

Fordham Intellectual Property, Media and Entertainment Law Journal

Volume 33 XXXIII
Number 1

Article 2

2022

Reconceptualizing Open Access to Theses and Dissertations

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Reconceptualizing Open Access to Theses and Dissertations

Cover Page Footnote

* Prof. Orit Fischman Afori is a Law Professor at the Haim Striks Faculty of Law, College of Management, Israel, and a co-founder and co-director of the Forum for Access to Knowledge in Israeli Higher Education Institutions. ** Dr. Dalit Ken-Dror Feldman is the legal director of the Law, Technology and Cyber Clinic, Faculty of Law, University of Haifa, Israel, and a co-founder and co-director of the Forum for Access to Knowledge in Israeli Higher Education Institutions. The authors wish to thank the Info-Justice project at American University Washington College of Law, and the participants at the Annual Meeting of the Global Expert Network on Copyright User Rights: The Right to Research in International Copyright, held on April 20-22, 2022, for their comments. The authors wish to thank in particular Irene Calboli for her comprehensive comments, Sean Flynn and Michael Palmedo for organizing the Annual Meeting and leading the project on Right to Research in International Copyright, the respondents to the survey for their important contribution to the study, and especially Jonathan Band, Teresa Hackett, Lynne Porat, Elena Yaroshenko, Pablo de Castro, and Naomi Greidinger for their assistance in circulating the questionnaire. Last but not least the authors would like to thank the editorial team for their excellent work on the article.

Reconceptualizing Open Access to Theses and Dissertations

Orit Fischman Afori* & Dalit Ken-Dror Feldman**

The global COVID-19 crisis has turned public attention to the special need for accessing those cutting-edge studies that are needed for further scientific innovation. Theses and dissertations (TDs) are prominent examples of such studies. TDs are academic research projects conducted by graduate students to acquire a high academic degree, such as a PhD. They encompass not only knowledge about basic science but also knowledge that generates social and economic value for society. Therefore, access to TDs is imperative for promoting science and innovation.

Open access to scientific publications has been in the focus of public policy discourse for two decades, but progress toward this end has been limited. As part of this discourse, there has been no systematic discussion of the special case of TDs and of the justification for adopting an open access publication policy toward them. The present study aims to fill this gap. We argue that the essence of TDs as unique outputs of academic research merits a special policy mandating the publication of these studies in open access format,

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subject to certain exceptions. This policy is underpinned by several arguments, which we develop in our study, based on historic and normative analysis. These considerations support reconceiving access to TDs using an open access approach designated particularly for them.

To better understand current open access policies toward TDs, we conducted a limited semi-empirical investigation to collect information. Our findings confirm that—despite the growing awareness of the importance of an open access TDs policy—no standard policy exists. Therefore, we propose to establish a mandatory global policy and standardization regarding the publication of TDs in designated repositories, open to the public, that would generate together an “open world wide web of TDs.” Such a global framework would facilitate the progress of science and promote the public good worldwide. In the aftermath of the global COVID-19 crisis, it seems that the time is ripe for such a move at both international and national levels.

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INTRODUCTION

The COVID-19 pandemic changed many aspects of life. In an instant, education and academic establishments worldwide had to switch to distance learning and research. Lockdowns prevented the ability to physically visit libraries, and access to books, articles, and research materials faced day-to-day obstacles around the world. Who would have imagined that in today's hyper-technological society so many people would be forced to study remotely or research from home, without access to the essential materials they needed?

In the face of these obstacles, libraries understood their important role in serving the needs of their communities and developed *ad hoc* technical solutions.¹ In the first days of lockdowns, physical materials were delivered by cab, an obviously inefficient solution.²

¹ See, e.g., JENNY PEACHEY, *MAKING A DIFFERENCE: LIBRARIES, LOCKDOWN AND LOOKING AHEAD 2* (Carnegie UK Trust ed., 2020); Jing Zhou, *The Role of Libraries in Distance Learning During COVID-19*, 38 INFO. DEV. 227, 227 (2022).

² See, e.g., Harry Mulholland, *Libraries Deliver Lockdown on Entertainment*, COAST CMTY. NEWS (Aug. 19, 2021), <https://coastcommunitynews.com.au/central-coast/news/2021/08/libraries-deliver-lockdown-entertainment/> [https://perma.cc/4CUT-2MS4].

Libraries searched for creative legal solutions that would make it possible to open digital access to books and other materials, for example by more broadly interpreting the term “fair use” in copyright law.³ But efforts to allow greater digital access to books, articles, and studies during the pandemic have disappointed.⁴ The global crisis has turned public attention to the “open access” agenda, focusing on digital access to academic studies and educational materials—an issue that has been addressed in the past two decades but with limited achievements. Moreover, the race to develop medical solutions to the pandemic has turned the spotlight on the special need to access the most recent studies that were needed for developing further knowledge and innovation.⁵ Had all the cutting-edge studies been published in an open access format, researchers would not have wasted precious time and effort attempting to access these studies, and new knowledge and innovation could have been developed faster.⁶ Easy access to knowledge facilitates efficient scientific research.

Theses and dissertations (TDs) are prominent examples of cutting-edge studies, but they also exhibit special characteristics. TDs are the final outcomes of higher academic degrees studies, and are expected to meet high standards of academic innovation. They encompass a broad range of knowledge, including not only basic science but also knowledge that generates social and economic value

³ See, e.g., Public Statement of Library Copyright Specialists: Fair Use & Emergency Remote Teaching & Research (Mar. 13, 2020), <https://tinyurl.com/tvnty3a> [<https://perma.cc/6U2J-RU96>].

⁴ Extensive calls to amend the World Trade Organization (WTO) TRIPS agreement and to adopt special exceptions to copyright during the pandemic, enabling digital access to copyrighted materials were rejected, and the final COVID-19 “waiver” proposed by the WTO referred only to patents and trade secrets. See Ministerial Conference, *Draft Ministerial Decision on the TRIPS Agreement*, WTO Doc. WT/MIN(22)/W/15/Rev.2 (June 17, 2022).

⁵ Various initiatives were aimed at enhancing free access to scientific publications during the pandemic. See, e.g., *List of COVID-19 and Temporarily Free Resources*, EXLIBRIS (Jan. 21, 2021), https://knowledge.exlibrisgroup.com/Summon/Content_Corner/Supporting_Resources/List_of_COVID-19_and_Temporarily_Free_Resources [<https://perma.cc/XRV7Q8CD>].

⁶ See, e.g., Sean Flynn et al., *Non-Patent Intellectual Property Barriers to COVID-19 Vaccines, Treatment and Containment* (AM. U. WASH. COLL. L. PIJIP/TLS Rsch. Paper Series, Paper No. 71, 2021) <https://digitalcommons.wcl.american.edu/research/h/71/> [<https://perma.cc/Y9BE-KWEP>].

for society. Therefore, they are examples of cutting-edge studies whose accessibility is always essential for the progress of science, especially when the flow of scientific knowledge is urgently needed. Nevertheless, open access to TDs is a blind spot that has been neglected in the literature.

Open access to scientific publications has been at the heart of public policy discourse for two decades. Much has been written about the various models of open access, the problems they raise, the possible solutions to them, and the limited achievements of the various initiatives.⁷ As part of this discourse, there has been no systematic discussion on the special case of TDs, which differentiates them from other scientific studies, or of the justifications for adopting an open access publication policy regarding TDs. The present study aims to fill this gap. It emphasizes the need to acknowledge TDs as unique academic products, access to which merits a global custom-designed regulatory policy. We argue that time is ripe for establishing an open worldwide web of TDs.⁸

⁷ See generally Joseph Scott Miller, *Foreword: Why Open Access to Scholarship Matters* to Symposium, *Open Access Publishing and Future of Legal Scholarship*, 10 LEWIS & CLARK L. REV. 733, 733 (2006); Michael W. Carroll, *The Movement for Open Access on Law*, 10 LEWIS & CLARK L. REV. 741, 741 (2006); Jessica Litman, *The Economics of Open Access Law Publishing*, 10 LEWIS & CLARK L. REV. 779, 779 (2006); Michael J. Madison, *The Idea of the Law Review: Scholarship, Prestige and Open Access*, 10 LEWIS & CLARK L. REV. 901, 901 (2006). See also Robert C. Denicola, *Copyright and Open Access: Reconsidering University Ownership of Faculty Research*, 85 NEB. L. REV. 351, 351 (2006); Steven Shavell, *Should Copyright of Academic Works be Abolished*, 2 J. LEGAL ANALYSIS 301, 301 (2010); Michael J. Madison et al., *Constructing Commons in the Cultural Environment*, 95 CORNELL L. REV. 657, 657 (2010); Michael W. Carroll, *Why Full Open Access Matters*, 9 PLOS BIOLOGY 1, 1 (2011); Eric Priest, *Copyright and the Harvard Open Access Mandate*, 10 NW. J. TECH. & INTELL. PROP. 377, 377 (2012); Jorge L. Contreras, *Confronting the Crisis in Scientific Publishing: Latency, Licensing, and Access*, 53 SANTA CLARA L. REV. 491, 491 (2013); Christopher J. Ryan Jr., *Not-So-Open Access to Legal Scholarship: Balancing Stakeholder Interests with Copyright Principles*, 20 RICH. J. L. & TECH. 1, 1 (2013); Joseph Scott Miller & Lydia Pallas Loren, *The Idea of the Casebook: Pedagogy, Prestige, and Trusty Platforms*, 11 WASH. J. L. TECH. & ARTS 31, 31 (2015); Julie L. Kimbrough & Laura N. Gasaway, *Publication of Government-Funded Research, Open Access, and the Public Interest*, 18 VAND. J. ENT. & TECH. L. 267, 267 (2016).

⁸ See *Web of Science*, CLARIVATE, <https://clarivate.com/webofsciencegroup/solutions/web-of-science/> [<https://perma.cc/F57Z-9MCR>] (serving as an example of the various initiatives for comprehensive databases of academic research which are operated

A thesis or dissertation is a “document which presents the author’s research and findings and submitted by him in support of his candidature for a degree or professional qualification.”⁹ The terms are used differently around the globe: in some countries, a “thesis” is the culmination of a course of study leading to a master’s degree, and a “dissertation” is the work required for a doctoral degree; in other countries, it is the reverse.¹⁰ We use the term “TDs” to signify final written works required to qualify for advanced academic degrees.

To support our proposed argument for the need to differentiate TDs from other research, we start by reviewing the historic development of TDs and the evolution of their role in academic institutions. In the early days of medieval European universities, the function of advanced degree studies was to demonstrate the qualification of the student to become a university teacher, *i.e.*, a professor.¹¹ The requirement of a final written study to obtain a doctorate or a master’s degree emerged in the 17th century.¹² The academic threshold of written TDs had to meet strict requirements of originality, contribution to the scientific field, and demonstration of ability to conduct independent research.¹³ At the same time, the role of university professors to supervise the conduct of advanced degree studies, culminating in the final written TDs, became clearer.¹⁴ In the last decades, advanced degrees have evolved further with the emergence of the

by private companies for commercial profit); *About Us*, CLARIVATE, <https://clarivate.com/about-us/> [<https://perma.cc/6DZ9-2DVF>].

⁹ Int’l Org. for Standardization, *Documentation – Presentation of Theses and Similar Documents*, ISO 7144-1986(E), § 3 (Dec. 1, 1986).

¹⁰ Brian Paltridge, *Thesis and Dissertation Writing: An Examination of Published Advice and Actual Practice*, 21 *ENG. FOR SPECIFIC PURPOSES* 125, 125 n.2 (2002).

¹¹ TERESA BRAWNER BEVIS, *A WORLD HISTORY OF HIGHER EDUCATION EXCHANGE: THE LEGACY OF AMERICAN SCHOLARSHIP 7* (Palgrave Macmillan Cham 2019).

