's industrial and technological development. As economies mature and invest in research and development, the demand for intellectual property protection grows. Patents incentivize innovation by granting exclusive rights to inventors, fostering a dynamic environment for technological advancement and economic growth.

Cimoli and Primi[153] emphasize that the development of a robust IP system is contingent upon the existence of a certain level of industrial and technological sophistication. Countries with well-established industrial bases and strong research capabilities are better positioned to leverage for economic growth and development.

This suggests that a linear progression exists, where industrial development precedes the effective implementation of a patent system. Nations without a strong foundation in industrialization may find it challenging to fully reap the benefits of intellectual property protection.

The transition from knowledge acquisition to technological capability development presents a significant hurdle for many nations. While intellectual property rights can incentivize innovation, they can also create barriers to technology transfer and adaptation. Today, we challenge of navigating a landscape characterized by strong intellectual property protection while simultaneously building domestic technological capabilities[154]. There is a need for strategic approaches that combine open innovation, technology transfer mechanisms, and targeted investments in research and development to bridge the gap between knowledge acquisition and technological self-sufficiency.

---

[152] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 15

[153] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 18

[154] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 18

Latin American countries face a complex landscape when it comes to intellectual property and development. While there is a growing recognition of the importance of knowledge-based economies, the region often grapples with conflicting priorities.

On one hand, there's a push for trade liberalization and integration into global markets, leading to a more open environment for goods and services. On the other hand, there's a simultaneous drive to strengthen intellectual property protection, particularly in response to international pressures. This tension creates a challenging environment for developing countries to navigate[155].

Moreover, the focus on traditional sectors and natural resources often overshadows the potential of knowledge-intensive industries. This lack of a strategic perspective on intellectual property hinders the region's ability to fully harness the benefits of innovation and technological advancement.

Developing countries often face the challenge of balancing short-term economic gains with long-term strategic development goals. A narrow focus on immediate economic benefits, such as exploiting existing comparative advantages in traditional sectors, can hinder the development of a robust knowledge base and technological capabilities.

Cimoli and Primi affirm the importance of a long-term perspective in fostering innovation and technological advancement. A sustained commitment to building scientific and technological capacity is essential for reaping the rewards of a knowledge-based economy. Short-term gains achieved through the exploitation of natural resources or low-cost labor may come at the expense of long-term competitiveness if not accompanied by investments in knowledge creation and innovation[156].

Latin American countries find themselves in a complex position within the evolving global knowledge economy. While there's a growing recognition of the importance of intellectual

---

[155] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 19

[156] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 20

property and innovation, these countries often operate as followers rather than leaders in this domain.

The region has been actively engaged in international trade negotiations, often adopting positions that favor trade liberalization in tangible goods while simultaneously seeking stronger intellectual property protection. This paradoxical stance reflects the challenges of balancing economic development goals with the demands of the global intellectual property regime[157].

To effectively participate in the global knowledge economy, Latin American countries must shift their focus from merely adopting international standards to developing tailored strategies that suit their specific needs and capabilities. A nuanced understanding of the complex interplay between different knowledge markets and the strategic role of intellectual property is essential for formulating effective policies and fostering innovation[158].

The intensification of patenting activity is closely tied to broader industrial and technological development. Countries that successfully implement industrial, technological, and trade policies to enhance their productive sectors often experience a surge in patenting. This suggests a correlation between a nation's technological capabilities and its reliance on intellectual property protection[159].

As economies develop and become more knowledge-intensive, firms seek to safeguard their innovations and capture economic returns through patents. This trend is further amplified by the increasing globalization of markets and the growing competition for technological leadership.

However, as already mentioned before, it's essential to recognize that the relationship between patenting and economic development is complex. While patents can play a crucial

---

[157] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 21

[158] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 21

[159] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 4

role in driving innovation, excessive reliance on intellectual property protection can also create barriers to entry and hinder technological diffusion.

The intricate relationship between intellectual property and innovation has undergone significant transformation in the context of increasingly open economies. The emergence of new technological paradigms, characterized by rapid knowledge diffusion and collaboration, has challenged traditional intellectual property frameworks.

The globalization of markets and the intensification of competition have led to a reconfiguration of the intellectual property landscape. Countries are faced with the challenge of balancing the need to protect domestic innovation with the demands of international trade and cooperation. The prominence of the United States in shaping intellectual property norms through trade agreements has further complicated this dynamic[160] – as we will see more later.

The traditional understanding of patents as mechanisms to protect investments in research and development is undergoing a transformation. As outlined by Cimoli and Primi[161], the emergence of new knowledge markets has redefined the role and function of patents.

The authors highlight the rise of a "science market" where universities and research institutions patent their findings, often without immediate commercialization intentions. Simultaneously, the concept of "liquid and derivative knowledge markets" emerges, where patents become strategic assets, their value derived not solely from the protected innovation itself, but from their potential to enhance market position and bargaining power.

This evolution underscores the complex interplay between patents, innovation, and competition. Patents are no longer merely tools for protecting inventions but have become strategic instruments in broader corporate strategies.

Intellectual property rights (IPRs) serve a dual purpose: they provide a mechanism for innovators to recoup their investments and generate profits, while also incentivizing further

---

[160] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 4

[161] CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 4/5

research and development. By granting exclusive rights to intellectual property owners, IPRs create a monopoly or quasi-monopoly, allowing them to capture a portion of the value generated by their innovations[162].

IPRs can be seen as a double-edged sword: are intended to stimulate innovation by rewarding inventors, but they can also inadvertently create barriers to entry and hinder competition. When IPRs are not carefully designed or implemented, they can morph from incentives for innovation into instruments for preserving monopolies.

Martínez-Piva[163] highlights the risk of excessive IPR protection leading to a situation where new entrants are discouraged from competing due to the high costs associated with navigating complex patent landscapes. This can stifle innovation and reduce the overall dynamism of the market.

Balancing the need to protect intellectual property with the imperative to foster competition and innovation is a complex challenge. Finding the optimal level of IPR protection requires careful consideration of the specific context and the desired outcomes.

This expansion of IP rights is not without its complexities and challenges. The OECD[164] notes that these developments have coincided with a rising tide of patenting activity by universities, particularly in fields like biotechnology, pharmaceuticals, medical devices, and software. This trend, spurred in part by legislation like the Bayh-Dole Act in the United States, has led to closer collaboration between academia and industry, but also raises questions about the balance between public research and private commercialization.

Furthermore, the digital age has intensified efforts to secure copyright protection for electronic information. This push aims to exploit the opportunities of electronic publishing while safeguarding existing copyright assets. However, concerns arise that such protection

---

[162] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 27

[163] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 28

[164] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 31/32

could limit access to essential information, especially in developing countries with limited resources.

The convergence of these trends—the expansion of IP rights, increased university patenting, and heightened copyright protection for digital information—has led to a growing debate over the balance between incentivizing innovation through IP protection and ensuring a robust public domain of knowledge. While IP rights can stimulate innovation, their overextension can stifle knowledge sharing, hinder scientific progress, and exacerbate existing inequalities in access to information. Striking a delicate balance between these competing interests is crucial for ensuring that knowledge serves both private and public good.

This tension between private control and public benefit is further complicated by the unique economic characteristics of knowledge itself. Unlike tangible goods, where consumption by one individual inherently limits its availability to others, knowledge is non-rivalrous. This means that the use of knowledge by one person does not diminish its value or availability for others.

This inherent "non-rivalry in use," as highlighted by the OECD[165], challenges the traditional justification for intellectual property rights, which often draws parallels to physical property. The OECD[166] argues that if intellectual property rights exclude potential users of knowledge, it leads to waste, as desires for knowledge remain unsatisfied despite the minimal cost of sharing it.

The non-rivalrous nature of knowledge thus challenges traditional notions of property and calls for a nuanced approach to intellectual property rights. While protecting the interests of creators is essential, it's equally important to ensure that knowledge is accessible and can be utilized for the betterment of society. Balancing these competing interests is a complex task, requiring careful consideration of the specific context and the desired outcomes[167].

---

[165] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 32
[166] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 32
[167] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 32

3.5. Access to Knowledge

The legal framework surrounding intellectual property, while designed to incentivize innovation, also presents significant challenges to accessing knowledge. Subramanian and Shaver[168] highlight this tension, noting that the law often treats knowledge as the exclusive property of individuals or corporations. This exclusive ownership allows rights holders to control who can access and utilize knowledge, often at a high price due to the lack of competition.

This inherent conflict within the legal system raises critical questions about the balance between incentivizing innovation and ensuring equitable access to knowledge. The grant of exclusive rights, while intended to promote creativity and investment, can inadvertently create barriers that hinder knowledge dissemination and limit the potential benefits of scientific and technological advancements for society as a whole.

This inherent tension within intellectual property law is further magnified by its global application. As Rizk *et al.*[169] note, a one-size-fits-all approach to intellectual property can be detrimental, particularly for developing countries who are primarily importers, not exporters, of knowledge-based goods. The privatization of knowledge, while potentially beneficial for countries with established research and development sectors, can disproportionately disadvantage those still building their knowledge economies. This highlights the need for a nuanced understanding of the different contexts and development stages of countries when formulating and implementing intellectual property laws.

Specifically, the intersection of access to knowledge and Indigenous rights is a critical area of concern, particularly in Brazil and Latin America, where Indigenous communities possess extensive traditional knowledge intrinsically linked to their cultural heritage and ways of life. This knowledge, however, is often marginalized or exploited within the prevailing intellectual property rights frameworks.

---

[168] SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011. p. 2
[169] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 4

The rights of Indigenous peoples touch the discussions on access to for several reasons, like the preservation of their cultural heritage, IP derived from traditional knowledge and their sustainable practices and resource management creating a more equitable and environmentally conscious development strategies, besides the obvious historical injustices faced by Indigenous peoples on their rights to their traditional knowledge.

Although Indigenous communities have important place in the discussion on access to knowledge, the intellectual property frameworks and development of the rights of Indigenous knowledge holders, they require a separated study considering all their particularities.

Returning to a more global perspective, the heightened emphasis on knowledge as a valuable economic asset has led to a strengthening of intellectual property protections. Paradoxically, as the OECD[170] observes, this has exacerbated existing challenges for both the research and educational groups.

Firstly, the rising cost of exploratory research, often conducted in the spirit of open science, has been amplified by the patenting of fundamental scientific techniques. While public funding supports "open" scientific inquiry, it doesn't always compensate for the additional expenses incurred due to expanded IP protections. Additionally, stricter legal protection for databases threatens to impede the use of vast "information spaces" and the specialized search engines designed to navigate them[171].

Secondly, the increased reliance on intellectual property protection as an incentive for knowledge creation has inadvertently deterred innovative newcomers. The landscape is shifting towards commercialization of discoveries, often at the expense of open access and collaboration. This can create barriers to entry for smaller players and emerging economies, further solidifying the dominance of established institutions and potentially stifling groundbreaking innovation[172].

---

[170] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 83
[171] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 83
[172] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 83

In essence, while the strengthening of intellectual property rights aims to foster innovation, it also poses significant challenges to the very communities that drive scientific and technological advancement.

The impact of heightened intellectual property protection extends beyond the immediate research landscape. The UNESCO Recommendation on Open Science[173] underscores the importance of open science infrastructure as a fundamental pillar, alongside open knowledge, open engagement, and open dialogue with other knowledge systems. This framework emphasizes the need for sustained investment in and funding of non-profit infrastructure that guarantees permanent and unrestricted access to the public to the largest extent possible.

The juxtaposition of increased privatization of knowledge with the global call for open science infrastructure reveals a stark tension. While intellectual property rights aim to incentivize innovation through exclusivity, the open science movement advocates for unrestricted access and collaboration to maximize societal benefits. This dichotomy highlights the need for a nuanced approach that balances the interests of creators with the broader goal of democratizing knowledge and fostering a more inclusive scientific ecosystem.

The evolving landscape of knowledge production and dissemination is not without its counter-trends. Rizk *et al.*[174] highlight the growing recognition of alternative models that challenge the dominant paradigm of knowledge privatization. Nonproprietary models of knowledge creation, characterized by open collaboration and alternative innovation approaches, are gaining prominence in generating wealth and achieving development objectives.

This shift towards open models is partially fueled by the transformative effects of globalization and new information technologies, which have democratized access to information and facilitated collaboration across borders. These models challenge the notion

---

[173] UNESCO. An introduction to the UNESCO Recommendation on Open Science. 2022. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000383771.
[174] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 4

that knowledge is solely a commodity to be owned and controlled, emphasizing its potential as a shared resource for collective benefit.

This burgeoning movement towards open models is juxtaposed against the global push for harmonizing intellectual property standards, often seen as a top-down imposition. Yet, a counter-trend has emerged from the bottom up, driven by the massive expansion of peer-to-peer collaborative efforts engaged in knowledge production and sharing within communities built on trust[175].

Rizk *et al.*[176] continues using examples such as open source software, Wikipedia, and the Human Genome Project to exemplify this phenomenon. These initiatives demonstrate that knowledge production can thrive on a global scale, transcending geographical boundaries and IP constraints, through grassroots collaboration. This decentralized model of knowledge creation and sharing stands in stark contrast to the increasingly centralized and standardized IP regime.

This parallel development of top-down IP harmonization and bottom-up knowledge sharing highlights the dynamic tension between proprietary and open models in the contemporary knowledge landscape. It raises questions about the most effective ways to foster innovation and ensure equitable access to knowledge in a rapidly changing global context.

The impact on access to knowledge is particularly pronounced in the digital realm. Vathitphund[177] notes that much of the information readily available on the internet, a vital source of knowledge for many, is already protected under copyright law. While the internet has democratized access to information in many ways, this extensive copyright protection, if strictly enforced, could paradoxically become a significant barrier to knowledge access in the digital environment.

The ease and speed with which information can be accessed and shared online have revolutionized how people learn and engage with knowledge. However, the pervasive nature

---

[175] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 4
[176] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 4
[177] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 9

of copyright in the digital realm raises concerns about the potential for overprotection, where legal restrictions may stifle the free flow of information and limit the public's ability to access and utilize knowledge resources. This is especially pertinent in developing countries, where the internet often serves as a primary source of educational and scientific materials.

The tension between copyright protection and knowledge access is further complicated by the rise of systems that challenge traditional notions of information enclosure. Mizukami and Lemos[178] highlight the emergence of "*systems for the production of knowledge-based goods and services that do not rely on information enclosure, but are compatible with information openness*". They point to the success of the free software movement, the proliferation of open licensing models, and the explosion of user-generated content on the Internet as evidence of this shift.

These developments suggest a growing recognition of the importance of knowledge disclosure and sharing for innovation and progress. The authors note that the "openness versus enclosure" metaphor, central to current debates on intellectual property law, is not always a binary choice. Openness can sometimes "enclose enclosure," suggesting that a more nuanced and flexible approach to knowledge sharing may be necessary to foster a thriving knowledge ecosystem.

The concept of "access to knowledge" (A2K) encompasses a broad spectrum of rights and concerns, extending far beyond mere access to education and learning opportunities. As Rizk *et al.*[179] explain, A2K advocates champion a wide definition of "knowledge," encompassing not just educational materials but also data, tools, inventions, artistic expressions, and other forms of human inquiry.

Furthermore, the demand for "access" within the A2K movement is multifaceted, including both the right to consume knowledge as well as the right to participate in its creation and modification. This expansive interpretation of A2K has far-reaching policy implications,

---

[178] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 13

[179] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 5/6

touching upon areas such as internet governance, libraries, cultural development, scientific research, and public health.

While much of the existing scholarship on A2K has focused on its role in economic development, Rizk *et al.*[180] argue that the concept can also be grounded in international human rights frameworks. The Universal Declaration of Human Rights[181], for instance, explicitly recognizes the right to participate in cultural life, enjoy the arts, and share in scientific advancement. This alignment with human rights principles strengthens the A2K movement's claims and provides a moral and ethical foundation for its advocacy.

The historical trajectory of intellectual property law has been marked by a tension between the interests of developed and developing countries. As early as the 1960s, developing countries advocated for reforms to international IP conventions like the Berne[182] and Paris[183] Conventions, aiming to align these instruments with their socioeconomic needs for access to educational material, scientific knowledge, and technology[184]. However, these efforts largely fell short of achieving the desired reforms.

The landscape shifted dramatically with the introduction of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) [185] in 1994. TRIPS marked a turning point, as it brought IP into the realm of multilateral trade negotiations, linking it with other areas like trade in goods, agriculture, and textiles. This move, accepted reluctantly by developing countries in exchange for concessions in other areas, fundamentally altered the global knowledge architecture.

TRIPS represented a significant departure from previous IP instruments. It encompassed all categories of IPRs, harmonized protection terms, and expanded the scope of protection to include computer programs and pharmaceutical products. This expansion of IP rights,

---

[180] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 5/6
[181] UNITED NATIONS GENERAL ASSEMBLY. *The Universal Declaration of Human Rights (UDHR)*. New York: United Nations General Assembly, 1948. Art. 27.
[182] Berne Convention for the Protection of Literary and Artistic Works. September 9, 1886, and amended on September 28, 1979. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=283698.
[183] Paris Convention for the Protection of Industrial Property. March 20, 1883, and amended on September 28, 1979. Available at: https://www.wipo.int/wipolex/en/treaties/textdetails/12633.
[184] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 17/18
[185] TRIPS Agreement on Trade-Related Aspects of Intellectual Property Rights. April 15, 1994. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=305907.

coupled with robust enforcement mechanisms and the WTO (World Trade Organization) dispute settlement system, reinforced a discourse that stronger IP protection would lead to increased innovation, investment, and technology transfer in developing countries. However, as Rizk *et al.*[186] suggest, the reality has been more complex, with potential negative impacts on access to knowledge and development objectives in less developed nations.

The TRIPS Agreement, while lauded by some for harmonizing global IP standards, became a focal point of controversy. Rizk *et al.*[187] highlight that many developing countries and non-governmental organizations (NGOs) criticized the agreement for its perceived "one size fits all" approach. TRIPS significantly curtailed the flexibility that countries previously enjoyed under earlier international agreements to tailor their IP regimes to their unique social needs and development levels.

Of particular concern were the potential adverse effects of TRIPS on public health and biodiversity. The agreement's stringent IP protections, particularly in the pharmaceutical sector, raised fears of increased drug prices and limited access to essential medicines in developing countries. Additionally, concerns arose regarding the potential impact of IP rights on biodiversity conservation and the traditional knowledge of indigenous communities.

The controversy surrounding TRIPS underscores the challenges of balancing the interests of developed and developing countries in the global IP landscape. It also highlights the need for ongoing dialogue and potential reforms to ensure that intellectual property laws promote innovation and development while safeguarding public health and other societal interests.

The growing concerns of developing countries regarding the impact of IP on their development led to a push for change within the World Intellectual Property Organization (WIPO). In 2004, Brazil, Egypt and other developing nations initiated the WIPO Development Agenda, a significant proposal aimed at integrating development

---

[186] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 17/18
[187] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 19

considerations into all of WIPO's activities. After years of intense debate, the WIPO Assemblies adopted forty-five recommendations in 2007 to establish this agenda.

These recommendations, as highlighted by Rizk *et al.*[188], marked a significant shift in the approach to IP within WIPO. They incorporated language and formulations on IP flexibilities, public policy objectives, and technical assistance, moving away from the narrower focus on IPRs that had previously dominated the organization. This shift signaled a growing recognition of the need to balance IP protection with broader development goals, particularly in the context of developing countries.

Despite the challenges posed by the TRIPS Agreement and the broader push for IP harmonization, developing countries have made notable strides in shaping a more inclusive international knowledge architecture. According to Rizk *et al.*[189], they have achieved significant milestones at the multilateral level, such as the Doha Declaration on TRIPS and Public Health and the WIPO Development Agenda. These achievements highlight the growing recognition of the need to balance IP protection with development concerns and public health needs.

In this endeavor, developing countries have strategically collaborated with international civil society and NGOs, leveraging collective action to advocate for their interests. Their efforts have also coincided with an evolving discourse within developed countries themselves, where debates about the most effective ways to disseminate knowledge and promote innovation are increasingly acknowledging the value of alternative and open business models[190]. This suggests a potential shift towards a more nuanced understanding of knowledge governance, one that recognizes the diversity of needs and priorities across different nations and communities.

The convergence of these diverse catalyzed a broader movement advocating for greater access to knowledge. As Rizk *et al.*[191] note, developing countries like Argentina, Brazil,

---

[188] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 22/23
[189] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 24
[190] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 24
[191] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 21

Egypt, and India, along with numerous NGOs, saw the need to expand the debate beyond the narrow focus on TRIPS and public health.

This led to the emergence of the access to knowledge movement, which aimed to address the impact of global IP rules on a wider range of public policy objectives, including access to educational materials and scientific knowledge. Drawing inspiration from the successful tactics of the access to medicines campaign, the A2K movement sought to leverage international collaboration and advocacy to reshape the global knowledge landscape. This marked a significant shift in the discourse, recognizing that access to knowledge is not merely a matter of economic development but also a fundamental human right with far-reaching implications for social progress and innovation.

A global network of public interest advocates has pushed back against restrictive IP regimes. This movement, born from the fight for access to antiretroviral medicines in the late 1990s, highlighted the inequities of a system where life-saving knowledge remained inaccessible to those who needed it most[192]. The stark contrast between the health expenditures of developed and developing nations underscored the urgency for a more equitable distribution of knowledge resources, setting the stage for the broader access to knowledge movement.

The A2K movement, initially focused on access to medicines, broadened over time to encompass a diverse coalition of farmers, educators, and software developers, all advocating for a more open and equitable knowledge landscape[193]. Their collective demands span a wide spectrum, from copyright limitations to internet freedom, reflecting the multifaceted nature of knowledge access and its impact on various sectors.

The growing momentum of the A2K movement culminated in a significant challenge to the established order within the WIPO. In 2004, A2K advocates successfully pushed for a WIPO Development Agenda that would reframe the institution's mission. As Rizk *et al.*[194] note,

---

[192] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 4/5
[193] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 4/5
[194] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 4/5

this agenda aimed to position intellectual property regulation as a means towards achieving equitable development, rather than an end in itself.

The 45 Adopted Recommendations under the Development Agenda, approved by the WIPO General Assembly in 2007, explicitly incorporated the language of "access to knowledge" as a central goal. This marked a pivotal moment in the evolution of global IP discourse, signaling a growing recognition of the need to balance IP protection with broader development objectives and access to knowledge concerns.

To counter the perceived overreach of intellectual property protection, developing countries have begun actively proposing alternative frameworks within international forums. Vathitphund[195] highlights their efforts to introduce new standards to the WIPO that prioritize human rights and knowledge access over restrictive copyright regimes.

A significant example of this proactive approach was the proposal of the A2K Treaty in 2005. This treaty, integrated into the WIPO Development Agenda, aimed to create an international framework that would enhance A2K and facilitate technology transfer. It sought to achieve this by preserving and clarifying limitations and exceptions to copyright, establishing a "knowledge commons" for publicly funded research, and clarifying the relationship between digital rights management (DRM) legislation and copyright protection, including compulsory licensing regimes for developing countries.

This treaty proposal reflected the broader A2K movement's goal of reclaiming knowledge that had been enclosed by private interests, reasserting its status as part of the common heritage of humanity. Although the A2K treaty was never formally adopted, it represents a significant milestone in the ongoing struggle for a more balanced and equitable approach to intellectual property rights.

The A2K movement has emerged as a response to the perceived aggressive expansion of IP protection by developed countries. While WIPO's Internet Treaties have raised awareness of authors' rights in developing countries, bilateral agreements like Free Trade Agreements

---

[195] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 14

(FTAs) have often had a detrimental impact, as noted by Vathitphund[196]. These agreements frequently include provisions that go beyond the minimum standards set by TRIPS, further strengthening IP protection and potentially restricting access to knowledge in developing nations. We will discuss more later on this and the ongoing struggle to find a balance between the interests of creators and the broader public good in the international IP landscape.

The World Summit on the Information Society (WSIS), held in 2003 and 2005, served as a critical platform for the nascent Access to Knowledge (A2K) movement to gain traction and articulate its concerns on a global stage. As Rizk *et al.*[197] explain, WSIS provided a forum to discuss the challenges and opportunities presented by the digital revolution, particularly the role of information and communication technology (ICT) in achieving development goals.

This summit allowed A2K advocates to highlight the interconnectedness of digital technologies, knowledge access, and development. They argued that the digital divide, both between and within countries, posed a significant barrier to knowledge sharing and equitable development. The WSIS discussions helped to mainstream A2K concerns and paved the way for further international engagement on this issue.

The A2K movement, in response to the expansion of intellectual property rights and its associated challenges, has emerged as a champion for the right to access information[198]. The scope of knowledge protected by intellectual property is vast, encompassing literature, art, software, inventions, and scientific devices. Similarly, the A2K movement's objectives are broad, ranging from access to data, education, technology, and inventions to access to plant seeds, biotechnology, and the arts.

---

[196] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 15

[197] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 21/22

[198] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 9

This thesis will focus primarily on the realm of access to copyrighted works – including in the digital environment, where the tension between intellectual property protection and the free flow of information is particularly pronounced.

3.6. Education and Digital Market

The profound potential of the ongoing scientific revolution to transform various sectors, including education, is undeniable. However, as this revolution unfolds primarily within the private sector, concerns arise about equitable access to the knowledge and tools it generates. The commodification of knowledge in a predominantly private scientific landscape can create significant barriers to educational access, particularly for those who cannot afford to pay for it.

The concept of access to knowledge is intrinsically linked to the fundamental right to education[199]. As enshrined in numerous international human rights instruments, the right to education encompasses not only the opportunity to attend school but also the ability to access and engage with knowledge that facilitates learning and personal development.

This inherent connection between access to knowledge and the right to education is complex, especially when considering the economic realities of knowledge production. While knowledge itself is non-rivalrous, meaning its use by one individual does not diminish its availability to others, the resources required to produce and disseminate knowledge are often limited, particularly in developing economies[200].

Factors like funding constraints, lack of access to research materials, and socio-economic disparities can significantly impede participation in knowledge creation and access to its benefits. This can lead to a scenario where knowledge becomes a commodity accessible only to a privileged few, while marginalized communities are left behind.

Moreover, the protection of knowledge through intellectual property rights and the paywalls of academic journals create additional barriers to access. These barriers disproportionately

---

[199] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 5

[200] LIU, Kung-Chung; RACHERLA, Uday S. *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*. Springer Nature, 2019. p. 487

affect developing countries, where financial resources for education and research are often limited. The alienation of traditional and grassroots knowledge producers from mainstream systems further exacerbates the problem, hindering collaboration and knowledge exchange[201].

A fundamental tenet of equitable education and a thriving digital market is the optimal utilization of knowledge, which inherently requires equitable access to existing knowledge resources. Liu and Racherla[202] argue that the current landscape of knowledge sharing is far from unencumbered, with various barriers restricting access and hindering the full potential of innovation.

These barriers, ranging from financial constraints and IP restrictions to socio-economic disparities, have led to a concentration of knowledge in the hands of a privileged few. This unequal distribution not only limits the diversity of innovation but also slows down the pace of progress due to unnecessary duplication of efforts.

To truly realize the potential of a knowledge-based economy, Liu and Racherla[203] emphasize the need for a comprehensive approach that addresses both the sharing of knowledge itself and the equitable distribution of the resources necessary for knowledge production. This includes not only addressing issues of IP and access to educational materials, but also tackling the deeper socio-economic factors that can create barriers to knowledge creation and utilization. Only by addressing these root causes can we create a truly inclusive and equitable knowledge ecosystem that fosters innovation and benefits society as a whole.

The inherent non-rivalrous nature of knowledge, as discussed previously, creates a unique challenge for developing countries seeking to access scientific advancements. While recognizing the importance of incentivizing creators through intellectual property rights, the OECD[204] emphasizes that a delicate balance must be struck. Overly stringent protection

---

[201] LIU, Kung-Chung; RACHERLA, Uday S. *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*. Springer Nature, 2019. p. 487
[202] LIU, Kung-Chung; RACHERLA, Uday S. *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*. Springer Nature, 2019. p. 487
[203] LIU, Kung-Chung; RACHERLA, Uday S. *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*. Springer Nature, 2019. p. 487
[204] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 33

can impede the collective knowledge enhancement that occurs when information is freely shared, commented upon, and recombined.

This restriction on knowledge flow poses a significant hurdle for developing countries, particularly in crucial areas like health and education. It limits their access to the latest scientific breakthroughs and hampers their ability to build upon existing knowledge to address local challenges.

The OECD[205] highlights a potential solution in sectors like health and education, where services have a profound impact on well-being. The fundamental rights to health and education may provide the leverage needed to negotiate a balance between private appropriation and public access. This could involve exploring alternative models, such as compulsory licensing or open access initiatives, that ensure wider dissemination of knowledge while still incentivizing innovation.

The transition from a knowledge economy to a knowledge society is predicated on the development of vibrant knowledge-intensive communities, particularly within academic and technical fields. These communities, characterized by their capacity for knowledge creation, collaborative learning, and utilization of information technologies, have the potential to drive innovation and progress[206].

Universities, as hubs of research and education, are well-positioned to foster these communities. However, to fully embrace this role, they may need to adapt their traditional models, moving beyond individual scholarship and proprietary knowledge towards a more open and collaborative approach that prioritizes knowledge sharing and accessibility. By fostering such environments, universities can play a pivotal role in realizing the vision of a knowledge society, where individuals across diverse fields and backgrounds are connected by their shared pursuit of knowledge and innovation.

---

[205] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 33
[206] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 36

While the digital age offers immense potential for transforming education, progress in this sector has been comparatively slow. Mcgeveran and Fisher[207] attribute this sluggish pace of change to various factors, including lack of resources and resistance to new practices. However, they identify a crucial barrier: copyright law and its influence on the educational use of digital content.

The complex web of copyright provisions, coupled with the business and institutional structures that have grown around them, can significantly hinder the seamless integration of digital resources into educational settings. This can lead to restricted access to educational materials, limited opportunities for innovative teaching methods, and ultimately, a missed opportunity to harness the full potential of digital technologies to improve learning outcomes[208].

McGevaran and Fisher[209] argue that copyright law is the fundamental framework that shapes the educational landscape, particularly regarding the use of digital content. It establishes the monopolies that underpin economic interests in this area and significantly influences norms and institutional practices concerning the use of content. This legal regime, therefore, is the natural starting point for understanding the complexities and challenges of integrating digital resources into education.

Caso[210] argues that the current state of academic copyright is a complex result of the interaction between informal norms, formal copyright laws, technological advancements, and metrics used to measure scientific impact. He contends that this interplay has led to a distortion of academic copyright, where authorship rights have shifted from being the engine of public dialogue and knowledge advancement to becoming a mere cog in the

---

[207] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 7

[208] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 7

[209] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 42

[210] CASO, Roberto. The academic copyright in the age of commodification of scientific research. *Scientific Research and Information Technology*, v. 10, 2020. p. 29

machinery of citation metrics. This shift, he suggests, has negative consequences such as the flattening of thought, self-referentiality, and a rise in research integrity breaches[211].

Furthermore, Caso posits that economic rights in academic works are no longer primarily aimed at disseminating scientific publications, but instead serve as a means to consolidate power and control over information and data. This transformation, in his view, has turned the "republic of science" into an "empire" where information flow is dictated by a few powerful actors[212].

Copyright's influence is pervasive, shaping how educators access, share, and utilize digital materials in their teaching. It determines what content is freely available, what requires licensing or permission, and how much educational institutions must invest to provide access to copyrighted works. By understanding the intricacies of copyright law, we can better assess its impact on educational practices and explore potential avenues for reform to ensure that copyright serves the needs of both creators and learners in the digital age.

The expansion of intellectual property rights, while intended to foster innovation, has sparked debate about its overall impact. The OECD[213] highlights that even systems designed with safeguards like limitations and exceptions can become imbalanced, potentially hindering access to knowledge.

Originally, the system was seen as a positive force for innovation and growth, as long as its negative effects were mitigated through clear rules and limitations. These included requirements for detailed descriptions of protected works, exclusions for certain areas like research and education, and strict criteria for originality.

However, the OECD[214] argues that this system has become less effective due to several factors. The sheer volume of works and inventions seeking protection has increased dramatically, and protections have expanded into areas that were previously exempt.

---

[211] CASO, Roberto. The academic copyright in the age of commodification of scientific research. *Scientific Research and Information Technology*, v. 10, 2020. p. 30-31
[212] CASO, Roberto. The academic copyright in the age of commodification of scientific research. *Scientific Research and Information Technology*, v. 10, 2020. p. 30-31
[213] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 84
[214] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 84

This loosening of constraints, according to the OECD[215], has transformed the IP system from a protector of innovation into a potential barrier, raising concerns about its impact on vital sectors like education. Additionally, traditional safeguards like fair use and educational exceptions may be eroding and creating challenges of maintaining free access to knowledge for educational purposes in an increasingly complex IP landscape.

The erosion of traditional safeguards within the IP system is evident in the judicial interpretation of exemptions intended for research and educational purposes. The Madey v. Duke University case[216] as a stark example of this erosion. In this case, a university's claim to exemption for research and educational use of patented laser technology was rejected. The court ruled that such activities fell under the university's "core business," rendering the exemption inapplicable.

This ruling, as the OECD[217] notes, exposed the fragility of the legal basis for free access to patented knowledge and materials in educational settings. It underscored that the business objectives of educational institutions, even non-profit ones, can be intertwined with their educational purposes, thus potentially negating the exemption. The Madey case serves as a cautionary tale, revealing the vulnerability of educational institutions to liability under evolving interpretations of IP law. It also serves as a stark reminder of the challenges faced by educational institutions in navigating the complex landscape of IP rights while fulfilling their core mission of knowledge dissemination and advancement.

In United States, there are two other cases on the subject. The Cambridge University Press *et al.* v. Patton *et al.* (the "Georgia State" case)[218] involved a dispute over the use of copyrighted materials in electronic course reserves at Georgia State University. The 11th Circuit Court of Appeals ultimately ruled that the university's use of copyrighted material was fair use in many instances, but also set out a more rigorous framework for determining fair use in the educational context.

---

[215] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 85
[216] UNITED STATES OF AMERICA. *Madey v. Duke University*, 307 F.3d 1351 (Fed. Cir. 2002). Available at: https://cyber.harvard.edu/people/tfisher/2002Madeyedit.html.
[217] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 86
[218] UNITED STATES OF AMERICA. *Cambridge Univ. Press v. Patton, 769 F.3d 1232 (11th Cir. 2014)*. Available at: https://casetext.com/case/cambridge-univ-press-oxford-univ-press-inc-v-patton

Shaver[219] suggests that the tension between copyright holders and educational institutions is further illustrated by the financial burden of licensing fees for copyrighted materials. Publishers have historically avoided legal challenges over fair use in educational photocopying, opting instead to collect licensing fees that collectively generate substantial revenue. However, the rise of digital course packs has disrupted this model, when some universities opted to stop paying licensing fees, leading to legal battles like the Cambridge University Press v. Patton case. This landmark case, funded by publishing industry associations, sought to clarify the boundaries of fair use in the digital age and demonstrates the high stakes involved in copyright disputes within the educational context and the potential financial burden on institutions forced to defend fair use claims. It also underscores the need for clear guidance on fair use in the digital realm to avoid costly litigation and ensure that copyright law does not become a barrier to educational access.