¹² See David Bogle, Pro-Vice-Provost of UCL’s Doctoral Sch., 100 Years of PhD in the UK at the Vitae Researcher Development International Conference (Sept. 18, 2018), <https://www.vitae.ac.uk/vitae-publications/blogs/history-of-phd.pdf/@@download/file/History%20of%20PhD.pdf> [<https://perma.cc/JAK5-QUFB>].

¹³ Douwe D. Breimer, *Leiden Dissertations*, in *HORA EST! ON DISSERTATIONS 7*, 7 (Leiden: Universiteitsbibliotheek, Leiden 2005).

¹⁴ Rosemary Deem & Shane Dowle, *The UK Doctorate: History, Features and Challenges*, in *TRENDS AND ISSUES IN DOCTORAL EDUCATION: A GLOBAL PERSPECTIVE*, 152, 153-54 (Maria Yudkevich et al. eds., 2020).

knowledge-based economy.¹⁵ At present, the emphasis of third-degree studies is not only on training future university teachers and researchers but also on preparing the workforce professionals and training future leaders.¹⁶ Accordingly, both the requirements for and perception of written TDs have adapted, and new models and perceptions regarding notions of contributions to the scientific field developed, as well. But TDs are still perceived as special products of advanced academic studies, requiring students to meet strict academic standards to qualify for an advanced degree.¹⁷

The proposed argument is that TDs, as special academic products, should be subject to a specially tailored policy that enables fully open access to the public. After describing the historical development of TDs, we define our position within the broader discourse surrounding “open science” initiatives.¹⁸ A range of justifications supports the need to facilitate access to research, from return on public investment in the academic sector to the promotion of efficient academic research as a public good.¹⁹ Over the years, various initiatives have emerged under the agenda of open science, all of which are aimed at strengthening the democratic structure of the information society.²⁰ Chief among these is the “open access” publication

¹⁵ Yanhua Bao et al., *From Product to Process. The Reform of Doctoral Education in Europe and China*, 43 STUDIES IN HIGHER EDUC., 524, 526 (2018).

¹⁶ *Id.*

¹⁷ *Id.* at 538.

¹⁸ See Paul A. David & Paul F. Uhler, *Creating the Global Information Commons for Science*, THE COMMITTEE ON DATA FOR SCIENCE AND TECHNOLOGY (Sept. 2005), <http://www.codata.info/wsis/GICSI-prospectus.html> [<https://perma.cc/A6C4-AYLK>].

¹⁹ See Lucie Guibault, *Owning the Right to Open Up Access to Scientific Publication*, in OPEN CONTENT LICENSING: FROM THEORY TO PRACTICE 137, 137 (Lucie Guibault & Christina Angelopoulos eds., 2011); Sascha Friesike et al., *Opening Science: Towards an Agenda of Open Science in Academia and Industry*, 40 J. TECH. TRANSFER 581, 582 (2015). See also MICHAEL NENTWICH, *CYBERSCIENCE: RESEARCH IN THE AGE OF THE INTERNET 3* (Austrian Acad. of Sci. Press 2003).

²⁰ See YOCHAI BENKLER, *THE WEALTH OF NETWORKS: HOW SOCIAL PRODUCTION TRANSFORMS MARKETS AND FREEDOM 2* (Yale Univ. Press 2006). See also Paul A. David, *The Economic Logic of “Open Science” and the Balance Between Private Property Rights and the Public Domain in Scientific Data and Information: A Primer*, in THE ROLE OF SCIENTIFIC AND TECHNICAL DATA IN INFORMATION IN THE PUBLIC DOMAIN: PROCEEDINGS OF A SYMPOSIUM 19, 19 (Julie M. Esanu & Paul F. Uhler eds., 2003); Victoria Stodden, *Enabling Reproducible Research: Licensing for Scientific Innovation*, 13 INT’L J. COMM. L. & POL’Y 1, 24 (2009); Valentina Vadi, *Sapere Aude! Access to Knowledge as a Human*

model, aimed at encouraging better access to research, including academic publications.²¹ The open access publishing model enables the broad dissemination of academic publications at a low cost and, as such, may overcome the market failure associated with the commercial publication model. The commercial publication model may have negative consequences for both scientific development and accomplishing the ultimate goals of academia.²² The open access publishing model gained support from policymakers worldwide and was endorsed as an official EU agenda.²³ The initiative has had additional ramifications, stressing the need to leverage the potential function of institutional digital repositories. Institutional or even national repositories can function as appropriate systems providing access to the growing mass of knowledge and information, promoting the progress of science and serving the public interest.²⁴ Institutional and national digital repositories play a central role in the overall open access agenda.

Various initiatives emerging under the umbrella of the open science movement have recently received a significant boost by attempts to incorporate them into discourse concerning human rights.²⁵ A “right to research,” which encompasses various human rights interests, may serve as the common thread justifying an obligation to open academic research to the public.²⁶

Right and a Key Instrument of Development, 12 INT’L J. COMM. L. & POL’Y 345, 348 (2008); Molly Beutz Land, *Protecting Rights Online*, 34 YALE J. INT’L L. 1, 44–46 (2009); Alessandro Delfanti & Nico Pitrelli, *Open Science: Revolution or Continuity?*, in OPEN SCIENCE, OPEN ISSUES 59, 59 (Sarita Albagli et al. eds., 2015).

²¹ See e.g., Lisa Phelps et al., *Supporting the Advancement of Science: Open Access Publishing and the Role of Mandates*, 10 J. TRANSLATIONAL MED. 13, 13 (2012).

²² See Priest, *supra* note 7, at 385–87.

²³ Martin Enserink, *In Dramatic Statement, European Leaders Call for ‘Immediate’ Open Access to All Scientific Papers by 2020*, SCI. (May 27, 2016), <http://www.sciencemag.org/news/2016/05/dramatic-statement-european-leaders-call-immediate-open-access-all-scientific-papers> [<https://perma.cc/CP5Z-RV5U>].

²⁴ See JULIAN CRIBB & TJEMPAKA SARI, *OPEN SCIENCE: SHARING KNOWLEDGE IN THE GLOBAL CENTURY 1* (CSIRO Pub. 2010).

²⁵ See Carroll, *supra* note 7, at 741.

²⁶ See e.g., Christophe Geiger and Bernd Justin Jütte, *Conceptualizing a ‘Right to Research’ and its Implications for Copyright Law, An International and European Perspective*, (Am. U. Int’l L. Rev., Rsch. Paper Series No. 77, 2022), <https://digitalcommons.wcl.american.edu/research/77/> [<https://perma.cc/Y9GG-DULG>]; Sean Flynn et al., *Implementing User Rights for Research in the Field of Artificial*

Despite awareness of the need for repositories that provide open access to TDs, there is no standard or mandatory framework for such repositories, whether national or transnational.²⁷ We examined current open access policies to TDs worldwide, which vary from country to country. Moreover, the main projects aimed at archiving TDs and providing access to them are either private-commercial ones, such as the ProQuest Dissertations & Theses Global,²⁸ or managed by civil society collaborations, such as DART-Europe E-Theses Portal and others. The latter are available for free, but they are not a mandatory scheme.²⁹ The most prominent national TDs project is the British EThOS system.³⁰ Although participation is not mandatory, most higher education institutions in the UK are taking part in it, and its success can be attributed to the fact that it is the product of a partnership of academic libraries, which developed and implemented the system to meet an academic need.³¹

Given the lack of a unified global standard, and to better understand current open access policies toward TDs, we conducted a limited semi-empirical investigation to collect information. To this end, we circulated a questionnaire to librarians at universities in various countries. The survey aimed to provide an evidence-based perspective for our normative study. Our findings confirm that despite the growing awareness of the importance of an open access TDs policy,

Intelligence: A Call for International Action, 42 EURO. INTELL. PROP. REV. 393, 395 (2020). See also Stephanie Davis-Kahl, *The Right to Research Coalition and Open Access Advocacy: An Interview with Nick Shockey*, in COMMON GROUND AT THE NEXUS OF INFORMATION LITERACY AND SCHOLARLY COMMUNICATION 287, 289–91 (2013); Julia Gelfand & Catherine Palmer, *Weaving Scholarly Communication and Information Literacy*, in COMMON GROUND AT THE NEXUS OF INFORMATION LITERACY AND SCHOLARLY COMMUNICATION 1, 11 (2013).

²⁷ See *infra* Part III A.

²⁸ *ProQuest Dissertations & Theses Global: Uncover the Undiscovered*, PROQUEST <https://about.proquest.com/en/products-services/pqdtglobal/> [<https://perma.cc/U837-Q8MW>].

²⁹ See *infra* Part III A.

³⁰ See *EThOS, E-Theses Online Service*, BRITISH LIBRARY, <https://ethos.bl.uk/Home.do?jsessionid=284F69842D7CE683731F416C7BEBDA5C> [<https://perma.cc/P3DE-5G46>].

³¹ See Jill Russell et al., *EThOS: A National OAI and Digitisation Service For E-Theses in the United Kingdom* (Dec. 7, 2007), https://www.researchgate.net/publication/265000711_ETHOS_a_national_OAI_and_digitisation_service_for_e-theses_in_the_United_Kingdom [<https://perma.cc/YU3T-QZW3>].

no standard policy exists. We received responses reporting on a range of policies, in particular concerning the question of whether the TDs repository is open to all or only to a limited community. In the US, there was some confusion about the status of ProQuest and its function as a national repository. Our survey covered 18 countries in North America, South America, Europe, Asia, Africa, and Australia. It revealed that although the open access TDs policy is widespread, it is far from being a global uniform norm.³²

We argue that TDs present a special case for the open science movement and open access publication format. TDs are the unique products of academic research, and meet the high standard of original contribution to science and innovation. As such, they play an important role in industry and merit special treatment, requiring their publication in open access format, subject to certain exceptions, in a designated institutional, national, or transnational repository. The goal is to establish a global network of TDs repositories—an “open worldwide web of TDs”—that would serve the progress of science worldwide. Such policy should be applied globally, through international agreements or other international schemes.³³ In November 2021, the United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted the Recommendation on Open Science,³⁴ which may be the appropriate framework for launching the proposed “open worldwide web of TDs” initiative.

We bring several arguments in support of this position.³⁵ First, we propose to reconceptualize advanced degree studies as a “social contract” between the student and society that includes the full disclosure of the TDs. A similar principle underlies patent policy, according to which the patentee gains exclusive right and in exchange should fully disclose the invention to the public, for promoting the progress of science and the public good.³⁶ This arrangement may be extended to the domain of TDs. Our argument is based on the

³² See *infra* Part III B.

³³ See *infra* Part IV A.

³⁴ See generally *UNESCO Recommendation on Open Science*, UNESCO (2021), <https://en.unesco.org/science-sustainable-future/open-science/recommendation> [<https://perma.cc/VV98-5Z3W>].

³⁵ See *infra* Part IV B.

³⁶ 35 U.S.C. § 102.

understanding that an advanced academic degree provides the student with various social and economic benefits,³⁷ which justifies, in our opinion, a policy requiring the student to give something back to society. The argument that applies to TDs does not necessarily apply to routine academic research.

The general justifications of the open science movement also support the adoption of an open access TDs policy. A prominent reason is public expenditure. The resources invested in graduate students' studies and their final research projects are immense.³⁸ A significant part of these investments originates from public funds, therefore the final outcome of this academic effort should guarantee the return of investment to the public. The development of science requires access to existing knowledge, therefore the public expenditure argument supports a mandatory scheme of open access TDs policy.³⁹ Other justifications stemming from the public expenditure reasoning include generating a fair and equal academic environment for all scholars, irrespective of the "strength" of their home institution. The academic environment is highly competitive, and an open access TDs policy supports researchers "down stream" who may face significant challenges in accessing updated research.⁴⁰ Another related key reason is adherence to efficient innovation policy, which underlies the open science agenda. The open science movement is based on the understanding that knowledge and innovation develop in an incremental process. The basic justification for open academic science is particularly strong when it comes to TDs, which are the product of a unique type of academic research, in which innovation

³⁷ Sandy Baum et al., *Education Pays, 2013: The Benefits of Higher Education for Individuals and Society*, TRENDS IN HIGHER EDUCATION SERIES (2013); Roy Y. Chan, *Understanding the Purpose of Higher Education: An Analysis of the Economic and Social Benefits for Completing a College Degree*, 6 J. EDU. POL'Y, PLAN. & ADMIN. 1, 13 (2016); JERE R. BEHRMAN & NEVZER G. STACEY, *THE SOCIAL BENEFITS OF EDUCATION* 129-30 (1997).

³⁸ See e.g., *Postsecondary Institution Expenses. Condition of Education*, NAT'L CTR. EDU. STAT. (2022), <https://nces.ed.gov/programs/coe/indicator/cue> [<https://perma.cc/HN3X-R9CC>] (referring to the rising instruction expenses per full-time equivalent (FTE) student at American degree-granting postsecondary institutions in the United States).

³⁹ See *infra* Part IV B 2.

⁴⁰ See Ben Jongbloed et al., *Transparency in Higher Education: The Emergence of a New Perspective on Higher Education Governance*, in *EUROPEAN HIGHER EDUCATION AREA: THE IMPACT OF PAST AND FUTURE POLICIES* 441 (Adrian Curaj et al. eds., 2018).

is a prerequisite that is strictly examined.⁴¹ Therefore, the access of researchers in all sectors to recent TDs is essential for the efficient progress of science. These and other considerations discussed in depth in the article, support the proposition that there is a pressing public need to establish a structured and institutionalized global framework for mandatory open access TDs policy based on designated repositories. Finally, we discuss potential barriers to our proposed model and suggest pragmatic means to overcome them.⁴²

The importance of the article lies in justifying the special treatment of TDs as academic outputs that must be subject to a global open access policy for the benefit of society as a whole. In the aftermath of the global COVID-19 crisis, it seems that time is ripe to establish a global initiative for publishing TDs in an open access and a unified format.

This article proceeds as follows: Parts I and II review the historical development of TDs and the emergence of the open science movement, respectively. Part III describes the current policies worldwide to open access to TDs and reports on a semi-empirical investigation that collected information on current policies in the matter around the world. Part IV delves into the theoretical justifications of a specially designed scheme for open access to TDs. Part V discusses the various barriers to the proposed model and the ways to overcome them. Part VI contains concluding remarks.

I. HISTORICAL AND NORMATIVE BACKGROUND OF THESES AND DISSERTATIONS

A. *Historical Development of Theses and Dissertations in Academia Worldwide*

The Muslim world was the first to introduce the notion of a “university”—the Arabic *madrassa*.⁴³ These universities granted a diploma to document that the student had finished his studies and was

⁴¹ See *infra* Part IV B 2.

⁴² See *infra* Part V.

⁴³ BEVIS, *supra* note 11, at 35.

therefore qualified to teach at the madrasa.⁴⁴ The oldest madrasa is the University of Karaouine, in Fez, Morocco, which was established in 859 AD.⁴⁵ The first European university, a Christian institution, was established more than 200 years later in Bologna, Italy, in 1088.⁴⁶ In the early days of European universities, only the most capable were accepted to study, and the degree demonstrated that the scholar was qualified to become a lecturer, i.e., it functioned as a license (*licentia*, in Latin) to teach.⁴⁷ The terms “doctor,” “professor,” “magister,” and “dominus” all signified a certified lecturer at the university.⁴⁸ For example, the University of Paris conferred the title of Master, whereas the University of Bologna conferred the title of Doctor.⁴⁹

While universities in Europe proliferated over the centuries, the requirement of a written study to obtain a doctorate or a Master’s degree emerged only in the 17th century.⁵⁰ Prior to then, earning a Master’s or a Doctor’s degree required scholars to participate in various oral disputes in which they had to demonstrate the ability to argue and debate.⁵¹ After completing the advanced studies, to be accepted as qualified university teachers, the scholars had to participate in a ceremonial procedure consisting of two stages: the *Vesperie*—the last time the candidate played the role of a participant in the oral dispute, and the *Inceptio*, in which the candidate first took on the master’s role.⁵² These oral procedures came to be known as a “defense” of the candidate’s thesis that was presented in the dispute.⁵³ The first written disputes can be found around the year 1550 in Central Europe.⁵⁴

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ *Id.* at 37.

⁴⁷ *Id.* at 38-39.

⁴⁸ *Id.* at 42.

⁴⁹ Bogle, *supra* note 12.

⁵⁰ Breimer, *supra* note 13, at 7, 9.

⁵¹ Olga Weijers, *The Medieval Disputatio*, in *HORA EST! ON DISSERTATIONS* 23, 26 (Leiden: Universiteitsbibliotheek, Leiden 2005).

⁵² *Id.* at 26.

⁵³ *Id.* at 26-27.

⁵⁴ Joseph S. Freedman, *Disputations in Europe in the Early Modern Period*, in *HORA EST! ON DISSERTATIONS*, 30, 34, 36 (Leiden: Universiteitsbibliotheek, Leiden 2005).

In the latter half of the 16th century, after the development of printing technology, universities in the Netherlands, Central Europe, and Scandinavia began to publish written disputes widely; in other parts of the world, publication was less widespread.⁵⁵ The earliest documented disputes often did not specify the author's name; over the years, the respondent's name was added as the author of the dispute.⁵⁶ The length of the dispute gradually increased in early modern times.⁵⁷ Many universities collected these writings and at times traded them for studies from other universities to acquire greater knowledge for their students.⁵⁸ The idea of a written final work of a doctorate candidate, known today as a thesis or dissertation, emerged only in the 17th century.⁵⁹

It is not clear when the first Philosophy Doctor (PhD) degree was officially awarded, but the first records of such a degree are from Germany, from where the practice gradually spread to the rest of the world.⁶⁰ The PhD became the highest academic degree, and its purpose was to certify mastery of a subject-matter field and the performance of original research.⁶¹ In the United States, the first PhD degree was granted by Yale University in 1861, following the German tradition.⁶² In the UK, the first PhD awarded was at the University of Oxford, in 1917, with others following in Oxford's footsteps soon thereafter.⁶³

Over time, the requirements for obtaining the highest academic degree became both clearer and stricter. Writing the culminating work of one's doctoral degree could take several decades, especially

⁵⁵ *Id.*

⁵⁶ *Id.* at 34.

⁵⁷ *Id.*

⁵⁸ See Jos Damen, *Five Centuries of Dissertations in Leiden: A Mirror of Academic Life*, in *HORA EST! ON DISSERTATIONS* 11, 13 (Leiden: Universiteitsbibliotheek, Leiden 2005).

⁵⁹ Bogle, *supra* note 12, at 1.

⁶⁰ See G. DuS, *A Question of Degrees*, 133 *SCIENCE* 441 (1961).

⁶¹ *Id.*

⁶² See *id.*

⁶³ See Deem & Dowle, *supra* note 14, at 153–54.

in the humanities.⁶⁴ In the exact sciences,⁶⁵ such as mathematics and physics, scholars generally spent fewer years on the written work, but it could still take close to a decade.⁶⁶ Today, research that qualifies for a doctorate culminates in the submission of a final written dissertation and may be completed within a few years.⁶⁷ Nevertheless, the academic threshold remains high, as the written TDs must meet strict requirements of originality, contribution to the field, and demonstration of ability to conduct independent research.⁶⁸

B. Theses and Dissertations as a Qualifying Threshold for Academic Acknowledgement

As noted, the perception of the written TDs has evolved over the years, as the purpose of advanced academic studies itself changed. In the early years of universities, the role of the doctoral degree was to train a small cohort of elite scholars in the search for pure knowledge and basic truth,⁶⁹ so a thesis or dissertation was therefore aimed at enriching the relevant field of study.⁷⁰ During this period, it was assumed that all doctoral researchers would go on to pursue academic careers, therefore the dissertation also served to certify the candidate's qualification as a teacher in the university.⁷¹

The development of doctoral degrees in the UK is of particular interest in view of the far-reaching reforms that were introduced over the years. In the early days, despite the long gestation of doctoral dissertations, there was only minimal supervision of the process over the research methods and training of the candidates.⁷² It was not until after World War II that the supervision of doctoral studies in the UK began, and only in the 1970s and 1980s has a PhD degree become a key consideration in employing lecturers in British

⁶⁴ See Breimer, *supra* note 13, at 7.

⁶⁵ EXACT SCIENCE, Merriam-Webster.com, <https://www.merriam-webster.com/dictionary/exact%20science> (last visited Oct. 29, 2022) (“[A] science (such as physics, chemistry, or astronomy) whose laws are capable of accurate quantitative expression[.]”).

⁶⁶ See Breimer, *supra* note 13, at 7.

⁶⁷ *Id.*

⁶⁸ See *id.*, at 7, 9.

⁶⁹ See Deem & Dowle, *supra* note 14, at 165–66.

⁷⁰ See *id.* at 166.

⁷¹ *Id.*

⁷² See *id.* at 153–54.

academies.⁷³ After World War II, the first university committees for advanced degrees were established, providing financial support for researchers.⁷⁴ As doctorate studies became more rigorous and the time needed for their completion remained long, many scholars dropped out of PhD programs.⁷⁵ Consequently, reforms were introduced into the PhD degree training process, which was limited to three-to-four years for a full-time scholar and to six-to-eight years for a part-time one.⁷⁶ Nonetheless, the high standard required of the dissertations remained.⁷⁷ Another reform introduced in the UK in the 1990s acknowledged a new type of professional doctoral degree for students who wished to combine advanced academic studies with full-time professional work.⁷⁸ These professional doctoral degrees combined training in traditional academic studies with a short practical thesis.⁷⁹ Thus, a doctoral degree's purpose preserved its origins as academic research aimed at producing new knowledge.⁸⁰ However, today greater emphasis is placed on applied knowledge of economic values, alongside contribution to society.⁸¹

Today, the doctoral thesis or dissertation remains a research project conducted under the supervision of academic experts.⁸² In some countries, there are clear regulatory guidelines for who can instruct doctoral research students, and clear guidelines for writing the dissertation and meeting the requirements for obtaining the degree.⁸³ Yet, the purpose of the doctoral degree has changed in the last decade as a result of profound social developments, chief among these being the emergence of the knowledge-based economy.⁸⁴ Today, the emphasis of doctoral studies is not only on training future university professors, but also on preparing the professional workforce for all

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *See* Bao et al., *supra* note 15, at 533.

⁷⁶ Deem & Dowle, *supra* note 14, at 153–54.

⁷⁷ *See* Breimer, *supra* note 13, at 9.

⁷⁸ *See* Deem & Dowle, *supra* note 14, at 154.

⁷⁹ *See id.* at 153–54.

⁸⁰ *See id.* at 154.

⁸¹ *See id.* at 172.

⁸² *Id.*

⁸³ *See* Bao et al., *supra* note 15, at 526.

⁸⁴ *See id.*

sectors of the economy and training future leaders for various societal functions.⁸⁵ Consistent with this shift in the purpose of doctoral degrees, the number of research students has increased greatly over the years.⁸⁶ The process of leveraging the advanced academic studies for serving societal needs and supporting the knowledge-driven economy was strengthened by the European Bologna Process, which has reformed academic studies in the EU.⁸⁷ The European Bologna Process has also emphasized, among other things, a new goal of academia in training students for the labor market and enhancing their employability in the innovation economy.⁸⁸

The evolving purpose of doctoral degrees led to the development of two types of doctoral studies: a research doctorate, following the traditional model aimed at contributing to knowledge in the relevant field of research; and a professional doctorate, aimed at training the professional workforce in various sectors, particularly in disciplines such as business administration, medicine,⁸⁹ health support professions, education, engineering, and social work.⁹⁰ Thus, various professional fields have been awarding doctoral degrees, for example, DBAs in business administration and EdDs in education.⁹¹ The transformation in the types of advanced degree studies has resulted in a shift in the knowledge produced in the course of doctoral research.⁹² Academic knowledge has expanded beyond pure theoretical thinking, adding an applied tier and building a closer connection

⁸⁵ *See id.*

⁸⁶ *See id.* at 527–28.