While the Georgia State case represents a victory for fair use in educational settings, it also introduced a stricter framework for determining its application, potentially creating new challenges for institutions seeking to utilize copyrighted materials. Another relevant case, the Authors Guild v. Google, Inc.[220] dealt with Google's project to digitize millions of books and make snippets of them available online. The Second Circuit Court of Appeals ruled in favor of Google, finding that its project constituted fair use due to its transformative nature and the significant public benefit it provided.

In Europe, there is the Infopaq International A/S v. Danske Dagblades Forening case[221] set a significant precedent regarding copyright protection in the digital age. The European Court of Justice ruled that even the reproduction of short extracts of a copyrighted work, such as an 11-word excerpt from a newspaper article, could constitute copyright infringement if those elements reproduced express the author's intellectual creation. This decision effectively raised the bar for fair dealing in the European Union, requiring greater caution and potentially more restrictive interpretations of exceptions to copyright protection

---

[219] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 121/122

[220] UNITED STATES OF AMERICA. *Authors Guild v. Google, Inc., 804 F.3d 202 (2d Cir. 2015)*. Available at: https://casetext.com/case/guild-v-google-inc-1

[221] EUROPEAN UNION. *Infopaq International A/S v. Danske Dagblades Forening, Case C-5/08, ECLI:EU:C:2009:465.* Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62008CJ0005

when dealing with digital content. It underscored the importance of obtaining authorization even for seemingly minor uses of copyrighted material in the online environment..

In Brazil, the Brazilian Federal Supreme Court (STF) in Associação Nacional dos Editores de Livros (Anel) v. Presidente da República (ADI 4815)[222] addressed the tension between freedom of expression and the right to privacy in the context of unauthorized biographies. The court declared that prior consent from the subject of a biography is not required for publication, emphasizing the importance of safeguarding freedom of expression and access to information. This ruling aligns with the broader principle of promoting a robust public domain of knowledge, where information can flow freely without undue restrictions. It also highlights the STF's commitment to balancing competing rights, ensuring that copyright protection does not unduly impede the public's right to access and engage with cultural and historical works.

The Supreme Court's decision in case Democratas v. Governador do Estado do Rio Grande do Sul (ADI 3059)[223], which challenged the State of Rio Grande do Sul's law mandating the preference of the use of free software in public administration, highlighted the tension between intellectual property rights and the broader public interest. The petitioner argued that the law violated principles such as competition and efficiency. However, as Feres[224] points out, the adoption of free software can align with constitutional principles by promoting transparency, reducing costs, and fostering technological sovereignty. By granting users the freedom to study, modify, and distribute software, free software can empower governments to break free from vendor lock-in, enhance data security, and stimulate local innovation.

---

[222] BRAZIL. Brazilian Federal Supreme Court. *Ação Direta de Inconstitucionalidade (ADI) 4815*. Associação Nacional dos Editores de Livros (Anel) v. Presidente da República, Relator: Min. Cármen Lúcia, Tribunal Pleno, julgado em 10/06/2015, DJe-018, divulgado em 29/01/2016, publicado em 01/02/2016. Available at: https://jurisprudencia.stf.jus.br/pages/search/sjur336558/false

[223] BRAZIL. Brazilian Federal Supreme Court. *Ação Direta de Inconstitucionalidade (ADI) 3059*. Democratas v. Governador do Estado do Rio Grande do Sul, Relator: Min. Ayres Britto; Redator do Acórdão: Min. Luiz Fux, julgado em 09/04/2015. Available at: https://redir.stf.jus.br/paginadorpub/paginador.jsp?docTP=TP&docID=8398297

[224] FÉRES, Marcelo Andrade. A adoção de Softwares Livres pelas diversas esferas da Administração Pública: alguns aspectos jurídicos de um ambiente de disputas econômicas. *REVISTA DA AGU, [S. l.], v. 5, n. 10*, 2006. DOI: 10.25109/2525-328X.v.5.n.10.2006.433. Available at: https://revistaagu.agu.gov.br/index.php/AGU/article/view/433.

Also, in the case Espaço Cultural Lupicínio Rodrigues e Outro(a) v. Alpargatas S.A. e Outro(a) (ARE 1244416)[225], the Brazilian Federal Supreme Court addressed the issue of copyright infringement, now in the context of a cultural center's unauthorized reproduction of copyrighted musical works. The court ruled in favor of the cultural center, determining that their actions fell under the fair use exception for educational and cultural purposes.

This decision underscores the STF's recognition of the importance of balancing copyright protection with the public's right to access and participate in cultural activities. The court emphasized that the cultural center's use of the copyrighted works did not harm the economic interests of the copyright holders, and that such use was in line with the broader societal goal of promoting cultural dissemination and access to knowledge.

The decision also highlights the STF's willingness to consider the specific context and purpose of the use when determining fair use. In this case, the court acknowledged the cultural center's non-profit nature and its role in promoting cultural activities, which weighed in favor of allowing the use of copyrighted works without authorization.

> "It's also worth mentioning that intellectual property rights serve to protect the authors of works, but also to foster access to culture, so that the rights of authors and the public in general must be weighed, and it is not possible to grant such protection to a work that distorts its own purpose as a published expression. It is no wonder that law, doctrine, and jurisprudence have adopted the theory of fair use, which, in short, means that small uses of protected works, as long as they do not cause harm to the author or distort the work itself, do not constitute sanctionable violations." (translation by the author)[226].

The jurisprudence surrounding copyright and education reveals a complex and evolving landscape. The cases highlight the potential erosion of traditional safeguards for educational use and/or underscore the importance of balancing copyright protection with the public's right to access and utilize knowledge for educational and cultural purposes. These cases collectively emphasize the need for a nuanced and flexible approach to copyright law, one

---

[225] BRAZIL. Brazilian Federal Supreme Court. *Recurso Extraordinário com Agravo (ARE) 1244416*. Espaço Cultural Lupicínio Rodrigues e Outro(a) v. Alpargatas S.A. e Outro(a), Relator: Min. Presidente, Decisão Monocrática Min. Dias Toffoli, julgado em 03/04/2020, DJe-088, divulgado em 13/04/2020, publicado em 14/04/2020. Available at: https://jurisprudencia.stf.jus.br/pages/search/despacho1304923/false

[226] BRAZIL. Brazilian Federal Supreme Court. *Recurso Extraordinário com Agravo (ARE) 1244416*. Espaço Cultural Lupicínio Rodrigues e Outro(a) v. Alpargatas S.A. e Outro(a), Relator: Min. Presidente, Decisão Monocrática Min. Dias Toffoli, julgado em 03/04/2020, DJe-088, divulgado em 13/04/2020, publicado em 14/04/2020. Available at: https://jurisprudencia.stf.jus.br/pages/search/despacho1304923/false

that considers the specific context and purpose of the use while also recognizing the societal value of knowledge dissemination. As technology continues to evolve and new forms of educational resources emerge, ongoing dialogue and legal interpretation will be crucial to ensure that copyright law serves as a tool for both incentivizing creativity and promoting access to knowledge.

For example, the Article 150, VI, d, of the Brazilian Federal Constitution (CF/88)[227] establishes a tax immunity for books, newspapers, periodicals, and the paper used in their production. This provision aims to safeguard freedom of expression and access to information by exempting these cultural goods from taxation. It plays a crucial role in promoting access to knowledge and information in Brazil. By exempting books and other cultural goods from taxation, it ensures that these resources remain affordable and accessible to a wider audience, thereby fostering education, cultural development, and democratic participation.

The impact of international trade agreements on access to knowledge, particularly in the educational sector, cannot be overlooked. The TRIPS Agreement, a cornerstone of the World Trade Organization, mandates minimum standards for intellectual property protection across member countries, including copyright and patent regulations[228]. While intended to foster innovation, this agreement has raised concerns about potential barriers to accessing essential resources like textbooks, journals, and other educational materials, especially in developing countries.

Although TRIPS allows for some unauthorized copying under the "fair use" doctrine, experts have argued that these exceptions are too narrow, limiting the flexibility of countries to tailor IP protection to their specific educational needs[229]. This is particularly concerning in the context of the internet, a powerful tool for expanding educational access, where encryption technologies can potentially override fair use principles.

---

[227] BRAZIL. *Constituição da República Federativa do Brasil de 5 de Outubro de 1988*. Brasília, 1988. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm.
[228] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 83/84
[229] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 83/84

The increasing dominance of digital technologies in education further complicates the issue. The internet offers unprecedented opportunities for disseminating educational content, but the application of traditional copyright laws to digital materials can create barriers to access and hinder the potential of online learning platforms.

Despite the clear benefits of utilizing digital content for educational purposes, universities and colleges often exhibit a reluctance to fully embrace these resources due to apprehensions surrounding potential intellectual property disputes. McGevaran and Fisher[230] reveal that university counsels' offices, in particular, tend to adopt an overly cautious approach to avoid any legal entanglements regarding copyright infringement. This hesitancy can lead to missed opportunities for innovation in teaching and learning, as institutions shy away from fully leveraging the wealth of information available online. The fear of litigation and potential financial liability can overshadow the educational benefits of using copyrighted materials, even when such use falls within the bounds of fair use or other exceptions.

The principle of exhaustion, which dictates when an intellectual property right holder's control over a product is considered exhausted after its initial sale, is a contentious issue with differing approaches across countries. Developed nations often favor territorial exhaustion, allowing them to maintain control over subsequent distribution and pricing even after the first sale. This approach enables them to adapt product prices to different market conditions, potentially maximizing profits and recouping research and development costs[231].

However, this preference for territorial exhaustion can lead to significant disparities in access to knowledge and information across different regions. The ability to block parallel imports and segment markets can result in higher prices in some countries, limiting access for consumers and hindering the dissemination of knowledge-based goods and services. This raises questions about the balance between the rights of intellectual property holders

---

[230] MONCAYO VON HASE, Andrés. The Flexibility of TRIPS and Its Possible Erosion in Bilateral, Multilateral, and Regional Negotiations. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 79

[231] MONCAYO VON HASE, Andrés. The Flexibility of TRIPS and Its Possible Erosion in Bilateral, Multilateral, and Regional Negotiations. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 80/81

and the broader public interest in ensuring equitable access to knowledge and information[232].

The debate over parallel imports and territorial exhaustion highlights the complex interplay between intellectual property rights, market dynamics, and social welfare. While territorial exhaustion may benefit rights holders in the short term, it can also create barriers to access and exacerbate existing inequalities. Finding a balanced approach that encourages innovation while ensuring widespread access to knowledge remains a critical challenge in the global IP landscape.

The emergence of modern technologies for reproduction and dissemination of information has further complicated the balance between private protection of intellectual property and public access to knowledge. Reichman and Okediji[233] highlight that even traditional exceptions to copyright, such as the private use exception, have been strained by technological advancements.

The ability to easily reproduce and share copyrighted works digitally has challenged the very concept of private use. This has prompted regulatory action in many countries, with lawmakers seeking to redefine the boundaries of permissible use in the digital age. The risk of the private use exception "*swallowing the exclusive reproduction right*" has led to stricter interpretations and limitations on this exception, further highlighting the tension between private protection and public access in the digital era[234].

The digital revolution has profoundly transformed the educational landscape, offering unprecedented opportunities for accessing and utilizing knowledge. As McGevaran and Fisher[235] note, digital technology has revolutionized how educational content is found,

---

[232] MONCAYO VON HASE, Andrés. The Flexibility of TRIPS and Its Possible Erosion in Bilateral, Multilateral, and Regional Negotiations. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 80/81

[233] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1383

[234] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1383

[235] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 9

accessed, manipulated, remixed, and disseminated—all essential steps in the dynamic process of "digital learning."

The digital market has revolutionized access to information, enabling users to effortlessly find, copy, and share a vast array of copyrighted works, from books and music to software and films. However, this ease of access has also presented significant challenges for copyright holders, with issues like piracy, unfair use, and unauthorized exploitation of knowledge becoming increasingly prevalent[236].

These challenges have prompted a wave of legislative and policy changes aimed at adapting copyright law to the digital age. The balance between protecting the rights of creators and ensuring public access to knowledge has become increasingly complex in the digital environment, necessitating ongoing dialogue and adaptation to find solutions that address both copyright protection and the evolving needs of users.

The rapid advancement of internet technologies and the proliferation of sharing platforms have profoundly disrupted traditional copyright regulation. Bosher and Yeşiloğlu[237] highlight the inherent tension between copyright law, designed for a pre-digital era, and the realities of the digital age. The internet's capacity for limitless dissemination and the rise of social networks have fundamentally altered how copyrighted material is used and valued.

Online sharing has become an integral part of modern culture, fueled by technological advancements and the interconnectedness of online communities. However, this ease of sharing has also led to widespread unauthorized distribution of copyrighted content. Despite this, research indicates that many users are unaware of the legal implications of their online activities, blurring the lines between legitimate sharing and copyright infringement[238].

In response to the rising tide of copyright infringement on the internet, developed countries, as primary producers of knowledge and technology, sought to strengthen copyright

---

[236] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 8

[237] BOSHER, Hayleigh; YEŞILOĞLU, Sevil. An analysis of the fundamental tensions between copyright and social media: the legal implications of sharing images on Instagram. *International Review of Law, Computers & Technology*, v. 33, n. 2, p. 164-186, 2019. p. 5

[238] BOSHER, Hayleigh; YEŞILOĞLU, Sevil. An analysis of the fundamental tensions between copyright and social media: the legal implications of sharing images on Instagram. *International Review of Law, Computers & Technology*, v. 33, n. 2, p. 164-186, 2019. p. 5

protection through international agreements like the WIPO Internet Treaties[239]. These treaties introduced tools like digital rights management (DRM) and technological protection measures (TPM), aimed at providing copyright holders with greater control over their works in the digital environment[240].

However, these protective measures have raised concerns about their potential to impede access to knowledge. By restricting the ability to copy and share copyrighted works, they could inadvertently limit the flow of information and hinder the public's ability to benefit from digital resources. This has sparked a debate between those who prioritize the protection of copyright holders' rights and those who advocate for the preservation of a "knowledge commons" and the free exchange of information as essential for human development and the upholding of human rights[241].

The implementation of the WIPO Internet Treaties, particularly in the United States through the Digital Millennium Copyright Act (DMCA)[242], has sparked concerns regarding the limitations and exceptions (L&Es) to copyright in the digital market. Vathitphund[243] argues that the DMCA's restrictions on circumventing TPMs are excessively narrow. While member countries have the flexibility to interpret L&Es within the framework of the treaties, the U.S. interpretation has arguably exceeded these boundaries.

This overprotection of copyright in the digital realm, enabled by TPMs, can threaten democratic traditions and social justice principles by unduly restricting public access to information and knowledge. Vathitphund[244] notes that despite the DMCA's assertion that

---

[239] WCT WIPO Copyright Treaty. December 19, 1996. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12740.
WPPT WIPO Performances and Phonograms Treaty. December 19, 1996. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12743

[240] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 8

[241] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 8

[242] UNITED STATES OF AMERICA. Digital Millennium Copyright Act of 1998. Available at: https://www.copyright.gov/legislation/dmca.pdf.

[243] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 12

[244] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 12

TPMs do not affect fair use rights, court interpretations have at times treated these provisions separately, potentially rendering fair use inapplicable in certain circumstances. This disconnect between the law's stated intent and its practical application raises significant concerns for access to knowledge in the digital age.

The fair use doctrine, a cornerstone of copyright law that allows for limited use of copyrighted material without permission from the rights holder, has become a contentious issue in the context of digital learning. Despite its potential to facilitate educational uses of copyrighted content, McGevaran and Fisher[245] report a widespread pessimism among educators, lawyers, librarians, and administrators regarding the doctrine's scope in protecting digital learning activities.

The lack of clear judicial guidance on fair use in educational settings, particularly concerning digital materials, has created uncertainty and anxiety among educational institutions. This has led to a cautious approach, with many institutions hesitant to utilize copyrighted content even when it might fall under fair use provisions. This hesitancy can stifle innovation in teaching and learning, as educators avoid incorporating valuable digital resources due to the fear of potential legal repercussions[246].

While some scholars and librarians believe that there is a growing willingness to rely on broader interpretations of fair use, the lack of clear legal precedent remains a significant barrier. The uncertainty surrounding fair use in the digital age highlights the need for updated guidance and legal frameworks that better align with the realities of modern education and technology.

The digital age has opened up unprecedented possibilities for scientific research, with the potential for search engines, data mining, and automated knowledge discovery tools to revolutionize how scientists access and analyze information[247]. However, to fully realize this potential, researchers require unrestricted access to a vast array of journals and

---

[245] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 53

[246] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 53

[247] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1368

databases, as well as the freedom to extract, use, and reuse the published research results contained within them.

This vision of unfettered access aligns with the collaborative ethos of the scientific community and is increasingly feasible due to advancements in digital technologies and telecommunications networks. Ideally, researchers worldwide should be able to access and analyze digital collections of scientific information and data, subject only to established norms of attribution and citation. However, copyright restrictions and the business models of academic publishers often create significant barriers to this ideal scenario, limiting the free flow of information and potentially hindering scientific progress.

A fundamental contradiction exists within the current system of knowledge dissemination, particularly concerning scientific research. As Reichman and Okediji[248] point out, authors and compilers of scientific works and databases often find themselves in the paradoxical situation of having to purchase access to the very information and data they produced, often with government funding.

This situation arises due to the dominant business models of academic publishers, which rely on copyright and database protection laws to monetize access to scientific knowledge. Instead of embracing the potential of digital technologies to democratize access, these laws are often used to reinforce traditional publishing models that restrict access and hinder the free flow of information[249].

This contradiction has profound implications for researchers, particularly those in developing countries with limited resources. It also raises broader questions about the social contract of scientific research, where publicly funded research is often locked behind paywalls, limiting its potential impact and societal benefit. The need for alternative models that prioritize open access and equitable knowledge sharing has become increasingly urgent in the digital age.

---

[248] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1476

[249] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1476

3.7. Trade Agreement and Licensing

The proliferation of bilateral and regional free trade agreements has significantly impacted intellectual property rights, particularly in developing countries. Von Hase[250] notes that these agreements, often negotiated with developed countries like the United States and the European Union, frequently impose stricter IP standards than those mandated by TRIPS. This has led to a reduction in the flexibility that developing countries previously had in tailoring IP protection to their specific needs and development levels.

The growing web of international trade agreements, each with its own set of IP provisions, has created a complex and sometimes contradictory landscape for developing countries to navigate[251]. This complexity necessitates a careful balancing act between adhering to international obligations and safeguarding national interests, particularly in areas like public health, education, and access to knowledge.

As Díaz[252] points out, free trade agreements are inherently incomplete contracts, leaving gaps and ambiguities that must be filled by national laws, regulations, and jurisprudence. This can lead to varying interpretations and implementations of IP standards, with potential consequences for access to knowledge and essential goods like pharmaceuticals.

The impact of FTAs on developing countries can be either beneficial or detrimental, depending on how they are implemented and the strength of complementary public policies. Strict adherence to FTAs, coupled with weak public policies in areas like innovation, health, and competition, can lead to overprotection of IPRs, hindering access to knowledge, limiting local innovation, and exacerbating existing inequalities[253].

---

[250] MONCAYO VON HASE, Andrés. The Flexibility of TRIPS and Its Possible Erosion in Bilateral, Multilateral, and Regional Negotiations. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 81

[251] MONCAYO VON HASE, Andrés. The Flexibility of TRIPS and Its Possible Erosion in Bilateral, Multilateral, and Regional Negotiations. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 81

[252] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 119

[253] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 119

Conversely, a flexible implementation of FTAs, combined with robust public policies, can create a more balanced approach that promotes innovation while ensuring broader access to knowledge and essential goods[254]. This highlights the importance of a nuanced understanding of the interplay between trade agreements, IP rights, and public policy in shaping a country's development trajectory.

Vathitphund[255] adds another layer to this complexity by highlighting the impact of FTAs on copyright protection and access to knowledge in developing countries. The stricter IP standards often found in these agreements can lead to increased prices for copyrighted educational and entertainment materials, further limiting access for those who already face significant barriers.

While international treaties technically allow developing countries some flexibility in determining their domestic IP protection levels, the reality is often more complex. Vathitphund[256] observes that many developing countries adopt a "wait and see" approach, hesitant to expand IP protection beyond international minimums. However, the rising tide of copyright infringement, coupled with pressure from bilateral agreements, often makes expanded IP protection seem inevitable.

This pressure can be particularly detrimental to access to knowledge in developing countries. Traditionally, access to educational and entertainment materials has been limited due to various factors, including economic constraints and infrastructure limitations. The strengthening of IP protection through trade agreements can exacerbate these issues, as it often leads to higher prices for copyrighted materials[257].

---

[254] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 119

[255] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 12/13

[256] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 12/13

[257] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 12/13

Vathitphund[258] highlights the irony of this situation. Under previous, less stringent IP regimes, many users in developing countries could have relied on fair use provisions to access books and other materials for educational purposes. However, the stricter standards imposed by bilateral agreements may now exclude these same users, further limiting their access to knowledge and hindering educational and cultural development.

The impact of trade agreements on intellectual property protection is not limited to the constraints they impose on domestic laws. These agreements also play a significant role in shaping the licensing landscape, particularly in the context of knowledge transfer and access to technology.

Licensing, as a contract model for knowledge transfer, plays a crucial role in fostering innovation and economic development. The OECD[259] emphasizes that knowledge flows, enabled by licensing agreements, allow for broader and more diverse applications of existing knowledge and competencies. This facilitates specialization, enabling companies to focus on their core strengths while accessing external innovations through licensing.

The development of open innovation initiatives and robust markets for intellectual property further enhances the contribution of IP to innovation. By encouraging actors to seek inventions externally, these markets create incentives for IP protection and provide opportunities for inventors to derive value from their creations. Licensing agreements, in particular, are crucial for businesses to access external technologies, stimulating learning and bolstering their innovation capabilities[260].

Universities and public research institutions (PRIs) also play a pivotal role in this ecosystem. While their direct contributions to innovation have traditionally been modest, they hold significant potential, especially in emerging and developing countries where

---

[258] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 12/13

[259] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 56

[260] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 55

research capacities are often concentrated in these institutions. University spin-offs and licensing agreements can contribute to the growth of an innovative business sector[261].

In emerging and developing economies, where the private sector is often less developed, universities and PRIs take on a heightened significance in the innovation ecosystem. These institutions often house a concentration of research capabilities, making them potential catalysts for innovation[262].

The potential benefits of leveraging university research for innovation are particularly appealing in these contexts. University spin-offs, for example, can contribute to the creation of a nascent innovative business sector. However, this potential should be balanced against the broader role that universities and PRIs play in these countries[263].

Their contributions extend beyond direct innovation, encompassing crucial functions like providing extension services to industry and ensuring the wide dissemination of knowledge. These functions are particularly important in environments with weak business framework conditions. If the pursuit of novelty through IP protection hinders the immediate sharing of research findings, it could compromise these vital contributions and ultimately impede broader societal development[264].

In conclusion, the complex interplay between trade agreements and intellectual property rights, particularly in the context of licensing, presents both challenges and opportunities for developing countries. While trade agreements can incentivize cross-border collaboration and technology transfer, they can also inadvertently restrict access to knowledge and exacerbate existing inequalities. A nuanced understanding of these dynamics, coupled with strategic policymaking and robust public investments in education and research, is crucial for developing countries to navigate the complexities of the global knowledge economy and

---

[261] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 67

[262] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 67

[263] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 67

[264] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 67

leverage intellectual property for their own development goals. The balance between incentivizing innovation and ensuring equitable access to knowledge remains a critical challenge, and it is essential to consider the unique needs and circumstances of developing countries when formulating and implementing intellectual property policies within the framework of trade agreements.

3.8. Social Cost and the Public Policies

The relationship between technological capability and competitiveness in the global market is a key determinant of a country's development potential. As Martínez-Piva[265] points out, wealthier nations tend to invest more in knowledge and technology, leading to a virtuous cycle of technological progress and increased competitiveness. This investment in knowledge generation not only drives innovation but also fuels the development of more intricate and technologically intensive production systems, further solidifying their competitive advantage.

Parallel to this process of accumulating technological capabilities, these nations often advocate for stronger intellectual property laws on the international stage. These laws, while intended to protect and incentivize innovation, can also serve to consolidate the wealth of developed nations by limiting competition and regulating the income generated from innovation.

This dynamic raise critical questions about the social cost of IP protection, particularly for developing countries with limited resources and technological capabilities. The strengthening of IP laws may disproportionately benefit developed nations, potentially widening the gap between the haves and have-nots in the global knowledge economy. This necessitates a careful examination of the social costs associated with IP protection and the implementation of public policies that promote equitable access to knowledge and technology for all.

---

[265] MARTÍNEZ-PIVA, Jorge Mario. *Knowledge Generation and Protection*. New York: Springer, 2009. p. xv

The social cost of intellectual property protection, particularly in the realm of copyright, becomes evident when examining its impact on scientific progress. Reichman and Okediji[266] emphasize that scientific discoveries are inherently reliant on a robust public domain, where previous findings serve as the foundation for future research and innovation. However, the trend towards heightened IP protection has often prioritized the safeguarding of existing knowledge goods for end users, neglecting the potential social costs and burdens imposed on future creation and innovation.

This emphasis on protection over access has resulted in a proliferation of IP rights, leading to issues such as "thickets" of overlapping rights, increased transaction and litigation costs, and a shrinking public domain. This not only hinders the free flow of information essential for scientific advancement but also creates an "anticommons" effect, where excessive fragmentation of rights can impede the development of new knowledge and technologies. The use of technological protection measures and digital rights management tools further restricts access in the online environment, exacerbating the challenges faced by researchers and innovators[267].

This focus on protecting existing knowledge assets, while potentially beneficial for copyright holders in the short term, can ultimately stifle the very innovation that IP law is intended to promote. By limiting access to the building blocks of future discoveries, overly restrictive IP regimes can create a long-term social cost that outweighs the short-term benefits of increased protection.

The prevailing discourse surrounding intellectual property often prioritizes exclusion and control, rather than maximizing the potential value that knowledge can bring through wider access. As Rizk *et al.*[268] argue, the monopolies granted by intellectual property rights, while providing incentives for innovation, are not the only or necessarily the most effective means of encouraging knowledge creation.

---

[266] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1475/1476

[267] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1475/1476

[268] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 3

These monopolies inherently impose a social cost, as knowledge goods are priced higher than they would be in a competitive market. While this may benefit IP rights holders in the short term, it also limits the broader utilization of knowledge within the economy. This trade-off between IP protection and social welfare manifests as concrete choices between competing values, such as health, education, equality, and freedom of expression[269].

In essence, the pursuit of innovation through strong IP protection must be weighed against the potential negative impacts on access to knowledge and other societal goals. Striking a balance between these competing interests requires a nuanced understanding of the economic and social implications of IP policies, and a willingness to explore alternative models that prioritize both innovation and equitable access.

Given the multifaceted social costs inherent in current IP regimes, the development and implementation of effective public policies become paramount. The challenge lies in crafting policies that not only incentivize innovation and reward creators but also ensure equitable access to knowledge and address the diverse needs of different stakeholders. This necessitates a shift from a solely protectionist approach to one that fosters a more balanced and inclusive knowledge ecosystem.

The significant gap between developed and developing countries in knowledge creation, dissemination, and utilization necessitates targeted public policies to bridge this divide. Martínez-Piva[270] advocates for viewing innovation promotion policies as an integral part of broader development strategies. Just as development aims to improve living standards, public policies should strive to enhance a country's capacity for knowledge creation and utilization, effectively narrowing the gap with more developed nations. This "catching up" strategy recognizes the importance of innovation in achieving economic growth and social progress.

---

[269] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 3

[270] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 36

To address the challenges and disparities in knowledge creation and access, public policies play a crucial role in shaping the innovation landscape. Martínez-Piva[271] outlines two broad categories of policies aimed at modifying market incentives: fiscal and financial measures.

Fiscal measures encompass direct government intervention to stimulate innovation through mechanisms like public funding for research projects, partnerships between public and private sectors, and the strategic use of public procurement to encourage the development and adoption of new technologies[272].

Financial measures, on the other hand, focus on providing credit and risk capital to support innovation activities. These policies aim to alleviate financial constraints faced by researchers and entrepreneurs, particularly in developing countries where access to capital may be limited[273].

The success of innovation policies hinges on effective communication and collaboration between diverse stakeholders, including university researchers, community-based practitioners, and policymakers. However, as Marshall and Guenette[274] highlight, these groups often operate in distinct camps, with competing priorities, assumptions, and divergent norms. This can lead to significant communication gaps and hinder the translation of research into actionable policies and practices.

While numerous strategies have been proposed to improve communication among these groups, the underlying contextual and cultural issues that contribute to these gaps are often overlooked[275]. Recognizing and addressing these deeper issues is crucial for fostering a more collaborative and inclusive approach to knowledge creation and utilization. This

---

[271] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 37

[272] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 37

[273] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 37

[274] MARSHALL, E. Anne; GUENETTE, F. Cross-cultural journeys: Transferring and exchanging knowledge among researchers and community partners. *Knowledge translation in context: Indigenous, policy, and community settings*, 2011. p. 35

[275] MARSHALL, E. Anne; GUENETTE, F. Cross-cultural journeys: Transferring and exchanging knowledge among researchers and community partners. *Knowledge translation in context: Indigenous, policy, and community settings*, 2011. p. 35

involves creating spaces for dialogue and understanding, where diverse perspectives are valued and incorporated into the policymaking process. By bridging the gaps between different stakeholders, public policies can be more effectively designed and implemented to promote innovation, address societal needs, and ensure equitable access to knowledge.

The optimization of national intellectual property systems for innovation and development is a complex endeavor, requiring a nuanced understanding of the interplay between legal, economic, and social factors. According to the OECD[276], a well-functioning IP system must navigate a multitude of constraints and objectives, balancing the needs of various stakeholders while fostering an environment conducive to innovation.

To maximize the contributions of an IP system, policymakers must consider the specific challenges faced by innovators, particularly in developing countries. These challenges often extend beyond legal and procedural aspects, encompassing broader economic and institutional factors that can either hinder or facilitate innovation[277].

Therefore, effective IP policies need to address not only the legal framework of IP rights but also the broader innovation ecosystem, including institutions, regulations, and complementary policies that support research and development, technology transfer, and commercialization of innovations. A holistic approach that considers the diverse needs of different users and sectors, as well as the specific market conditions in developing countries, is crucial for harnessing the potential of IP to drive innovation and promote economic development[278].

The recognition that intellectual property systems can have unintended negative consequences has sparked extensive policy discussions on how to regulate and mitigate these excesses[279]. The potential for IP protection to shift activities from the public to the

---

[276] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 18

[277] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 18

[278] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014. p. 18

[279] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 90

private sector, leading to increased commercialization and potential restrictions on access, underscores the need for carefully crafted policies. These policies must strike a balance between incentivizing innovation and ensuring that knowledge remains broadly accessible for societal benefit. A nuanced and adaptable approach is crucial to avoid over-privatization and foster a thriving knowledge ecosystem that serves both private interests and the public good.

To address the social costs and challenges associated with intellectual property, public action is essential to create a more equitable and effective knowledge ecosystem. The OECD[280] identifies three key areas for public intervention: externalities, equity, and expertise.

Firstly, public intervention is warranted when market forces fail to adequately provide essential public goods in the knowledge economy. This includes subsidizing or directly providing exploratory science and research and development (R&D) that generates significant knowledge spillover effects. Ensuring open access to basic research and promoting the widespread dissemination of knowledge are crucial components of addressing externalities[281].

Secondly, public action is necessary to ensure the equitable and optimal use of knowledge for the benefit of both present and future generations. This requires addressing the needs of those who lack the financial resources to access essential knowledge goods, such as medicines or educational methods, as private markets often underfund projects that cater to marginalized or underserved communities. To promote equity, public policies should prioritize generating and disseminating knowledge that is relevant and accessible to all segments of society, regardless of socioeconomic status or geographic location. This ensures that the benefits of knowledge are shared broadly and contribute to a more inclusive and just society[282].

---

[280] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 90
[281] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 90
[282] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 91

Finally, public action should focus on nurturing independent communities of expertise in complex scientific, technological, and cultural fields. Relying solely on profit-driven private entities to support such communities can be problematic, as their interests may not align with the unbiased pursuit of knowledge. However, ensuring truly independent expertise while avoiding potential government interference presents its own challenges. Supporting the development of diverse and autonomous knowledge communities is crucial for a healthy and innovative society[283].

To address the challenges and imbalances inherent in current intellectual property regimes, a paradigm shift towards a more holistic approach is necessary. Rizk *et al.*[284] propose replacing the conventional wisdom on IP, innovation, and development with a new framework guided by the principle of "access to knowledge".

The A2K approach emphasizes a coordinated public policy response that extends beyond IP law to encompass trade, ICT promotion, education, health, and other relevant areas. The overarching goal is to maximize the potential for knowledge-based development by promoting the widespread sharing of knowledge and fostering an environment where it can flourish freely[285].

By adopting this approach, policymakers can move away from the restrictive and often monopolistic tendencies of traditional IP systems. Instead, they can prioritize policies, technologies, and business models that enable knowledge to be leveraged for the benefit of society as a whole, rather than being constrained or monopolized for the benefit of a few[286]. This shift towards A2K has the potential to unlock the full potential of knowledge as a driver of development, innovation, and social progress.

Ultimately, the social costs associated with intellectual property rights, particularly in terms of restricted access to knowledge, necessitate a comprehensive and nuanced approach to policymaking. By addressing externalities, promoting equity, and nurturing expertise,

---

[283] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 91
[284] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 1/2
[285] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 1/2
[286] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 1/2

governments can play a crucial role in shaping a more inclusive and balanced knowledge ecosystem. A more open approach offers a promising alternative to the traditional focus on IP protection, emphasizing the importance of collaboration, knowledge sharing, and public access for achieving sustainable development and fostering a more equitable society.

3.9. Open Initiatives and Brazilian Tecnobrega Case

The landscape of knowledge production and dissemination has been significantly impacted by the rise of open initiatives, which challenge traditional notions of intellectual property and copyright. One of the most influential open movements is the free software movement, which has evolved and expanded into the broader concept of "open source".

As Mizukami and Lemos[287] explain, the free software movement, spearheaded by Richard Stallman and the Free Software Foundation, gained momentum through a combination of activism and voluntary participation in free software projects. By the late 1990s, this movement had achieved international recognition and a substantial following. However, it also faced challenges, including misunderstandings about the meaning of "free" (as in freedom versus gratis) and perceptions that free software was primarily for technically savvy users.

To address these challenges, a spin-off group, the Open Source Initiative, emerged and sought to rebrand free software as "open source"[288]. This strategic move aimed to highlight the business advantages of open software and make it more appealing to a wider audience. The open source movement, with its emphasis on collaboration, transparency, and community-driven development, has since become a major force in the software industry and beyond.

The free software movement's principles and practices have extended beyond software, giving rise to the "free culture" movement, a loosely organized network advocating for

---

[287] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 15

[288] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 15

similar open and collaborative approaches in broader cultural production. Mizukami and Lemos[289] define free culture as a movement that critically examines the role of intellectual property law in incentivizing content creation and its impact on access to knowledge, education, freedom of speech, and cultural participation.

Both the free software and free culture movements share a normative desire for "freedom" in their respective domains and advocate for reforms in intellectual property law. They also actively seek to offer practical alternatives to the current system through innovative licensing strategies that leverage existing legal frameworks[290].

The concept of "open business" has emerged from this shift towards free culture. It focuses on identifying and analyzing business models that embrace more flexible approaches to intellectual property, particularly through the distribution of free or open content[291]. This represents a move away from the purely ideological and political discourse of free culture towards a more pragmatic approach.