⁸⁷ *See id.* at 525.

⁸⁸ *See id.* at 526.

⁸⁹ Medical degrees are an exemption. The first medical degrees were recognized by the authorities around the year 1231 in Schola Medica Salernitana, Italy (though they were granted even before). As far as we know, however, no written final dissertation was needed as a prerequisite to obtain these degrees. *See* 1 HASTINGS RASHDALL, *THE UNIVERSITIES OF EUROPE IN THE MIDDLE AGES* 84 (1895) https://lollardsociety.org/pdfs/Rashdall_Universities_vol1.pdf [<https://perma.cc/HP34-QSXZ>].

⁹⁰ Bao et al., *supra* note 15, at 530–31. *See also* Berit H. Johnsen, *From Dr. Philos to PhD*, in 1 *RESEARCH PROJECT PREPARATION WITHIN EDUCATION AND SPECIAL NEEDS EDUCATION: INTRODUCTION TO THEORY OF SCIENCE, PROJECT PLANNING AND RESEARCH PLANS* 80 (Berit H. Johnsen ed., 2013) (providing a deeper discussion regarding the change in European perceptions of advanced academic studies).

⁹¹ Bao et al., *supra* note 15, at 530.

⁹² *See id.* at 531–32.

with the needs of societal sectors outside of academia, including industry.⁹³ Evolution of the purpose of doctoral studies has not changed the basic requirement that the final TDs should demonstrate a significant contribution to the relevant field of science, although the quality of the professional doctorates is controversial.⁹⁴ Today, the requirement of academic innovation is understood broadly to encompass not only knowledge of basic science but also the knowledge that generates social and economic value for society.⁹⁵

II. OPEN SCIENCE, OPEN ACCESS, AND THE RIGHT TO RESEARCH

We should examine those initiatives aimed at enhancing access to academic research in the broader context of social movements pertaining to open science and open access, both of which have emerged in recent decades.⁹⁶ These movements are part of a larger idea of culture that balances the free flow of information with proprietary rights.⁹⁷ Together, these ideas are part of a global trend aimed at promoting the democratization of the information society,⁹⁸ seeking to introduce the principles of fundamental rights into additional domains of modern civic life.⁹⁹ We discuss the background of these initiatives and their principles below.

⁹³ See *id.* at 532.

⁹⁴ See *id.* at 539.

⁹⁵ See *id.* at 535.

⁹⁶ See Mary Douglas, *Foreword* to MARCEL MAUSS, *THE GIFT: THE FORM AND REASON FOR EXCHANGE IN ARCHAIC SOCIETIES* ix, xviii (W. D. Halls trans., 1990) (discussing the gift exchange economy theory). See also MARK ANDREW HILL, *THE BENEFIT OF THE GIFT: SOCIAL ORGANIZATION, AND EXPANDING NETWORKS OF INTERACTION IN THE WESTERN GREAT LAKES ARCHAIC* 6 (Berghahn Books 2012); Yochai Benkler, *Sharing Nicely: On Shareable Goods and the Emergence of Sharing as a Modality of Economic Production*, 114 *YALE L.J.* 273, 276 (2004).

⁹⁷ See LAWRENCE LESSIG, *FREE CULTURE: HOW BIG MEDIA USES TECHNOLOGY AND THE LAW TO LOCK DOWN CULTURE AND CONTROL CREATIVITY* 3 (2004).

⁹⁸ BENKLER, *supra* note 20, at 2. See also Lisa von Wiegen & Shannon M. Oltmann, *A Different Democratic Divide: How the Current U.S. Online Court Record System Exacerbates Inequality*, 112 *L. LIBR. J.* 257, 257–58, 260 (2020).

⁹⁹ See, e.g., Janet Elizabeth Hope, *Open Source Biotechnology* (Dec. 23, 2004) (Ph.D. dissertation, Australian National University) (on file at <http://ssrn.com/abstract=755244>); David W. Opperbeck, *The Penguin's Genome, or Coase and Open Source Biotechnology*, 18 *HARV. J.L. & TECH.* 167, 168 (2004); Andrés Guadamuz González, *Open Science: Open Source Licenses in Scientific Research*, 7 *N.C. J.L. & TECH.* 321, 323–24 (2006).

A. *The Open Science Movement*

Many studies have stressed that openness in science and the accessibility of research are important in fostering scientific development and encouraging innovation, which then promotes both economic growth and the public good.¹⁰⁰ Access to prior knowledge is essential for maintaining a thriving academic culture. “Open science” is a broad notion that includes a series of initiatives aimed at encouraging open access to research and information.¹⁰¹ The principle underlying those initiatives considered to fall under the umbrella of open science is that the results of scientific research should be fully available, and therefore legal and other barriers to their accessibility should be removed.¹⁰² The open science agenda calls for restoring the underlying ethos of academia, which reflects the values of a universal, original, and critical research community, i.e., an open community.¹⁰³ This ethos was enshrined in Newton’s insight that “If I have seen a little further it is by standing on the shoulders of giants.”¹⁰⁴ The main justifications for facilitating access to research are based on the need to increase the return on public investments in the academic sector, promote efficient academic research, and thereby advance the public good and social wellbeing.¹⁰⁵

¹⁰⁰ See Annie Brett, *Information as Power: Democratizing Environmental Data*, 1 UTAH L. REV. 127, 165 (2022); Anna Berti Suman & Robin Pierce, *Challenges for Citizen Science and the EU Open Science Agenda Under the GDPR*, 4 EUR. DATA PROT. L. REV. 284, 286–88 (2018); David, *supra* note 20, at 20; David & Uhler, *supra* note 18.

¹⁰¹ Friesike et al., *supra* note 19, at 582.

¹⁰² See Stephan Leible et al., *A Review on Blockchain Technology and Blockchain Projects Fostering Open Science*, 2 FRONTIERS IN BLOCKCHAIN 1, 2, 17, 21 (Nov. 19, 2019) <https://doi.org/10.3389/fbloc.2019.00016> [<https://perma.cc/943K-XU2U>]; Massimiliano Assante et al., *Enacting Open Science by D4Science*, 101 FUTURE GENE. COMPUT. SYS., 555, 555 (2019); Sönke Bartling & Sascha Friesike, *Towards Another Scientific Revolution*, in OPENING SCIENCE: THE EVOLVING GUIDE ON HOW THE INTERNET IS CHANGING RESEARCH, COLLABORATION AND SCHOLARLY PUBLISHING 3, 7, 9 (Sönke Bartling & Sascha Friesike eds., 2014).

¹⁰³ See David, *supra* note 20, at 21; David & Uhler, *supra* note 18.

¹⁰⁴ Letter from Isaac Newton to Robert Hooke (Feb. 5, 1675) <https://digitallibrary.hsp.org/index.php/Detail/objects/9792> [<https://perma.cc/LE4B-Q2DW>].

¹⁰⁵ See Vesna Zabijakin-Chatleska & Aneta Cekikj, *Attitudes and Practices of Data Sharing and Data Preservation Among Social Science Researchers in the Republic of North Macedonia*, 15 BALKAN SOC. SCI. REV. 251, 253-256 (2020); Guibault, *supra* note 19; WALT CRAWFORD, OPEN ACCESS: WHAT YOU NEED TO KNOW NOW 1 (2011); Sheila

Restrictions on access to research, such as those stemming from intellectual property rights, may therefore limit the dissemination of data and knowledge and hinder the development of science and innovation.¹⁰⁶ In light of the rapid development of the information society in the last two decades, amplified by an increasingly digital environment, the open science movement has produced a comprehensive framework for developing a balanced policy concerning science.¹⁰⁷

The Access to Knowledge (A2K) movement is one that has emerged as the result of a public struggle over the appropriate policy for research and development in the pharmaceutical market.¹⁰⁸ The A2K initiative gained support from less-developed countries because it was perceived as a means of stressing that the interests and concerns of these countries should be taken into consideration while designing international intellectual property law.¹⁰⁹ In 2007, the World Intellectual Property Organization (WIPO) undertook a program to promote access to knowledge and technology in developing countries, with the goal of encouraging creativity and innovation, as well as strengthening such activities within the framework of WIPO's own activities.¹¹⁰ This move focused public attention on the A2K discourse and brought to the forefront of public debate the safeguards that help less developed countries in protecting their interests

Jasanoff, *Transparency in Public Science: Purposes, Reasons, Limits*, 69 LAW & CONTEMP. PROBS. 21, 21 (2006).

¹⁰⁶ See e.g., Fiona Murray et al., *Of Mice and Academics: Examining the Effect of Openness on Innovation*, 8 AM. ECON. J. ECON. POL'Y 212, 213 (2016); Friesike et al., *supra* note 19, at 582.

¹⁰⁷ See Lea Shaver, *Intellectual Property, Innovation and Development: The Access to Knowledge Approach*, in ACCESS TO KNOWLEDGE IN BRAZIL 1, 3–4 (2010).

¹⁰⁸ See *id.*; Amy Kapczynski, *The Access to Knowledge Mobilization and the New Politics of Intellectual Property*, 117 YALE L.J. 804, 804 (2008).

¹⁰⁹ Kapczynski, *supra* note 108, at 806.

¹¹⁰ See WIPO, *The 45 Adopted Recommendations Under the WIPO Development Agenda, Recommendation ¶ 19* (2007), <http://www.wipo.int/ip-development/en/agenda/recommendations.html> [<https://perma.cc/9Z53-A8VX>] (“To initiate discussions on how, within WIPO’s mandate, to further facilitate access to knowledge and technology for developing countries and LDCs to foster creativity and innovation and to strengthen such existing activities within WIPO.”).

in the international arena.¹¹¹ As part of this discourse, there is also a growing call to take this movement one step further and acknowledge the principle of Access to Knowledge or Access to Information as a fundamental human right.¹¹² A new phase in the evolution of the A2K discourse has emerged that focuses on human rights, as we will discuss below in Part C.

UNESCO has also recently endorsed the open science movement,¹¹³ launching a number of global initiatives that examine worldwide access to information. Their aim has been to enhance international cooperation in education, arts, sciences, and culture.¹¹⁴ In recent years, UNESCO has promoted several projects examining worldwide access to information.¹¹⁵ In November 2021, it released its Recommendation on Open Science, the product of a consultation process with various stakeholders.¹¹⁶ The report builds on previous recommendations regarding the digital information environment, such as the Recommendation on Science and Scientific Research (2017)¹¹⁷ and the Recommendation on Open Educational Resources (2019).¹¹⁸ The proclaimed goal of the Recommendation on Open Science is “to provide an international framework for open science policy and practice.”¹¹⁹ This Recommendation elaborates on the principles of open science and proposes how we may achieve its

¹¹¹ Shaver, *supra* note 107; Kapczynski, *supra* note 108, at 806; see Jerome H. Reichman, *Intellectual Property in the Twenty-First Century: Will the Developing Countries Lead or Follow?*, 46 HOUS. L. REV. 1115, 1184-85 (2009).

¹¹² See Lea Shaver & Caterina Sganga, *The Right to Take Part in Cultural Life: On Copyright and Human Rights*, 27 WIS. INT'L L.J. 637, 639-40 (2010); Land, *supra* note 20, at 44-46.

¹¹³ UNESCO, <https://www.unesco.org/en> [<https://perma.cc/67NN-RXEV>].

¹¹⁴ *Communication and Information*, UNESCO, <https://www.unesco.org/en/communication-information> [<https://perma.cc/W5WQ-UH7Y>].

¹¹⁵ *Right to Information*, UNESCO, <https://www.unesco.org/en/communication-information/right-information?hub=370> [<https://perma.cc/9BY8-FUUJ>].

¹¹⁶ *Recommendation on Open Science*, UNESCO (2021), <https://unesdoc.unesco.org/ark:/48223/pf0000379949.locale=en> [<https://perma.cc/4KTV-NEZ4>].

¹¹⁷ *Recommendation on Science and Scientific Researchers*, UNESCO, https://en.unesco.org/themes/ethics-science-and-technology/recommendation_science [<https://perma.cc/WVR2-35YY>].

¹¹⁸ *Recommendation on Open Educational Resources (OER)*, UNESCO (Nov. 25, 2019), http://portal.unesco.org/en/ev.php-URL_ID=49556&URL_DO=DO_TOPIC&URL_SECTION=201.html [<https://perma.cc/QJY6-76LX>].

¹¹⁹ *Recommendation on Open Science*, *supra* note 116.

goal.¹²⁰ Working groups tasked with discussing ways of implementing the Recommendation are taking their first steps.¹²¹

B. The Open Access Publication Initiative and the Role of Institutional Repositories

“Publication” is the mechanism by which scientific progress is disseminated to the broader academic community and which allows the incremental use of existing knowledge in future research.¹²² Publications are a vital part of academic life. Scholars report their new findings in academic publications, which enables others to examine, critique, improve, and develop new knowledge based on prior disclosed knowledge. The open science movement has evolved into various initiatives aimed at encouraging better access to research, including academic publications.¹²³ In many cases, these publications are not accessible because of publishers’ commercial interests and enforcement of these interests by means of intellectual property rights or other legal restrictions, or because of the absence of academic policies supporting the dissemination of research.¹²⁴ In the 1990s & 2000s, there was outcry against the lack of access to academic publications.¹²⁵ It was prompted by the fact that a handful of

¹²⁰ *Id.*

¹²¹ *Implementation of the UNESCO Recommendation on Open Science*, UNESCO (May 20, 2022), <https://www.unesco.org/en/natural-sciences/open-science/implementation> [<https://perma.cc/JP25-M5RK>].

¹²² Olav Sorenson & Lee Fleming, *Science and the Diffusion of Knowledge*, 33 RSCH. POL’Y 1615, 1617 (2004).

¹²³ *See, e.g.*, Sophia Crüwell et al., *Seven Easy Steps to Open Science*, 227 ZEITSCHRIFT FÜR PSYCHOLOGIE 237 (2019).

¹²⁴ OECD, GIVING KNOWLEDGE FOR FREE: THE EMERGENCE OF OPEN EDUCATIONAL RESOURCES 82–83 (2007). The transfer of rights and awareness of researchers that they (and the institution) are the copyright owners of the scientific article is poor. In 2002–2003, a questionnaire was sent to 542 researchers as part of the RoMEO project in the UK, in which they examined the rights that the authors want to keep for themselves in their study, which they seek to publish. Over 60% wanted other users to be able to view, print, and save their work, but not modify it, as long as the users give them credit. About 55% wanted to limit the use of their work only to non-commercial use and for educational purposes only. The project also showed that about 41% of researchers do not understand the meaning of transferring copyright ownership to a publisher. *Id.*

¹²⁵ PSFC Library, *Print Journal Cancellations*, <https://library.psfc.mit.edu/about/cancels/cancels.html> [<https://perma.cc/WPD2-PDRR>]; *see also* Right to Research Coalition, www.righttoresearch.org/learn/problem/index~print.shtml [<https://perma.cc/WF3M-T2MM>].

international publishing corporations dominated the distribution of the most prestigious academic journals, and that subscription fees to scientific journals skyrocketed.¹²⁶ From a public interest perspective, these practices have created a market failure, which continues to undermine the goal of academia in disseminating knowledge.¹²⁷ The open access publishing format that has emerged in response has grown significantly in the Web 2.0 era, and has thrived in recent years.¹²⁸

The open access publishing initiative was initiated by three declarations made in 2002–2003, known as the Berlin-Bethesda-Budapest declarations, which consolidated and formalized the open access movement.¹²⁹ The key elements of open access publishing, formulated in these declarations, are that (a) research should be freely accessible worldwide, free of charge and without barriers; (b) use of the publications is permitted subject to attribution to the original journal in which research was published; and (c) publications should be immediately deposited in digital format in at least one database

¹²⁶ See Priest, *supra* note 7, at 385–87.

¹²⁷ See Fiona Murray & Scott Stern, *Do Formal Intellectual Property Rights Hinder the Free Flow of Scientific Knowledge? An Empirical Test of the Anti-Commons Hypothesis*, 63 J. ECON. BEHAV. & ORG. 648, 649 (2007); see also Kimbrough & Gasaway, *supra* note 7, at 283–84.

¹²⁸ See, e.g., CRIBB & SARI, *supra* note 24, at 1; Phelps et al., *supra* note 21, at 1; Bartling & Friesike, *supra* note 102, at 7.

¹²⁹ See The Budapest Open Access Initiative, The Howard Hughes Medical Institute, Bethesda Statement on Open Access Publishing (June 20, 2003), <http://legacy.earlham.edu/~peters/fos/bethesda.htm> [<https://perma.cc/RPP3-KYGN>]; The Berlin Declaration, Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (Oct. 22, 2003), <https://openaccess.mpg.de/Berliner-Erklaerung> [<https://perma.cc/AU42-GX4B>]. The first declaration of 2002 was initiated by a consortium of researchers, universities, laboratories, libraries, civil society organizations, journals, and publishers. See The Budapest Open Access Initiative, Declaration on Budapest Open Access Initiative (Feb. 14, 2002), <https://www.budapestopenaccessinitiative.org/read/> [<https://perma.cc/6459-6ZNB>]. The Bethesda statement was at the result of a meeting held in April 2003 at the Howard Hughes Medical Institute. The purpose of the Bethesda statement was to stimulate dialogue in the research community on how the idea of open access can be promoted in the scientific literature. The Berlin Declaration was also signed by a consortium of researchers, universities, and other research and open access organizations. See also *How Should We Define “Open Access”?*, SPARC OPEN ACCESS NEWSLETTER (Aug. 4, 2003), <http://legacy.earlham.edu/~peters/fos/newsletter/08-04-03.htm> [<https://perma.cc/PYT6-Y59Bhtml>].

that is committed to open access principles in a long-term archive.¹³⁰ The open access publishing initiative sought to introduce a game-changing model into the commercial academic publications market.¹³¹ By facilitating broader dissemination of academic publications at a lower cost, it aimed to overcome the market failure of the “behind paywalls” publication model.¹³² Technological developments of the last decade, including the global expansion of online connectivity, growing capacities of digital storage, and thriving information culture, have reinforced the desire to remedy the inaccessibility of research.¹³³ The open access publishing agenda has gained official support from the EU Ministers of Science, Innovation, Trade, and Industry, who released a shared statement in 2016, advocating for publication of all publicly funded research in the EU in an open access format open access format.¹³⁴

The open access publishing initiative and the conditions for its emergence have stressed the need to leverage the potential of institutional digital repositories. Several reasons exist to encourage academic publication in open access format and open publications in institutional repositories to the public. First, in the 21st century, when the quantity of academic information doubles every five years, there is a growing gap between the creation of scientific information and its sharing because most of the information remains unreachable to the general public.¹³⁵ To make the growing mass of knowledge effectively accessible, it is imperative to generate a comprehensive

¹³⁰ JOHANNES J. M. VELTEROP, *OPEN SOCIETY INSTITUTE OPEN ACCESS PUBLISHING AND SCHOLARLY SOCIETIES: A GUIDE* 5 (2005).

¹³¹ Giancarlo F. Frosio, *Open Access Publishing: A Literature Review* 44–48 (CREATE, Working Paper No. 2014/1, 2014), <http://www.create.ac.uk/publications/000011> [<https://perma.cc/3P49-LSFL>].

¹³² Chris Armbruster, *Cyberscience and the Knowledge-Based Economy, Open Access in the Natural and Social Sciences: The Correspondence of Innovative Moves to Enhance Access, Inclusion and Impact in Scholarly Communication*, 6 POL’Y FUTURES EDUC. 424 (2008).

¹³³ Basil Ajith, *The Shift from the Copyright Regime to Free Culture* (Aug. 17, 2013), <http://ssrn.com/abstract=2311145> [<https://perma.cc/XDA8-UCTD>].

¹³⁴ Enserink, *supra* note 23. See also Dagmar Sitek & Roland Bertelmann, *Open Access: A State of the Art*, *OPENING SCIENCE: THE EVOLVING GUIDE ON HOW THE INTERNET IS CHANGING RESEARCH, COLLABORATION AND SCHOLARLY PUBLISHING* 139, 140–42 (Sönke Bartling & Sascha Friesike eds., 2014).

¹³⁵ CRIBB & SARI, *supra* note 24, at 1; Phelps et al., *supra* note 21, at 1.

and efficient tool that makes it possible to reach this knowledge. Institutional or even national repositories can function as appropriate “gates” to the growing mass of knowledge and information. Consolidating academic research within institutional or thematic repositories has many other advantages to the academic community and to the public interest, such as saving the production cost involved in the traditional publication process; reducing repetitive and overlapping research due to the ability to conduct a thorough search of existing studies; allowing focused and targeted exposure to updated research; fostering research collaborations; allowing immediate exposure of research; eliminating the long lead times of the traditional publication process; and focusing the attention of the academic community on new and updated knowledge.¹³⁶ It has been argued that all these advantages of institutional or thematic repositories can facilitate progress in science and better serve the public interest.¹³⁷

Another prominent reason for establishing institutional repositories has to do with the return on public funding. The public expenditure on academic research has increased greatly in the last two decades worldwide,¹³⁸ and the outcomes of these investments, namely academic research, should be fully accessible and free to the public.¹³⁹ Finally, public research libraries, which are also supported by public funds, could fulfill their purpose by providing a better service to the public and facilitating access to greater knowledge.

The call to extend the role of institutional repositories as part of general open access efforts finds support in the argument that knowledge should be democratized and open to the general public, on a global scale, and not only to the local scientific community.¹⁴⁰ Ideally, the global scientific community should operate in an unconstrained environment that allows the free use of previous research, including the raw data used in the course of the research. It has been

¹³⁶ Rob Kitchin et al., *Funding Models for Open Access Digital Data Repositories*, 39 ONLINE INFO. REV. 664, 665 (2015).

¹³⁷ Theodora Bloom et al., *Data Access for the Open Access Literature: PLOS's Data Policy*, 11 PLOS MED 1 (2014).

¹³⁸ See Patrick Gaulé & Nicolas Maystre, *Getting Cited: Does Open Access Help?*, 40 RES. POL'Y 1332 (2011).

¹³⁹ *Id.*

¹⁴⁰ E.g., Kapczynski, *supra* note 108, at 834–39.

argued that such an open and free scientific environment serves the progress of science in all countries, guaranteeing access to knowledge to developing countries as well.¹⁴¹

C. *The Rise of the Right to Research*

Advocates from open science movement, the A2K movement, and open access publishing initiatives have called to incorporate all of these notions within the framework of a fundamental right.¹⁴² It has been argued that access to knowledge should be acknowledged as a basic human right, derived from other already established human rights, first and foremost the freedom of speech.¹⁴³ The nexus between open information, knowledge, and human rights has been extensively discussed by scholars, civil society organizations, and policymakers in the last two decades.¹⁴⁴ Some American scholars have noted that the clause in the Constitution that gives Congress the authority to legislate intellectual property laws for the purpose of promoting the progress of science and of the useful arts, provides an anchor for adopting safeguards for access to knowledge as

¹⁴¹ See, e.g., *id.* at 839.

¹⁴² See, e.g., Vadi, *supra* note 20; Land *supra* note 20.

¹⁴³ See Lea Bishop Shaver, *Defining and Measuring A2K: A Blueprint for an Index of Access to Knowledge*, 4 I/S 235, 239 (2008); Peter S. Menell, *Knowledge Accessibility and Preservation Policy for the Digital Age*, 44 Hous. L. Rev. 1013, 1042–1045 (2007).