This shift from proprietary models to free culture[292] and open business represents a significant paradigm shift in the way we think about knowledge production and dissemination. It challenges traditional notions of ownership and control, emphasizing the potential of collaboration, sharing, and openness to drive innovation and creativity.

---

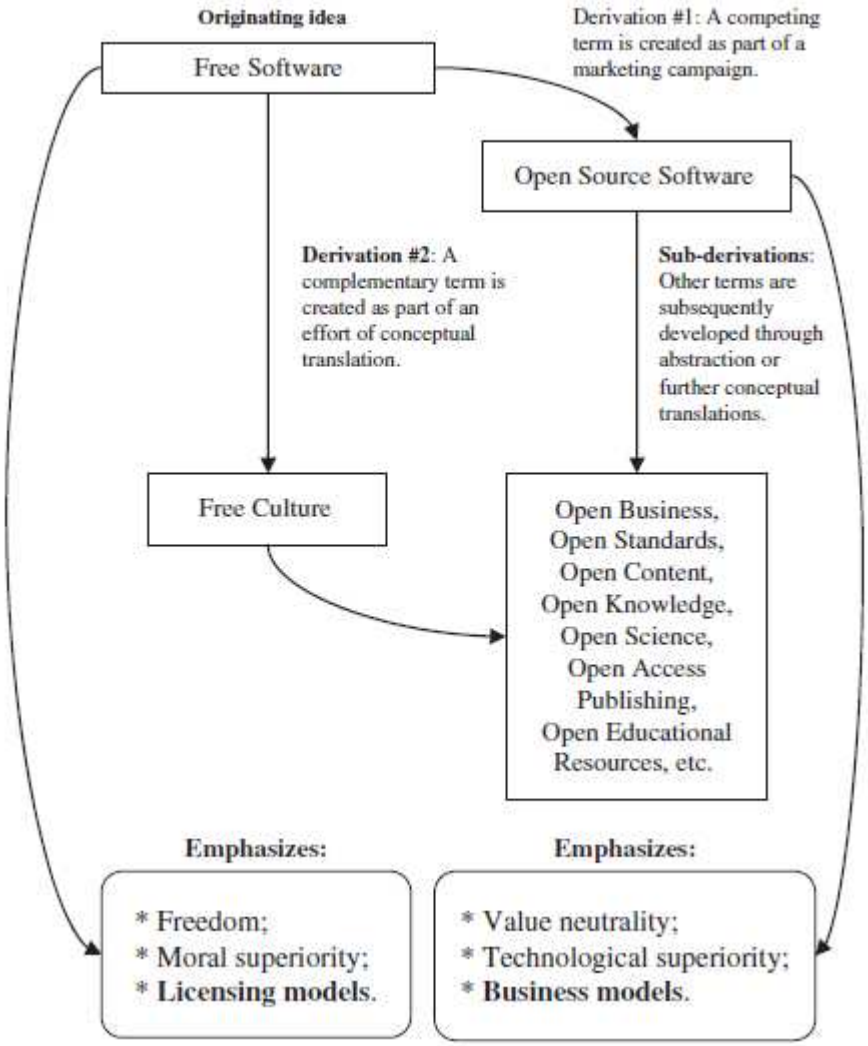
[289] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 17/18

[290] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 17/18

[291] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 17/18

[292] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 18

Figure 2.1 : An historical-generative map of key terms and ideas



Source: Mizukami and Lemos[293]

This image provides a visual representation of the historical progression and conceptual relationships among key terms and ideas in the open initiatives movement. Originating from the "Free Software" concept, the movement branched into "Open Source Software" through a marketing-driven effort to reframe the concept for broader appeal. Simultaneously, the concept of "Free Culture" emerged as a parallel initiative, applying similar principles to a wider range of cultural production.

Notably, the concept of "Free Culture" gave rise to several sub-derivations. "Open Business" focuses on exploring business models based on open content, while "Open Standards"

---

[293] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 19

emphasizes the importance of standardized protocols and formats for interoperability. "Open Content" refers to the creation and sharing of content under open licenses, allowing for reuse and modification. "Open Knowledge" serves as a foundational concept for the movement, advocating for unrestricted access and use of information. This concept further expands into "Open Science," which promotes transparency and collaboration in scientific research, and "Open Access Publishing," which aims to make research outputs freely available online. Finally, "Open Educational Resources" encompasses openly licensed educational materials that can be used, adapted, and shared by anyone, promoting equitable access to education.

The image also highlights a key distinction between "Free Culture" and its derivatives. While "Free Culture" emphasizes freedom, moral superiority, and licensing models, its derivatives tend to focus on value neutrality, technological superiority, and business models. This shift in emphasis reflects the evolution of open initiatives from their activist roots to a more pragmatic approach that seeks to integrate open principles into diverse sectors and industries.

The Brazilian music genre, Tecnobrega, offers a compelling example of how alternative models of knowledge production and dissemination can thrive outside traditional intellectual property frameworks. Originating in Belém, a city of 1.4 million people in the state of Pará, Tecnobrega has achieved widespread popularity despite operating entirely outside the formal music industry[294].

Notably, the Tecnobrega business model is characterized by its informality. Musicians prioritize making individual songs "explode" in the informal market through street vendors and word-of-mouth, rather than releasing traditional albums. This approach relies heavily on DJs and audience feedback to gauge a song's success before considering a full album release[295].

---

[294] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 20

[295] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 22

The informal nature of Tecnobrega extends to its business practices, with an absence of written contracts and widespread acceptance of the illegal sale of mass-produced copies. As Mizukami and Lemos[296] note, Tecnobrega is a business model based on social norms rather than law, where IP rights play no role in incentivizing content creation. Instead, the absence of enforcement and a weak copyright culture have created a unique environment where a new cultural industry has flourished.

This case study challenges conventional assumptions about the necessity of strong IP protection for creative industries. It suggests that alternative models, based on social norms and informal networks, can be equally effective in promoting creativity and ensuring the circulation of cultural products.

The concept of "commons" is crucial in understanding the dynamics of knowledge sharing and production, particularly in the context of open initiatives. Mizukami and Lemos[297] distinguish between two types of commons: legal commons and social commons.

Legal commons are established through explicit legal frameworks, such as open content licensing, where creators voluntarily allow for the use and distribution of their works under specific conditions. Social commons, on the other hand, arise when historical and social circumstances render traditional IP concepts inapplicable or unenforceable[298].

The Tecnobrega phenomenon exemplifies the emergence of a social commons. In this context, the ineffectiveness of copyright enforcement, coupled with the high cost of legal music, has led to a vibrant informal market where music is shared and consumed as if it were part of a commons. This illustrates how social practices can organically create alternative models of knowledge sharing, even in the absence of formal legal frameworks[299].

---

[296] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 27

[297] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 27/28

[298] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 27/28

[299] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 28

The Tecnobrega case also demonstrates that the collapse of traditional IP enforcement does not necessarily lead to a decline in cultural production. Instead, it can foster innovation and the emergence of new business models that thrive within the social commons. This phenomenon raises important questions about the role of law and policy in encouraging open cultural production and how legal frameworks can adapt to accommodate and support these emerging models. As Mizukami and Lemos[300] suggest, the key question is how to create institutional spaces where creators, consumers, and entrepreneurs can safely engage in social action and knowledge sharing.

The emergence and success of open initiatives like free software, open source, and the Tecnobrega phenomenon have highlighted the viability of alternative models for knowledge production and dissemination. However, these models do not operate in isolation. As Mizukami and Lemos[301] emphasize, open licensing and business models exist within a complex and ever-evolving institutional environment, shaped by regulatory frameworks, technological advancements, and economic forces.

The expansion of open initiatives beyond software has led to a proliferation of innovative models for knowledge dissemination and access. Creative Commons (CC) and Wikipedia stand as prominent examples of this shift, translating free software licensing strategies to a broader range of cultural production. These initiatives have spawned a lexicon of new terms, including "open content," "open business," "open standards," "open licensing," and "open educational resources", all building upon the foundations of free and open source software[302].

Contreras[303], in his book about the theory and practice of licensing, explains the concept of public licenses: they are granted to the general public, often without requiring monetary compensation. These licenses are typically offered online and become effective

---

[300] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 29

[301] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 14/15

[302] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 13

[303] CONTRERAS, Jorge L. *Intellectual property licensing and transactions: theory and practice*. Cambridge University Press, 2022.

automatically upon the user's download or use of the licensed content. Despite their informal nature, public licenses underpin a vast amount of online content, software, and even patent rights[304]. Contreras identifies three distinct types of public licensing: Creative Commons online content licenses, open source software (OSS) licenses, and patent pledges[305].

Creative Commons, in particular, has revolutionized how creators share their work. By providing standardized licenses that allow creators to retain copyright while granting others permission to use their work under specific conditions, CC has fostered a culture of sharing and collaboration[306]. This model, born out of the open-source software movement, has enabled the creation and dissemination of a vast array of openly licensed educational and cultural materials, expanding access to knowledge and promoting creativity.

Caso[307] highlights the potential of Open Access as a powerful tool for knowledge dissemination, enabled by digital technologies. He argues that Open Access offers distinct advantages over traditional publishing models, particularly in mitigating the risk of overly rigid, market-driven control over scientific knowledge. However, Caso emphasizes that the ultimate success of Open Access hinges on our ability to navigate the complex interplay between intellectual property law, contracts, scientific norms, and technological standards[308].

Caso *et al.*[309] underscore the reciprocal relationship between Open Access, science, and society. They argue that Open Access can drive scientific and social institutions towards greater openness and transparency, while a more open paradigm in science and society can

---

[304] CONTRERAS, Jorge L. *Intellectual property licensing and transactions: theory and practice*. Cambridge University Press, 2022. p. 18-19
[305] CONTRERAS, Jorge L. *Intellectual property licensing and transactions: theory and practice*. Cambridge University Press, 2022. p. 18-19
More on the theory and practice of licensing, check the above book.
[306] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 143
[307] CASO, Roberto. Open Access to Legal Scholarship and Copyright - Rules: A Law and Technology Perspective. In: PERUGINELLI, Ginevra and RAGONA, Mario (Eds), *Law via the Internet - Free Access, Quality of Information, Effectiveness of Rights*. European Press Academic Publishing, Florence (Italy), 2009. p. 12
[308] CASO, Roberto. Open Access to Legal Scholarship and Copyright - Rules: A Law and Technology Perspective. In: PERUGINELLI, Ginevra and RAGONA, Mario (Eds), *Law via the Internet - Free Access, Quality of Information, Effectiveness of Rights*. European Press Academic Publishing, Florence (Italy), 2009. p. 12
[309] CASO, Roberto et al. Open access, open science, open society. In: *Positioning and power in academic publishing: players, agents and agendas*. IOS Press, 2016. p. 18

inform the necessary adjustments to the fundamental rules governing the Information Society, such as intellectual property, data protection, and the evaluation of academic outputs[310].

They note that while legislative interventions are crucial for the top-down regulation of Open Access, current legislative efforts often lack a comprehensive understanding of Open Access's role in science and society[311]. They advocate for a combination of top-down and bottom-up approaches, including institutional policies that mandate green road archiving, to achieve a more effective implementation of OA principles[312].

The rise of open access publishing further exemplifies this trend, challenging traditional models that restrict access to scholarly research behind paywalls. Shaver[313] highlights the potential of new, non-profit publishing models to reach a wider audience and democratize access to scientific knowledge. Open peer review journals, open access to academic papers, and the sharing of research data contribute to a more transparent and collaborative scientific process, allowing for faster dissemination of ideas and greater accountability in research.

As noted by the OECD[314], digital technologies have also enabled greater engagement of diverse social actors in scientific activities, from agenda-setting and co-production of research to the dissemination of scientific information and learning. This democratization of science, made possible by open initiatives, has the potential to transform the scientific landscape, fostering a more inclusive and collaborative approach to knowledge creation and sharing.

Open initiatives, from the free software movement to the emergence of open business models like Tecnobrega, demonstrate the potential for alternative approaches to knowledge production and dissemination that challenge traditional intellectual property paradigms. These initiatives highlight the power of collaboration, sharing, and openness in fostering

---

[310] CASO, Roberto et al. Open access, open science, open society. In: *Positioning and power in academic publishing: players, agents and agendas*. IOS Press, 2016. p. 18
[311] CASO, Roberto et al. Open access, open science, open society. In: *Positioning and power in academic publishing: players, agents and agendas*. IOS Press, 2016. p. 18-19
[312] CASO, Roberto et al. Open access, open science, open society. In: *Positioning and power in academic publishing: players, agents and agendas*. IOS Press, 2016. p. 18-19
[313] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 11
[314] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Trends Shaping Education 2022*. OECD Publishing, Paris, 2022. p. 58/59

creativity, innovation, and access to knowledge. The rise of open science infrastructure, including publishing platforms and shared databases, further supports this trend. Notably, these platforms face the linguistic diversity challenge, to make scientific knowledge accessible in multiple languages and thus promoting inclusivity and broader participation in the global scientific community. This emphasis on linguistic diversity not only expands access to scientific knowledge but also recognizes the importance of cultural and linguistic context in knowledge creation and dissemination, paving the way for a more equitable and representative global scientific landscape.

The growing importance of language in the context of open science and knowledge dissemination will be explored further in the next chapter, which examines the crucial role of translation in ensuring equitable access to scientific knowledge across linguistic and cultural boundaries.

4. LANGUAGE EFFECTS ON COPYRIGHT AND ACCESS TO SCIENTIFIC KNOWLEDGE: THE TRANSLATION IMPORTANCE

While open access initiatives and evolving interpretations of copyright law have made strides in expanding access to scientific knowledge, a critical barrier remains: language. The mere availability of information does not guarantee its comprehension or utilization, particularly in a global context where linguistic diversity is the norm. This chapter delves into the intricate relationship between language, copyright, and access to scientific knowledge, exploring the critical role of translation in bridging linguistic divides and ensuring equitable access to knowledge for all.

The interplay between language and copyright law is multifaceted and complex. Durant and Davis[315] highlight that language serves various functions within the legal framework. It can be both the object of analysis in disputes involving trademarks and copyright infringement and the means of defining legal concepts and doctrines.

---

[315] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution*, 2021. p. 344

In the context of copyright disputes, language is often scrutinized to determine the originality and creativity of a work, as well as the extent to which it has been copied or adapted[316]. Linguistic analysis can also be employed to assess the validity of defenses like fair use, where the necessity of using specific language to express an idea is at issue.

Moreover, the language of copyright law itself is constantly evolving in response to broader debates in science, industry, and the arts. Terms like "originality," "substantial similarity," and "fair use" are not static concepts but are continually reinterpreted and refined through legal discourse and judicial decisions.

The intricate relationship between language and copyright law underscores the importance of linguistic analysis in understanding and interpreting legal provisions. It also highlights the need for a nuanced approach to copyright protection that considers the specific linguistic context of each work and its intended use.

A key challenge in copyright law lies in determining the boundaries between permissible use and infringement, particularly in the context of language. As Durant and Davis[317] observe, the concept of "copying" exists on a spectrum, ranging from verbatim reproduction, easily detectable through plagiarism software, to more nuanced forms like creative adaptation and legitimate influence from genre conventions.

This spectrum poses a challenge for legal interpretation, as determining the precise threshold between protected expression and unprotected ideas is often difficult. The distinction between copying and inspiration, especially in the realm of language, can be subtle and subjective. This ambiguity has led to frequent judicial warnings about the complexities of defining this threshold, highlighting the need for careful analysis and interpretation in copyright disputes.

The digital age, with its ease of copying and disseminating information, has further complicated this issue. The ability to cut and paste text, remix content, and create derivative works raises questions about the extent to which such actions constitute infringement or fall under permissible uses like fair use or fair dealing. The evolving nature of technology and

---

[316] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution*, 2021. p. 344
[317] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution*, 2021. p. 351

the increasing complexity of creative expression necessitate a nuanced and adaptable approach to copyright law that can effectively address these challenges while balancing the interests of creators and the public.

The modern conception of the "subject" or "author" as the sole proprietor of a work is deeply ingrained in copyright law[318]. This individualistic perspective, born from the Enlightenment and reinforced by modern legal frameworks, often struggles to accommodate the complexities of knowledge creation in the digital age, where collaboration and the remixing of existing works are increasingly common.

Arrabal[319] further critiques the oversimplified creative process in the traditional dichotomy between "idea" and "work," arguing that this distinction, rooted in classic and modern metaphysics, fails to adequately address contemporary copyright challenges. This reductive view, hinders our ability to grapple with the nuanced questions of authorship, originality, and ownership that arise in a world where knowledge is increasingly shared, adapted, and transformed through digital technologies.

A central question in copyright disputes often revolves around the defense of necessity, where the use of specific language is claimed to be essential for conveying a particular idea. Linguistic analysis can shed light on this issue by examining the range of verbal alternatives available and the extent to which the choices made are constrained by linguistic necessity versus creative expression[320].

Copyright law, while protecting original expression, also recognizes that certain "building blocks" of language must remain freely available for use by others. These building blocks include common words, phrases, and ideas that are essential for communication and

---

[318] ARRABAL, Alejandro Knaesel. Direito autoral e linguagem: uma (re)leitura a partir da hermenêutica filosófica. In: BEÇAK, Rubens; BORGES, Alexandre Walmott; LOPES, Ana Maria D'Ávila. (Org.). *Hermenêutica*. Florianópolis: CONPEDI, 2014. p. 2

[319] ARRABAL, Alejandro Knaesel. Direito autoral e linguagem: uma (re)leitura a partir da hermenêutica filosófica. In: BEÇAK, Rubens; BORGES, Alexandre Walmott; LOPES, Ana Maria D'Ávila. (Org.). *Hermenêutica*. Florianópolis: CONPEDI, 2014. p. 18

[320] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution,* 2021. p. 352/353

expression. However, the distinction between protectable expression and unprotectable ideas can be blurred, particularly when dealing with complex or technical language[321].

Linguistic analysis can help to clarify this distinction by examining the pool of available verbal alternatives for expressing a particular concept[322]. For example, the choice of prepositions or relative pronouns may be limited due to grammatical constraints, while the selection of nouns or verbs often involves a wider range of creative choices. This analysis can reveal whether the use of specific language in an allegedly infringing work is truly necessary or merely a matter of preference or style.

By applying linguistic techniques to analyze the relationships between a source work, a derivative work, and the norms of discourse within a particular genre, researchers can gain deeper insights into the originality and creative contribution of a work, ultimately informing legal interpretations of copyright infringement and fair use.

Despite the diverse potential applications of linguistic analysis within the realm of intellectual property law, its integration into legal practice and scholarship remains surprisingly limited[323]. Traditionally, linguistic expertise has been viewed primarily as a tool for litigation, often in the form of expert testimony. However, the potential for linguistic insights to inform broader legal and policy debates on copyright and access to knowledge remains largely untapped.

Durant and Davis[324] envision a future where research in this area becomes increasingly interdisciplinary, delving into historical and theoretical questions about language and its relationship to copyright law. Such research could examine how language evolves over time, how it is used to express creative ideas, and how it is interpreted and understood in different cultural contexts. These insights could, in turn, inform legal interpretations of copyright and

---

[321] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution,* 2021. p. 352/353
[322] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution,* 2021. p. 352/353
[323] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution*, 2021. p. 360
[324] DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution*, 2021. p. 360

contribute to the development of more nuanced and effective policies that balance the interests of creators with the broader goals of knowledge dissemination and access.

Language plays a crucial role in development, shaping how societies access, understand, and utilize knowledge. The ability to communicate effectively is a cornerstone of social progress, facilitating the exchange of ideas, fostering innovation, and enabling collective problem-solving. However, linguistic diversity can also create barriers to knowledge sharing, particularly in the context of scientific research, where the dominance of certain languages can marginalize non-native speakers and limit access to vital information.

The intrinsic connection between knowledge and language necessitates a deeper understanding of how language influences the production, dissemination, and accessibility of knowledge in a global context. As Tietze[325] points out, knowledge and understanding are inextricably linked to language, and the increasingly multilingual nature of global interactions demands effective means to share knowledge across linguistic barriers. Translation, therefore, emerges as a crucial practice for facilitating the exchange of ideas and information across diverse linguistic communities.

While a common language like English can serve as a bridge, it is not a universal solution. Tietze[326] emphasizes that both the process and product of knowledge creation and dissemination are not neutral but are shaped by cultural and linguistic assumptions about what constitutes valid and useful knowledge. These assumptions can influence how knowledge is presented and understood, potentially creating biases and exclusions for those who do not share the same linguistic and cultural background. Therefore, a comprehensive approach to knowledge sharing must recognize and address the role of language in shaping both the production and reception of knowledge, ensuring that it is accessible and relevant to diverse audiences worldwide.

The concept of translation itself is multifaceted and encompasses a wide range of practices and outcomes. Montgomery[327] describes it as a "canopy" under which a vast array of

---

[325] TIETZE, Susanne. *Language, translation and management knowledge: A research overview*. Routledge, 2021. p. 1
[326] TIETZE, Susanne. *Language, translation and management knowledge: A research overview*. Routledge, 2021. p. 1
[327] MONTGOMERY, Scott L. *Science in translation: Movements of knowledge through cultures and time*. University of Chicago Press, 2000. p. 3

phenomena gather. It has been employed in various contexts, from oral to written communication, performed by individuals, groups, and even machines. The materials translated vary widely, from original texts to copied, altered, or even fabricated works, encompassing a diverse range of prose, poetry, songs, and stories.

Translation methods are equally varied, ranging from loose interpretations to strict word-for-word fidelity. The resulting translations can be complete rewrites, elegant adaptations, ideological reinterpretations, or literal renderings that are incomprehensible or useless. This diversity highlights the inherent subjectivity and interpretive nature of translation, where the meaning and impact of a work can be significantly altered depending on the translator's approach and the cultural context in which it is received.

Given this complexity, it is essential to consider how translation, as a key language practice, can both facilitate and hinder access to scientific knowledge. The challenges of translating scientific works accurately and effectively, while also navigating copyright restrictions and linguistic diversity, have significant implications for knowledge dissemination and the advancement of science globally.

The impact of language on the dissemination and utilization of knowledge is not a recent phenomenon. Throughout history, the power of translation has been instrumental in shaping knowledge systems and even saving lives, long before the advent of the modern "knowledge-based society". The trade of books and ideas, in various forms and across cultural boundaries, has played a significant role in the development of knowledge throughout human history[328].

Once a text is published, it takes on a life of its own, independent of its creator. This notion challenges the traditional author-centric approach to understanding a work and suggests the need for a broader perspective that examines how a text evolves as it enters the public domain and traverses different cultures. A work's meaning and impact can be significantly altered by translation, adaptation, and interpretation, reflecting the unique cultural and historical context of each receiving audience[329].

---

[328] MONTGOMERY, Scott L. *Science in translation: Movements of knowledge through cultures and time*. University of Chicago Press, 2000. p. 13
[329] MONTGOMERY, Scott L. *Science in translation: Movements of knowledge through cultures and time*. University of Chicago Press, 2000. p. 14

While the preservation of scientific texts seems assured in our modern era of printing, digitization, and vast libraries, their accessibility is not universal. Montgomery[330] reminds us that these seemingly secure texts often represent the culmination of complex histories of translation and adaptation, resulting in diverse versions tailored to specific linguistic communities. These translations are not mere copies, but rather unique originals in their own right, each carrying the nuances and cultural context of the target language.

The notion of a "universal scientific discourse" is challenged by the reality of linguistic diversity and the crucial role of translation in the making of science. While scientific communities are indeed bound by shared conventions of communication, these codes alone do not capture the full spectrum of knowledge exchange. The translation process, while facilitating the spread of scientific ideas, also introduces an element of interpretation and adaptation, shaping how knowledge is understood and applied in different contexts[331].

The dominance of English and other languages commonly used in developed countries in scientific and technical publishing creates a significant linguistic barrier for developing nations. As Talagala[332] highlights, translation into local languages is essential for these countries to access and utilize scientific and technical knowledge effectively. The dependency on developed countries for such knowledge, coupled with the prevalence of English in scientific discourse, underscores the crucial role that translation plays in bridging the knowledge gap.

This nuanced understanding of translation's role in shaping scientific knowledge sets the stage for a deeper exploration of its legal and ethical implications, particularly within the framework of copyright law. The copyright law, while protecting the rights of authors and publishers, can inadvertently create obstacles to the translation and dissemination of scientific works. The following sections will explore these challenges and their implications for access to scientific knowledge in developing countries.

---

[330] MONTGOMERY, Scott L. *Science in translation: Movements of knowledge through cultures and time*. University of Chicago Press, 2000. p. 14
[331] MONTGOMERY, Scott L. *Science in translation: Movements of knowledge through cultures and time*. University of Chicago Press, 2000. p. 273
[332] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 13/14

4.1. Language Translation and Scientific Knowledge

The ability to access scientific knowledge is fundamental for progress and development in any society. However, access alone is not enough; comprehension and application are equally crucial. This is where the role of language becomes paramount. The vast majority of scientific literature is published in a few dominant languages, primarily English. This creates a significant barrier for researchers, students, and practitioners in non-English speaking regions, particularly in developing countries.

Translation, therefore, emerges as a critical tool for democratizing scientific knowledge. By making scientific publications available in multiple languages, translation bridges the linguistic gap, ensuring that valuable insights and discoveries are not confined to a privileged few. For developing countries, translation is not merely a matter of convenience; it is a necessity for participating in the global scientific community, building local expertise, and driving innovation and development on their own terms.

For the purposes of this discussion, the term "translation" will be used broadly to encompass various forms of linguistic transfer, including written translation, oral interpretation, transcription, transliteration, and the creation of neologisms, recognizing that they all play a crucial role in facilitating access to knowledge across linguistic barriers.

The historical exchange of knowledge across Eurasia and beyond demonstrates that despite significant barriers to communication, including linguistic differences, the quest for knowledge has persistently driven cross-cultural exchange. Translation emerges as a central mechanism in overcoming these linguistic obstacles, enabling the preservation and expansion of scientific knowledge[333].

While physical, social, cultural, and temporal barriers also played a role in shaping knowledge exchange, language remains a crucial factor that can either facilitate or hinder the dissemination and utilization of scientific information[334]. The importance of translation

---

[333] MANNING, Patrick; OWEN, Abigail (Ed.). *Knowledge in translation: global patterns of scientific exchange, 1000-1800 CE*. University of Pittsburgh Press, 2018. p. 1

[334] MANNING, Patrick; OWEN, Abigail (Ed.). *Knowledge in translation: global patterns of scientific exchange, 1000-1800 CE*. University of Pittsburgh Press, 2018. p. 1

in bridging linguistic divides and fostering cross-cultural understanding has been a recurring theme throughout history, from ancient civilizations to the modern era.

Translation plays a pivotal role in facilitating cross-cultural communication and knowledge exchange. It goes beyond merely transferring words from one language to another; it involves a complex process of interpretation, adaptation, and cultural negotiation. As Manning and Owen[335] assert, translation can add value by introducing new or revised texts, recognizing the accomplishments of the source language and culture, and stimulating valuable debate within the target language community. This process allows for the comparison of new ideas with existing ones, fostering a deeper understanding of diverse perspectives and enriching the intellectual landscape.

The power of translation in the history of knowledge, as Scott Montgomery cited by Manning and Owen[336] aptly states, is commensurate with the power of the word itself. It enables the dissemination of scientific discoveries, philosophical concepts, and cultural artifacts across linguistic and cultural boundaries, contributing to the advancement of knowledge and the enrichment of human understanding.

Despite its critical role in the cross-cultural exchange of knowledge, the concept of translation has often been overlooked in historical analyses of scientific discourse. Manning and Owen[337] note that historians of science have frequently employed metaphors and dynamics to describe knowledge exchange, yet these discussions rarely emphasize the specific contributions of language or translation. This oversight is perhaps due to the ubiquitous nature of translation in everyday life. As D'Hulst and Gambier[338] suggest, translation is so deeply ingrained in multilingual encounters that it has often been taken for granted, failing to be recognized as a distinct category of language or communication worthy of scholarly attention.

---

[335] MANNING, Patrick; OWEN, Abigail (Ed.). *Knowledge in translation: global patterns of scientific exchange, 1000-1800 CE*. University of Pittsburgh Press, 2018. p. 2
[336] MANNING, Patrick; OWEN, Abigail (Ed.). *Knowledge in translation: global patterns of scientific exchange, 1000-1800 CE*. University of Pittsburgh Press, 2018. p. 2
[337] MANNING, Patrick; OWEN, Abigail (Ed.). *Knowledge in translation: global patterns of scientific exchange, 1000-1800 CE*. University of Pittsburgh Press, 2018. p. 9
[338] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 17

The importance of translation in facilitating access to knowledge is particularly evident in the realm of scientific research. As Talagala[339] emphasizes, translation empowers individuals to access knowledge in a language they understand, thereby preventing linguistic barriers from excluding those who are not proficient in the dominant languages of scientific publication. In a world characterized by linguistic diversity, translation becomes a prerequisite for meaningful access to knowledge, ensuring that scientific advancements are not confined to a select group of language speakers but are instead shared broadly for the benefit of all[340].

While translation is widely recognized as a crucial tool for knowledge dissemination, it is not without its critics. Talagala[341] outlines two primary arguments against translation: the potential for misinterpretation or manipulation of the original text's meaning, and the assertion that promoting bilingualism or multilingualism could eliminate the need for translation altogether.

The first argument highlights the inherent challenges of translation, acknowledging that the transfer of meaning across languages is not always straightforward. Differences in cultural context, linguistic nuances, and the translator's own biases can potentially lead to misinterpretations or distortions of the original text. However, this criticism focuses on the potential pitfalls of translation rather than its fundamental necessity in a multilingual world[342].

The second argument, advocating for bilingualism or multilingualism as an alternative to translation, is often impractical and idealistic. While promoting language learning is undoubtedly beneficial, achieving widespread fluency in multiple languages is a complex and long-term endeavor. In the meantime, translation remains an essential tool for ensuring

---

[339] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 13
[340] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 13
[341] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 13/14
[342] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 13/14

immediate access to knowledge for those who do not speak the language of the original text[343].

Therefore, while the criticisms of translation raise valid concerns, they do not diminish the importance of translation as a means of bridging linguistic divides and promoting knowledge sharing.

The need for translation in developing countries is particularly acute due to their unique circumstances and priorities. Talagala[344] emphasizes that these nations require translations of entire scientific and technical works, not just excerpts, to effectively utilize them in mass education and vocational training programs. This is essential for building a solid foundation of knowledge and expertise within the local population, fostering technological advancement and socioeconomic development. Furthermore, developing countries need to reproduce these translations in large quantities to ensure widespread access for students, teachers, and other stakeholders.

The rapid pace of change in science and technology further exacerbates the challenges of translation for developing countries. Talagala[345] emphasizes that scientific and technical books and learning materials can quickly become obsolete, necessitating swift translation to ensure that developing nations have timely access to the latest knowledge. This urgency is not merely a matter of keeping up with the latest trends but is crucial for staying competitive in a global knowledge economy and addressing pressing developmental challenges.

Furthermore, affordability is a critical factor in ensuring meaningful access to scientific knowledge for developing countries[346]. The ability to translate and reproduce educational materials at a cost accessible to the public is essential for bridging the knowledge gap and fostering widespread learning opportunities.

---

[343] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 13/14
[344] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 16
[345] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 16
[346] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 16

The act of translation is not merely a linguistic exercise; it is a cultural one as well. St. André and Peng[347] describe translation as the re-creation of a written text in another language, a process that involves the re-presentation of a cultural artifact to a new audience. This raises important questions about representation: what aspects of the original work are prioritized in the translation, whose interests are served by this representation, and what purpose does the translation ultimately serve?

These questions are particularly pertinent in the context of scientific translation. The translation of scientific works involves not only conveying factual information but also interpreting complex concepts, methodologies, and theoretical frameworks within a specific cultural and linguistic context. This raises ethical considerations regarding the potential for misinterpretation, bias, or the omission of culturally relevant nuances. It also highlights the power dynamics inherent in translation, as the translator acts as a mediator between the source culture and the target audience, potentially shaping how knowledge is received and understood.

The translation process is not immune to power dynamics. It operates within a complex web of relationships, influenced by institutional structures, cultural norms, and individual agency. St. André and Peng[348] acknowledge that knowledge transfer is inherently intertwined with power relations, with translators often navigating multiple domestic and foreign institutions and ideologies.

However, contrary to the view that translation is solely determined by institutional powers, St. André and Peng[349] argue that individual agency and linguistic competence play a crucial role in the translation process. Translators must make choices, negotiating between different traditions and power structures, exercising their agency to "select, delete, and compromise."

This perspective challenges the notion of translation as a passive act of transfer, emphasizing its dynamic and transformative potential. By recognizing the agency of translators and their ability to navigate power relations, we can better understand how

---

[347] ST ANDRÉ, James; HSIAO-YEN, Peng. Introduction: Setting the Terms. *Approaches to Translation Studies*, v. 34, 2011. p. 11
[348] ST ANDRÉ, James; HSIAO-YEN, Peng. Introduction: Setting the Terms. *Approaches to Translation Studies*, v. 34, 2011. p. 23/24
[349] ST ANDRÉ, James; HSIAO-YEN, Peng. Introduction: Setting the Terms. *Approaches to Translation Studies*, v. 34, 2011. p. 23/24

translation shapes the flow of knowledge across cultures and contributes to the ongoing evolution of scientific discourse.

The process of knowledge transfer, or the movement of knowledge between individuals, groups, and organizations, is essential for the advancement of science and society as a whole. Røvik[350] defines knowledge transfer as the exchange and reception of experience and knowledge, resulting in changes in the recipient's knowledge base or performance. This process, however, is often fraught with challenges, leading to varying degrees of success and frequent failures.

Røvik[351] proposes a novel approach to understanding knowledge transfer by conceptualizing it as an act of translation, akin to the translation of language and texts. This translation theory of knowledge transfer highlights the importance of translation competence as a key organizational capacity for successful knowledge exchange. It offers a new lens through which to analyze why some knowledge transfers succeed while others fail, providing valuable insights for both researchers and practitioners.

By drawing parallels between linguistic translation and knowledge transfer, Røvik[352] emphasizes the importance of interpretation, adaptation, and contextualization in effectively conveying knowledge across different domains and communities. This approach recognizes that knowledge is not simply transferred but rather transformed and reinterpreted as it moves from one context to another.

Røvik[353] identifies a common architecture underlying all knowledge transfer processes. This architecture consists of five core elements: the source organizational context, the practices and knowledge to be transferred, the borders or barriers between the source and recipient units, the recipient organizational context, and the mediators facilitating the transfer.

---

[350] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 12/13
[351] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 12/13
[352] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 12/13
[353] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 17

The specific combination and interaction of these elements vary across different knowledge transfer processes, leading to diverse outcomes. However, understanding this underlying architecture is crucial for analyzing and improving knowledge transfer strategies. It provides a framework for identifying potential bottlenecks, addressing challenges, and leveraging opportunities to enhance the effectiveness of knowledge dissemination and utilization.

In the context of scientific knowledge, translation can be seen as a crucial mediating element within this knowledge transfer architecture. It bridges the linguistic and cultural borders between the source (the original scientific work) and the recipient (the target audience). By adapting and contextualizing scientific knowledge, translation facilitates its comprehension and application in diverse settings, ultimately contributing to the broader goal of knowledge transfer.

A fundamental aspect of effective translation, particularly in the realm of scientific knowledge, is translation competence. Røvik[354] defines this competence as encompassing not only bilingualism, or fluency in both the source and target languages, but also biculturalism, which entails a deep understanding of the societal contexts from which the source text originates and into which the translated text is received.

Bilingualism ensures that the translator can accurately comprehend the nuances and complexities of the original text while also expressing them clearly and effectively in the target language. Biculturalism, on the other hand, allows the translator to navigate the cultural and social norms that shape the meaning and interpretation of the text, ensuring that it resonates with the target audience and avoids potential misunderstandings or misrepresentations[355].

While the importance of bilingualism and biculturalism is most often associated with linguistic translation, its relevance extends to broader forms of knowledge transfer. As Røvik[356] argues, mediators and translators in any field must possess a deep understanding

---

[354] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 269
[355] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 269
[356] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 269

of both the source and recipient contexts to effectively facilitate the exchange of knowledge. This includes not only linguistic and cultural knowledge but also an awareness of the specific goals, values, and constraints of each community involved in the transfer process.

A fundamental challenge in knowledge translation, particularly in scientific contexts, lies in the process of codifying tacit knowledge, or transforming implicit, experiential knowledge into explicit, articulable forms. As Røvik[357] explains, this process is often constrained by the limitations of language and grammar. The inherent ambiguity and imprecision of words can make it difficult to fully capture the nuanced and often intuitive aspects of tacit knowledge, leading to potential loss or distortion of information during the translation process.

Translation barriers, often stemming from significant imbalances between the source and target contexts, can manifest in various ways, each posing unique challenges to the effective dissemination of scientific knowledge[358]. These barriers can arise from substantial linguistic differences, such as variations in grammar, vocabulary, and idiomatic expressions, making it difficult to accurately convey scientific concepts across languages. Cultural differences, including divergent social norms, values, and beliefs, can further complicate translation, as the same terms or ideas may carry different connotations in different cultural contexts. Additionally, power imbalances, such as the dominance of certain languages in scientific publishing or unequal access to translation resources, can create significant obstacles for researchers and communities who do not speak the dominant languages or lack the means to translate scientific works[359]. These multifaceted barriers highlight the complexity of language in knowledge transfer and underscore the need for comprehensive approaches that address linguistic, cultural, and socioeconomic factors to ensure equitable access to scientific knowledge for all.

---

[357] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 78
[358] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 109
[359] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 109

Beyond linguistic and cultural barriers, translating scientific knowledge often involves navigating the complexities of national contexts. Røvik[360] notes that translating into another language frequently entails entering a new domain of knowledge, encompassing political institutions and traditions, public administration, geography, and media. This highlights the need for translators to possess a broad understanding of the target audience's societal context, ensuring that the translated text is not only linguistically accurate but also culturally relevant and appropriate.

Historically, translation has often been perceived as a quest for faithful reproduction of a source text, with the translated text considered a mere equivalent of the original[361]. This view assumes that language operates as a transparent medium through which meaning can be transferred seamlessly from one language to another.

The conventional view of translation as a simple process of linguistic transfer has been challenged by a more nuanced understanding of its diverse forms and interpretations. Gambier[362] highlights the rich variety of labels used to describe translation practices, both past and present. These range from modern terms like rewriting, localization, transcreation, and adaptation to historical concepts like mimesis, appropriation, and imitation. Furthermore, the very understanding of what translation entails has evolved over time, with descriptions encompassing explanation, substitution, metamorphosis, and even a simple "turn around".

This diversity in terminology and conceptualization reflects the dynamic and multifaceted nature of translation. It is not a monolithic practice but rather a spectrum of approaches and strategies, each with its own implications for the meaning and impact of the translated text. This diversity also underscores the need for a comprehensive understanding of translation that considers its various forms and functions, particularly in the context of scientific knowledge where accuracy, precision, and cultural relevance are paramount.

---

[360] RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023. p. 115

[361] GAMBIER, Yves. Concepts of translation. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 17

[362] GAMBIER, Yves. Concepts of translation. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 21

The act of translation is not solely a linguistic exercise; it is deeply embedded in a complex web of contextual factors that shape its meaning and impact. Gambier[363] highlights the numerous contextual issues that influence translation, including power dynamics, colonization, cultural development, multilingualism, oral traditions, illiteracy, religious beliefs, the relationship between language and national identity, and the forces of globalization. These factors contribute to the diverse understandings and approaches to translation found in different parts of the world.

The evolving landscape of translation is deeply intertwined with advancements in technology and the changing patterns of knowledge dissemination. D'Hulst and Gambier[364] highlight the impact of technological evolution on the creation, organization, and reception of translations. From collaborative volunteer efforts to large-scale multilingual projects, technology has reshaped the very notions of "text" and "translation," leading to new forms of digital content and adaptation for diverse "locales".

The rise of digital technologies has also transformed how knowledge about translation is produced, shared, and utilized. Bibliometric tools, such as citation and content analysis, offer valuable insights into translation flows, helping book historians and cultural historians trace the evolution and impact of translated works. These tools have become indispensable for mapping the complex networks of scholarly communication and understanding how knowledge about translation circulates in academic and social spheres[365].

The increasing "scientification" of translation studies, mirroring trends in other disciplines, is further reflected in the use of bibliometric analysis for academic policymaking[366]. By analyzing the patterns and trends in translation research, policymakers can make informed decisions about resource allocation, research priorities, and the development of translation education programs. This growing emphasis on data-driven analysis underscores the

---

[363] GAMBIER, Yves. Concepts of translation. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 23
[364] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 101
[365] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 101
[366] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 101

ongoing professionalization and institutionalization of translation studies as a field of inquiry.

The internationalization of translation presents a paradox. While it facilitates the global dissemination of ideas, it can also exert pressure on smaller or less dominant languages that rely on translation to establish and promote their own cultural identities.[367] Languages like English, with their global reach, often serve as a lingua franca, facilitating communication across diverse linguistic communities. However, this dominance can also overshadow the unique cultural and linguistic nuances embedded in smaller languages, potentially leading to a homogenization of knowledge and the marginalization of diverse perspectives[368].

The widespread use of English in scientific communication, in particular, has sparked debate about its capacity to adequately capture the cultural and identity values expressed in literary and philosophical texts. This raises concerns about the potential loss of cultural specificity and the homogenization of knowledge through translation, particularly when a single language dominates the global discourse.

Translation plays a crucial role in democratizing access to knowledge, extending beyond the confines of an elite group and reaching individuals who may not be proficient in the dominant languages of scientific discourse[369]. It serves as a tool for inclusivity and empowerment, allowing diverse communities to engage with and benefit from scientific advancements.

Furthermore, translation carries an ethical dimension by facilitating the sharing of knowledge and promoting a more equitable distribution of information. It not only enables access to the knowledge itself but also provides insights into how that knowledge is produced and utilized within different cultural and institutional contexts. This deeper understanding of the "instrument" of knowledge, as D'Hulst and Gambier[370] put it, can

---

[367] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 151
[368] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 151
[369] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 407
[370] D'HULST, Lieven; GAMBIER, Yves. Introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018. p. 407

inform educational and research practices, fostering a more critical and reflective approach to knowledge creation and dissemination.

The translation of scientific knowledge is not a neutral or objective endeavor. Sumillera, Kühn, and Surman[371] emphasize that there are no "innocent decisions" in this process. Every aspect of translation, from the selection of texts to be translated to the methods and strategies employed, is influenced by political convictions, power relations, and often, nation-building agendas.

Those who control the translation process wield significant power, as they determine which knowledge is disseminated, how it is presented, and to whom it is made available. This power can be used to shape public opinion, influence policy decisions, and even construct national identities. The translation of scientific knowledge, therefore, is not merely a linguistic exercise but a deeply political act with far-reaching consequences. Recognizing these power dynamics is crucial for understanding the complexities of knowledge transfer and the potential biases inherent in translated works.

4.2. Language Translation and Copyright

The intersection of language, translation, and copyright law is a complex and often contentious terrain. While copyright aims to protect the rights of authors and incentivize creativity, it can also create barriers to the translation and dissemination of knowledge, particularly in a multilingual and increasingly globalized world. There is an intricate relationship between language, translation, and copyright, specially considering how legal frameworks treat the translation of scientific works and the broader goal of knowledge accessibility.

The instrumental role of translation in facilitating the transfer of knowledge, particularly from developed to developing countries, has long been acknowledged. However, this recognition has been accompanied by a persistent "translatophobia" – a fear that translation

---

[371] SUMILLERA, Rocío G.; KÜHN, Katharina; SURMAN, Jan. *Translation in knowledge, knowledge in translation*. John Benjamins Publishing Company, 2020. p. 9

threatens the economic interests of authors[372]. This tension between the desire to harness translation's developmental potential and the need to protect authors' rights has fueled a longstanding dichotomy in international copyright law.

Developed nations, home to the dominant languages of scientific and cultural production, have historically advocated for stronger translation rights to safeguard their economic interests as net exporters of knowledge. Conversely, developing nations, often reliant on translated materials for access to knowledge, have pushed for limitations on these rights to facilitate the importation and dissemination of knowledge in their own languages. This dynamic reveals the power imbalances inherent in international copyright law, where the interests of developed nations often overshadow the needs of developing countries.

The intersection of copyright law and translation presents a unique challenge for developing countries seeking to access scientific and technical knowledge. As Talagala[373] notes, the protection of translation rights under copyright law can inadvertently restrict the ability of these countries to translate and disseminate essential materials in a timely and affordable manner. This limitation can impede their efforts to educate their populations, build local expertise, and ultimately participate fully in the global knowledge economy.

A fundamental tenet of copyright law is the exclusive right it grants to authors of original works, including the right to authorize or prohibit the translation of their creations[374]. While this right is intended to protect authors and incentivize creative production, it can inadvertently hinder the dissemination of knowledge, particularly in the context of scientific works. The requirement of obtaining authorization from copyright holders before translating can create a bottleneck, delaying or even preventing the translation of valuable scientific resources into languages accessible to a wider audience.

Cunningham[375] highlights the tension between copyright law and the diverse interpretations inherent in the act of translation. He questions the extent of control copyright holders should

---

[372] LEE, Tong King. Translation and copyright: towards a distributed view of originality and authorship. *The Translator*, Routledge, 2020. p. 3
[373] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 17
[374] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 17
[375] CUNNINGHAM, Alan. Translation, Copyright & Authority. *Pólemos*, v. 12, n. 2, 2018.

exert over translations, the necessity of authorization, and the potential for multiple valid translations to coexist. The copyright law, according to Cunningham, seems to favor a single, authoritative translation, but this view is challenged by the existence of moral rights that allow authors to object to derogatory treatments, suggesting that translation is open to interpretation and debate[376].

While copyright law may theoretically encourage translation by incentivizing authors to authorize translations in exchange for royalties, Talagala[377] argues that this has not proven to be the case in developing countries. The economic incentives for translating scientific works into local languages in these regions are often limited due to smaller markets and lower purchasing power. This can result in a situation where valuable scientific knowledge remains locked behind language barriers, inaccessible to those who could benefit most from it.

The legal framework surrounding translation further complicates the issue of access to scientific knowledge. Translations themselves are typically granted copyright protection as original literary or scientific works[378]. While this protection is intended to incentivize translation efforts, it can paradoxically hinder the dissemination of translated works. The exclusive rights granted to the translator can limit the reproduction and distribution of the translation, potentially increasing its cost and reducing its accessibility, particularly in developing countries where resources are often scarce.

The primary objective of copyright law, at least in common law jurisdictions, is to promote public benefit[379]. This is achieved through a delicate balancing act between protecting the rights of creators and ensuring the public's ability to access and utilize their works. Copyright law grants creators exclusive rights to their literary and scientific works, providing them with incentives to produce more content that ultimately enriches the public domain.

---

[376] CUNNINGHAM, Alan. Translation, Copyright & Authority. *Pólemos*, v. 12, n. 2, 2018. p. 389
[377] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 17
[378] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 17
[379] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 17

The protection of translation rights is deeply ingrained in both international and national copyright law. Talagala[380] emphasizes that Article 8 of the Berne Convention[381], a cornerstone of international copyright law, grants authors the exclusive right to authorize translations of their works. This provision is further reinforced by the TRIPS Agreement[382], which requires member countries to comply with the Berne Convention's provisions, including the protection of translation rights.

With most countries around the entire world are member countries adhering to the Berne Convention and/or bound by the TRIPS Agreement, the protection of translation rights has become a nearly universal legal norm. This widespread recognition of translation rights underscores the importance that copyright law places on the creative and intellectual effort involved in translating a work from one language to another. However, as previously noted, this protection can also pose challenges for access to knowledge, particularly in developing countries where translation is essential for accessing scientific and technical information.

The exclusive nature of translation rights within copyright law is a significant factor in determining access to scientific knowledge. As Talagala[383] elucidates, these rights empower copyright holders to control the translation of their works, requiring those seeking to translate to obtain prior authorization. This exclusivity, while intended to protect the author's economic and moral rights, can act as a barrier to the widespread dissemination of knowledge, particularly in developing countries where translation is essential for accessing scientific and technical information.

The impact of translation rights on the accessibility of knowledge is threefold. Firstly, they can outright prevent the translation of copyrighted works if the rights holder refuses authorization[384]. This scenario is particularly concerning for developing countries that rely

---

[380] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 19

[381] Berne Convention for the Protection of Literary and Artistic Works. September 9, 1886, and amended on September 28, 1979. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=283698.

[382] TRIPS Agreement on Trade-Related Aspects of Intellectual Property Rights. April 15, 1994. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=305907.

[383] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 20

[384] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 20/21

on translations to access scientific and technical materials not available in their local languages.

Secondly, translation rights can impose a financial burden on those wishing to translate and reproduce copyrighted works. Copyright holders can demand licensing fees for both the translation and its subsequent reproduction, increasing the cost of translations and limiting their accessibility to the public[385]. This financial barrier disproportionately affects developing countries, where resources are often scarce and the market for translated works may be limited.

Finally, translation rights can create an administrative burden, especially when dealing with works published in foreign countries. Locating and obtaining consent from copyright holders can be a time-consuming and costly process, further hindering the timely and affordable translation of scientific and technical materials in developing nations[386].

These three factors combined can significantly impede the translation and dissemination of copyrighted works, particularly in developing countries where the need for timely and affordable translations of scientific and technical materials is paramount for educational and developmental purposes[387]. The current landscape of copyright law, with its strong emphasis on protecting translation rights, can pose significant barriers to achieving this goal. Talagala[388] argues that the unbalanced protection of translation rights in developing countries' copyright laws can hinder the timely and affordable translation of these essential knowledge products. This imbalance stems from the inherent conflict between the rights of copyright holders, often residing in developed nations, and the needs of developing countries to access and disseminate knowledge in their own languages.

The act of translation introduces additional complexities into the already intricate world of copyright law. It challenges traditional notions of authorship and originality, raising questions about who holds the right to control a work that is essentially the "same" but

---

[385] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 20/21
[386] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 20/21
[387] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 20/21
[388] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 1

expressed in a different language[389]. The translator, through their creative and intellectual effort, contributes to the creation of a new work, yet their contribution is often overshadowed by the original author's claim to ownership.

The Berne Convention, a foundational international treaty for copyright protection, has played a crucial role in shaping the legal landscape for translations. Since its inception, it has undergone numerous revisions and remains a cornerstone of copyright law worldwide[390]. The Convention explicitly recognizes and protects translations of literary and artistic works, as well as official translations of legislative, administrative, and legal texts.

However, while the Berne Convention provides a framework for translation rights, the degree of harmonization in their protection varies across jurisdictions. The European Union, for instance, demonstrates only limited harmonization in this area, with member states retaining some discretion in interpreting and implementing translation rights[391]. This can lead to inconsistencies and legal uncertainties for translators and publishers operating across borders, highlighting the need for ongoing efforts to harmonize and clarify the legal status of translations within the European Union and beyond.

The protection of translation rights is not limited to the Berne Convention. The Universal Copyright Convention (UCC)[392], another major international copyright treaty, also explicitly recognizes the exclusive right of authors to authorize translations of their works[393]. This dual recognition in both the Berne Convention and the UCC solidifies the importance of translation rights within the global copyright framework and further reinforces the need for a nuanced approach to balancing these rights with the broader goals of knowledge dissemination and access.

While translations and adaptations both involve modifying existing works, it is crucial to distinguish between the two within the context of copyright law. The European

---

[389] LEE, Tong King. Translation and copyright: towards a distributed view of originality and authorship. *The Translator*, Routledge, 2020. p. 1

[390] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 16

[391] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 16

[392] Universal Copyright Convention (UCC). Geneva, September 6, 1952. Available at: https://wipolex-res.wipo.int/edocs/lexdocs/treaties/en/unesco1/trt_unesco1.pdf.

[393] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 17

Commission[394] defines translation as the act of rendering a work from one language to another, while adaptation refers to altering a pre-existing work, either copyrighted or in the public domain, to serve a different purpose. This alteration results in a new work where both the original and newly added elements are intertwined.

Understanding this distinction is essential for determining the rights and obligations of both original authors and those who create derivative works. Translations, as derivative works, generally require the authorization of the original copyright holder, while adaptations may enjoy a greater degree of freedom depending on the specific circumstances and the applicable copyright laws. This distinction becomes particularly relevant in the context of scientific translation, where the boundaries between translation and adaptation can be blurred, raising questions about authorship, originality, and the extent of copyright protection for translated works.

European Commission[395] noted that, while Article 8 of the Berne Convention grants authors the exclusive right to authorize the translation of their literary and artistic works (safeguarding the author's economic and moral interests), Articles 11 and 11ter from the same Convention also delves into specific aspects of translation rights in the context of dramatic, musical, and literary works, providing that in essence, the act of translating a copyrighted work, regardless of its genre, requires the prior authorization of the copyright holder, emphasizing the exclusive nature of this right and the importance of respecting the author's control over their creative output.

While the Berne Convention establishes the exclusive right of authors to authorize translations, it also allows for certain exceptions and limitations to this right. Notably, the Convention permits the use of works for the "sole purpose of illustration for teaching or scientific research, for noncommercial purposes"[396]. However, these exceptions are not mandatory, and their implementation varies across jurisdictions.

---

[394] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 50
[395] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 52
[396] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 66

The European Commission's study[397] found that many European Union member states do not explicitly include the translation right within the scope of the exception for scientific research. This means that even in non-commercial research contexts, obtaining authorization from the copyright holder may still be necessary to translate a work legally. This lack of clarity and harmonization regarding exceptions for scientific research can create significant barriers to the translation and dissemination of scientific knowledge, particularly in regions where resources and expertise are limited.

The right of translation, a core economic right of authors, is not as straightforward as other economic rights such as reproduction or distribution. While explicitly recognized in the Berne Convention, it is notably absent in European Union copyright directives like the InfoSoc Directive[398]. This inconsistency in legal recognition highlights the complex and often fragmented nature of translation rights within different legal frameworks[399].

At the national level, the regulation of translation rights varies considerably. Some countries explicitly acknowledge it as a distinct right, while others subsume it under the broader right of reproduction[400]. This lack of harmonization can create legal uncertainty and challenges for translators and publishers operating across borders.

Furthermore, the intersection of economic and moral rights adds another layer of complexity. While obtaining translation rights grants permission to translate a work, it does not absolve the translator from respecting the author's moral rights, such as the right to attribution and the right to integrity of the work. Additionally, the right to translate does not automatically extend to the use of other copyrighted elements within the source work, such as images or graphical elements, which may require separate authorizations[401].

---

[397] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 66

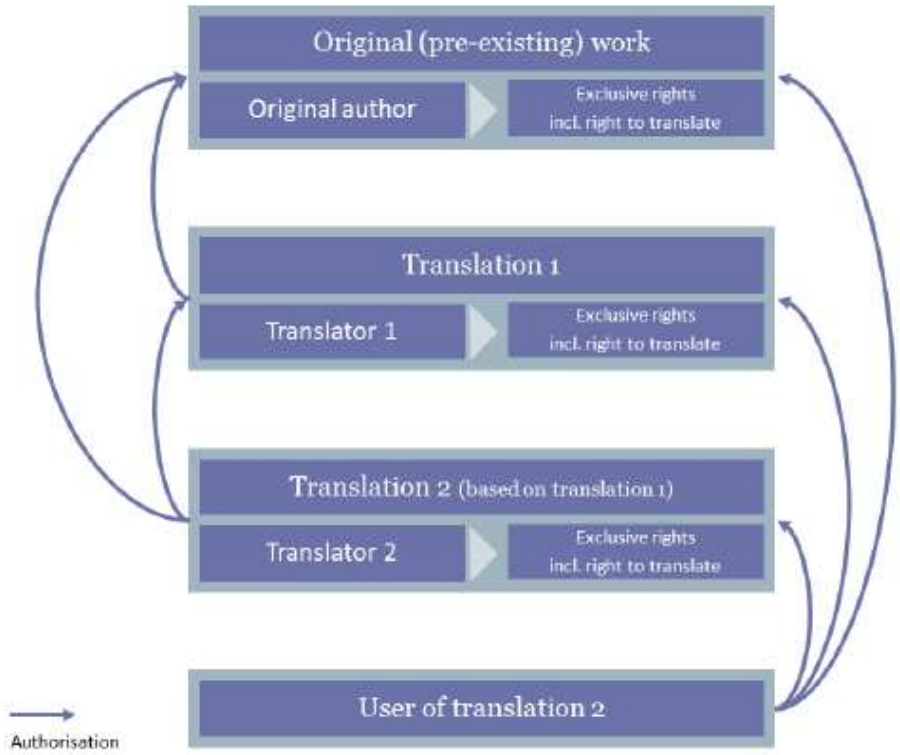
[398] EUROPEAN UNION. *Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society*. Available at: https://eur-lex.europa.eu/eli/dir/2001/29/oj.

[399] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 85

[400] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 85

[401] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 85

The Berne Convention elevates the right of translation to a "fundamental right" of the author[402]. This right empowers the author to not only translate their own work but also to authorize or prohibit others from doing so. The Commission[403] further elucidates that this authorization entails allowing a third party to transform the work into another language while ensuring the faithful communication of the original's thought, style, and message. This emphasis on fidelity underscores the importance of accurate and nuanced translation in upholding the author's intent and preserving the integrity of the original work.



Source: European Commission[404]

The above image illustrates the chain of authorization required for the use of a translated work under copyright law. The original author holds exclusive rights, including the right to authorize translations. Translator 1, upon authorization, creates Translation 1 and gains exclusive rights to it, including the right to authorize further translations. If Translator 2

---

[402] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 86

[403] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 86

[404] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 90

wishes to create Translation 2 based on Translation 1, they must obtain authorization from Translator 1 and original author. Finally, the user of Translation 2 must also seek authorization from Translator 2, Translator 1 and original author. This process highlights the complex web of rights and permissions involved in the translation and use of copyrighted works.

The principle of originality in translation and the potential for indirect infringement is highlighted in the 1853 English case Murray v Bogue.[405] In this case, the court addressed the scenario of a retranslation of a German translation taken from an original English work. Even if the re-translator was unaware of the original English source, the court suggested that such a retranslation could still constitute indirect piracy, infringing upon the copyright of the original English work[406]. This case underscores the complex and layered nature of translation rights and the potential for unauthorized translations to violate the copyright of original works, even through indirect pathways.

While unauthorized translations of copyrighted works may be subject to legal action by the original copyright holder, the determination of infringement often hinges on the commercial intent behind the translation. As in the 1995 case ZXY Music GmbH v King[407], if the translator seeks to commercialize their unauthorized work, the original copyright holder is entitled to a share of any revenues generated. However, this ruling opens for translations created without the intention of commercial gain may fall outside the scope of infringement, especially when serving a public interest, such as the dissemination of scientific knowledge.

While the Berne Convention and the TRIPS Agreement affirm the exclusive right of authors to authorize translations, they also acknowledge the importance of limitations and exceptions (L&Es) to this right. Article 9(2) of the Berne Convention, while not explicitly mentioning translation, provides a general exception for reproduction in certain special cases, provided it doesn't conflict with normal exploitation of the work or unreasonably

---

[405] UNITED KINGDOM. *Murray v Bogue* (1853) 1 Drew 353. Available at: https://vlex.co.uk/vid/murray-v-bogue-807060349

[406] EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014. p. 90

[407] UNITED KINGDOM. ZYX Music GmbH v King, (1995) 3 All E.R. 1 (22 March 1995). Available at: https://uk.practicallaw.thomsonreuters.com/D-016-1406

prejudice the author's legitimate interests[408]. This exception can arguably be extended to translation rights by implication.

The TRIPS Agreement, in Article 13, further clarifies the application of L&Es to exclusive rights, including translation rights. However, both the Berne Convention and TRIPS leave the determination of the specific scope of these exceptions to individual member countries. This results in a degree of uncertainty regarding the exact extent to which translation rights can be limited[409].

Furthermore, Talagala[410] argues that the current framework of L&Es in these agreements is unlikely to allow for broad exceptions that would enable the timely and affordable translation of scientific and technical materials in developing countries.

Copyright laws in many jurisdictions provide limitations and exceptions, such as fair dealing or fair use, that allow for the use of copyrighted material without the rights holder's permission under certain circumstances. However, the applicability of these L&Es to the translation of entire scientific and technical works, and their subsequent reproduction in large quantities, remains uncertain[411].

Fair dealing and fair use typically allow for limited use of copyrighted works for purposes like research, criticism, or education. However, these exceptions are often subject to specific conditions and limitations, such as the requirement for the use to be non-commercial and not prejudicial to the rights holder's interests. In the context of developing countries, where the need for widespread dissemination of translated educational materials is paramount, the limitations of fair dealing and fair use may not adequately address their needs.

The Berne Convention, in its Appendix to the Paris Act of 1971, offers some concessions to developing countries regarding translation rights. These countries have the option to either limit the duration of translation rights to ten years or to issue compulsory licenses for

---

[408] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 21/22
[409] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 21/22
[410] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 21/22
[411] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 23

translations[412]. However, these provisions fall short of adequately addressing the needs of developing nations in the context of scientific and technical knowledge.

The ten-year limitation and the waiting period required for issuing compulsory licenses are deemed too long for the rapid pace of scientific and technological advancements. Additionally, the administrative and procedural complexities involved in obtaining compulsory licenses can lead to delays and increased costs, further hindering timely and affordable translation efforts[413].

The complex interplay between international copyright agreements, national laws, and the varying interpretations of translation rights across jurisdictions creates a challenging landscape for knowledge dissemination. While the Berne Convention and the Universal Copyright Convention aim to protect authors' rights, the implementation of these rights at the national level often leaves room for interpretation and potential discrepancies. This can lead to inconsistencies in how translations are protected and utilized.

Cai[414] argues for a reconsideration of the role of translation within copyright law. The author emphasizes the creative nature of translation, challenging its categorization as merely a derivative work in current U.S. and international copyright law. This underestimation of the translator's creative contribution can disincentivize the production of high-quality translations, hindering knowledge exchange and cultural understanding[415].

Cai[416] suggests that a more open approach to translation, with fewer restrictions from copyright holders, could encourage the production of more and better translations. This would facilitate cross-cultural knowledge exchange and better align copyright law with its core purpose of promoting knowledge and learning. Specifically, Cai[417] proposes

---

[412] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 23/24
[413] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 24
[414] CAI, Zhengyan. More Creativity and Less Restriction: About the Relationship between Translation and Copyright. *International Journal of Social Science Studies*, v. 10, 2022. p. 85
[415] CAI, Zhengyan. More Creativity and Less Restriction: About the Relationship between Translation and Copyright. *International Journal of Social Science Studies*, v. 10, 2022. p. 85
[416] CAI, Zhengyan. More Creativity and Less Restriction: About the Relationship between Translation and Copyright. *International Journal of Social Science Studies*, v. 10, 2022. p. 85
[417] CAI, Zhengyan. More Creativity and Less Restriction: About the Relationship between Translation and Copyright. *International Journal of Social Science Studies*, v. 10, 2022. p. 85

recognizing the translator's creative efforts and shortening the period of copyright protection for translation rights as potential revisions to existing copyright frameworks.

In this context, the delicate balance between incentivizing translation through copyright protection and ensuring widespread access to translated works becomes even more critical. The legal ambiguities and inconsistencies surrounding translation rights can create significant barriers for developing countries, hindering their efforts to translate and disseminate scientific and technical materials.

As Talagala[418] emphasizes, the core issue lies in the unbalanced protection of translation rights within the copyright laws of developing countries. This imbalance often favors the interests of copyright holders in developed nations over the needs of developing countries to access and utilize knowledge in their own languages. This imbalance urges for more exploration on the legal frameworks, policy implications, and potential solutions for achieving a more equitable and effective approach to translation rights in the context of scientific knowledge dissemination. Is crucial to expound why developing countries have failed to strike a proper balance in their copyright laws between the protection of translation rights and the ability of people to access translations of copyright protected scientific and technical books and learning materials[419], a thorough examination of these issues is essential.

4.3. Language Translation Challenges

While copyright law and its exceptions, such as fair use, can provide some flexibility for translating copyrighted materials, these provisions alone may not be sufficient to address the complex challenges faced by those seeking to make scientific knowledge accessible across linguistic barriers. This necessitates a more nuanced approach that balances the interests of copyright holders with the societal need for widespread access to information, particularly in the realm of education and research.

---

[418] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 25

[419] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 25

Translating scientific and technical works into other languages for educational purposes often falls under the fair use doctrine, which allows for the use of copyrighted material without permission or payment in certain circumstances[420]. However, as Shaver[421] notes, even when engaging in fair use, it's crucial for organizations to demonstrate good faith by retaining copyright notices and attribution to the original authors and publishers.

While copyright exceptions like fair use offer some flexibility, the process of obtaining copyright permissions for translation can be a significant hurdle, particularly for smaller organizations and individuals in developing countries. As Shaver[422] points out, the costs associated with securing these permissions can be substantial. Publishers often incur expenses for legal advice and contract reviews to ensure they have the authority to grant licenses.

Moreover, the administrative burden of verifying the legitimacy of requests and negotiating terms with multiple copyright holders can be time-consuming and resource-intensive. This can create a significant barrier for those seeking to translate scientific and educational materials for non-commercial purposes, especially in regions with limited resources and infrastructure.

Taking licensing into consideration, it offers a potential pathway for accessing copyrighted works for educational use, it often comes with restrictions that can hinder the very goals of digital learning. McGevaran and Fisher[423] highlight that rights holders frequently require the implementation of digital rights management (DRM) systems as a condition for licensing their content to educational institutions.

DRM systems, designed to control access to and use of digital content, can significantly limit educational applications. For instance, they may restrict the ability to copy, print, or share materials, which are essential activities for collaborative learning and knowledge

---

[420] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 122

[421] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 122

[422] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 100

[423] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 70/71

dissemination. Additionally, DRM requirements can have a "viral" effect, spreading to other content that is incorporated into the licensed material. For example, if a teacher licenses a text with DRM restrictions, they may be compelled to restrict access to their entire course website to comply with the licensing terms.

These restrictions can disproportionately impact smaller institutions and individual users who lack the bargaining power to negotiate with content providers. Moreover, the technical and financial resources required to implement DRM systems can be prohibitive for many educational institutions, particularly elementary and secondary schools. This creates a situation where licensing requirements, while intended to protect copyright holders, can actually exclude a significant portion of the educational community from accessing and utilizing valuable digital resources.

The process of obtaining licenses for translating copyrighted materials can be a daunting task, often referred to as the "permissions maze"[424]. This labyrinthine process is particularly challenging for individuals and non-commercial institutions lacking the resources and expertise to navigate the complex world of rights clearance.

Numerous obstacles stand in the way of securing licenses. Identifying the copyright holder can be difficult, especially for older or less-known works. Even when the rights holder is identified, negotiating a license can be a lengthy and complicated process, involving legal fees and potentially restrictive terms and conditions. The financial burden of paying for a license can be prohibitive for many, especially in developing countries where resources are scarce. Additionally, compliance with other license conditions, such as restrictions on how the translated work can be used or distributed, can further limit its impact and reach[425].

These complexities and costs associated with licensing can stifle translation efforts and hinder access to scientific knowledge. The "permissions maze" not only creates practical barriers but also discourages individuals and institutions from even attempting to translate

---

[424] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 77

[425] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006.

copyrighted materials, even when their use would be permissible under fair use or other exceptions.

In contrast to the challenges posed by traditional copyright licensing, open licensing models have emerged as a powerful tool for facilitating translation and knowledge dissemination. Organizations dedicated to overcoming language barriers, such as Pratham Books and the African Storybook Project, have enthusiastically embraced Creative Commons licenses[426]. These licenses allow for the free translation and adaptation of their materials into any language, significantly expanding the reach and impact of their work.

By relinquishing exclusive control over their content, these organizations prioritize access and impact over profit, fostering a collaborative approach to knowledge creation and sharing. This open licensing model not only empowers educators across the globe to adapt and translate materials to suit their specific needs but also serves as a model for how copyright can be leveraged to promote greater accessibility and inclusivity in education.

Open-access publishing not only fosters a more inclusive and collaborative scientific community but also addresses the critical issue of affordability. Shaver[427] highlights the dual meaning of “free” in "free culture": it refers to both freedom (libre) and affordability (gratis). Books published under Creative Commons licenses exemplify this concept, being both freely available and free of charge. This model directly tackles the financial barriers that often hinder access to knowledge, particularly in developing countries where resources are limited. By removing the cost barrier, open-access publishing democratizes access to scientific knowledge, empowering individuals and institutions alike to participate in and contribute to the global scientific discourse.

Beyond simple translation, open licenses, such as those offered by Creative Commons, facilitate the adaptation of content into various formats[428]. This adaptability is particularly valuable in educational contexts, where the ability to modify and repurpose existing materials can significantly enhance learning experiences. For example, openly licensed

---

[426] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 146/147
[427] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 147
[428] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 148

textbooks can be tailored to specific courses or learning levels, while stories can be transformed into audio or audiovisual formats to cater to diverse learners, including those with visual or reading impairments.

This flexibility not only expands the reach of educational resources but also promotes a more inclusive and adaptable learning environment. By empowering educators to customize content to their specific needs and contexts, open licensing fosters a more dynamic and responsive approach to education, ultimately contributing to the democratization of knowledge.

Despite the potential of open licenses to facilitate knowledge sharing, their interpretation and application within the legal system pose significant challenges. Mizukami and Lemos[429] emphasize that correctly interpreting these licenses requires not only a deep understanding of both domestic and international law, but also a nuanced grasp of the broader context in which they are used. This includes understanding the norms and practices of the communities and actors involved in open licensing, as well as the technological and social factors that shape their application.

The complexity of open licenses, coupled with the often specialized knowledge required to interpret them correctly, can lead to misunderstandings and misapplications within legal and administrative settings. This can create uncertainty for both licensors and licensees, potentially undermining the intended goals of promoting open access and collaboration.

To ensure the effective implementation of open licensing models, it is crucial to foster greater legal awareness and understanding among stakeholders involved in knowledge dissemination. This could involve providing educational resources for creators, users, and legal professionals, as well as promoting dialogue and collaboration between different sectors to develop clearer and more accessible licensing frameworks.

---

[429] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 32

The emergence of open licensing models presents a unique challenge for legal scholarship and interpretation. Mizukami and Lemos[430] highlight the crucial role that legal scholars can play in facilitating the integration of these new models into existing legal frameworks. By analyzing how open licenses align with or challenge established legal categories, scholars can provide valuable insights for legislators, judges, and administrators, ultimately shaping a more informed and adaptable legal environment.