¹⁴⁴ See, e.g., ELLEN COLLINS ET AL., GUIDE TO OPEN ACCESS MONOGRAPH PUBLISHING FOR ARTS, HUMANITIES AND SOCIAL SCIENCE RESEARCHERS 1, 6 (2015); CRAWFORD, *supra* note 105, at 1; CRIBB & SARI, *supra* note 24, at 1; CATHERINE JONES, INSTITUTIONAL REPOSITORIES: CONTENT AND CULTURE IN AN OPEN ACCESS ENVIRONMENT 1 (Ruth Rikowski ed., 2007); UMA KANJILAL & ANUP KUMAR DAS, INTRODUCTION TO OPEN ACCESS at 3 (UNESCO ed. 2015), <http://unesdoc.unesco.org/images/0023/002319/231920E.pdf> [<https://perma.cc/72NE-KMB2>]; JOHN WILLINSKY, THE ACCESS PRINCIPLE: THE CASE FOR OPEN ACCESS TO RESEARCH AND SCHOLARSHIP xi (2006); Intekahab Alam, *Changing Role of Academic Librarians in Open Access Environment*, 4 J. LIBR. & INFO. SCI. 449, 450 (2014); Eric Archambault et al., *Proportion of Open Access Peer-Reviewed Papers at the European and World Levels—2004–2011*, SCIENCEMATRIX 1, 1 (2013); Armbruster, *supra* note 132, at 424; Martijn Arns, *Open Access is Tiring Out Peer Reviewers*, 515 NATURE 467, 467 (2014); Charles W. Bailey, Jr., *What Is Open Access?*, in OPEN ACCESS: KEY STRATEGIC, TECHNICAL AND ECONOMIC ASPECTS 13, 14 (Neil Jacobs ed., 2006); Carroll, *The Movement for Open Access Law*, *supra* note 7, at 741, 746; Carroll, *Why Full Open Access Matters*, *supra* note 7, at 1–2; Alissa Centivany, *Paper Tigers: Rethinking the Relationship Between Copyright and Scholarly Publishing*, 17 MICH. TELECOMM. & TECH. L. REV. 385, 385–86 (2011).

well.¹⁴⁵ A more direct recognition of the existing relationship between information, knowledge, and human rights occurred in 1948, with the enactment of Article 27 of the Universal Declaration of Human Rights, which proclaims that “Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.”¹⁴⁶ This human right was further acknowledged in Article 15 of the International Convention on Economic, Social, and Cultural Rights, adopted in 1966.¹⁴⁷ Therefore, access to knowledge as a human right could also potentially derive from the “third generation” human rights, headed by these recognized cultural rights, or even from the right to education.¹⁴⁸

In recent years, the discourse about access-to-knowledge as a human right has evolved significantly, and various specialized areas have developed within it. One such area is the newly emerging “right to research,” an area that merits special attention.¹⁴⁹ Scientific research is incremental, and therefore access to prior knowledge is essential for accomplishing the ultimate goals of scientific progress.¹⁵⁰ Therefore, the open science movement, and more particularly the call for accessible publication policy, may be based on the theoretical foundation of the right to research, as a basic human right.¹⁵¹ The right to research is not expressly included in international law documents, yet it may be derived by way of interpretation out from the underlying goals of various acknowledged human

¹⁴⁵ Margaret Chon, *Postmodern “Progress”: Reconsidering the Copyright and Patent Power*, 43 DEPAUL L. REV. 97, 142–46 (1993); Menell, *supra* note 143, at 1042–45.

¹⁴⁶ G.A. Res. 217 (III) A, art. 27, Universal Declaration of Human Rights (Dec. 10, 1948).

¹⁴⁷ G.A. Res. 2200 (XXI) art. 15, International Covenant on Civil and Political Rights (Mar. 29, 1967).

¹⁴⁸ See Antonija Petricusic, *Empowerment of the Individual Under International Law*, 14 CROAT. INT’L RELATIONS REV. 109, 112 (2008); Peter H. Kooijmans, *Human Rights—Universal Panacea? Some Reflections on the So-Called Human Rights of the Third Generation*, 37 NETH. INT’L L. REV. 315, 320 (1990).

¹⁴⁹ Geiger & Jütte, *supra* note 26.

¹⁵⁰ See CRAWFORD, *supra* note 105 at 1; Jasanoff, *supra* note 1054, at 1; T.L. Spires-Jones et al., Editorial, *Opening Up: Open Access Publishing, Data Sharing, and How They Can Influence Your Neuroscience Career*, EUR. J. NEUROSCIENCE 1413, 1413 (2016).

¹⁵¹ See CRIBB & SARI, *supra* note 24, at 1; Phelps et al., *supra* note 21, at 1.

rights addressing the scientific realm.¹⁵² To begin with, the right to freedom of expression covers a wide range of areas, from political speech to freedom of press, yet freedom of research as part of freedom of expression is relatively an unexplored domain.¹⁵³ The acknowledged right “to share in scientific advancement and its benefits”,¹⁵⁴ also known as the “right to science,”¹⁵⁵ is a prominent source of the new emerging right to research, and its conceptualization under this framework is in its first steps in both the literature and policy documents.¹⁵⁶ Freedom of information’s rationale is another anchor for establishing the “right to research”: enabling to enjoy the benefits of science requires access to relevant information exactly as the participation in democratic processes requires access to information to allow citizens informed opinions.¹⁵⁷ The newly born “right to research,” therefore, is profoundly associated with the various open access initiatives’ goals, fostering their normative underpinnings.

¹⁵² See Geiger & Jütte, *supra* note 26. See also CHRISTOPHE GEIGER & BERND JUSTIN JÜTTE, *The Right to Research as Guarantor for Sustainability, Innovation and Justice in EU Copyright Law*, INTELLECTUAL PROPERTY RIGHTS IN THE POST PANDEMIC WORLD: AN INTEGRATED FRAMEWORK OF SUSTAINABILITY, INNOVATION AND GLOBAL JUSTICE (Taina E. Pihlajarinne et al. eds., forthcoming 2022) (available at <https://ssrn.com/abstract=4140627>) [<https://perma.cc/H3GQ-QQD9>].

¹⁵³ Geiger & Jütte, *supra* note 26.

¹⁵⁴ G.A. Res. 217 (III) A, art. 27, Universal Declaration of Human Rights (Dec. 10, 1948).

¹⁵⁵ Audrey R. Chapman, *Towards an Understanding of the Right to Enjoy the Benefits of Scientific Progress and Its Applications*, 8 J. HUM. RTS. 1 (2009).

¹⁵⁶ See e.g. *The Right to Enjoy the Benefits of Scientific Progress and its Applications*, UNESCO (2009), <https://unesdoc.unesco.org/ark:/48223/pf0000185558> [<https://perma.cc/6DMK-HNSE>]. Occasionally, the ‘right of science’ is associated with academic freedom, perceived in its broadest meaning. See, e.g., Klaus D. Beiter, *Where Have All the Scientific and Academic Freedoms Gone? And What Is ‘Adequate for Science’? The Right to Enjoy the Benefits of Scientific Progress and Its Applications*, 52 ISR. L. REV. 233, 234–35 (2019); Sebastian Porsdam Mann et al., “*Sleeping Beauty*”: *The Right to Science as a Global Ethical Discourse*, 42 HUM. RTS. Q. 332 (2020).

¹⁵⁷ Geiger & Jütte, *supra* note 26.

III. THESES, DISSERTATIONS, AND OPEN ACCESS

A. *Current Trends in Open Access Approach to Theses and Dissertations*

Today, many universities worldwide require that TDs be deposited in their library,¹⁵⁸ and in the past decade, they have also required an electronic copy.¹⁵⁹ Yet, submission of TDs in an accessible format does not necessarily entail an open access policy. As discussed above, there is a growing discourse on the special role institutional repositories have in the open access initiative.¹⁶⁰ Repositories operated on digital platforms enable universities to share resources and scientific information, making possible the convenient and well-organized preservation of scientific studies.¹⁶¹ Digital repositories also enable full, easily handled, and low-cost access to academic knowledge and structured searches in the “treasure of knowledge.”¹⁶² If properly designed, they provide additional advantages in the preservation of academic studies,¹⁶³ increase the exposure of the studies contained in them, and ensure their long-term preservation.¹⁶⁴

This potential function of university digital repositories can provide access to all academic “papers,”¹⁶⁵ but TDs merit special treatment within the repositories because of their different nature and function. For example, such treatment may include providing the general public unlimited access to the TDs, considering that academic repositories are usually sponsored by national authorities, and

¹⁵⁸ See Dillip K. Swain, *Global Adoption of Electronic Theses and Dissertations*, LIBR. PHIL. & PRAC. 1, 1 (2010).

¹⁵⁹ See Marisa L Ramirez et al., *Do Open Access Electronic Theses and Dissertations Diminish Publishing Opportunities in the Social Sciences and Humanities? Findings from a 2011 Survey of Academic Publishers*, 74 COLL. & RSCH. LIBRS. 368, 368–80 (2013).

¹⁶⁰ See *supra* notes 139–145 and accompanying text.

¹⁶¹ See Jennifer Ann Stevenson & Jin Zhang, *A Temporal Analysis of Institutional Repository Research* 105 SCIENTOMETRICS 1491, 1521 (2015).

¹⁶² See Swain, *supra* note 157, at 3.

¹⁶³ See *id.* at 1.

¹⁶⁴ See Stevenson & Zhang, *supra* note 161, at 1522.

¹⁶⁵ John Rigby & Barbara Jones, *Bringing the Doctoral Thesis by Published Papers to the Social Sciences and the Humanities: A Quantitative Easing? A Small Study of Doctoral Thesis Submission Rules and Practice in Two Disciplines in the UK*, 124 SCIENTOMETRICS 1387, 1390 (2020).

may therefore require different indexing from other academic studies, for easier detection and identification.¹⁶⁶ Currently, TDs are not open to the public in worldwide academia, nor are they classified as a distinct category (*e.g.*, in the “Web of Knowledge”).¹⁶⁷ There are also no international agreements or transnational standards on the matter, and current policies relating to the accessibility to TDs vary from both country to country and one institution to another.¹⁶⁸

Given the lack of international cooperation and of a uniform standard regarding the open access policy to TDs, several non-state organizations have created the infrastructure for a global TDs repository. For example, the Open Access Thesis and Dissertations organization (OATD.org), operates a website for searching open access TDs worldwide.¹⁶⁹ The freely available TDs come from 1,100 institutions worldwide. To date, the organization has indexed more than six million open TDs.¹⁷⁰ Nevertheless, there is no clear definition of the exact type of open access policy that enables an institution to be included in this list.¹⁷¹ Several free databases are also beginning to index TDs. A particularly large one, with over six million records and significant exposure to European research, is the Networked Digital Library of Theses and Dissertations (NDLTD).¹⁷² The NDLTD is involved in activities aimed at promoting awareness of the importance of the accessibility of TDs, holds symposiums on the matter, and has established a journal dedicated to fostering knowledge about access to TDs.¹⁷³

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ *See, e.g.*, Figure 6.

¹⁶⁹ *Open Access Theses and Dissertations*, <https://oatd.org> [<https://perma.cc/6WY6-2CB9>]

¹⁷⁰ *See id.*

¹⁷¹ *See Open Access Theses and Dissertations: About OATD—The FAQ*, <https://oatd.org/faq.html> [<https://perma.cc/LF9M-A65C>] (“We define open access broadly to cover ETD that are free to access and read online. We encourage authors to consider formally specifying use permissions, for example by publishing their theses with a Creative Commons license.”).

¹⁷² *The Networked Digital Library of Theses and Dissertations (NDLTD)*, NDLTD, <https://ndltd.org/> [<https://perma.cc/J9NY-KNRX>].