In Brazil, this task is particularly relevant, as the legal community has yet to fully explore the implications of open licensing for the country's legal system. Key questions remain unanswered, such as how to reconcile these new models with existing legal concepts and how to interpret international legal instruments in light of Brazil's unique legal context[431]. These challenges necessitate a collaborative effort between legal scholars, policymakers, and practitioners to develop a comprehensive understanding of open licensing and its potential impact on Brazil's knowledge ecosystem.

The concept of language as a form of intellectual property raises complex questions about ownership and control, particularly in the realm of education. Hutton[432] explores the hypothetical scenario of recognizing a language as a legally protectable entity. This raises the questions of who would own such a right, what the nature and scope of that ownership would be, and how it would be enforced.

In essence, if language were considered intellectual property, it would fundamentally alter the relationship between language communities and the knowledge encoded within their language. This could have significant implications for education, particularly in multilingual contexts where access to educational materials in diverse languages is crucial.

The concept of "language rights," recognized in some jurisdictions, raises intriguing questions about the ownership and control of language in relation to knowledge access.

---

[430] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 32

[431] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 32

[432] HUTTON, Christopher. Who owns language? Mother tongues as intellectual property and the conceptualization of human linguistic diversity. *Language Sciences*, v. 32, n. 6, 2010. p. 639

Hutton[433] explores this concept, often framed within an ecological metaphor of linguistic diversity and the notion of "language death." This metaphor is intertwined with the idea of language as a collective property owned by specific groups, potentially conceptualized as a form of legal property.

This perspective raises the question of whether language rights can be understood as a form of intellectual property, and what implications this might have for knowledge dissemination and access. If language is viewed as a property right, it could potentially be subject to restrictions and limitations, impacting the ability of individuals and communities to use and share knowledge in their own language.

The concept of language rights, as explored by Hutton[434], raises intricate questions about ownership and control, particularly in relation to indigenous and minority languages. Some proponents of language rights argue that native speakers of a language should be recognized as its collective owners, with a form of "self-ownership" that encompasses the language as a fundamental aspect of their cultural identity.

This perspective aligns with broader discussions on cultural heritage and the rights of indigenous communities. It raises the question of whether language, as a cultural asset, should be subject to legal protection and control by the community that created and nurtured it. However, this also raises complex issues regarding the definition of ownership, the scope of rights granted to language communities, and the potential conflicts that could arise between individual expression, collective rights, and the broader public interest.

The debate over language rights and ownership has significant implications for the translation of scientific knowledge. If language is viewed as a form of intellectual property owned by a specific community, it could potentially impact the ability of others to translate and disseminate scientific works in that language. This could create barriers to knowledge access for researchers and students who do not belong to the language community, highlighting the need for a nuanced approach that balances the protection of linguistic and cultural heritage with the broader goal of promoting scientific knowledge dissemination.

---

[433] HUTTON, Christopher. Who owns language? Mother tongues as intellectual property and the conceptualization of human linguistic diversity. *Language Sciences*, v. 32, n. 6, 2010. p. 642

[434] HUTTON, Christopher. Who owns language? Mother tongues as intellectual property and the conceptualization of human linguistic diversity. *Language Sciences*, v. 32, n. 6, 2010. p. 642

The debate surrounding language rights and ownership, as Hutton[435] explains, exposes a fundamental tension within intellectual property law. On one side is the liberal view of language as a public good, essential for a free exchange of ideas in a marketplace of information. On the other side is the Romantic-organicist ideal of language as collective property, intimately linked to cultural identity and deserving of protection.

However, neither of these perspectives fully captures the complex realities of language in the 21st century. The clash is not simply between modern and traditional societies, but a schism within modernity itself, as we grapple with the challenges of globalization, digital technologies, and the increasing commodification of knowledge[436].

Intellectual property law, therefore, serves as a critical arena for addressing these issues, shaping how we understand ownership, culture, agency, information, and control in a rapidly changing world[437]. Given the central role of language in these debates, a deeper engagement with linguistic theory is crucial for developing intellectual property frameworks that are equitable, inclusive, and responsive to the needs of diverse linguistic communities.

While the idea of language as intellectual property remains largely theoretical, it highlights the complex relationship between language, culture, and knowledge ownership. It also underscores the importance of considering the potential impact of language rights on access to education, information, and cultural participation, particularly for marginalized communities and those speaking less dominant languages.

While the concept of language as property raises complex questions about ownership and control, the overarching goal remains to ensure equitable access to knowledge for all. This is particularly evident in the realm of accessible formats for persons with print disabilities, where technological advancements and international cooperation have played a crucial role in overcoming language barriers.

---

[435] HUTTON, Christopher. Who owns language? Mother tongues as intellectual property and the conceptualization of human linguistic diversity. *Language Sciences*, v. 32, n. 6, 2010. p. 646

[436] HUTTON, Christopher. Who owns language? Mother tongues as intellectual property and the conceptualization of human linguistic diversity. *Language Sciences*, v. 32, n. 6, 2010. p. 646

[437] HUTTON, Christopher. Who owns language? Mother tongues as intellectual property and the conceptualization of human linguistic diversity. *Language Sciences*, v. 32, n. 6, 2010. p. 646

Legislative efforts have sought to address the challenges of translating copyrighted works for specific groups. In the United States, the Chafee Amendment[438] of 1996 simplified the process of converting books into accessible formats for print-disabled readers[439]. This amendment clarified that no permission was required from authors or publishers for such conversions, enabling organizations serving blind readers to provide access to a wider range of materials.

The Chafee Amendment served as a precursor to the Marrakesh Treaty[440] of 2013, an international agreement that specifically addresses the needs of persons with print disabilities. This treaty facilitates the creation and cross-border exchange of accessible format copies of copyrighted works, such as braille, audio, or large-print versions, among its member countries.

In conclusion, language, as an inseparable component of knowledge, plays a multifaceted role in the creation, dissemination, and utilization of scientific information. The dominance of certain languages in scientific publishing, coupled with the complexities of copyright law, creates significant challenges for accessing and translating scientific works, particularly for developing countries and marginalized communities.

Translation, in its various forms, is crucial for bridging linguistic divides and ensuring equitable access to knowledge. However, the historical and ongoing power imbalances in the global knowledge landscape, coupled with the intricacies of copyright law, often hinder translation efforts. The exclusive nature of translation rights, the financial and administrative burdens of licensing, and the ambiguities surrounding fair use and exceptions all contribute to a complex and often inequitable system.

The emergence of open initiatives, such as Creative Commons licensing and open access publishing, offers promising avenues for overcoming these challenges. These models, by

---

[438] UNITED STATES OF AMERICA. *The Chafee Amendment*: 17 U.S.C. 121 & 121A. Available at: https://www.loc.gov/nls/who-we-are/laws-regulations/copyright-law-amendment-1996-pl-104-197/

[439] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 101

[440] WIPO. *Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired, or Otherwise Print Disabled (MVT).* Geneva, 2013. Available at: https://www.wipo.int/treaties/en/ip/marrakesh/

prioritizing collaboration and knowledge sharing, can facilitate the translation and dissemination of scientific works, making them more accessible to diverse audiences.

Moreover, legal and policy reforms are essential to create a more equitable and inclusive framework for translation. This includes clarifying the scope of limitations and exceptions to copyright, developing accessible licensing mechanisms, and fostering greater collaboration between stakeholders in the translation process.

By recognizing the inherent value of linguistic diversity and investing in translation, we can unlock the full potential of scientific knowledge and ensure that its benefits are shared globally. The pursuit of knowledge is a collective endeavor, and translation plays a vital role in fostering a more inclusive and equitable global scientific community.

5. LANGUAGE DATA: IMPACTS ON LANGUAGE AND ACCESS TO SCIENTIFIC PRODUCTION

The digital age has ushered in an era of unprecedented access to information, transforming how knowledge is produced, disseminated, and consumed. The vast amounts of data generated online, including scientific publications, research data, and scholarly discussions, offer immense potential for accelerating scientific discovery and innovation. However, this wealth of information is not evenly distributed or accessible. Linguistic barriers, algorithmic biases, and the commodification of data pose significant challenges to equitable access and utilization of this valuable resource.

There is an intricate relationship between language and access to scientific production, examining how linguistic factors, technological advancements, and legal frameworks shape the availability and utilization of scientific knowledge. It is important to delve into the linguistic diversity data, as part of a better understanding surrounding the language in scientific works.

5.1. English dominance in developing countries

The dominance of English in scientific publishing poses a formidable challenge for developing countries seeking to access and utilize scientific knowledge. While English has

become the lingua franca of the global scientific community, its dominance can inadvertently marginalize researchers and scholars who are not native English speakers. This linguistic hegemony creates a significant barrier for developing countries, where English proficiency may be limited, and access to translated materials is often scarce.

The prevalence of English in scientific publishing, while facilitating global communication, presents a doubtful advantage. As Chan[441] observes, its status as a lingua franca unquestionably streamlines international collaboration and knowledge exchange, however, this "Englishisation" of science also poses risks. The encroachment of English into other languages, can threaten linguistic diversity and cultural identity. This is not just an abstract concern; countries like France have taken active measures to protect their language from being displaced by English.

The dominance of the English language itself is a significant barrier to access to scientific knowledge for developing countries[442]. While English serves as a common language for international scientific communication, this linguistic hegemony can inadvertently create disparities and limit the reach of scientific knowledge to non-English speaking populations.

For developing countries, the dominance of English in scientific publishing presents a unique set of challenges. Researchers who are not native English speakers face additional barriers to accessing and contributing to scientific knowledge. This can hinder the development of local scientific communities and limit opportunities for innovation and research in non-English speaking regions. Furthermore, the reliance on English can perpetuate existing power imbalances in the global knowledge landscape, where research produced in English is often prioritized and valued more highly than work published in other languages.

The dominance of English is particularly pronounced in the realm of science and technology, stemming from two key factors. First, Anglo-American countries hold a leading position in scientific and technological advancements, with the vast majority of research

---

[441] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 3
[442] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 10

output published in English[443]. This creates a self-reinforcing cycle where English becomes the default language for scientific communication, further solidifying its dominance.

Second, the global recognition of English as the lingua franca of science incentivizes researchers in non-English speaking countries to publish their work in English to reach a wider audience and gain international recognition[444]. This trend is further amplified by the tendency of leading academics and scholars in developing countries to partner with internationally renowned publishers based in English-speaking countries.

This dominance of English poses a significant challenge for developing countries, where the linguistic landscape is often characterized by a multitude of local languages and dialects[445]. English is not a language of general use in these regions, creating a linguistic disconnect between the global scientific community and local researchers, students, and practitioners.

This linguistic disconnect creates a significant hurdle for developing countries seeking to access and utilize scientific knowledge. As Talagala[446] states, the dominance of English in disseminating scientific and technical knowledge products, particularly those originating from developed countries, poses a substantial problem for non-English speaking nations. This linguistic barrier hinders the effective transfer of knowledge and can exacerbate existing inequalities in access to scientific and technological advancements.

This dominance is self-perpetuating. As Shaver[447] explains, even bilingual and multilingual authors in developing countries often choose to publish in English to reach a wider audience and attract the attention of publishers with greater resources and global reach. The larger potential market for English-language titles makes them more attractive investments for publishers, further fueling the demand for English language materials. This creates a cycle

---

[443] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 10
[444] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 10
[445] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 11
[446] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 12
[447] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 47

where the prevalence of English-language publications encourages more individuals to learn English, which in turn reinforces the demand for English-language content.

The linguistic landscape of publishing starkly reflects the dominance of a few major languages. Despite the existence of over seven thousand languages with established writing systems, only a tiny fraction boast commercially viable publishing industries. English reigns supreme, producing double the number of books compared to Mandarin Chinese and German combined. Other major languages like Spanish, French, and Russian, often associated with historical colonial empires, also maintain a significant presence in the publishing world[448].

While these languages collectively account for a small part of the global population, they represent the most of book publishing[449]. This stark disparity highlights the vast linguistic inequality in access to information and knowledge. The dominance of a few languages in publishing effectively marginalizes the remaining of the world's population, whose linguistic and cultural diversity is not reflected in the available literature.

The global spread of English has led to a complex linguistic landscape where the traditional concept of "native speaker" is increasingly blurred. With over 80% of English communication occurring between non-native speakers, the emergence of localized varieties like Chinese English or Hong Kong English challenges the notion of a single, standard English[450].

Furthermore, the increasing mobility of individuals and the rise of digital technologies have led to diverse linguistic identities and competencies. Some non-native speakers achieve near-native proficiency, while others self-identify as native speakers based on personal and cultural factors rather than linguistic criteria. In countries like Singapore or India, where

---

[448] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 47/48
[449] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 47/48
[450] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 102

English is widely used even in domestic settings, the concept of a native speaker becomes even more fluid and multilayered[451].

The rise of digital communication and "native speaker" has further complicated the notion of linguistic competence, as proficiency in technology becomes intertwined with language skills. This has given rise to the concept of "digital natives," individuals with advanced technological skills who excel at communicating in online environments[452].

As Sharifian[453] notes, this global spread of English and the resulting linguistic diversity have led to a "crisis of terminology" regarding what constitutes a native speaker. The traditional distinctions between native, second-language, and foreign-language users are becoming increasingly irrelevant. This linguistic evolution reflects the dynamic and ever-changing nature of language, challenging us to rethink our assumptions about linguistic identity and competence in the globalized world.

Technological innovation, particularly the rise of the internet and digital communication tools, has significantly expanded opportunities for language learning and intercultural communication. This increased exposure to English has, in turn, accelerated its global spread and led to the development of new, localized varieties of the language[454].

This phenomenon reflects the dynamic interaction between global and local forces in shaping language use and identity. As Sharifian[455] notes, the rise of intercultural communication as the default mode of interaction in the globalized world has had a profound impact on how fluency and competence in English are defined and assessed. This has led to new frameworks for understanding the competencies required for successful communication in a diverse and interconnected world.

---

[451] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 102
[452] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 102
[453] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 102
[454] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 103
[455] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 103

The evolving landscape of English usage and the growing emphasis on intercultural communication have also had a profound impact on language education. As Sharifian[456] notes, the traditional model of teaching English with a focus on native-speaker competence has become increasingly irrelevant in a globalized world where most communication occurs between non-native speakers.

Scholars and educators have recognized that effective communication in today's world requires intercultural competence, the ability to navigate cultural differences and communicate effectively across diverse linguistic and cultural backgrounds. This shift in focus has led to a re-evaluation of language teaching goals, prioritizing skills and competencies that facilitate communication in a multicultural context rather than solely striving for native-like proficiency[457].

The global spread of English and increased intercultural contact have had a profound impact on language use and communication. Sharifian[458], echoing Kramsch's observations, highlights the rise of multilingualism as a result of increased global interaction. This has led to the development of "symbolic competence," the ability to navigate and understand diverse linguistic and cultural contexts.

However, Sharifian[459] argues that globalization and the growing use of international languages like English have also spurred another crucial development: the use of a single language, such as English, to express and negotiate multiple cultural conceptualizations. This phenomenon has led to the emergence of a new type of competence, "meta-cultural competence", which refers to the ability to understand and navigate different cultural frameworks within a single language.

The evolving status of English as a global language has led to a new paradigm in language education: English as an International Language (EIL)[460]. This approach recognizes English

---

[456] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 103/104
[457] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 103/104
[458] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 105
[459] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 105
[460] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 106

as a pluricentric language, encompassing diverse varieties shaped by different speech communities around the world. Learning EIL entails appreciating this diversity at all levels, from pronunciation to the cultural conceptualizations embedded in its semantic and pragmatic meanings[461].

While this perspective may initially seem daunting for educators due to the added complexity, exposure to multiple varieties of English is crucial for preparing learners for the sociolinguistic realities of the globalized world. It not only enhances their communicative competence but also broadens their conceptual horizons by introducing them to diverse cultural perspectives[462]. This expanded understanding can foster greater intercultural communication and collaboration, which are essential skills in today's interconnected world.

The paradigm shift towards English as an International Language (EIL) has reshaped language education, emphasizing intercultural communication and the diversity of English varieties over native-speaker proficiency[463]. This shift has profound implications for English Language Teaching (ELT), particularly in developing countries.

The focus of ELT should move away from achieving native-like accents and towards fostering intelligibility and intercultural communication skills. This requires learners to develop meta-cultural competence, the ability to recognize and navigate diverse cultural conceptualizations within English. By integrating lessons on cultural conceptualizations associated with different English varieties and providing opportunities for conceptual explication and negotiation, ELT curricula can equip learners with the skills needed for effective communication in a globalized world[464].

Furthermore, this approach can empower learners by recognizing their own cultural backgrounds as valuable assets in the learning process. By reflecting on their own cultural conceptualizations, learners can develop the critical awareness and communication skills

---

[461] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 106
[462] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 106
[463] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 107
[464] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 107

necessary to engage with individuals from diverse backgrounds[465]. This shift towards intercultural competence is essential for creating a more equitable and inclusive global community, where linguistic diversity is not a barrier but a source of enrichment and collaboration.

Another concept is the English as a Medium of Instruction (EMI) which shifts towards non-English-speaking countries with significant implications for education. While EMI can provide students with exposure to the global language of academia and business, it also raises questions about the balance between content learning and language acquisition.

As Dearden[466] notes, all EMI teachers cannot be expected to possess the necessary language teaching expertise. Also, there is potential for it to replace English as a foreign language (EFL) as the primary vehicle for English language proficiency. As more academic subjects are taught in English, the demand for dedicated EFL courses may diminish. This could have implications for the role of language centers and preparatory programs[467].

Furthermore, the increasing use of EMI raises questions about the status of native English-speaking teachers. While native speakers may bring certain linguistic advantages, bilingual teachers who understand their students' cultural and linguistic context can also be highly effective. The preference for native English speakers in some institutions may lead to a "brain drain" of bilingual teachers, hindering the development of local language teaching expertise[468].

Considering the EMI, it is crucial to understand its impact on teaching, learning, and assessment. By carefully considering the potential benefits of EMI, there are many challenges about its implementation to ensure that it is used effectively to enhance student learning and development.

---

[465] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 107
[466] DEARDEN, Julie. *English as a medium of instruction-a growing global phenomenon*. British Council, 2014. p. 32/33
[467] DEARDEN, Julie. *English as a medium of instruction-a growing global phenomenon*. British Council, 2014. p. 33
[468] DEARDEN, Julie. *English as a medium of instruction-a growing global phenomenon*. British Council, 2014. p. 33

In summary, the dominance of English in scientific communication presents a complex challenge for developing countries, particularly in the context of knowledge access and participation in the scientific community around the world. While English serves as a lingua franca, its dominance can also create barriers for non-native speakers and perpetuate existing power imbalances.

However, the evolving nature of English as an International Language, with its diverse varieties and cultural conceptualizations, presents new opportunities for language education and intercultural communication. Sharifian[469] advocates for a shift in English Language Teaching towards fostering meta-cultural competence, empowering learners to navigate diverse linguistic and cultural landscapes. This shift in language education paradigms holds the potential to create a more inclusive and equitable global scientific landscape, where knowledge is accessible and relevant to all, regardless of their linguistic origin.

This evolution in language education has significant implications for developing countries, where English is often taught as a foreign language. By adopting a more intercultural approach to language teaching, educators can equip learners with the skills needed to effectively engage with the global scientific community and access the vast body of knowledge available in English, while also respecting and valuing their own linguistic and cultural backgrounds.

5.2. The Power Language Index

The Power Language Index (PLI) created by Chan[470] is a metric designed to assess the influence of languages on a global scale. The PLI considers various factors such as the number of native speakers, economic power, geographic distribution, and presence in international organizations to determine a language's overall influence.

As Chan points out, the vast majority of the world's languages have very few speakers:

> "There are over 6,000 languages spoken in the world today, but some 2,000 of them count fewer than 1,000 speakers. Moreover, just 15 account for

---

[469] SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017. p. 108/109

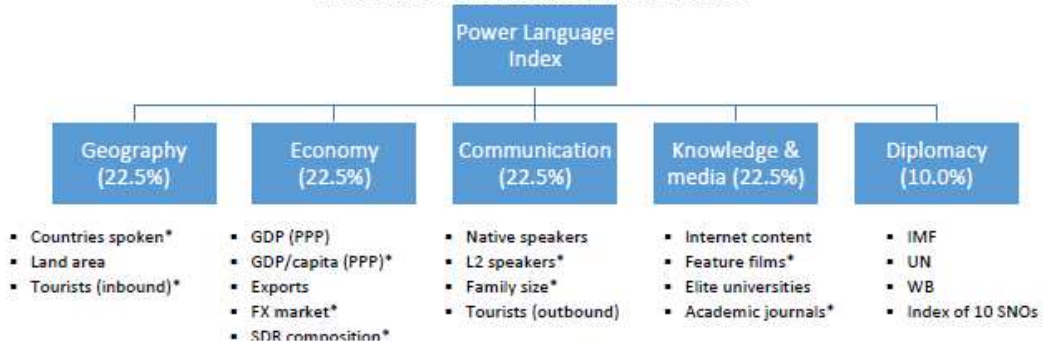
[470] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016.

> half of the languages spoken in the world. In a globalized world with multilingual societies, knowledge of languages is paramount in facilitating communication and in allowing people to participate in society's cultural, economic and social activities"[471].

Chan[472] suggests that the efficacy of a language, and by extension its associated culture, can be evaluated by examining the "opportunities" it affords its speakers. These opportunities can be broadly classified into five categories: geographic mobility, economic participation, communication reach, access to knowledge and media, and diplomatic influence.

To quantify the "opportunities" associated with different languages, Chan[473] developed the Power Language Index, a comprehensive metric that incorporates 20 indicators to assess a language's influence. The PLI evaluates a language's usefulness to a representative individual, taking into account factors such as:

FIGURE 1: POWER LANGUAGE INDEX STRUCTURE



Source: Power language index[474]

It is important to note that, for Chan[475], the PLI is not intended to measure the inherent value or aesthetic qualities of a language or its associated culture. Rather, it focuses on the practical advantages and opportunities that a language offers its speakers in terms of communication, economic participation, and access to knowledge and information.

Chan listed the 10 most powerful languages according Power Language Index:

---

[471] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 2
[472] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 2
[473] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 2
[474] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 13
[475] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 2

Table 2: Power Language Index ranking (top 10)

RANK	SCORE	LANGUAGE	NATIVE (MM)	GEOGRAPHY	ECONOMY	COMMUNI-CATION	KNOWLEDGE & MEDIA	DIPLOMACY
1	0.889	English	446.0	1	1	1	1	1
2	0.411	Mandarin*	960.0	6	2	2	3	6
3	0.337	French	80.0	2	6	5	5	1
4	0.329	Spanish	470.0	3	5	3	7	3
5	0.273	Arabic	295.0	4	9	6	18	4
6	0.244	Russian	150.0	5	12	10	9	5
7	0.191	German	92.5	8	3	7	4	8
8	0.133	Japanese	125.0	27	4	22	6	7
9	0.119	Portuguese	215.0	7	19	13	12	9
10	0.117	Hindi*	310.0	13	16	8	2	10

** If all Chinese dialects/languages (Mandarin being the largest) are considered as one it would not change the rank ordering. However, if Urdu and Hindi – and all the Hindi dialects – are taken as one it would vault it past Portuguese and Japanese.*

Source: Power language index[476]

The index reveals that English is the most influential language globally, with a score that is more than double that of Mandarin, the second-ranked language. This dominance is attributed to English being the primary language of three G7 nations and its widespread use as a lingua franca due to historical and colonial factors. French ranks third due to its significance in international diplomacy, followed by Spanish and Arabic[477].

Interestingly, the top six languages in the PLI, even when excluding the diplomacy category, also happen to be the official languages of the United Nations. The remaining four in the top ten include two of the BRIC languages (Portuguese and Hindi) and the languages of two major economic powers (German and Japanese)[478]. This reinforces the link between language, economic power, and global influence.

English stands as the undisputed lingua franca of the world, dominating global communication across all five identified opportunities: geography, economy, communication, knowledge and media, and diplomacy[479]. Moreover, English's perceived neutrality has facilitated its adoption as an official language and a means of inter-linguistic communication in diverse contexts, such as India and Singapore, creating this "Englishisation" of cultures that also raises concerns about the potential displacement of lesser-used languages and the erosion of linguistic diversity[480]. The dominance of English, while enabling global communication, may also inadvertently marginalize non-English

---

[476] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 3
[477] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 3
[478] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 3
[479] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 19
[480] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 19

speakers and create barriers to knowledge access for those who are not proficient in the language.

The PLI can be applied not only to individual languages but also to countries to assess their "language dividend"—the weighted average of PLI scores based on the languages spoken within their borders[481]. This calculation takes into account the prevalence of different languages in a country and their respective PLI scores, providing insights into a nation's linguistic competitiveness and the potential advantages or disadvantages its language profile offers in the global context.

The calculation of a country's PLI score also considers the unique role of English as the global lingua franca. Chan[482] proposes adjusting the weighted-average PLI by factoring in a nation's level of English proficiency, using the English Proficiency Index (EPI) as a measure. This adjustment allows for a more nuanced assessment of a country's linguistic landscape, recognizing that English proficiency can significantly enhance a nation's overall language dividend.

Table 2: Country PLI rank and score

RANK	COUNTRY	COUNTRY PLI	WGT AVG PLI	ADJUSTED EPI
1	Singapore	0.926	0.460	0.718
2	Canada	0.925	0.751	0.758
3	Denmark	0.901	0.090	0.811
4	USA	0.889	0.889	0.810
5	UK	0.889	0.889	0.803
6	New Zealand	0.889	0.889	0.832
7	Australia	0.889	0.889	0.827
8	Ireland	0.889	0.889	0.837
9	Barbados	0.889	0.889	0.837
10	Jamaica	0.889	0.889	0.831
11	Trinidad & Tobago	0.889	0.889	0.771
12	Netherlands	0.889	0.080	0.809
13	Israel	0.879	0.125	0.754
14	Norway	0.871	0.090	0.781
15	Austria	0.867	0.191	0.676

Source: Power language index (partially of the data)[483]

The PLI can be a valuable tool in understanding access to knowledge, as it sheds light on the power dynamics and inequalities in the global knowledge landscape. By identifying the

---

[481] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 30
[482] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 30
[483] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 30 to 33

most influential languages, the PLI reveals which languages dominate areas such as scientific publishing, international communication, and access to information. This can help to identify potential barriers for researchers and scholars who do not speak these dominant languages, particularly in developing countries where access to translated materials may be limited.

Furthermore, the PLI can help in policy decisions and interventions aimed at promoting linguistic diversity and ensuring equitable access to knowledge. By understanding which languages are most influential, policymakers and organizations can prioritize translation efforts, support multilingual publishing initiatives, and advocate for language policies that recognize and value the linguistic diversity of the global scientific community.

Ultimately, the Power Language Index serves as a reminder that language is not merely a neutral tool for communication but a powerful force that shapes access to knowledge, influences research agendas, and perpetuates or challenges existing power structures in the global scientific landscape.

5.3. Ethnologue: Languages of the World

Ethnologue[484] is a reference resource for languages of the world. It was created to provide information on the number of languages spoken in the world, their distribution, and their characteristics. Ethnologue is used by researchers, educators, and policymakers working with languages.

Ethnologue is commonly used to identify endangered languages, providing a list of endangered languages, which are languages that are at risk of disappearing. This list is used by organizations working to preserve endangered languages. Also, it aids develop language policies as it is used by governments and other organizations to develop language policies. These policies can include decisions about which languages should be used in education, government, and other domains. Additionally, contributes to conduct research on languages

[484] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: http://www.ethnologue.com.

as it is used by researchers to study languages and their relationships to each other, helping to understand the evolution of languages and the factors that contribute to language change.

Then, Ethnologue is a reference resource for making informed decisions in every language context worldwide. The following data provides important insights into how the languages are stablished.

According to the Ethnologue, there are 7,164 languages currently in use worldwide[485]. This figure, however, is not static. As the understanding of global languages expands, so too does the documented number of languages. Additionally, languages themselves are constantly evolving, shaped by the dynamic communities that use them and the ever-changing world around them. This fluidity underscores a precarious reality: approximately 40% of these languages are endangered, often spoken by fewer than 1,000 individuals. This stark contrast is further highlighted by the fact that a mere 23 languages are spoken by more than half of the global population[486].

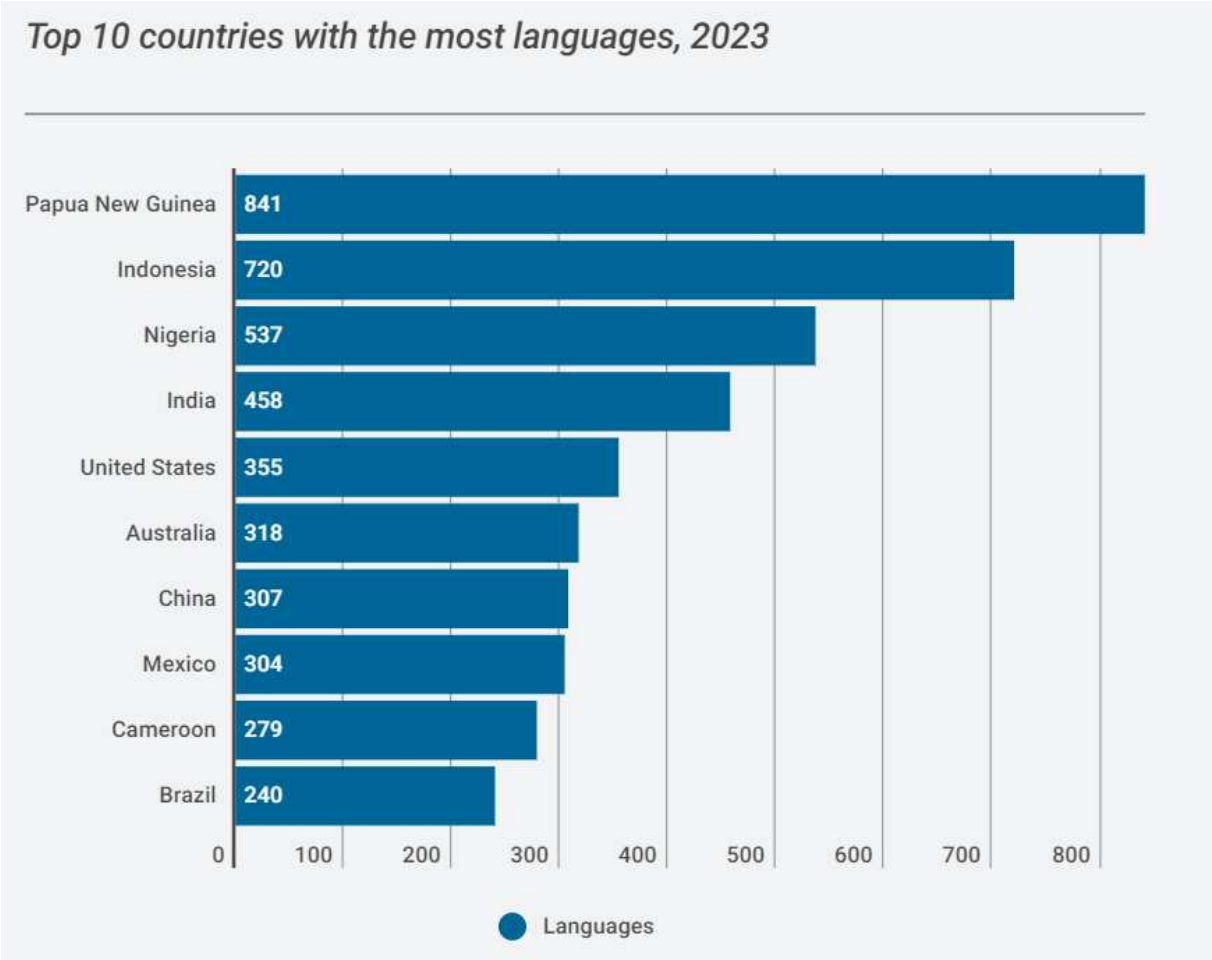
The distribution of languages worldwide is uneven, with certain regions and countries boasting significantly higher linguistic diversity than others. According to Ethnologue data, the ten countries with the greatest number of spoken languages in 2023 were Papua New Guinea (841), Indonesia (720), Nigeria (537), India (458), the United States (355), Australia (318), China (307), Mexico (304), Cameroon (279), and Brazil (240)[487]. This demonstrates a notable concentration of linguistic diversity in specific geographic areas, with Papua New Guinea alone accounting for more than 10% of the world's known languages.

---

[485] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/how-many-languages/.

[486] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/how-many-languages/.

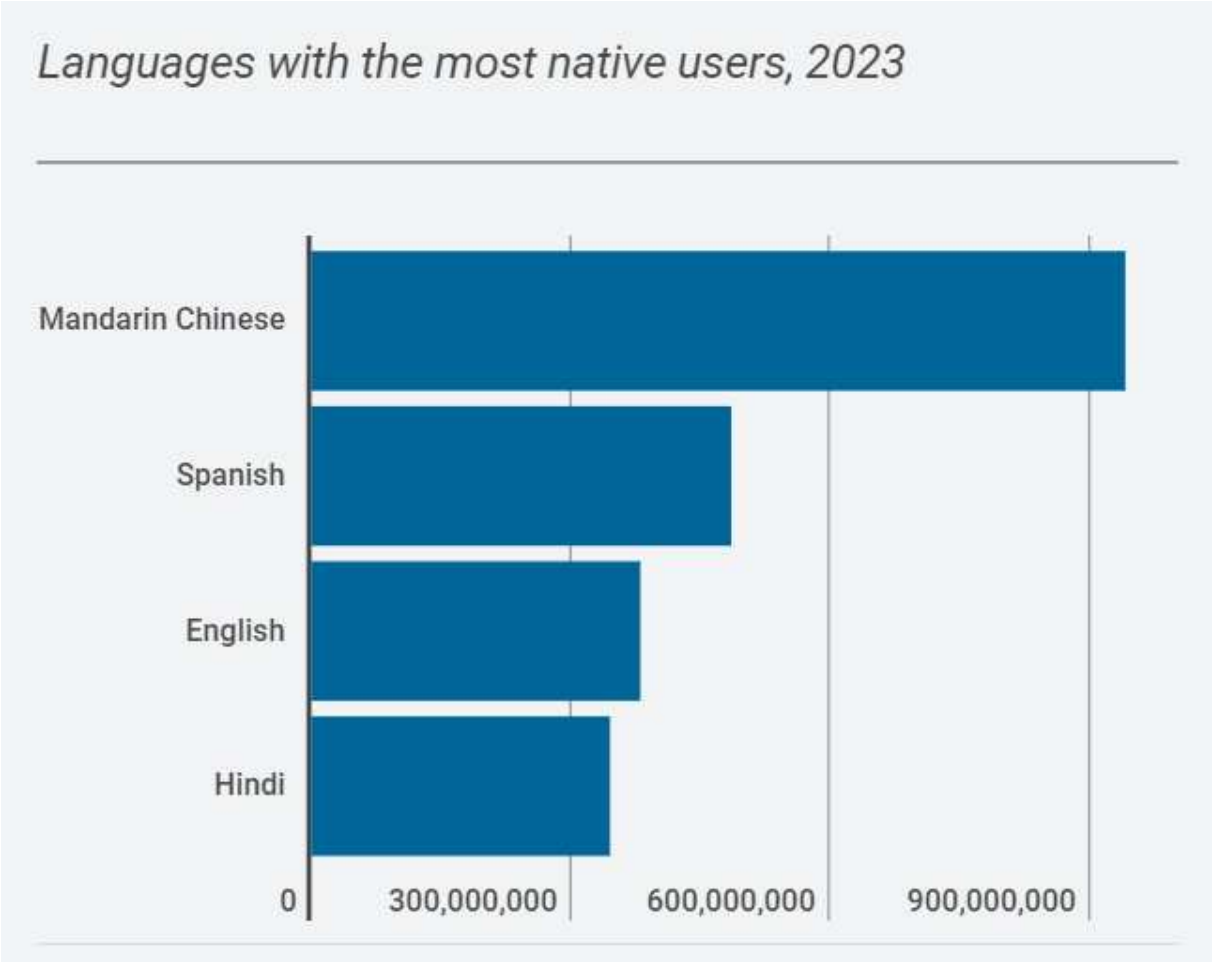
[487] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/countries-most-languages/.