¹⁷³ *Id.*

Beyond these grassroots initiatives attempting to challenge the lack of global collaboration in building TDs repositories, the lack of national policies is apparent. In the US, there is no unified federal policy, and it remains up to each institution to decide on the matter. For example, in 2020, the University of California, which has several campuses, has adopted a policy that “requires theses or dissertations prepared at the University to be (1) deposited into an open access repository, and (2) freely and openly available to the public, subject to a requested delay of access (‘embargo’) obtained by the student.”¹⁷⁴ The policy further requires that “campuses must ensure that student ETD are available open access via eScholarship (UC’s open access repository and publishing platform), at no cost to students,” and explains the advantages of the open access policy.¹⁷⁵ eScholarship is open for free to the general public.¹⁷⁶ In contrast to the University of California, dissertations at Saint Louis University, for example, are open access mostly for the institution and other partners in the higher education sector.¹⁷⁷

The US Library of Congress functions as a national repository with regard to publications in the US, and publishers are usually required to deposit new publications at the Library.¹⁷⁸ The obligation does not apply to TDs, however, because these are not regarded as “publications.”¹⁷⁹ Nevertheless, the Library of Congress holds more than one million TDs that were submitted in the US from the end of the 19th century onward, some of which are in microfilm format.¹⁸⁰ The website of the Library explains that these TDs do not have records in the online catalog of the Library of Congress, and none are

¹⁷⁴ *Open Access Theses & Dissertations*, OFFICE OF SCHOLARLY COMM’N U.C., <https://osc.universityofcalifornia.edu/for-authors/dissertations-theses/> [<https://perma.cc/NE87-JWVY>].

¹⁷⁵ *Id.*

¹⁷⁶ *See Terms of Use and Copyright Information*, ESCHOLARSHIP U.C. (2017), <https://escholarship.org/terms> [<https://perma.cc/2PXW-3KCZ>].

¹⁷⁷ *See Dissertations @ Saint Louis University*, PROQUEST (June 1, 2021), <https://libraries.slu.edu/search/databases/dblink.php?page=dissslu> [<https://perma.cc/N4GG-NWFS>].

¹⁷⁸ General Pugh, et al., *Library of Congress*, in *THE GOVERNMENT MANUAL ONLINE VIA GPO ACCESS 55–62* (1990). *See also* 17 U.S. Code § 407.

¹⁷⁹ *See Pugh*, *supra* note 178.

¹⁸⁰ *See Ask a Librarian, Frequently Asked Questions: General*, LIBRARY OF CONGRESS (Aug 03, 2020), <https://ask.loc.gov/faq/300086> [<https://perma.cc/A8L8-5R6V>].

freely available online through the Library.¹⁸¹ Therefore, the Library of Congress does not serve as an ETD national repository. To provide a substitute for a national ETD repository, the Library of Congress has transferred the TD deposited at the Library to ProQuest. The Library also subscribes to ProQuest Dissertations & Theses Global, which operates a commercial TDs database holding ETD, open only to registered institutions, subject to payment.¹⁸² The Library of Congress allows only researchers on the premises of the Library to gain access to ProQuest TDs because of the limitations of the Library's license.¹⁸³ Many US institutions encourage depositing TDs with the ProQuest TDs system, which holds a large number of US TDs (2.7 million TDs as of 2021),¹⁸⁴ but there are no requirements to make depositing of TDs mandatory. And unless the authors marked their work as open access,¹⁸⁵ the ProQuest system does not make their work available to academics from non-registered institutions and to the general public, outside the Library of Congress reading rooms.¹⁸⁶

The UK has been much more determined than the United States in promoting a national TDs repository. The Joint Information Systems Committee (JISC) and the Consortium of Research Libraries in the British Isles (CURL), as equal partners, funded the E-Theses Online Service (EThOS) project.¹⁸⁷ In its first stage, the goal of the EThOS project was to determine the best way for establishing a

¹⁸¹ *Id.*

¹⁸² *Id.*; see *ProQuest & Open Access*, PROQUEST, <https://about.proquest.com/en/company/proquest-open-access/> [<https://perma.cc/9M93-BTNZ>] (highlighting the policy of ProQuest Dissertations & Theses Global as allowing access via the open web without authentication only to TDs that were initially available on an open access basis).

¹⁸³ *Id.*

¹⁸⁴ See Alissa A. Droog, *ProQuest Dissertations & Theses Global*, CHARLESTON ADVISOR 30, 30 (Aug. 15, 2021), <https://commons.lib.niu.edu/bitstream/handle/10843/24306/2021.10%20PQDT%20Review.pdf?sequence=1> [<https://perma.cc/V525-MTNC>].

¹⁸⁵ *Users Not Affiliated with an Institution*, PROQUEST, https://support.proquest.com/s/article/Users-not-affiliated-with-an-institution?language=en_US [<https://perma.cc/76L3-ZTN6>] (explaining that non-registered personnel may access publications in case the open access option is chosen).

¹⁸⁶ See Droog, *supra* note 184, at 30.

¹⁸⁷ Anthony Troman et al., *A New Electronic Service for UK Theses: Access Transformed by EThOS*, 33 INTERLENDING & DOCUMENT SUPPLY, 157, 159 (2007).

viable and sustainable national repository for doctoral dissertations, on a fully open access basis.¹⁸⁸ The project was led by the University of Glasgow, serving as the head of the consortium, supported by a line of universities and organizations.¹⁸⁹ The British Library supported the project by developing the business model and the infrastructure.¹⁹⁰ The EThOS service was launched at full capacity in August 2008.¹⁹¹ As of today, EThOS holds over 300,000 published doctoral dissertations in open access, free for download for the general public, and over 580,000 doctoral dissertations are indexed.¹⁹² One hundred and forty-seven UK institutions of higher education are participating in the project.¹⁹³ Although participation is not mandatory, in 2019 only a handful of the 165 institutions of higher education in the UK were not participating in the EThOS project.¹⁹⁴ The project can serve as a model for the potential power of academic libraries acting as an engine for reforms promoting open access policies.

A similar initiative to the British EThOS project operating at the European level is the DART-Europe E-Theses Portal. The DART-Europe project was founded in 2005 as a partnership of a consortium of European university libraries to improve global access to European research theses.¹⁹⁵ The DART-Europe is managed by University College London, and it provides fully open access to 1,155,615 theses, from 572 universities in 29 European countries.¹⁹⁶

¹⁸⁸ *Id.* at 158.

¹⁸⁹ *Id.* at 159.

¹⁹⁰ *Id.*

¹⁹¹ *Id.* at 159, 162.

¹⁹² *About EThOS*, BRITISH LIBR., <https://www.bl.uk/ethos-and-theses/about-ethos> [<https://perma.cc/AP7V-2YLA>].

¹⁹³ *EThOS, Participating Institutions* BRITISH LIBR., https://ethos.bl.uk/HEIList.do?_ga=2.245373188.1870342903.1649573651-389572518.1649573651 [<https://perma.cc/TTE7-7HB6>].

¹⁹⁴ *See Higher Education in Numbers*, Universities UK (Sept. 28, 2022), <https://www.universitiesuk.ac.uk/latest/insights-and-analysis/higher-education-numbers> [<https://perma.cc/M6EP-YS5P>].

¹⁹⁵ *DART-Europe E-theses Portal*, DART EUROPE, <https://www.dart-europe.org/basic-search.php> [<https://perma.cc/END7-QW8B>].

¹⁹⁶ *Id.*

Participation in this pan-European project is voluntary, and the project does not reflect a unified and binding EU policy.¹⁹⁷

In sum, current policies relating to the accessibility of TDs vary from country to country. Despite awareness of the need to establish national repositories that provide fully open access to TDs, there is still no standard or mandatory framework for such repositories, whether national or transnational.

B. Empirical Glance at Policies Worldwide

We conducted limited, semi-empirical research aimed at collecting information about current approaches in various countries to the accessibility of TDs. To this end, we sent a questionnaire to key stakeholders in various countries, such as librarians at universities. We disseminated the questionnaire through platforms such as the American Library Association-Copyright Discussion Group (ACRL), both by mailing list and website blog of the organization, and the Association of Research Libraries, through a member of the organization and through the Right to Research Network, as part of the Info-Justice project at American University Washington College of Law. We also circulated the survey among friends of the network.

This is not an empirical study, and we did not purport to conduct a comprehensive survey of the current policies worldwide regarding the accessibility of TDs. The semi-empirical part of the study was intended merely to add some evidence-based perspective to our normative study. We sought mainly to collect information concerning the advantages and pitfalls of the position that TDs should be governed by open-access policies.

Participation in the survey involved answering questions about the policies of the respondents' institutions concerning TDs. No personal information was collected, except to identify the position of the respondent at the institution (i.e., lecturer, librarian, or other).

¹⁹⁷ See, e.g., *DART-Europe E-Theses Portal*, STANFORD LIBRARIES <https://searchworks.stanford.edu/view/10436087/> [https://perma.cc/V2CQ-KY4E] (showcasing how the resources available vary from partner to partner and it does not have a meta-data standard). In addition, just 29 European countries are involved in the project. See *Browsing by Country*, DART EUROPE, <https://www.dart-europe.org/browse-list.php?index=country/> [https://perma.cc/E246-KBSR].

Participation in the survey was voluntary. The survey was approved by the ethics committees at the University of Haifa and of the College of Management. The survey was conducted in March–April 2022. We received 54 replies from various countries, about 50% of them from various States in the US.

As shown in Figure 1, of 54 respondents, 28 were from the United States, 7 from Israel, 3 from Canada, 2 from the Netherlands, and one from each of the following countries: Argentina, Spain (reported as Catalonia), Ethiopia, France, Germany, Ghana, Greece, India, Mexico, Nigeria, North Macedonia, Pakistan, Philippines, and the UK.

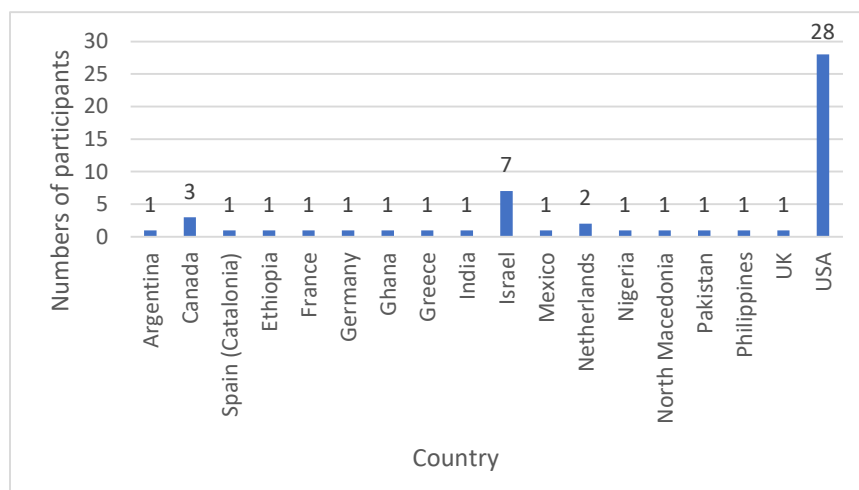


Figure 1: Countries in the survey

Forty-two of 54 respondents were librarians, 7 professors or lecturers, and the remaining 5 included PhD candidates, administrators, and others. We assumed that librarians were well informed about the TDs policy at their institution, and therefore focused on analyzing their responses. Forty-two respondents reported that their institution had programs for both secondary and tertiary degrees, 7 reported having only secondary degree programs, and 5 reported having only tertiary degree programs. In the United States, of the 28 respondents representing 28 institutions, 24 reported that they offered both secondary and tertiary degree programs.

As shown in Figure 2, the following types of institutions respond to the survey: 37 public institutions, 14 private, 1 semi-public, 1 non-profit organization, and 1 government-supported. Nine of the 14 private institutions were from the United States. There were no significant differences between private and public institutions regarding their TDs open access policy. As shown in Figure 3, 27 respondents reported that their institution had a separate repository for TDs. Four respondents reported that they did not have any repository, none of them from the United States.