Source: Ethnologue[488]

Mandarin Chinese is the most spoken language globally, with an estimated 940 million native speakers in 2023 as per the provided chart. This linguistic dominance is primarily due to China's large population. It's important to note that Mandarin is part of the broader Chinese macrolanguage, a group of 13 related languages sharing a common writing system and literary tradition. Other prominent members of this group include Wu and Cantonese, further highlighting the linguistic diversity within China itself[489].

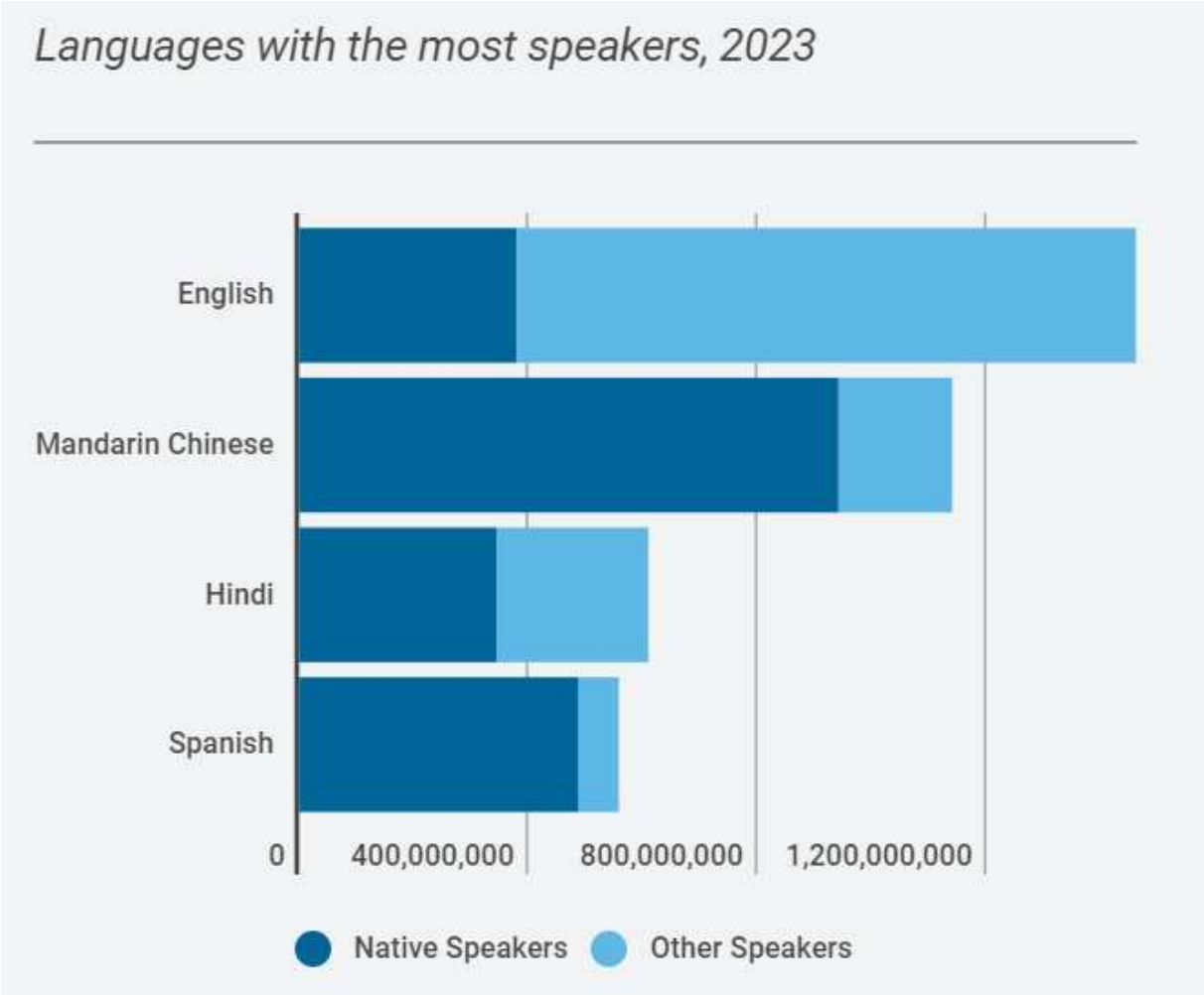
[488] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/countries-most-languages/.
[489] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/most-spoken-language/.



Source: Ethnologue[490]

The next graph showcases the global distribution of the four most spoken languages in 2023, categorized as native speakers and non-native speakers. While Mandarin Chinese boasts the highest number of native speakers, English surpasses it in total speakers, encompassing both native and non-native speakers.

[490] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/most-spoken-language/.

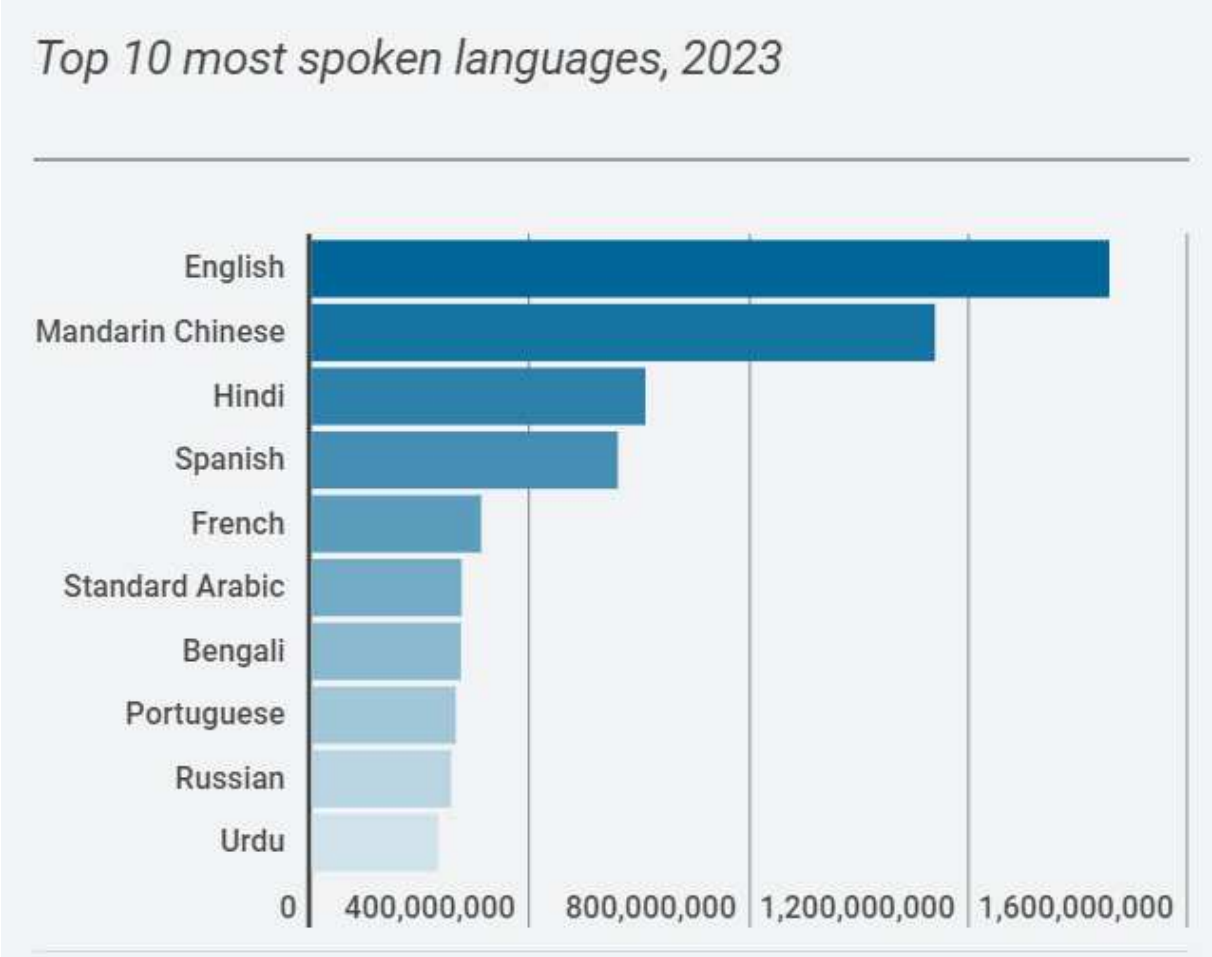


Source: Ethnologue[491]

This global dominance of English is attributed to the historical influence of the British Empire and the subsequent cultural spread of American influence[492]. Despite Mandarin Chinese having more native speakers, the widespread use of English as a second or additional language in many countries solidifies its position as the most spoken language globally.

[491] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/most-spoken-language/.
[492] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/most-spoken-language/.

The top ten most spoken languages in the world in 2023, according to Ethnologue, are:



Source: Ethnologue[493]

These languages represent a significant portion of the global linguistic landscape. English, in particular, stands out with a substantial lead over the other languages due to its status as a global lingua franca. While the provided graph showcases the top ten, there is a vast linguistic diversity that exists worldwide. This diversity is a testament to the richness of human culture and communication.

The data provided by Ethnologue paints a complex picture of the global linguistic landscape. While there is a vast diversity of languages spoken worldwide, this diversity is not evenly distributed. Certain countries, such as Papua New Guinea and Indonesia, are

[493] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/insights/ethnologue200/.

home to a disproportionately large number of languages, while other countries, like China and the United States, have fewer but more widely spoken languages.

The dominance of a few languages, notably English and Mandarin Chinese, in terms of global speaker numbers, highlights the impact of historical, cultural, and geopolitical factors on language use. This dominance, however, does not negate the importance of linguistic diversity. The thousands of languages spoken across the globe are vital repositories of cultural knowledge and identity.

5.4. Scientific Production Quantity by Language

Examining the relationship between scientific production and language is complex, as data on the language of publication for all scientific works is not readily available. However, understanding this relationship is crucial as it can shed light on potential biases and inequalities in the global scientific community. The dominance of certain languages in scientific publishing may marginalize research conducted in other languages, potentially hindering the dissemination of knowledge and limiting the diversity of perspectives in scientific discourse.

To assess scientific production, one metric could be the total number of patents in each country, as provided by WIPO PATENTSCOPE[494]. This is a reliable source, but it does not encompass all types of scientific output, such as research articles, conference papers, and books. Therefore, while patent data offers valuable insights into technological innovation and development, it presents a limited view of overall scientific productivity and language.

The Organisation for Economic Co-operation and Development (OECD) offers two pertinent indicators that provide a more nuanced perspective on scientific production. The first, the Programme for International Student Assessment (PISA)[495], assesses the scientific literacy of 15-year-olds, gauging their ability to utilize scientific knowledge to identify questions, acquire new knowledge, explain scientific phenomena, and draw evidence-based

---

[494] WIPO PATENTSCOPE. *Patentscope Database*, 2024. Available at: https://www.patentscope.wipo.int.
[495] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Science performance (PISA) (indicator)*. Science, Technology and Innovation Scoreboard (STI.Scoreboard) 2024. Online version: https://www.oecd.org/en/data/datasets/science-technology-and-innovation-scoreboard.html

conclusions about science-related issues[496]. While PISA is valuable for understanding a country's potential to absorb and apply scientific knowledge, it does not directly measure the quantity of scientific output.

The second OECD indicator, the total number of scientific publications[497], offers a broader view of scientific output. It encompasses data from a wide range of countries and attributes publications based on the authors' institutional affiliations. This indicator provides valuable insights into the quantity of scientific research produced globally.

However, when considering languages, this metric becomes less clear-cut. Several countries have multiple official languages (e.g., Canada and Switzerland), and the OECD data does not specify the language in which each publication is written. Therefore, attributing publications to specific languages becomes challenging. This lack of granularity makes it difficult to assess the precise relationship between language and scientific output using this particular indicator.

The Curtin Open Knowledge Initiative's analysis in "*Language Diversity in Scholarly Publishing*"[498] provides a closer look at the linguistic landscape of academic publications. The research, conducted by Cameron Neylon, Bianca Kramer, and Jamie Diprose, mapped 122 million objects in Crossref up to the end of May 2022, revealing interesting results[499].

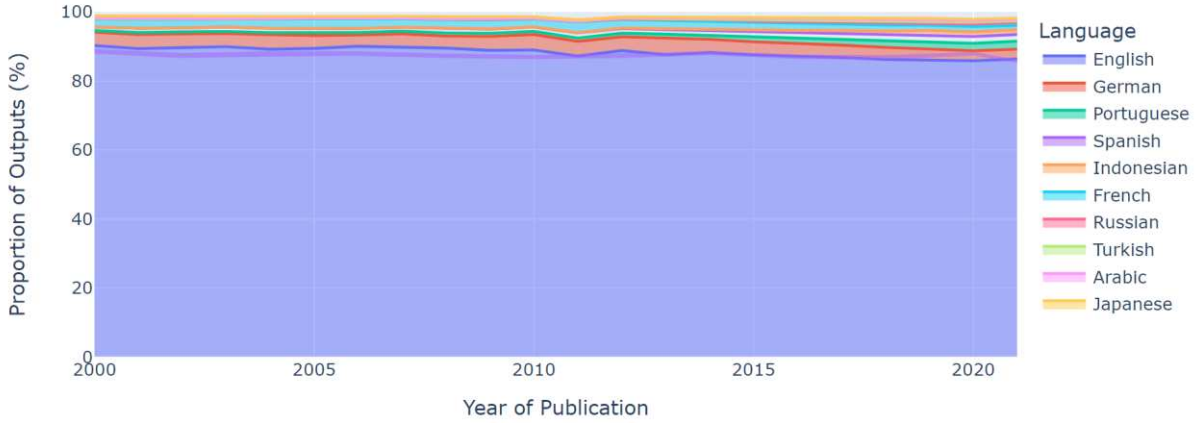
---

[496] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Science performance (PISA). 2024*. Online version: https://www.oecd.org/en/data/indicators/science-performance-pisa.html

[497] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *OECD calculations based on Scopus Custom Data, Elsevier, Version 1.2024, April 2024*. Science, Technology and Innovation Scoreboard (STI.Scoreboard) 2024. Online version: https://www.oecd.org/en/data/datasets/science-technology-and-innovation-scoreboard.html

[498] DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/

[499] DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/



500

In 2021, English overwhelmingly dominated scholarly output, accounting for 86.35% of publications. German, Portuguese, and Spanish followed at a considerable distance, with 2.86%, 2.29%, and 1.94% respectively. Other languages like Indonesian, French, Russian, Turkish, Arabic, and Japanese constituted smaller percentages, collectively representing less than 5% of publications. Notably, a remaining 1.79% encompassed all other languages, underscoring the vast diversity of languages used in scholarly communication but also highlighting the disproportionate representation of English[501].

The dominance of English in scholarly publishing raises concerns about linguistic diversity and inclusivity in the scientific community. It may create barriers for researchers who do not speak English as their first language, potentially marginalizing their contributions and limiting the dissemination of knowledge across linguistic boundaries. Efforts to promote multilingualism and support publications in diverse languages are crucial to fostering a more equitable and inclusive scholarly environment.

---

[500] DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/

[501] DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/

5.5. Language Data Discussion

This chapter has explored the intricate relationship between language and access to scientific production. The dominance of English in scientific communication, as evidenced by various metrics like the COKI Language Dataset analysis, has significant implications for the global scientific community. While English serves as a lingua franca, facilitating international collaboration and knowledge sharing, it also creates barriers for non-native English speakers, potentially marginalizing their contributions and limiting the diversity of perspectives in scientific discourse.

The concentration of scientific production in a handful of countries, as reflected in the number of publications, further highlights the disparities in research capacity and access to resources across different regions. This uneven distribution of scientific output raises concerns about equitable participation in the global scientific enterprise.

The challenges posed by language barriers and unequal distribution of scientific production necessitate concerted efforts to promote linguistic diversity and inclusivity in the scientific community. Initiatives to support multilingual publications, translation services, and language training programs can help bridge linguistic divides and foster a more equitable and representative scientific landscape.

Furthermore, the insights gleaned from indicators like the Power Language Index underscore the importance of investing in different capacities building in all countries. Specifically addressing linguistic disparities, we can create a more inclusive and collaborative scientific environment where knowledge creation and dissemination are not limited by language or geography.

Ultimately, a diverse and inclusive scientific community is essential for tackling global challenges and advancing access to knowledge. By recognizing and valuing the contributions of researchers from diverse linguistic and cultural backgrounds, we can foster a richer and more innovative scientific enterprise.

6. LANGUAGE ACCESS TO SCIENTIFIC KNOWLEDGE: THE LASK INDEX

The ease of access to academic production developed in different parts of the world can generate social impacts in the scientific and technological development of various nations, especially those in development. However, an analysis of this issue solely through the lens of discrepancies between private and social products, as highlighted by Coase[502], may not fully capture the complexities involved. Such an approach, while useful in identifying specific deficiencies, might inadvertently lead to the implementation of corrective measures that cause more harm than the original issue.

Coase argues for a broader perspective that considers the total effect of alternative social arrangements, encompassing not just market-based measures of production value but also wider societal impacts[503].

In the context of language access to scientific knowledge, a Coasian analysis would entail examining not only the direct benefits of increased access, like technological advancement and economic growth, but also the potential unintended consequences. For instance, the dominance of a particular language in scientific communication, while facilitating global collaboration, might simultaneously marginalize research conducted in other languages, leading to a loss of diverse perspectives and knowledge systems.

The unrestricted availability of scientific information enables researchers, students, and professionals from various fields to have access to a vast collection of cutting-edge research, innovative studies, and scientific discoveries relevant to the local context. This democratization contributes to collaboration between institutions and the circulation of knowledge, allowing researchers from different regions to work together to develop new technologies and solutions. This global interconnection drives scientific and technological progress, putting developing countries closer to the most advanced nations.

---

[502] COASE, Ronald H. The Problem of Social Cost. *Journal of Law and Economics*, v. 3, 1960. p. 42/43
[503] COASE, Ronald H. The Problem of Social Cost. *Journal of Law and Economics*, v. 3, 1960. p. 42/43

However, it is important to question how easy it is to access this scientific production, since barriers such as the need to pay to access it or the lack of this material translated into widely spoken languages can make this access practically impossible.

Thus, this work proposes to develop an index to measure access to scientific knowledge produced by certain languages, taking as parameters the language number of speakers and the languages in which scientific knowledge is most commonly made available. For this purpose, an index will be developed that will seek to measure the ease of access to scientific knowledge for the languages. The index will not take into account if the content is paid or free, or access limits, focusing only on the language barrier.

6.1. The LASK Index

The development of the Language Access to Scientific Knowledge (LASK) Index is of paramount importance in understanding and addressing the disparities in access to scientific information across different languages. This index strives to quantify and analyze the availability and dissemination of scientific knowledge in various languages, providing valuable insights into the linguistic landscape of scientific communication.

By employing a comprehensive system of data, an index in these field needs to seek to transform our understanding of language access to scientific knowledge and drive meaningful change towards a more inclusive and equitable global scientific community. The rationale behind should be multifaceted:

Identifying Language Barriers: The index must identify languages that are underrepresented or marginalized in scientific literature, highlighting potential barriers to knowledge dissemination and scientific participation for individuals and communities who speak those languages.

Informing Policy Decisions: By providing quantifiable data on language access to scientific knowledge, the index can inform evidence-based policy decisions aimed at promoting linguistic diversity and inclusivity in scientific communication. This could involve supporting multilingual publications, translation initiatives, and language training programs.

Fostering Equity and Inclusion: By highlighting the disparities in language access to scientific knowledge, it can raise awareness about the need for greater equity and inclusion in the scientific community. This can encourage initiatives to bridge linguistic divides and ensure that scientific knowledge is accessible to all, regardless of their language background.

Enhancing Research Collaboration: The index also may aspires to facilitate international research collaboration by identifying potential language barriers and promoting strategies to overcome them. This can lead to more diverse and inclusive research teams, fostering innovation and knowledge sharing.

Preserving Cultural Heritage: Languages are not just tools for communication; they are repositories of cultural knowledge and identity. By promoting access to scientific knowledge in diverse languages, the index can help the discussion to the preservation of cultural heritage and linguistic diversity.

The Language Access to Scientific Knowledge (LASK) Index is calculated by synthesizing data from two primary sources: Ethnologue[504], which provides the global speakers (both native and non-native) for each language, and the COKI Language Dataset[505], which offers the corresponding percentage of scholarly publications in each language. By combining these metrics, the LASK Index aims to provide a comprehensive assessment of the relationship between a language's prevalence and its representation in scientific literature.

Due to the COKI Language Dataset only providing data for 10 languages, this study has a significant constraint as it will focus only on the following languages: English, German, Portuguese, Spanish, Indonesian, French, Russian, Turkish, Arabic, and Japanese. It is important to acknowledge this limitation, as it excludes a significant number of languages and may not fully represent the global linguistic diversity in scientific publishing.

---

[504] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/language/.

[505] DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/

Table 1 – Languages by % of scholarly publishing, total of speakers and the % of speakers

Language	% of scholarly publishing	Total of speakers	% of speakers
All Languages	100.000	7,668,000,000	100.000
English	86.347	1,515,231,760	19.760
German	2.864	133,908,920	1.746
Portuguese	2.293	263,838,450	3.441
Spanish	1.945	559,520,830	7.297
Indonesian	1.373	199,002,320	2.595
French	1.268	311,575,110	4.063
Russian	0.839	255,392,520	3.331
Turkish	0.495	90,095,180	1.175
Arabic	0.430	382,899,280	4.993
Japanese	0.357	123,466,720	1.610

Created by the author based on Ethnologue[506] and COKI Language Dataset[507]

Table 1 presents a comparison of the ten languages from COKI Language Dataset in terms of their share of scholarly publishing, total number of speakers, and the percentage of the global population that speaks each language – the last created by the author using Ethnologue numbers. The data reveals a stark disparity between the dominance of English in scholarly publishing and its relative share of global speakers.

English accounts for 86.35% of scholarly publishing, far exceeding its share of global speakers (19.76%) which indicates a disproportionate representation of English in academic

[506] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/language/.

[507] DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/

literature compared to its actual speakers worldwide. The remaining nine languages collectively account for only 13.65% of scholarly publishing, suggesting a significant underrepresentation of research published in languages other than English.

Languages like Spanish and Arabic have large speaker populations (7.297% and 4.993% respectively) but relatively low percentages of scholarly publishing (1.945% and 0.430%). This discrepancy highlights the potential marginalization of research conducted in these languages.

The LASK Index is a new indicator that measures the access to scientific knowledge for different languages. It is calculated by multiplying the percentage of scholarly publishing in a language by the percentage of the global population that speaks that language. The LASK Index can be used to identify languages that are underrepresented in scientific publishing and to track progress towards greater linguistic diversity in research.

Table 2 – LASK Index: Languages by % of scholarly publishing and the % of speakers creating the LASK Score

Language	% of scholarly publishing	% of speakers	LASK Score (in %)
All Languages	100.000	100.000	100.000
English	86.347	19.760	17.063
German	2.864	1.746	0.050
Portuguese	2.293	3.441	0.079
Spanish	1.945	7.297	0.142
Indonesian	1.373	2.595	0.036
French	1.268	4.063	0.052
Russian	0.839	3.331	0.028
Turkish	0.495	1.175	0.006
Arabic	0.430	4.993	0.021
Japanese	0.357	1.610	0.006

Created by the author based on Table 1 referencing Ethnologue[508] and COKI Language Dataset[509]

Assuming all the sources numbers are correct, English has the highest LASK Score, followed by Spanish and Portuguese. German, although creates more scholarly publishing has a low percentage of speakers, culminating in a lower LASK Score. Together with French, Indonesian, Russian and Arabic, they all have relatively medium LASK Scores. Turkish and Japanese have the lowest LASK Scores.

Overall, the LASK Index shows that English is the dominant language of scientific publishing, but it is not spoken by the majority of the world's population. Also, there is a

[508] EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: https://www.ethnologue.com/language/.
[509] DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/

significant disparity between the share of scholarly publishing and the percentage of the global population that speaks each language – such as Spanish and Arabic that have large speaker populations but relatively low percentages of scholarly publishing.

The LASK Index, with the acknowledgement of the substantial constraints, can be used to promote multilingualism in scientific publishing and to ensure that research is accessible to a wider audience. The reason for this is the overrepresentation of English in scholarly publishing may lead to a bias towards research conducted in English-speaking countries and institutions, potentially neglecting valuable contributions from other regions and cultures. Additionally, the underrepresentation of research in other languages can create a barrier to accessing scientific knowledge for individuals who do not speak English, limiting their participation in the global scientific community. Moreover, the lack of linguistic diversity in scholarly publishing may hinder international research collaboration, as researchers who do not speak English may face challenges in publishing and sharing their work.

To foster a more equitable and inclusive scientific landscape, a multi-pronged approach is necessary. This includes actively promoting multilingualism by encouraging the publication of research in diverse languages, ensuring a broader representation of knowledge. Investing in robust translation services can further enhance accessibility and facilitate knowledge exchange across linguistic barriers. It is equally important to recognize and value the contributions of researchers who publish in languages other than English, cultivating a more diverse scientific community. The development of language-specific metrics can provide a nuanced understanding of linguistic diversity in research, informing targeted interventions. Finally, fostering cross-cultural collaboration can dismantle language barriers and create a truly global scientific community that harnesses the collective intelligence of researchers from all linguistic backgrounds.

The LASK Index was developed to underscore the necessity of a formal social indicator for language-specific access to scientific knowledge and to encourage global stakeholders to collect data on this issue for all languages and countries. As the research presented in this study demonstrates, this data is challenging to gather, yet it is crucial for understanding and addressing disparities in knowledge dissemination.

6.2. The Power of Social Indicators in Informing Policy Decisions

The development of social indicators as a scientific field, while rooted in earlier contributions in the 1920s and 1930s, gained significant momentum in the mid-1960s. This surge was driven by the need for comprehensive systems to monitor social transformations and assess the impact of social policies in both developed and developing nations[510].

In response to this need, extensive conceptual and methodological efforts were undertaken to develop instruments for measuring well-being and social change, often under the auspices of multilateral institutions like the OECD and UNESCO[511]. These efforts involved a wide range of actors, including universities, unions, research centers, and public planning agencies, each contributing to the refinement of tools for quantifying and qualifying living conditions, structural poverty, and other social dimensions[512].

A social indicator, as defined by Jannuzzi[513], is a primarily quantitative measure imbued with substantive social meaning. It serves to replace, quantify, or operationalize an abstract social concept of theoretical interest (for academic research) or programmatic interest (for policy formulation). In essence, a social indicator is an empirically grounded methodological tool that provides information about a specific aspect of social reality or the changes occurring within it.

For academic research, social indicators act as a bridge between the explanatory models of social theory and the empirical evidence of observed social phenomena[514]. They allow researchers to translate abstract concepts into measurable variables, facilitating the testing of hypotheses and the evaluation of social interventions.

Social indicators can be classified in a variety of ways, including simple and composite, descriptive and normative, quantitative and qualitative, objective and subjective, input,

---

[510] JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006. p. 13
[511] JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006. p. 14
[512] JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006. p. 14/15
[513] JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006. p. 15
[514] JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006. p. 15

process, and output, effort and results, performance and stock, efficiency, effectiveness, and social impact, and absolute and relative[515]. To be useful, social indicators should possess certain desirable properties, such as social relevance, validity, reliability, coverage, sensitivity, specificity, intelligibility, communicability, feasibility, periodicity, disaggregation, and historicity[516].

The availability of a comprehensive system of relevant, valid, and reliable social indicators significantly enhances the likelihood of success in formulating and implementing public policies. Such a system enables more comprehensive and technically sound social diagnoses, monitoring of actions, and evaluation of results, thereby strengthening the evidence base for policy decisions[517].

The development and implementation of social indicators specifically designed to measure language access to knowledge across different countries can significantly enhance our understanding of this complex issue and inform more effective policy decisions. By employing a diverse array of well-defined and robust indicators, we can quantify, analyze, and interpret the intricate relationship between language, the number of speakers, and overall access to knowledge. This data-driven approach can empower policymakers and stakeholders to develop targeted interventions that promote linguistic diversity, equity, and inclusion in the global knowledge landscape.

7. COPYRIGHT POWER: TRANSLATION AS A TOOL PROMOTE ACCESS TO KNOWLEDGE IN DEVELOPING COUNTRIES

The dominance of English and the complexities of international copyright law pose significant challenges for developing countries, particularly those where English is not the native language. Access to scientific knowledge, a critical factor for development and

---

[515] JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006. p. 25

[516] JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006. p. 28

[517] JANNUZZI, Paulo de Martino. *Indicadores Sociais na Formulação e Avaliação de Políticas Públicas*. Available at: http://disciplinas.stoa.usp.br/pluginfile.php/304294/mod_resource/content/1/Jannuzzi_Indicadores%20sociais%20na%20formula%C3%A7%C3%A3o%20e%20avalia%C3%A7%C3%A3o%20de%20pol%C3%ADticas%20p%C3%BAblicas.pdf. p. 8

innovation, is often hindered by linguistic barriers and legal restrictions. Researchers, students, and practitioners in these countries face significant obstacles in accessing and utilizing scientific literature published predominantly in English. This lack of access can impede their ability to participate in the global scientific community, limit their research capabilities, and hinder their efforts to address local challenges and needs.

Translation, therefore, emerges as a powerful tool for empowering developing countries and promoting equitable access to scientific knowledge. By making scientific works available in local languages, translation can bridge linguistic divides, facilitate knowledge transfer, and foster a more inclusive and equitable global scientific community. However, copyright law, while intended to protect the rights of authors and incentivize creativity, can also inadvertently create barriers to translation.

The principle of balancing copyright owners' rights with the public's access to copyrighted works is acknowledged in various international agreements, including the Berne Convention, the TRIPS Agreement, and bilateral agreements[518]. These instruments attempt to achieve this balance by granting exclusive rights to copyright holders while also providing for exceptions and limitations that allow for certain uses of copyrighted material without the need for authorization. However, the effectiveness of this balance in the context of developing countries is often questioned.

Talagala[519] argues that the current balance struck by these international agreements primarily favors the interests of developed nations. This is due to a variety of factors, including the historical dominance of Western countries in shaping international copyright law and the often divergent needs and priorities of developing nations. The limitations and exceptions provided in these agreements may not adequately address the specific challenges faced by developing countries in accessing and utilizing knowledge, particularly in areas like scientific research and education. This imbalance highlights the need for a more nuanced and flexible approach to copyright that considers the diverse contexts and developmental needs of different nations.

---

[518] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 203/204

[519] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 203/204

The "one-size-fits-all" approach to copyright protection, often promoted through international agreements, faces criticism for failing to acknowledge the diverse needs and priorities of different countries. Talagala[520] argues that imposing uniform standards of copyright protection, including translation rights, is unrealistic and illogical. Each country has unique cultural, economic, and social contexts that necessitate tailored approaches to copyright law.

In his analysis of international intellectual property rights negotiations, Drahos[521] suggests that democratic bargaining among states could lead to more efficient international intellectual property norms. However, he points out that the historical expansion of these regimes has often been driven by colonization and coercion rather than genuine democratic dialogue.

Drahos[522] highlights three key conditions for democratic bargaining: representation, full information, and non-domination. He argues that these conditions have rarely been met in past negotiations, casting doubt on the efficiency and legitimacy of resulting agreements like TRIPS. The lack of democratic process, he suggests, may have contributed to feelings of unfair treatment and ongoing criticisms of TRIPS.

This perspective raises important questions about the power dynamics and equity concerns inherent in international intellectual property negotiations. It underscores the need for a more inclusive and transparent approach to ensure that the interests of all stakeholders, particularly those in developing countries, are adequately represented and considered.

In developing countries, the focus is often on accessing and utilizing existing knowledge, rather than solely incentivizing new creation. Therefore, a rigid and uniform copyright system may not be the most effective way to promote development and access to knowledge in these regions. A more flexible approach, one that allows for greater adaptability and

---

[520] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 209

[521] DRAHOS, Peter. Negotiating intellectual property rights: between coercion and dialogue. In: *Global intellectual property rights: Knowledge, access and development*. London: Palgrave Macmillan UK, 2002. p. 179-180

[522] DRAHOS, Peter. Negotiating intellectual property rights: between coercion and dialogue. In: *Global intellectual property rights: Knowledge, access and development*. London: Palgrave Macmillan UK, 2002. p. 179-180

responsiveness to local needs, may be necessary to ensure that copyright law serves as a tool for progress rather than a barrier to it.

Talagala[523] emphasizes that the timely and affordable translation of scientific and technical materials is essential for promoting knowledge access in developing countries. However, a copyright law that stringently protects translation rights without adequate exceptions hinders this process.

The requirement to obtain authorization from copyright holders before translating or reproducing scientific and technical works can be expensive and time-consuming, making translations unaffordable and delaying their availability. This situation is exacerbated by the fact that many scientific works are published in English or other languages not widely spoken in many countries, further highlighting the need for affordable and timely translations[524].

This issue is a common challenge faced by many developing countries where multiple languages are spoken or a single local language dominates all spheres of life. The restrictive copyright environment in these countries can limit access to scientific knowledge, hindering educational opportunities, research capabilities, and overall development.

7.1. Disseminating Access to Knowledge: Rethinking Copyright Incentives

The challenges facing developing countries in accessing and utilizing knowledge necessitate a deeper exploration of the economic and legal issues at play, particularly within the context of the Global South[525]. These countries face unique realities, including limited resources, infrastructure constraints, and linguistic barriers, that can hinder their ability to participate fully in the global knowledge economy.

As the A2K movement emphasizes, equity and efficiency can be enhanced by expanding the distribution of knowledge goods and tools. This requires a critical rethinking of

---

[523] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 202
[524] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 202
[525] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 7

copyright incentives and policies to ensure that they not only protect the rights of creators but also promote broader access to knowledge, especially in developing countries.

Research focused on the specific challenges and opportunities faced by developing countries is essential for crafting effective policies that align with their developmental goals. This includes exploring alternative models of knowledge production and dissemination, such as open licensing and collaborative platforms, that can facilitate knowledge sharing and empower local communities. Additionally, it necessitates a nuanced understanding of how copyright law can be adapted to better serve the needs of developing nations, without undermining the legitimate interests of copyright holders.

The access to knowledge perspective challenges the traditional focus on intellectual property protection by raising fundamental questions about who benefits from innovation and who is excluded[526]. It critically examines the role of law in determining access to knowledge and questions whether barriers to access not only harm individuals but also have negative consequences for economic growth and future innovation.

The A2K perspective emphasizes that the true social impact of innovation lies in its diffusion and application. When knowledge is widely and rapidly disseminated, it can significantly improve social welfare, particularly in areas like health, education, and security. Moreover, broad access to knowledge is crucial for economic growth, as businesses need access to new technologies, ideas, and information to reach their full productive potential. Thus, from a public good perspective, ensuring widespread and timely access to knowledge is essential for both social and economic progress.

While the strengthening of intellectual property rights is often touted as a catalyst for creativity and cultural development, Díaz[527] argues that it is not the sole determinant. Creativity thrives in an environment where creators can freely access and draw inspiration from the vast cultural and scientific heritage of humanity. The ability to use, reuse, remix, and even copy existing works is essential for generating new ideas and expressions.

---

[526] SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011. p. 3

[527] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 131

Therefore, copyright protection must strike a delicate balance between incentivizing creation and ensuring access to the building blocks of creativity. Excessive protection can stifle innovation by restricting access to cultural heritage and limiting the creative possibilities for new works. The social dissemination of knowledge and cultural works is as crucial for innovation as the appropriability of creative products.

Peter Drahos and John Braithwaite presents a critical perspective on stronger IP protection necessarily leads to greater innovation and societal benefit. They argue that intellectual property rights can be a force for both good and ill, and their impact on society hinges on the democratic nature of the decision-making processes surrounding them[528].

They highlight the potential for IP rights to be used to further private interests at the expense of the public good. They criticize the "*corruption of the public purposes of universities*" as they increasingly prioritize the pursuit of property rights over the free dissemination of knowledge[529]. In his view, universities should be rewarded for fostering open research environments and contributing to the public domain, rather than solely focusing on patent acquisition and revenue generation.

Furthermore, the authors draw attention to the negative consequences of an overly commodified knowledge system. The current landscape to "*information feudalism*," where scientists become "*vassals of knowledge corporations*," their research agendas dictated by commercial interests rather than the pursuit of knowledge for the public good[530]. This commodification of knowledge restricts access to information, particularly for researchers in developing countries, and stifles creativity and innovation.

In contrast to the view that intellectual property rights are the primary driver of innovation, Drahos and Braithwaite emphasize the historical significance of public institutions, particularly universities, in fostering a culture of innovation[531]. They contend that creativity has flourished throughout history in the absence of strong IP rights, and that public

---

[528] DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002. p. 189
[529] DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002. p. 189
[530] DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002. p. 201
[531] DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002. p. 212

investment in open research environments is more likely to yield knowledge that benefits society as a whole[532].

This perspective raises important questions about the role of intellectual property in promoting development and access to knowledge, particularly in the context of scientific research and education. By challenging dominant narratives about IP and advocating for a more nuanced understanding of its impact, there is a broader conversation about how to create a more equitable and inclusive global knowledge system.

This balance is particularly critical in developing countries, where access to existing knowledge and cultural resources can be a significant factor in driving creativity and innovation. By ensuring a vibrant public domain and allowing for reasonable uses of copyrighted works, copyright law can play a vital role in promoting cultural development and empowering local creators to contribute to the global knowledge landscape.

The political economy of IP systems, particularly in Latin America, is often shaped by the interests of powerful industries such as pharmaceuticals, biotechnology, software, and entertainment. These groups have actively supported free trade agreements that strengthen IP protection, a trend further reinforced by the United States' vigilant monitoring of these agreements[533].

In this context, Latin American countries face a significant challenge in developing a dynamic competitiveness based on knowledge and innovation. While strong IP rights can incentivize investment and protect domestic industries, they can also create barriers to entry and limit access to knowledge and technology, particularly for smaller players and developing economies.

To overcome these challenges and harness the benefits of a knowledge-based economy, Martínez-Piva[534] argues that Latin American countries must take a proactive approach to science and technology policies. This involves investing in research and development,

---

[532] DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002. p. 214/215

[533] MARTÍNEZ-PIVA, Jorge Mario. *Knowledge Generation and Protection*. New York: Springer, 2009. p. viii

[534] MARTÍNEZ-PIVA, Jorge Mario. *Knowledge Generation and Protection*. New York: Springer, 2009. p. viii

promoting the generation of high-value-added products and processes, and upskilling the workforce to move up the technological ladder. In essence, active public policies that prioritize science and technology are crucial for Latin American countries to compete effectively in the global market and achieve sustainable development in the face of increasingly stringent IP regulations.

The implementation of copyright provisions in Latin American and Caribbean countries requires a cautious and balanced approach. Díaz[535] warns that an excessive strengthening of digital property rights, without adequate enforcement of exceptions and limitations as outlined in international treaties like the Berne Convention, can have detrimental consequences. Such overprotection can not only hinder the dissemination of information and communication technologies (ICTs), which are crucial for development, but also inadvertently encourage digital piracy and fuel the illegal economy.

This unintended consequence arises because overly restrictive copyright laws can limit access to legitimate and affordable digital content, pushing consumers towards illegal alternatives. A balanced approach to copyright, one that protects creators' rights while ensuring reasonable access through exceptions and limitations, is essential for fostering a healthy digital market and promoting both innovation and access to knowledge.

To effectively address the issue of the lack of access to books and reading materials, Shaver[536] identifies four key challenges that must be overcome: reaching readers who cannot afford current prices, serving a more diverse population, developing new titles in neglected languages, and creating more cost-effective distribution methods for both print and digital formats. These challenges highlight the complex interplay of economic, social, and linguistic factors that influence access to knowledge.

For developing countries, a more strategic approach to addressing copyright limitations may be to negotiate specific concessions tailored to their unique needs and contexts. Talagala[537]

---

[535] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 126

[536] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 12

[537] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 209

suggests that focusing on narrow exceptions for specific uses (e.g., translation and reproduction of translations), subject matter (e.g., scientific and technical materials), and users (e.g., students) could be more effective in achieving a balance between copyright protection and access to knowledge.

This approach recognizes the reality that broad exceptions may face resistance from copyright holders, particularly in developed countries where there are concerns about potential loss of revenue and control over their works. However, by focusing on specific areas where the potential for economic harm is limited, such as translations into languages with small markets, developing countries may be able to secure concessions that significantly enhance access to scientific knowledge without unduly compromising the rights of copyright holders.

Additionally, focusing on specific categories of users, such as students, can further mitigate concerns about the potential for unauthorized commercial exploitation of translated works. By tailoring copyright exceptions to the specific needs and circumstances of developing countries, it is possible to create a more equitable and effective framework for knowledge dissemination that benefits both creators and users.

The complex landscape of international copyright law, shaped by treaties, agreements, and diverse national implementations, requires a nuanced approach that acknowledges the differing realities faced by various countries. Shaver[538] advocates for a more tailored approach to exceptions for translations, recognizing that language markets vary significantly in size and economic viability. In particular, she highlights the need for special treatment of "neglected languages," those with limited commercial potential, to ensure that their speakers are not left behind in the global knowledge economy.

This perspective aligns with the broader critique of the "one-size-fits-all" approach to copyright protection, which often prioritizes the interests of developed countries and dominant languages. Recognizing the unique challenges faced by speakers of neglected languages, and providing them with tailored exceptions and support mechanisms, is crucial for promoting linguistic diversity, equitable access to knowledge, and cultural preservation.

---

[538] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 140

The concept of copyright exceptions, whether they allow for free or paid use of copyrighted material, plays a central role in balancing the interests of copyright holders with the broader public good[539]. These exceptions recognize that certain uses of copyrighted works, such as for educational or research purposes, can benefit society without unduly harming the rights holder.

To strike a balance between copyright protection and access to knowledge, international copyright agreements have established a framework of limitations and exceptions (L&Es) that allow for certain uses of copyrighted material without the need for authorization. Díaz[540] identifies several key areas where L&Es are crucial for promoting access to knowledge:

Personal Use: The right to make copies of copyrighted works for personal use is a fundamental exception that allows individuals to enjoy and engage with cultural and informational content.

Educational Purposes: Reproduction of copyrighted works for educational purposes is another essential exception, facilitating teaching, learning, and research activities.

Press Freedom: The ability for the press to reproduce articles on political, religious, and scientific topics is vital for informing the public and fostering democratic discourse.

Ephemeral Recordings: This exception allows broadcasters to make temporary recordings of their broadcasts for technical or archival purposes.

Libraries: Libraries play a crucial role in collecting, preserving, and disseminating knowledge. Exceptions that enable libraries to reproduce works for preservation, replacement, or other legitimate purposes are essential for ensuring their continued operation and contribution to society.

---

[539] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 131

[540] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 137/138

Access for Disabled People: Exceptions that allow for the adaptation of copyrighted works into accessible formats for individuals with disabilities are vital for ensuring equal access to information and cultural participation.

Software Interoperability: The ability to make copies of software for the purpose of achieving interoperability is important for promoting competition and innovation in the software industry.

As Díaz[541] highlights, the role of libraries is particularly crucial in the context of L&Es. He emphasizes the need to clarify ambiguities in legislation to discourage unauthorized mass photocopying while also strengthening the ability of libraries to reproduce works for legitimate purposes, such as preservation and replacement. This approach ensures that copyright law serves not only the interests of copyright holders but also the broader public interest in accessing and utilizing knowledge.

Latin American countries face a complex situation when implementing copyright exceptions, such as fair use for personal purposes or reproduction for educational and scientific research, established in the Berne Convention and WIPO agreements[542]. These countries are under pressure, both externally and internally, to strengthen copyright protection, which could result in a rigid implementation of these agreements.

Such rigidity risks limiting exceptions and allowing for the indiscriminate use of technological protection measures (TPMs), potentially negating the flexibility envisioned by the Berne Convention, TRIPS Agreement, and WIPO[543]. While this approach tries to deter piracy, it could actually increase the social costs of accessing information and knowledge, stifle competition, and hinder innovation and creativity.

---

[541] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 137/138

[542] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 130

[543] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 130

As technology continues to evolve, Reichman and Okediji[544] argue that the current IP framework, with its emphasis on exclusive rights, is not conducive to the open and collaborative nature of scientific inquiry. Specifically, they point out that exclusive rights may not provide the optimal incentives for upstream research, where the focus is on generating new knowledge and discoveries that have broad societal benefits.

This disconnect between IP rights and the needs of the scientific community has led to calls for policy reforms that would better align with the realities of modern research practices. The authors[545] emphasize the importance of ensuring that intellectual property laws, both domestic and international, do not hinder the use of innovative tools and technologies that can accelerate scientific progress. Such tools, like automated knowledge discovery mechanisms, are essential for tackling complex social and environmental challenges, and their potential should not be stifled by outdated or restrictive IP regimes.

Courts and policymakers have a crucial role to play in ensuring that the right to science and culture, intertwined with access to knowledge, is upheld. While achieving this is a complex task that requires coordinated efforts across various policy domains, such as education, culture, and technology, Subramanian and Shaver[546] emphasize that judicial review can be a powerful tool for addressing specific instances where government action hinders access to knowledge.

Intellectual property laws, in particular, can sometimes impede wider access to new technologies or cultural content. When these laws act as barriers to knowledge dissemination, they should be scrutinized as potential limitations on the right to science and culture, as well as other relevant rights like health, education, and food. While not every limitation necessarily constitutes a violation of these rights, recognizing the human rights implications of intellectual property laws can encourage a more balanced approach that

---

[544] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1479/1480

[545] REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012. p. 1479/1480

[546] SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011. p. 11

considers both the interests of creators and the broader societal benefits of knowledge access[547].

The establishment of regional organizations can serve as a crucial step in addressing the disparities in access to knowledge between developed and developing countries[548]. These organizations can play a pivotal role in removing barriers to knowledge access and facilitating meaningful participation in high-level policy debates.

Developing countries, often at a disadvantage in international negotiations due to limited resources and bargaining power, can find strength in numbers through regional alliances. By working together, they can amplify their voices and advocate for policies that prioritize their unique needs and development goals.

Furthermore, regional organizations can help to bridge the gap in understanding between developed and developing countries regarding the purpose of intellectual property rights. While developed countries often push for stricter IP standards to protect their economic interests, developing countries require flexibility and room for experimentation to "catch up" and build their knowledge economies[549].

By fostering cooperation and dialogue among developing nations, regional organizations can play a vital role in promoting a more equitable and inclusive global knowledge landscape. They can advocate for policies that balance the interests of creators and users, ensuring that intellectual property rights are not used as a tool for exclusion but rather as a means to promote access to knowledge and foster development.

To address the complex challenges surrounding translation and copyright, Shaver[550] proposes three potential solutions:

---

[547] SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011. p. 11

[548] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 14

[549] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 14

[550] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 134/136

Specific Copyright Exceptions for Charitable Translation: This solution would eliminate the costly and time-consuming process of obtaining copyright permissions for charitable translations. By allowing for free translation into neglected languages, this exception would promote greater access to educational and cultural materials without harming the economic interests of copyright holders in established markets.

Copyright Exception for Machine Translation: As machine translation technology advances and becomes capable of accurately translating entire libraries of educational and informational materials, a copyright exception for this purpose can remove legal barriers that might hinder the development and deployment of this technology. This would enable wider and faster dissemination of knowledge across languages, particularly in regions with limited translation resources.

Broader Translation Exceptions for Neglected Languages: This solution would create a general exception that allows for the free translation and reproduction of works in neglected languages, as long as the original creators are credited. This would incentivize the creation and translation of works in these languages, promoting linguistic diversity and cultural expression. It would also provide greater access to educational materials and other resources for communities whose languages are underrepresented in traditional publishing.

Also, legal reforms are necessary to clarify and expand the scope of educational uses of copyrighted material. McGevaran and Fisher[551] suggest that these reforms can be categorized based on their scope, ranging from narrow, targeted amendments to more comprehensive and transformative solutions.

Narrow amendments, often referred to as "rifle-shot" changes, offer the advantage of being more politically feasible and achievable in the short term. However, their impact may be limited in addressing the broader challenges of digital learning and access to knowledge.

---

[551] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 92

On the other hand, more radical reforms, while potentially transformative, may face significant political opposition and resistance from copyright holders[552].

The optimal approach to legal reform in this context is likely a combination of both narrow and broader solutions. Targeted amendments can address specific issues and provide immediate relief for educators and students, while broader reforms can tackle the systemic challenges posed by copyright law in the digital age. However, as McGevaran and Fisher[553] emphasize, the success of any legal reform ultimately depends on the specifics of its implementation. Careful consideration must be given to the precise parameters of each exception or limitation, ensuring that they are clear, balanced, and effectively address the needs of both creators and users of copyrighted material.

A more radical, yet potentially effective, solution to the challenges posed by copyright restrictions in the educational context could involve implementing a compulsory licensing scheme specifically tailored for educational uses of content. Such a system would allow for broader use of copyrighted materials in educational settings, subject to fair compensation for rightsholders. However, as McGevaran and Fisher[554] point out, formulating the details of such a scheme requires extensive research, dialogue, and negotiation among various stakeholders, including copyright holders, educators, and legislators. The specific parameters of such a compulsory licensing system, including the scope of permissible uses, the calculation of compensation, and the mechanisms for dispute resolution, would need to be carefully designed to ensure a fair and balanced outcome for all parties involved.

To maximize the benefits of intellectual property in developing countries, Martinez-Piva[555] proposes three key solutions:

---

[552] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 92

[553] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 92

[554] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 98

[555] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 310

Implement flexible IP legislation: Developing countries should implement intellectual property laws that comply with international agreements like TRIPS but also utilize the available flexibilities to balance incentives for innovation with access to knowledge and cultural heritage. This means ensuring that IP protection does not hinder public health initiatives or create unreasonable barriers to accessing essential goods and services.

Develop complementary public policies: A comprehensive approach to IP should include complementary public policies that support innovation, education, competition, and consumer rights. These policies can create a more balanced and equitable environment where IP rights are not the sole drivers of innovation, but rather work in conjunction with other social and economic goals.

Treat IP as a multi-sectoral issue: Intellectual property should not be viewed as the exclusive domain of IP protection agencies. Ministries of health, innovation, science, and technology should also be involved in shaping IP policies, ensuring that they align with broader national development goals. Additionally, fostering a transparent and inclusive institutional framework that allows for the expression of diverse interests, from IP holders to consumers and users, is crucial for achieving a balanced and equitable IP system.

To address the challenges and maximize the benefits of intellectual property in developing countries, a multi-pronged approach is needed, focusing on both strengthening internal capabilities and strategically navigating international agreements.

First, investment in knowledge-intensive activities is crucial. This includes not only university and postgraduate education but also on-the-job training to ensure a skilled workforce that can adapt to new technologies and meet the evolving demands of the market[556].

Second, developing and strengthening innovation systems is paramount. This involves bolstering public institutions responsible for science, technology, and innovation policy, as

---

[556] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 311/312

well as increasing R&D activities across universities, research centers, and the private sector[557].

Third, strategically managing trade liberalization is key. This entails promoting exports with higher value-added, attracting transnational corporations that contribute to technology transfer, and strengthening the capacity of local firms to engage in global value chains[558].

It's important to note that addressing the challenges of IP and development goes beyond intellectual property alone. A range of complementary policies, including trade, education, and investment strategies, can significantly impact a country's technological and innovative capabilities. The combination and balance of these measures will ultimately determine whether a country can leverage IP to achieve sustainable development and create a knowledge-based economy[559].

To effectively disseminate translated scientific knowledge, particularly in developing countries, addressing the copyright licensing dilemma is crucial. Shaver[560] suggests that solutions such as blanket licensing, fair use, copyright exceptions, and open licensing hold the potential to unlock existing resources and facilitate the translation process. Once translations are created, digital distribution can rapidly and economically scale their reach, ensuring broader access to the knowledge contained within them. However, establishing effective print distribution channels may require more time and investment due to the logistical challenges involved.

The expansion of the digital economy in Latin America presents unique opportunities for the mass production and distribution of digital public goods. The growth of e-government

---

[557] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 311/312

[558] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 311/312

[559] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 311/312

[560] SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020. p. 183/184

initiatives and the increasing use of digital technology by universities, research centers, and NGOs have led to a surge in the availability of public and freely accessible content online[561].

Furthermore, the emergence of new digital industries, such as internet service providers and search engines, whose business models rely on widespread access to information, further reinforces the importance of promoting an open and accessible digital ecosystem[562]. Public policies should encourage the development of these industries while ensuring that intellectual property legislation is applied in a manner that supports digital inclusion, innovation, and creation.

The expansion of the public domain through digitalization, the availability of public information online, and the growth of digital libraries can help to harmonize the goals of intellectual property protection with those of promoting access to knowledge[563]. By making a vast amount of information freely available, these initiatives can create a more inclusive and equitable environment for learning, research, and innovation.

Moreover, as Rovira-Esteva *et al.*[564] note, open access to scientific literature has the potential to increase the citation impact of research, further incentivizing open sharing and contributing to the overall advancement of knowledge. While demonstrating a clear causal link between open access and increased citations may be challenging, the "open access advantage" remains a promising author incentive to promote free access to scholarly literature and its associated public benefits.

---

[561] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 132

[562] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 132

[563] DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 132

[564] ROVIRA-ESTEVA, Sara; OLALLA-SOLER, Christian; AIXELÁ, Javier Franco. Open access in translation and interpreting studies: A bibliometric overview of its impact (1996-2015). *Meta*, 2021. p. 551

Despite the progress made by open initiatives, there are potential pitfalls in assuming that the current momentum towards open access is self-sustaining. Mizukami and Lemos[565] identify two potential "traps" that could lead to complacency and hinder further progress:

The Trap of Complacency: This trap involves focusing solely on the current successes of the free software movement and the resilience of information sharing in the face of restrictive copyright laws. While these achievements are noteworthy, it would be a mistake to assume that an open future is guaranteed. Technological and legal landscapes are constantly evolving, and new challenges to access to knowledge may arise.

The Trap of Overreliance on Licensing: This trap involves believing that innovative licensing models alone, such as Creative Commons, are sufficient to ensure a free flow of information and knowledge. While these licenses are powerful tools for change, they operate within a broader institutional environment that may be hostile to their long-term viability. Legal frameworks, technological constraints, and economic incentives can all influence the effectiveness of open licensing, and relying solely on these mechanisms may not be enough to achieve the desired outcomes.

Both traps can lead to political inaction, which would be detrimental to the A2K movement's goals. The complexity of the issues surrounding copyright, technology, and knowledge access necessitates ongoing research, dialogue, and advocacy to ensure that the progress made towards a more open and equitable knowledge ecosystem is not reversed.

To fully embrace the potential of innovation in the knowledge economy, it is crucial to recognize and harness the four key drivers of innovation: scientific advancements, user-based networks, modularity, and information and communication technologies (ICTs)[566]. The OECD[567] emphasizes that the education sector has often neglected the transformative potential of these forces, focusing instead on incremental improvements rather than radical change.

---

[565] MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010. p. 36

[566] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 94

[567] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 94

A major innovation policy challenge lies in balancing increased effectiveness with the preservation of the public dimension of knowledge. While measures like increased research funding and collaboration with industry can enhance innovation, it is equally important to safeguard the open and collaborative nature of knowledge creation and dissemination. This "public dimension" refers to a knowledge space free from private appropriation, where information is openly shared and collaboratively developed[568].

To achieve this balance, policymakers must adopt a Schumpeterian approach that embraces disruptive innovation and seeks to move the education system into a new era[569]. This involves considering the principles of open collaboration, knowledge sharing, and user-driven innovation in the design and implementation of educational policies.

Promoting open translation aligns with the OECD's[570] "three E's" of public action for knowledge production: externalities, equity, and expertise. By removing linguistic barriers and facilitating the free flow of information, open translation generates positive externalities, promotes equitable access to knowledge, and empowers diverse communities of expertise.

7.2. Brazilian Panorama: Portuguese Language Barrier and Copyright Limitations and Exceptions

The dominance of English in scientific publishing and international communication is a well-established fact. However, the linguistic landscape is not static. As Talagala[571] notes, just as Latin once held a position of prominence in the past, English's current dominance may not be permanent.

Portuguese, although boasts a vast geographic reach and it is spoken on four continents[572], does not have the influence like English. Its linguistic proximity to Spanish, another major

---

[568] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 95
[569] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 95
[570] ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004. p. 90/91
[571] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 14
[572] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 27

language, can amplifies its potential impact. The resurgence of Portuguese in East Timor, defying the trend of "Englishisation" demonstrates the potential for languages to reclaim their prominence in specific contexts[573].

Brazil, as a member of the BRIC nations, plays a crucial role in the trajectory of the Portuguese language[574]. The country's economic and cultural influence is contributing to the growing global significance of Portuguese. This has important implications for access to scientific knowledge, as it opens up opportunities for the production and dissemination of research in Portuguese, reaching a wider audience and fostering greater linguistic diversity in the scientific community.

Limitations and exceptions to copyright law play a crucial role in promoting access to knowledge in Brazil, especially in the face of the digital revolution and the challenges faced by developing countries. Mizukami *et al.*[575] highlight two key reasons for the significance of L&Es in this context:

Addressing Technological Upheavals: L&Es are essential for adapting copyright law to the rapid changes brought about by new information and communication technologies. They enable society to transition from being mere consumers of information to active users, harnessing the creative potential of these technologies while mitigating their disruptive impact on traditional copyright-based business models.

Promoting Development in Developing Countries: L&Es are a matter of national development policy for countries like Brazil, where access to knowledge is often limited by economic constraints. By allowing for certain uses of copyrighted material without authorization, L&Es can ensure that knowledge goods are accessible to a wider audience, particularly those who cannot afford to purchase them. This promotes educational opportunities, fosters creativity, and contributes to overall social and economic development.

---

[573] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 27
[574] CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016. p. 27
[575] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 41/42

Brazil's approach to copyright law has deep historical roots in criminal law, with the Imperial Criminal Code of 1830 establishing the first reproduction right and imposing criminal sanctions for unauthorized reproduction. Interestingly, both the reproduction right itself and its duration were initially defined within the framework of criminal law[576]. This emphasis on criminal enforcement highlights the historical importance placed on protecting authors' rights and deterring unauthorized copying in Brazil.

The historical grounding of copyright in criminal law has led to a unique situation in Brazil, where mass copyright infringement is often met with criminal prosecution[577]. While other countries grapple with the appropriateness of criminalizing every act of copyright infringement, this debate is largely absent in Brazil, where such practices have been the norm since the 19th century. This approach reflects a strong emphasis on protecting authors' rights, but it also raises concerns about the potential for overreach and the criminalization of everyday activities in the digital age.

Brazil's approach to limitations and exceptions (L&Es) in copyright law has its origins in the Medeiros e Albuquerque Law of 1898[578], the country's first non-criminal copyright statute[579]. This law, enacted shortly after the Berne Convention, established seven limitations focused on facilitating free speech and education. These included provisions for the reproduction of smaller works within larger scientific or educational works, news articles, official documents, and excerpts for criticism.

---

[576] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 43/44

[577] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 45

[578] BRAZIL. *Lei n° 496 de 1 de Agosto de 1898*. Lei Medeiros e Albuquerque. Coleção de Leis do Brasil, Página 4 Vol. 1, Capital Federal, 1898. Available at: https://www2.camara.leg.br/legin/fed/lei/1824-1899/lei-496-1-agosto-1898-540039-publicacaooriginal-39820-pl.html.

[579] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 46

Subsequent copyright statutes, including the current Copyright Act of 1998[580], have maintained this basic framework, with some modifications[581]. However, these laws have consistently prioritized outlining the scope and term of copyright protection, followed by a list of limitations, without explicitly articulating the underlying principles or justifications for these exceptions. This approach, closer to the fair dealing systems of continental Europe than the American fair use doctrine, has resulted in a rigid system that struggles to adapt to the dynamic challenges of new technologies[582].

This lack of flexibility can hinder the legitimate use of copyrighted materials for educational, research, and other public interest purposes, ultimately limiting access to knowledge and information in the digital age. The balance between deterrence and the need for flexibility in accessing and utilizing copyrighted material remains a central challenge for Brazilian copyright law.

The Brazilian legal tradition, while acknowledging the importance of copyright exceptions and limitations (L&Es), presents challenges to their effective implementation and interpretation. Mizukami *et al.*[583] identify three key factors that contribute to this:

Lack of a Clear Constitutional Goal for Copyright Protection: The Brazilian Constitution does not explicitly articulate the overarching purpose of copyright protection, leading to a predominance of natural rights discourses that prioritize authors' rights over other public or private interests. This lack of a clear constitutional mandate hinders a more balanced approach to copyright that considers the diverse needs of creators and users.

Absence of Explicit Justifications for Exceptions and Limitations: Brazilian copyright statutes often present lists of L&Es without explaining the underlying principles or rationales for their existence. This lack of transparency makes it difficult to interpret these

---

[580] BRAZIL. *Lei n° 9.610 de 19 de Fevereiro de 1998*. Altera, atualiza e consolida a legislação sobre direitos autorais e dá outras providências. Brasília, 1998. Available at: http://www.planalto.gov.br/ccivil_03/leis/l9610.htm.

[581] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 47

[582] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 47

[583] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 47/48

provisions coherently and adapt them to evolving technological and social contexts. The absence of clear justifications also leaves L&Es vulnerable to narrow interpretations that favor copyright holders over broader public interests.

Criminalization of Copyright Infringement: The long-standing tradition of criminalizing all acts of copyright infringement, regardless of their severity, further exacerbates the challenges of balancing copyright protection with access to knowledge. The strictness of the L&Es, coupled with the threat of criminal prosecution, can create a chilling effect on legitimate uses of copyrighted material, particularly for educational and research purposes. This approach also amplifies pressure from content industries for even stronger criminal enforcement, potentially leading to an overemphasis on protection at the expense of access.

The insular nature of copyright scholarship in Brazil poses an additional challenge to achieving a balanced approach to copyright law. Mizukami *et al.*[584] argue that the limited number of scholars in the field, combined with the fact that many of them are also lawyers working for the content industry, has led to a homogeneity of discourse that favors a pro-industry perspective. This concentration of influence within the content industry not only shapes the drafting of copyright laws but also significantly influences their interpretation.

This lack of diversity in perspectives can stifle critical debate and hinder the development of a more nuanced understanding of copyright's role in society. The overrepresentation of industry interests in both legislative and scholarly discourse can lead to an overemphasis on protection at the expense of access to knowledge, particularly for marginalized communities and those with limited resources.

To achieve a more equitable and balanced copyright system, it is crucial to foster a broader and more inclusive dialogue that involves diverse stakeholders, including educators, researchers, libraries, and civil society organizations. Only by incorporating diverse perspectives can Brazil develop copyright policies that truly reflect the needs and interests of its entire population, balancing the rights of creators with the public's right to access and utilize knowledge.

---

[584] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 69

The prevailing discourse within Brazilian copyright scholarship, according to Mizukami *et al.*[585], often focuses on a narrower interpretation of the utilitarian justification for copyright. This perspective emphasizes incentivizing authors through strong copyright protection as the primary goal, neglecting broader considerations of public access and the social value of knowledge.

This narrow focus, rooted in a hierarchical view that prioritizes authors over non-authors, frames copyright as a means of shielding authors from the public rather than balancing their interests with broader societal needs. The emphasis on protecting authors' personality and dignity, while important, often overshadows discussions about the potential negative consequences of excessive copyright protection, such as limited access to knowledge and cultural works.

This skewed perspective, coupled with the dominant role of the content industry in legal scholarship and interpretation, has created a climate where the potential social costs of copyright protection are often overlooked or minimized. This calls for a more comprehensive and balanced approach to copyright law in Brazil, one that recognizes the importance of incentivizing creativity while also ensuring that copyright serves the broader public interest in access to knowledge and cultural participation.

While the Brazilian legal framework emphasizes the protection of authors' rights, the Constitution also mandates the protection of broader public interests that can be affected by copyright law[586]. These constitutional provisions encompass guarantees for free speech, education, access to culture, antitrust laws, and consumer rights. They also outline societal goals such as promoting cultural production and dissemination, building a just and equitable society, eradicating poverty, reducing inequalities, and ensuring full employment.

These constitutional principles suggest a broader mandate for copyright law beyond simply protecting authors' rights. The government's responsibility to promote access to culture, education, and science, as well as to foster scientific development and technological

---

[585] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 69/70

[586] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 70

capacity, necessitates a more balanced approach to copyright. This balance can be achieved through the strategic use of limitations and exceptions (L&Es), which allow for certain uses of copyrighted material without authorization from the rights holder. By utilizing L&Es to promote educational and cultural access, Brazil can fulfill its constitutional obligations and ensure that copyright law serves as a tool for social progress and development, rather than an impediment.

The concept of the "social function of property," enshrined in the Brazilian Constitution and already mentioned by the Lara's study[587], offers a potential pathway for a more balanced approach to copyright exceptions and limitations. Although historically there has been resistance to applying this clause to intellectual property, recent legal scholarship has been more receptive to the idea[588]. This opens up the possibility of considering the social impact of copyright and balancing individual rights with broader societal interests, such as access to knowledge and cultural participation.

However, the current system of exceptions and limitations in Brazilian copyright law falls short of achieving this balance[589]. The existing provisions are often overly restrictive, outdated, and lacking in coherence, providing little room for flexible interpretation. Additionally, the content industry tends to misinterpret these provisions, further limiting users' rights. This situation underscores the need for reform to create a more robust and adaptable framework for exceptions and limitations that can effectively address the challenges of the digital age and ensure that copyright law serves both creators and the public good.

7.3. Intellectual Property, Development and Innovation: The Knowledge Approach

The challenges and disparities highlighted in this study underscore the need for a re-evaluation of traditional intellectual property paradigms, particularly in the context of

---

[587] LARA, Fabiano Teodoro. Propriedade intelectual: uma abordagem pela análise econômica do Direito. DelRey Editora, 2010.
[588] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 72
[589] MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010. p. 73

developing countries. A shift towards a knowledge-centered approach, one that prioritizes access, equity, and the social function, is essential for achieving sustainable development and fostering a more inclusive global knowledge society.

The concept of a knowledge society, as envisioned by Rizk *et al.*[590], encompasses more than just intellectual property rights. It demands a comprehensive approach that combines legal measures with a robust infrastructure, investment in human capital, quality education, and incentives for both domestic and international investment. Transparency in data transfer and utilization, alongside an environment that nurtures creativity and innovation, are also fundamental to realizing this vision.

Rizk *et al.*[591] echo Stiglitz's assertion that "information is power", highlighting its potential for both progress and manipulation. Access to information empowers individuals and communities, enabling them to participate fully in societal and economic activities. However, the unequal distribution of information, often perpetuated by restrictive intellectual property regimes, can lead to a concentration of power and hinder social and economic progress.

Therefore, a knowledge-based approach to development requires not only robust IP protection but also a broader strategy that promotes equitable access to information, fosters a culture of learning and innovation, and empowers individuals and communities to utilize knowledge for their own development and well-being.

The knowledge-based approach to development recognizes that information is power, and equitable access to information is crucial for empowering individuals, communities, and nations. However, as Okediji[592] highlights, development indicators in many countries reflect weak performance in areas directly related to copyright law's objectives, such as promoting democratic governance, facilitating a robust marketplace of ideas, securing access to educational materials, and improving literacy. This suggests a disconnect between the theoretical aims of copyright and its practical impact on development, calling for a more

---

[590] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 199
[591] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development.* 2010. p. 199
[592] OKEDIJI, Ruth L. The Limits of International Copyright Exceptions for Developing Countries. *Vand. J. Ent. & Tech. L.*, v. 21, p. 689, 2018. p. 692/693

nuanced approach that prioritizes access and balances the needs of creators with those of society.

Talagala[593] further emphasizes that even among developing countries, there is a great diversity in economic, social, and political conditions. This necessitates different standards of copyright protection to accommodate these varying levels of development. A one-size-fits-all approach to copyright may not be effective in promoting equitable access to knowledge and fostering innovation in diverse contexts. Therefore, policymakers must consider the unique circumstances and needs of each country when formulating and implementing copyright laws.

The ability to generate research, create knowledge, and translate it into new technologies is a cornerstone of economic prosperity for developed nations[594]. However, this process is not solely reliant on strong intellectual property protection. While appropriating rents from research and technology is undoubtedly important, it necessitates prior stages of innovation and technological development.

Contrary to the notion that stringent IP rules automatically foster innovation, Martínez-Piva[595] argues that the protection of IP rights primarily benefits industries that have already developed technological capabilities in high-value sectors. These sectors, characterized by knowledge-intensive activities, drive technical change, enhance absorption capacity, and create a demand for further knowledge accumulation.

Therefore, developing countries seeking to leverage IP for development must focus on building their technological capabilities and moving up the value chain. This requires investing in research and development, education, and infrastructure, as well as fostering a culture of innovation and knowledge sharing. Only when a certain level of technological

---

[593] TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021. p. 212/213

[594] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 309

[595] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 309

sophistication is achieved can a country effectively utilize and benefit from a strong IP regime.

The impact of strong intellectual property rights on development, particularly in developing countries, is a complex issue with potential drawbacks. Martínez-Piva[596] argues that a strict IP regime, while theoretically incentivizing innovation, may inadvertently hinder technological progress by impeding imitative, adaptive, and incremental innovation, essential components of the development process for many emerging economies.

Therefore, rather than solely focusing on strengthening IP protection, developing countries should prioritize science and technology policies that counteract these potential stumbling blocks[597]. This entails investing in research and development, education, and infrastructure, as well as fostering a culture of innovation and knowledge sharing. By building a strong foundation of technological capabilities, developing countries can better leverage IP rights to protect their own innovations and participate more effectively in the global knowledge economy.

The role of technology in fostering access to knowledge and promoting development is undeniable. However, Martínez-Piva[598] argues that simply relying on trade policies and strengthening intellectual property rights is insufficient to propel developing countries towards knowledge-based economies and higher positions in the global value chain. In fact, overemphasis on IP protection, without adequate attention to knowledge diffusion and technological capacity building, can hinder innovation and development.