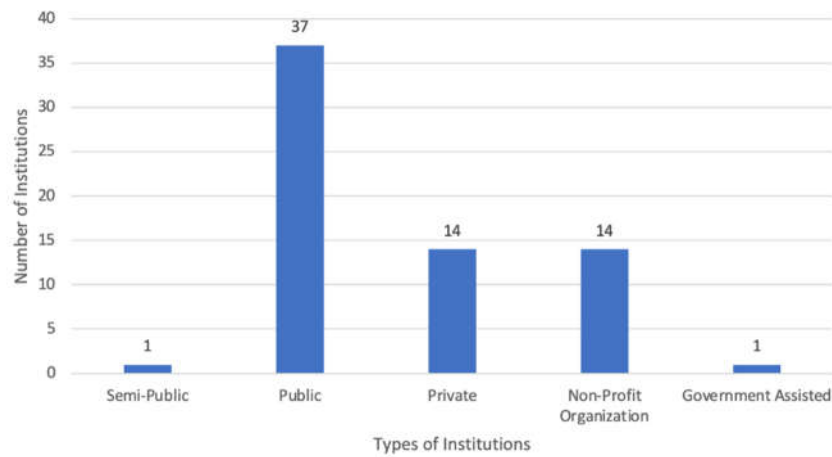


Figure 2: Types of Institutions

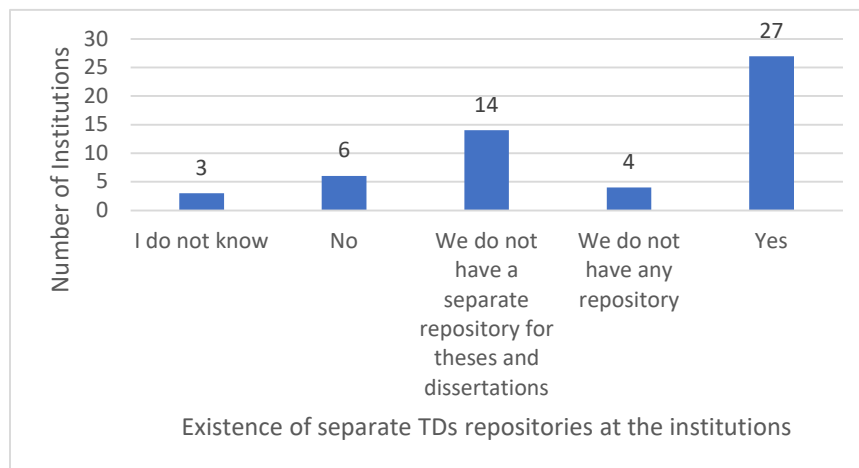


Figure 3: Existence of separate TDs repositories at the institutions

To understand whether there is a difference in the open access policy to TDs between the various institutions according to the rate of TDs deposits per year (high vs. low), we asked respondents to estimate the rate of submissions of TDs per year at their institutions. Of the 50 respondents who answered this question, 30 (60%, 19 of them in the United States), reported having more than 100 submissions per year. These were both private and public institutions, and most of them reported having an open access policy toward TDs.

The transition to the digital era changed how TDs can be deposited. Electronic TDs (ETD) are common and easy to share. Most of the institutions switched to digital submission and deposit of TDs, with or without printed versions. Four institutions required a deposit of a printed TDs, only one of them from the United States. Two of the 4 institutions reported having an open TDs access policy, one reported having fee-based access to TDs, and one (in India) did not answer the question about the policy and reported that the institution did not have a repository, therefore TDs were not accessible to the general public.

More than 74% of the 50 institutions reported having a single institutional repository. Five of the 50 institutions reported having a shared repository with other institutions, of which 3 were in the United States, 1 in Israel, and 1 in the UK.

Seven respondents confirmed that their institutions had a Creative Commons (CC) license policy at their repository, four had a BY-NC-ND¹⁹⁸ license, and the others either provided a choice of four types of licenses to authors, or licenses were determined based on the field of research.

Figure 4 shows that most of the institutions had both theoretical and practical TDs. One of the respondents replied that in Mexico, according to general regulations, there are other types of degrees that had a written final work, which were not theses or dissertations. One of the institutions in the US had programs with non-traditional final projects, such as field practicum reports.

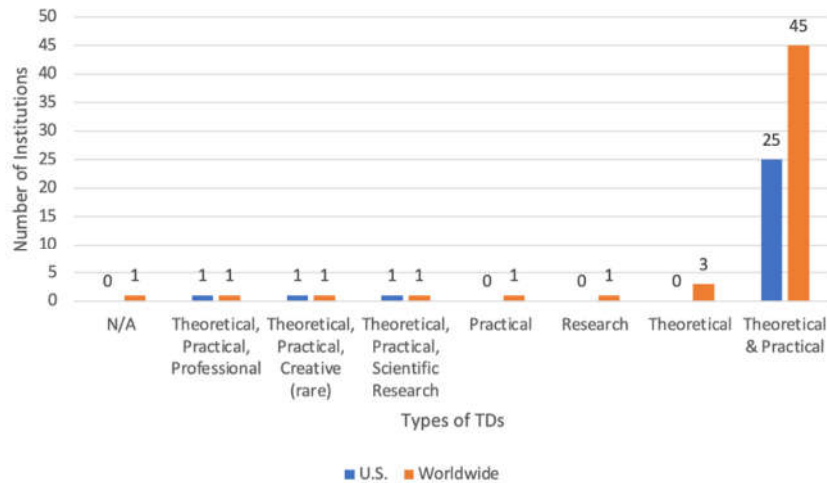


Figure 4: Types of TDs by institution

Figure 5 shows that 32 of 54 institutions reported having an open access policy for all TDs, some have an option for an embargo. Six respondents did not answer, and 4 respondents reported that the

¹⁹⁸ CC license BY-NC-ND (By. Non Commercial. Non Derivatives) allows others to download the work and share it with others as long as credit is being given, and as long as the work is kept unchanged and no commercial use is made. See *Creative Commons Attribution – Non Commercial-Non Derivatives 4.0 International (CC BY-NC-ND 4.0)* <https://creativecommons.org/licenses/by-nc-nd/4.0/> [<https://perma.cc/3Z6W-5SBT>].

choice of the policy was left to the author. The remaining 12 institutions had an open TDs access policy, but a limited one.

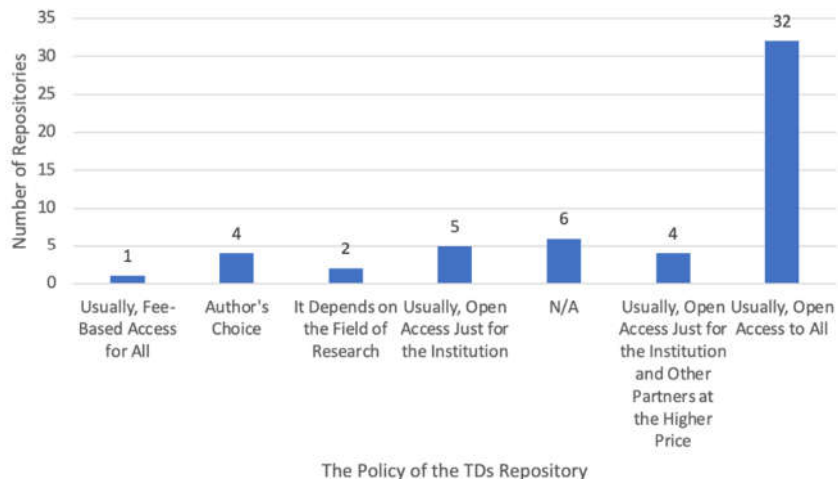


Figure 5: The policy of the TDs repository

As shown in Figure 6, 31 institutions (17 in the United States) reported not sending a copy of the TDs to a national repository, and 19 (9 in the United States) reported sending a copy to a national repository. Nine United States institutions replied that they deposited the TDs at ProQuest Dissertations & Theses Global. Respondents at 5 of these 9 United States' institutions did not know whether ProQuest was considered to be a national repository, and the remaining 4 respondents reported that they believe that ProQuest Dissertations & Theses Global was considered a national repository.

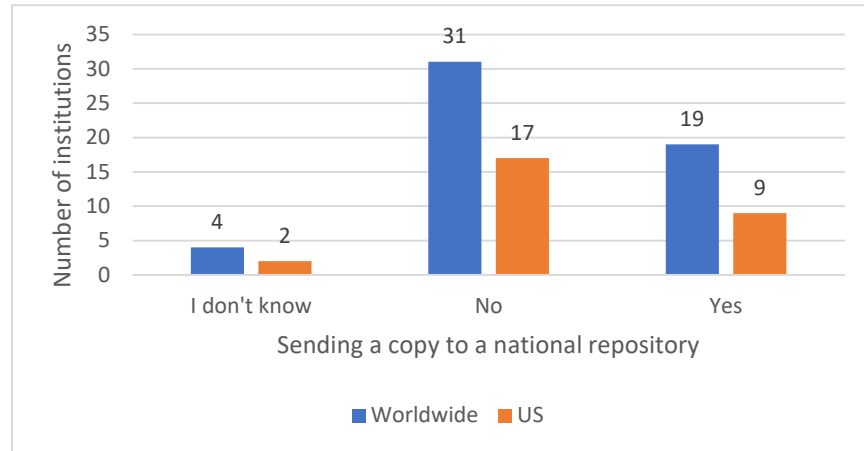


Figure 6: Sending a copy to a national repository

In sum, this semi-empirical survey reinforces the understanding that despite the growing awareness of the importance of an open access policy for TDs, no such standard policy exists. Institutions resort to a wide range of policies, in particular with regard to the question of whether the TDs repository should be open to all or only to a limited community. In the US, there was some confusion regarding the status of ProQuest and its function as a national repository. Our survey did not find a difference between public and private institutions concerning their open access policy to TDs.

IV. RECONCEPTUALIZING THE ACCESSIBILITY OF THESES AND DISSERTATIONS

Considering the historical and normative background of TDs as unique fruits of academic research, and in light of the open access movement and its underlying justifications, this article proposes to take TDs accessibility one step forward and to this end construct a specially tailored framework that will serve as a unified standard on both national and international levels.

A. *A Global and Unified Policy for Open Theses and Dissertations Repositories*

Despite growing awareness of the need to allow open access to TDs worldwide, as well as seminal initiatives to construct open national TDs repositories such as the one in the UK, the data collected in our survey reveal that there is no global and unified policy on this matter. There is no obligation in any country to adopt a policy requiring that the deposited ETD be fully accessible to the general public, rather than to a limited group of academic institutions.¹⁹⁹ Moreover, the involvement of commercial entities in the process of generating TDs repositories raises concerns because these repositories are not aimed at serving the general public and are not free.²⁰⁰ In the United States, various institutions have adopted different approaches to open access.²⁰¹

We propose to reconceptualize TDs and differentiate them from all other academic research, paving the way for establishing a specially tailored policy for a global and fully-fledged open access policy to TDs, under a harmonized scheme. Under this scheme, each institution should generate a separate repository for TDs or deposit its ETD in a public national repository for TDs, which allows their easy identification. Each institution should make TDs fully accessible for free, subject to the possibility of applying for an embargo (*i.e.*, delay of publication) for a limited time for justified reasons.²⁰² This general policy may be adopted at either the institutional level or at a higher one, such as the relevant regulatory authority in each country, or as a global norm. To create a global and unified standard, such a policy should be made mandatory. The end goal would be to establish a global network of national or institutional TDs repositories that would function as an “open worldwide web of TDs.” All the arguments in favor of opening access to TDs become stronger when they are considered on a global scale. Therefore, the repositories should be operated according to a shared standard, allowing

¹⁹⁹ See *supra* Part III.A.

²⁰⁰ See, e.g., *supra* note 182 (referring to ProQuest Dissertations & Theses Global).

²⁰¹ See, e.g., *supra* Figure 6.

²⁰² For further discussion on justified reasons for approving a limited embargo period, see *infra* Part VII.A, C.

their interconnectivity in