In the fiercely competitive global marketplace of the 21st century, access to knowledge has become a fundamental pillar for development and growth[599]. Investing in human capital and ensuring the widespread dissemination of knowledge are not only essential for individual

---

[596] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 310

[597] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 310

[598] MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 306

[599] RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010. p. 200

empowerment but also for fostering business innovation and socioeconomic development at the national level. A2K, therefore, represents more than just access to information; it is a strategic imperative for countries seeking to thrive in the knowledge-based economy.

Developing countries have been trying to address the challenges of knowledge access, as evidenced by the push for a development agenda within the WIPO, the A2K Treaty campaign, and various initiatives promoting access to copyrighted materials[600]. These efforts signify a growing resistance to the expansion of IP law originating from developed countries and a desire to establish a more balanced and equitable system.

However, despite the establishment of multiple organizations and initiatives aimed at solving the A2K problem, Vathitphund[601] argues that the key to success lies in harmonization and implementation at the regional level. Regional organizations can play a crucial role in coordinating efforts, sharing resources, and advocating for policies that reflect the specific needs and priorities of developing countries in their region.

The ability of a country or region to create, use, and leverage knowledge is crucial in the current global landscape. Martínez-Piva[602] emphasizes the importance of robust national innovation systems that continually evolve to enhance local innovative capacities. These systems should utilize a variety of tools, including the incentives provided by intellectual property rights, to foster a culture of creativity and invention.

The significance of IP protection standards is particularly pronounced in open economies heavily reliant on foreign trade. These standards increasingly influence the competitiveness and growth potential of nations. Therefore, it is essential for countries to strategically navigate the IP landscape, identifying opportunities within existing frameworks and leveraging their flexibility to support national innovation policies. Adapting IP protection

---

[600] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 15

[601] VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010. p. 15

[602] MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009. p. 52

to the unique characteristics and needs of a specific country or region is key to ensuring that it promotes, rather than hinders, innovation and development.

The prevailing critique of intellectual property law and policy is that it has swung too far towards protectionism, prioritizing private interests over the public good[603]. Advocates for access to knowledge argue that a rebalancing is necessary to ensure that the potential for knowledge-based development is maximized for all.

This shift requires a deeper recognition of the value of A2K and its connection to human rights. While the A2K movement has traditionally focused on development and trade arguments, Subramanian and Shaver[604] propose a complementary approach that emphasizes the importance of A2K for human rights. This involves recognizing the role of courts in protecting and defending these rights, particularly in the face of restrictive IP laws that may hinder access to essential knowledge and information.

By framing A2K as a human rights issue, advocates can broaden the scope of the debate and appeal to a wider range of stakeholders. This approach also opens up new avenues for legal and policy interventions, potentially leading to a more balanced and equitable IP system that prioritizes both innovation and the public's right to access and utilize knowledge.

The digital age presents a paradoxical landscape for knowledge access and education. While digital technology offers vast opportunities for innovative and enriched content reuse, significant legal obstacles persist, primarily stemming from copyright law[605]. The existing legal framework, often unclear and unfavorable to educational uses, can hinder the full potential of digital tools in the learning environment. This disconnect between the capabilities of technology and the restrictions of law can create barriers to access, particularly for developing countries that rely heavily on digital resources for education.

The concept of the public domain, where creative works are freely available for use and adaptation, is essential for fostering a thriving cultural and intellectual environment.

---

[603] SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011. p. 3
[604] SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011. p. 3
[605] MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006. p. 111

Reichman[606] argues that ensuring access to copyrighted culture without unnecessary constraints is crucial for the flourishing of literary and artistic pursuits. By allowing creators to draw inspiration and build upon existing works, the public domain acts as a fertile ground for creativity and innovation.

The recognition that all copyrighted works will eventually enter the public domain underscores the importance of finding a balance between protecting the rights of copyright holders and promoting access to knowledge. While copyright law aims to incentivize creativity by granting exclusive rights to creators, it is equally important to ensure that these rights do not unduly restrict the public's ability to access, utilize, and build upon existing works. A well-balanced copyright system can foster a dynamic and evolving cultural landscape, where the creations of the past inspire and inform the innovations of the future.

The history of copyright law reveals a constant evolution in response to technological advancements. As Mills[607] points out, technological change has been the primary driver of copyright law's development, often disrupting the delicate balance between the rights of copyright holders and the public's access to works. New technologies can empower either copyright owners, by enabling greater control over their works, or users, by facilitating easier access and exploitation of protected content.

The invention of the photocopier, for example, revolutionized the way copyrighted materials could be reproduced, leading to widespread concerns about unauthorized copying. This tension between technology and copyright protection is further exacerbated by the increasing availability of these technologies to individuals, particularly in the digital age[608]. The rise of the internet and digital distribution has made it easier than ever to reproduce and disseminate copyrighted works, posing significant challenges for copyright holders and necessitating ongoing adaptation of legal frameworks.

---

[606] REICHMAN, Jerome H. The Limits of “Limitations and Exceptions” in Copyright Law. In: OKEDIJI, Ruth L. (Ed.). *Copyright law in an age of limitations and exceptions*. Cambridge University Press, 2017. p. 312

[607] MILLS, Mary L. New technology and the limitations of copyright law: An argument for finding alternatives to copyright legislation in an era of rapid technological change. Chi.-Kent L. Rev., v. 65, p. 307, 1989. p. 310

[608] MILLS, Mary L. New technology and the limitations of copyright law: An argument for finding alternatives to copyright legislation in an era of rapid technological change. Chi.-Kent L. Rev., v. 65, p. 307, 1989. p. 310

To harness the potential of intellectual property for development and ninnovation, developing countries must adopt a strategic and proactive approach. Olwan and Fitzgerald[609] outline a roadmap with several practical measures:

Educate Policymakers and the Public: Conducting studies on the economic and cultural impact of IP-reliant industries is essential for understanding the needs of various sectors and tailoring IP systems accordingly. Raising awareness about the WIPO Development Agenda and its implications among relevant stakeholders is also crucial.

Revise IP Laws with a Pro-Development Perspective: IP laws should be structured to prioritize development goals, considering each country's unique circumstances, international obligations, and local needs. This includes adopting a balanced view of IP that values both creators and users, and ensuring that laws facilitate access to knowledge and educational opportunities. Liberal and generous limitations and exceptions are critical for achieving this balance.

Explore Alternative Approaches to IP: Open source software, sui generis protection, public domain, open content licensing, and access to knowledge frameworks offer alternative models that can support social and economic development. Developing countries should understand and utilize open licensing systems like Creative Commons to foster knowledge sharing and collaboration.

Implement Other Practical Measures: Open communication with citizens about development plans and IP issues is essential for building trust and ensuring that policies align with public needs. Collaboration among government institutions, both domestically and internationally, can facilitate the sharing of best practices and expertise in IP management. Strong competition laws are also necessary to prevent the misuse of the IP system and ensure its benefits are shared equitably. Finally, IP laws should be tailored to the specific context and development stage of each country, rather than simply transposing laws from other jurisdictions.

---

[609] OLWAN. Rami; FITZGERALD, Brian. IP and Development: A Road Map for Developing Countries in the Twenty-First Century. In: FITZGERALD, Brian; GILCHRIST, John (Ed.). *Copyright Perspectives: Past, Present and Prospect*. Springer, 2015. p. 89-95

By implementing these comprehensive measures, developing countries can create a more balanced and effective IP system that fosters innovation, promotes access to knowledge, and contributes to sustainable development.

To meaningfully contribute to development goals, copyright law must go beyond incentivizing creation and consider a broader set of objectives[610]. These include:

Facilitating the production of knowledge within a robust public domain: This means ensuring that copyright law does not stifle the creation of new knowledge by overly restricting access to existing works, which serve as building blocks for further innovation.

Facilitating access to information: Copyright law should include provisions that enable the widespread dissemination of information, particularly in developing countries where access to educational and scientific resources may be limited.

Assisting in the formation of human capital and absorptive capacity: This involves supporting educational initiatives and allowing for the use of copyrighted materials in ways that enhance learning and skills development.

Supporting access to knowledge and education: Copyright law should not be a barrier to education, but rather a tool for facilitating access to educational materials and promoting lifelong learning.

The importance of these objectives for development, especially access to education, has long been recognized by developing countries[611]. However, historical attempts to reform international copyright law to better address these concerns have often fallen short. This highlights the need for continued advocacy and innovative solutions to ensure that copyright serves as a tool for development, rather than an obstacle to it.

In developing countries where English is not the primary language, the predominance of English in scientific literature creates a significant barrier to knowledge dissemination and utilization. This linguistic barrier, coupled with the challenges posed by copyright

---

[610] OKEDIJI, Ruth L. The Limits of International Copyright Exceptions for Developing Countries. *Vand. J. Ent. & Tech. L.*, v. 21, p. 689, 2018. p. 721

[611] OKEDIJI, Ruth L. The Limits of International Copyright Exceptions for Developing Countries. *Vand. J. Ent. & Tech. L.*, v. 21, p. 689, 2018. p. 721

restrictions on translation, can severely hinder these countries' ability to drive innovation and development. Effective translation of scientific materials into local languages is essential for empowering researchers, educators, and policymakers, enabling them to fully participate in the global scientific discourse, adapt cutting-edge technologies to local contexts, and develop solutions that address their specific challenges. The lack of access to translated scientific knowledge can perpetuate dependence on developed nations, stifle innovation, and limit economic growth. Therefore, investing in translation infrastructure and promoting policies that facilitate the translation and dissemination of scientific works in diverse languages is not merely a cultural or linguistic issue, but a fundamental component of sustainable development in the knowledge-based economy.

8. FINAL CONSIDERATIONS

The exploration of the intricate relationship between law, development, and innovation, with a specific focus on copyright and translation, reveals a complex landscape fraught with challenges and opportunities. While copyright law aims to incentivize creativity and reward authors, its implementation, particularly in the context of developing countries, often creates barriers to accessing scientific knowledge.

The dominance of English in scientific publishing, coupled with restrictive copyright regimes and the high cost of translation, can marginalize researchers and scholars in non-English speaking regions. This linguistic and legal hegemony not only hinders the dissemination of knowledge but also stifles innovation and perpetuates inequalities in the global knowledge economy.

A central theme in this thesis is the importance of access to knowledge as a driver of innovation and development. In today's globalized world, knowledge is increasingly recognized as a key resource, and the ability to access and utilize it is crucial for countries seeking to achieve sustainable economic growth and social progress.

Translation plays a vital role in facilitating access to knowledge, particularly for non-English speaking populations. By bridging linguistic barriers, translation enables the transfer of knowledge and ideas across cultures and borders, fostering innovation and

promoting cross-cultural understanding. However, the high costs and complexities associated with translation often limit its effectiveness, particularly in developing countries.

The high costs associated with traditional translation methods have long been a significant barrier to knowledge access. However, the advent of artificial intelligence (AI) has the potential to revolutionize the translation industry, offering more affordable and efficient solutions. The use of AI translation tools in the long-term cost can create savings, particularly for large-scale translation projects, but the licensing requirements for accessing to use AI technology can still be complex and costly. These copyright challenges considering AI is essential for facilitating knowledge access and bridging linguistic barriers.

The question then arises: should developing countries focus solely on translating existing knowledge from dominant languages, or should they also invest in developing their own local knowledge production capacities? While translation is undoubtedly valuable, it is not a panacea for addressing the knowledge gap. A balanced approach that combines translation with efforts to support local research and innovation is likely to be the most effective strategy for promoting sustainable development, as it is important to consider the context dependence of each country reality.

The rise of open initiatives, such as open access publishing and Creative Commons licensing, offers a new perspective. These models, by prioritizing collaboration, knowledge sharing, and flexibility, demonstrate the potential for a more equitable and inclusive approach to copyright. Furthermore, the evolution of legal frameworks recognition of fair use for educational and public good purposes indicates a growing awareness of the need to balance copyright protection with broader societal interests.

To fully harness the power of copyright for development, a more nuanced and context-specific approach is needed. Developing countries must actively engage in international discussions and advocate for policies that prioritize their unique needs and challenges. This includes promoting the use of open licensing models, supporting local translation initiatives, and leveraging technological advancements to overcome linguistic barriers.

While open initiatives and evolving specific countries legal frameworks offer promising avenues for addressing these challenges, they are not sufficient on their own. A more comprehensive and multifaceted approach is needed to dismantle these barriers and create a truly inclusive global knowledge ecosystem.

Considering the language barriers for access to knowledge, the first and most important for any further discussion is to enhance data as initiated in this work with the LASK Index, as it has certain limitations due to its reliance on secondary research data. A new social indicator by a formal entity with trustful data would serve as a standardized tool to measure and compare the linguistic accessibility of scientific publications across different languages and regions. By quantifying the extent of language barriers, it could inform policy decisions and guide targeted interventions to improve access to scientific knowledge.

This work advocates for the establishment of a global indicator dedicated to collect data on scientific publications languages. This indicator would provide insights and more resources to researches and policy makers working to make scientific knowledge more accessible to diverse linguistic communities, especially considering translation barriers.

It is also important to have a re-evaluation of the international copyright law, particularly considering the context of developing countries. This work proposes the introduction of specific provisions that allow for the translation of scientific works into non-dominant languages under fair use or other exceptions, even when the copyright holder does not grant permission. This would empower local communities to access and utilize scientific knowledge in their native languages, fostering greater inclusivity and equity in the global knowledge landscape.

When examining the relationship between translation and access to knowledge, it is important to move beyond a purely cost-benefit analysis. While cost-effectiveness is certainly a factor to consider, it should not be the sole determinant of translation policy. It is equally important to consider the cultural and social implications of translation, as well as the potential for translation to empower local communities and foster a sense of ownership over knowledge.

This thesis argues for a more nuanced methodological approach that recognizes the multifaceted nature of translation and its impact on access to knowledge. By considering factors such as the cultural relevance of translated materials, the quality and accuracy of translations, and the long-term benefits of empowering local knowledge production, we can develop a more comprehensive understanding of the role of translation in promoting development and innovation.

These proposals, taken together, represent a holistic approach to addressing the language barriers that hinder access to knowledge. By combining quantitative measurement, financial support, and legal reform, we can create a more equitable and inclusive global knowledge ecosystem that benefits all, regardless of their linguistic background.

Ultimately, the goal is to create a copyright system that fosters both creativity and access to knowledge, ensuring that the benefits of scientific and technological advancements are shared equitably across linguistic and cultural boundaries. By embracing the transformative potential of translation and rethinking the traditional paradigms of copyright, we can build a more inclusive and equitable global knowledge society.

REFERENCES

ARRABAL, Alejandro Knaesel. Direito autoral e linguagem: uma (re)leitura a partir da hermenêutica filosófica. In: BEÇAK, Rubens; BORGES, Alexandre Walmott; LOPES, Ana Maria D'Ávila. (Org.). *Hermenêutica*. Florianópolis: CONPEDI, 2014.

ATKINSON, Benedict; FITZGERALD, Brian. *Short History of Copyright*. Springer International Pu, 2016.

AUFDERHEIDE, Patricia; JASZI, Peter. *Reclaiming fair use: How to put balance back in copyright*. University of Chicago Press, 2018.

BALLESTRIN, Luciana. América Latina e o giro decolonial. *Revista Brasileira de Ciência Política*, nº11. Brasília, maio - agosto de 2013, pp. 89-117.

BELLANTUONO, Giuseppe; LARA, Fabiano T. (Ed.). *Law, Development and Innovation*. Springer, 2016.

Berne Convention for the Protection of Literary and Artistic Works. September 9, 1886, and amended on September 28, 1979. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=283698.

BOSHER, Hayleigh; YEŞILOĞLU, Sevil. An analysis of the fundamental tensions between copyright and social media: the legal implications of sharing images on Instagram. *International Review of Law, Computers & Technology*, v. 33, n. 2, p. 164-186, 2019.

BRAZIL. Brazilian Federal Supreme Court. *Ação Direta de Inconstitucionalidade (ADI) 3059*. Democratas v. Governador do Estado do Rio Grande do Sul, Relator: Min. Ayres Britto; Redator do Acórdão: Min. Luiz Fux, julgado em 09/04/2015. Available at: https://redir.stf.jus.br/paginadorpub/paginador.jsp?docTP=TP&docID=8398297

BRAZIL. Brazilian Federal Supreme Court. *Ação Direta de Inconstitucionalidade (ADI) 4815*. Associação Nacional dos Editores de Livros (Anel) v. Presidente da República, Relator: Min. Cármen Lúcia, Tribunal Pleno, julgado em 10/06/2015, DJe-018, divulgado em 29/01/2016, publicado em 01/02/2016. Available at: https://jurisprudencia.stf.jus.br/pages/search/sjur336558/false

BRAZIL. Brazilian Federal Supreme Court. *Recurso Extraordinário com Agravo (ARE) 1244416*. Espaço Cultural Lupicínio Rodrigues e Outro(a) v. Alpargatas S.A. e Outro(a), Relator: Min. Presidente, Decisão Monocrática Min. Dias Toffoli, julgado em 03/04/2020, DJe-088, divulgado em 13/04/2020, publicado em 14/04/2020. Available at: https://jurisprudencia.stf.jus.br/pages/search/despacho1304923/false

BRAZIL. *Constituição Política do Império do Brasil de 25 de Março de 1824*. Rio de Janeiro, 1824. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao24.htm.

BRAZIL. *Constituição da República Federativa do Brasil de 5 de Outubro de 1988*. Brasília, 1988. Available at: http://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm.

BRAZIL. *Lei n° 496 de 1 de Agosto de 1898*. Lei Medeiros e Albuquerque. Coleção de Leis do Brasil, Página 4 Vol. 1, Capital Federal, 1898. Available at: https://www2.camara.leg.br/legin/fed/lei/1824-1899/lei-496-1-agosto-1898-540039-publicacaooriginal-39820-pl.html.

BRAZIL. *Lei n° 9.609 de 19 de Fevereiro de 1998*. Dispõe sobre a proteção da propriedade intelectual de programa de computador, sua comercialização no País, e dá outras providências. Brasília, 1998. Available at: http://www.planalto.gov.br/ccivil_03/leis/l9609.htm.

BRAZIL. *Lei n° 9.610 de 19 de Fevereiro de 1998*. Altera, atualiza e consolida a legislação sobre direitos autorais e dá outras providências. Brasília, 1998. Available at: http://www.planalto.gov.br/ccivil_03/leis/l9610.htm.

CAI, Zhengyan. More Creativity and Less Restriction: About the Relationship between Translation and Copyright. *International Journal of Social Science Studies*, v. 10, 2022.

CASO, Roberto et al. Open access, open science, open society. In: *Positioning and power in academic publishing: players, agents and agendas*. IOS Press, 2016.

CASO, Roberto. Open Access to Legal Scholarship and Copyright - Rules: A Law and Technology Perspective. In: PERUGINELLI, Ginevra and RAGONA, Mario (Eds), *Law via the Internet - Free Access, Quality of Information, Effectiveness of Rights*. European Press Academic Publishing, Florence (Italy), 2009.

CASO, Roberto. The academic copyright in the age of commodification of scientific research. *Scientific Research and Information Technology*, v. 10, 2020.

CIMOLI, Mario; PRIMI, Annalisa. Intellectual Property and Development: an interpretation of the (new) markets for knowledge. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009.

CHAN, Kai L. Power language index. *Which are the world's most influential languages*, 2016.

COASE, Ronald H. The Problem of Social Cost. *Journal of Law and Economics*, v. 3, 1960.

CONTRERAS, Jorge L. *Intellectual property licensing and transactions: theory and practice*. Cambridge University Press, 2022.

COOTER, Robert; EDLIN, Aaron. *The Falcon's Gyre: Legal Foundations of Economic Innovation and Growth*. Robert Cooter, 2014.

COTTER, Thomas F. Fair Use and Copyright Overenforcement. *Iowa L. Rev.*, v. 93, p. 1271, 2007.

CUNNINGHAM, Alan. Translation, Copyright & Authority. *Pólemos*, v. 12, n. 2, 2018.

DEARDEN, Julie. *English as a medium of instruction-a growing global phenomenon*. British Council, 2014.

DAM, Helle V.; ENGBERG, Jan; GERZYMISCH-ARBOGAST, Heidrun (Ed.). *Knowledge systems and translation*. Walter de Gruyter, 2005.

DEPOORTER, Ben; PARISI, Francesco. Fair use and copyright protection: a price theory explanation. *International Review of Law and Economics*, v. 21, n. 4, p. 453-473, 2002.

DÍAZ, Álvaro. Free Trade Agreements and Intellectual Property: Impacts and Challenges. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009.

DIPROSE, James P.; KRAMER, Bianca; NEYLON, Cameron. Language Diversity in Scholarly Publishing. *COKI Language Dataset*. June 21, 2022. Online version: https://openknowledge.community/language-diversity/

D'HULST, Lieven; GAMBIER, Yves. General introduction. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018.

DOSI, Giovanni et al. The role of intellectual property rights in the development process, with some lessons from developed countries: an introduction. *Intellectual property rights: Legal and economic challenges for development*, v. 1, p. 1-55, 2014.

DRAHOS, Peter; BRAITHWAITE, John. *Information feudalism: Who owns the knowledge economy*. Earthscan Publications Ltd, 2002.

DRAHOS, Peter. Negotiating intellectual property rights: between coercion and dialogue. In: *Global intellectual property rights: Knowledge, access and development*. London: Palgrave Macmillan UK, 2002.

DURANT, Alan; DAVIS, Jennifer. *Directions in intellectual property law research: A linguistic contribution*, 2021.

EBERHARD, David M.; SIMONS, Gary F.; FENNIG, Charles D. *Ethnologue: Languages of the World*. Twenty-seventh edition. Dallas, Texas: SIL International. 2024. Online version: http://www.ethnologue.com.

EUROPEAN COMMISSION, Directorate-General for Translation. DEBUSSCHE J; TROUSSEL J. Translation and intellectual property rights: final report. *Publications Office*, 2014.

EUROPEAN UNION. *Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society*. Available at: https://eur-lex.europa.eu/eli/dir/2001/29/oj.

EUROPEAN UNION. *Directive 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC*. Available at: https://eur-lex.europa.eu/eli/dir/2019/790/oj.

EUROPEAN UNION. *Infopaq International A/S v. Danske Dagblades Forening, Case C-5/08, ECLI:EU:C:2009:465*. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62008CJ0005

FÉRES, Marcelo Andrade. A adoção de Softwares Livres pelas diversas esferas da Administração Pública: alguns aspectos jurídicos de um ambiente de disputas econômicas. *REVISTA DA AGU, [S. l.], v. 5, n. 10*, 2006. DOI: 10.25109/2525-328X.v.5.n.10.2006.433. Available at: https://revistaagu.agu.gov.br/index.php/AGU/article/view/433.

FRISCHMANN, Brett M.; MADISON, Michael J.; STRANDBURG, Katherine J. Governing Knowledge Commons. *Oxford University Press*, 2014.

GAMBIER, Yves. Concepts of translation. In: *A history of modern translation knowledge: Sources, concepts, effects*. John Benjamins Publishing Company, 2018.

GORDON, Wendy J. Intellectual Property. *The Oxford Handbook of Legal Studies, Peter Cane and Mark Tushnet, eds., Oxford University Press*, pp. 617-646, October 2003. Available at SSRN: https://ssrn.com/abstract=413001.

HUGHES, Justin. Fair Use and Its Politics – at Home and Abroad. In: OKEDIJI, Ruth L. (Ed.). *Copyright law in an age of limitations and exceptions*. Cambridge University Press, 2017.

HUTTON, Christopher. Who owns language? Mother tongues as intellectual property and the conceptualization of human linguistic diversity. *Language Sciences*, v. 32, n. 6, 2010.

JANNUZZI, Paulo de Martino. *Indicadores Sociais na Formulação e Avaliação de Políticas Públicas*. Available at: http://disciplinas.stoa.usp.br/pluginfile.php/304294/mod_resource/content/1/Jannuzzi_Indicadores%20sociais%20na%20formula%C3%A7%C3%A3o%20e%20avalia%C3%A7%C3%A3o%20de%20pol%C3%ADticas%20p%C3%BAblicas.pdf.

JANNUZZI, Paulo de Martino. Indicadores Sociais no Brasil. 3ª Edição. *Campinas: Editora Alínea*, 2006.

LARA, Fabiano Teodoro. *Propriedade intelectual: uma abordagem pela análise econômica do Direito*. DelRey Editora, 2010.

LEADBEATER, Bonnie J.; BANISTER, Elizabeth M.; MARSHALL, E. Anne. How-what-we-know-becomes-more-widely-known is context dependent and culturally sensitive. In*: Knowledge Translation in Context*. University of Toronto Press, 2011.

LEE, Tong King. Translation and copyright: towards a distributed view of originality and authorship. *The Translator*, Routledge, 2020.

LEROY, Marcos. *Evolution and Development of the Limitations and Exceptions in Copyright and Authors Rights*. Belo Horizonte, 2020.

LIU, Kung-Chung; RACHERLA, Uday S. *Innovation, Economic Development, and Intellectual Property in India and China: Comparing Six Economic Sectors*. Springer Nature, 2019.

MANNING, Patrick; OWEN, Abigail (Ed.). *Knowledge in translation: global patterns of scientific exchange, 1000-1800 CE*. University of Pittsburgh Press, 2018.

MARSHALL, E. Anne; GUENETTE, F. Cross-cultural journeys: Transferring and exchanging knowledge among researchers and community partners. *Knowledge translation in context: Indigenous, policy, and community settings*, 2011.

MARTÍNEZ-PIVA, Jorge Mario. General Conclusions: The Challenges for Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009.

MARTÍNEZ-PIVA, Jorge Mario. *Knowledge Generation and Protection*. New York: Springer, 2009.

MARTÍNEZ-PIVA, Jorge Mario. Protection of Intellectual Property Rights, Innovation, and Development. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009.

MCGEVERAN, William; FISHER, William W. The digital learning challenge: obstacles to educational uses of copyrighted material in the digital age. *Berkman Center Research Publication*, n. 2006-09, 2006.

MERGES, Robert P. *Justifying intellectual property*. Harvard University Press, 2011.

MILLS, Mary L. New technology and the limitations of copyright law: An argument for finding alternatives to copyright legislation in an era of rapid technological change. *Chi.-Kent L. Rev.*, v. 65, p. 307, 1989.

MIZUKAMI, Pedro Nicoletti et al. Exceptions and limitations to copyright in Brazil: a call for reform. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 41-78, 2010.

MIZUKAMI, Pedro Nicoletti; LEMOS, Ronaldo. From free software to free culture: The emergence of open business. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, p. 13-39, 2010.

MONCAYO VON HASE, Andrés. The Flexibility of TRIPS and Its Possible Erosion in Bilateral, Multilateral, and Regional Negotiations. In: *Knowledge generation and protection: intellectual property, innovation and economic development*. New York, NY: Springer New York, 2009

MONTGOMERY, Scott L. *Science in translation: Movements of knowledge through cultures and time*. University of Chicago Press, 2000.

OKEDIJI, Ruth L. The Limits of International Copyright Exceptions for Developing Countries. *Vand. J. Ent. & Tech. L.*, v. 21, p. 689, 2018.

OKEDIJI, Ruth L.; PROSSER, William L. The International Copyright System: Limitations, Exceptions and the Public Interest. *Issue Paper*, n. 15, 2006.

OLIAR, Dotan; STERN, James Y. Right on Time: First Possession in Property and Intellectual Property. *BUL Rev*., v. 99, p. 395, 2019.

OLWAN. Rami; FITZGERALD, Brian. IP and Development: A Road Map for Developing Countries in the Twenty-First Century. In: FITZGERALD, Brian; GILCHRIST, John (Ed.). *Copyright Perspectives: Past, Present and Prospect*. Springer, 2015.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Innovation in the Knowledge Economy: Implications for Education and Learning*. OECD Publishing, Paris, 2004.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*. OECD Publishing, Paris, 2014.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *OECD calculations based on Scopus Custom Data, Elsevier, Version 1.2024, April 2024*. Science, Technology and Innovation Scoreboard (STI.Scoreboard) 2024. Online version: https://www.oecd.org/en/data/datasets/science-technology-and-innovation-scoreboard.html

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Science performance (PISA)*. 2024. Online version: https://www.oecd.org/en/data/indicators/science-performance-pisa.html

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Science performance (PISA) (indicator)*. Science, Technology and Innovation Scoreboard (STI.Scoreboard) 2024. Online version: https://www.oecd.org/en/data/datasets/science-technology-and-innovation-scoreboard.html

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). *Trends Shaping Education 2022*. OECD Publishing, Paris, 2022.

Paris Convention for the Protection of Industrial Property. March 20, 1883, and amended on September 28, 1979. Available at: https://www.wipo.int/wipolex/en/treaties/textdetails/12633.

QUIJANO, Aníbal. Colonialidade do poder, eurocentrismo e América Latina. *A Colonialidade do Saber: etnocentrismo e ciências sociais. Perspectivas Latinoamericanas*. Buenos Aires: Clacso, p. 107-126, 2005.

REICHMAN, Jerome H. The Limits of "Limitations and Exceptions" in Copyright Law. In: OKEDIJI, Ruth L. (Ed.). *Copyright law in an age of limitations and exceptions*. Cambridge University Press, 2017.

REICHMAN, Jerome H.; OKEDIJI, Ruth L. When copyright law and science collide: empowering digitally integrated research methods on a global scale. *Minnesota Law Review*, v. 96, n. 4, 2012.

RIZK, Nagla et al. *Access to knowledge in Egypt: new research on intellectual property, innovation and development*. 2010.

Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations. October 25, 1961. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12656.

RØVIK, Kjell Arne. *A translation theory of knowledge transfer: Learning across organizational borders*. Oxford University Press, 2023.

ROVIRA-ESTEVA, Sara; OLALLA-SOLER, Christian; AIXELÁ, Javier Franco. Open access in translation and interpreting studies: A bibliometric overview of its impact (1996-2015). *Meta*, 2021.

SENFTLEBEN, Martin. *Copyright, limitations, and the three-step test: an analysis of the three-step test in international and EC copyright law*. Kluwer Law International BV, 2004.

SHARIFIAN, Farzad. *Cultural Linguistics: Cultural conceptualisations and language*. John Benjamins Publishing Company, 2017.

SHAVER, Lea. *Access to knowledge in Brazil: new research on intellectual property, innovation and development*. Bloomsbury Academic, 2010.

SHAVER, Lea. *Ending Book Hunger: Access to Print Across Barriers of Class and Culture*. Yale University Press, 2020.

ST ANDRÉ, James; HSIAO-YEN, Peng. Introduction: Setting the Terms. *Approaches to Translation Studies*, v. 34, 2011.

SUBRAMANIAN, Ramesh; SHAVER, Lea. *Access to knowledge in India: New research on intellectual property, innovation and development.* Bloomsbury Academic, 2011.

SUMILLERA, Rocío G.; KÜHN, Katharina; SURMAN, Jan. *Translation in knowledge, knowledge in translation*. John Benjamins Publishing Company, 2020.

TALAGALA, Chamila. *Copyright law and translation: access to knowledge in developing economies*. Routledge, 2021.

THRANE, Torben. Representing interpreters' knowledge: Why, what, and how. In: *V. Dam, H., Engberg, J., and Gerzymisch-Arbogast, H.(Eds.), Systems and translation*, 2005.

TIETZE, Susanne. *Language, translation and management knowledge: A research overview*. Routledge, 2021.

TRIPS Agreement on Trade-Related Aspects of Intellectual Property Rights. April 15, 1994. Available at: https://www.wipo.int/treaties/en/text.jsp?file_id=305907.

UNESCO. An introduction to the UNESCO Recommendation on Open Science. 2022. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000383771.

UNITED KINGDOM. *Murray v Bogue* (1853) 1 Drew 353. Available at: https://vlex.co.uk/vid/murray-v-bogue-807060349

UNITED KINGDOM. ZYX Music GmbH v King, (1995) 3 All E.R. 1 (22 March 1995). Available at: https://uk.practicallaw.thomsonreuters.com/D-016-1406

UNITED NATIONS GENERAL ASSEMBLY. *The Universal Declaration of Human Rights (UDHR)*. New York: United Nations General Assembly, 1948.

UNITED STATES OF AMERICA. *Authors Guild v. Google, Inc., 804 F.3d 202 (2d Cir. 2015).* Available at: https://casetext.com/case/guild-v-google-inc-1

UNITED STATES OF AMERICA. Bayh–Dole Act of 1980. Available at: https://www.law.cornell.edu/uscode/text/35/part-II/chapter-18.

UNITED STATES OF AMERICA. *Cambridge Univ. Press v. Patton, 769 F.3d 1232 (11th Cir. 2014)*. Available at: https://casetext.com/case/cambridge-univ-press-oxford-univ-press-inc-v-patton

UNITED STATES OF AMERICA. Copyright Act of 1790. An Act for the encouragement of learning, by securing the copies of maps, Charts, and books, to the authors and proprietors of such copies, during the times therein mentioned. Available at: https://www.copyright.gov/about/1790-copyright-act.html.

UNITED STATES OF AMERICA. Copyright Act of 1831. An Act to amend the several acts respecting copyrights. Available at: https://www.ellenwhite.info/copyright_law_us_1831.htm.

UNITED STATES OF AMERICA. Copyright Act of 1976. An Act for the general revision of the Copyright Law, title 17 of the United States Code, and for other purposes. Available at: https://www.law.cornell.edu/uscode/text/17.

UNITED STATES OF AMERICA. Digital Millennium Copyright Act of 1998. Available at: https://www.copyright.gov/legislation/dmca.pdf.

UNITED STATES OF AMERICA. *Madey v. Duke University*, 307 F.3d 1351 (Fed. Cir. 2002). Available at: https://cyber.harvard.edu/people/tfisher/2002Madeyedit.html.

UNITED STATES OF AMERICA. *Sony Corporation of America v. Universal City Studios*, 464 U.S. 417 (1984). Available at: https://supreme.justia.com/cases/federal/us/464/417/.

UNITED STATES OF AMERICA. *The Chafee Amendment*: 17 U.S.C. 121 & 121A. Available at: https://www.loc.gov/nls/who-we-are/laws-regulations/copyright-law-amendment-1996-pl-104-197/

Universal Copyright Convention (UCC). Geneva, September 6, 1952. Available at: https://wipolex-res.wipo.int/edocs/lexdocs/treaties/en/unesco1/trt_unesco1.pdf.

VATHITPHUND, Thipsurang. Access to knowledge difficulties in developing countries: A balanced access to copyrighted works in the digital environment. *International Review of Law, Computers & Technology*, v. 24, n. 1, p. 7-16, 2010.

WCT. WIPO Copyright Treaty. December 19, 1996. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12740.

WIPO Development Agenda. 45 Adopted Recommendations. 2007, and amended on September 28, 1979. Available at: https://www.wipo.int/ip-development/en/agenda/recommendations.html.

WIPO. *Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired, or Otherwise Print Disabled (MVT).* Geneva, 2013. Available at: https://www.wipo.int/treaties/en/ip/marrakesh/

WIPO PATENTSCOPE. *Patentscope Database*, 2024. Available at: https://www.patentscope.wipo.int.

WPPT. WIPO Performances and Phonograms Treaty. December 19, 1996. Available at: https://wipolex.wipo.int/en/treaties/textdetails/12743.

WTO. DOHA WTO MINISTERIAL: Ministerial Declaration. WT/MIN(01)/DEC/1. November 14, 2001. Available at: https://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm.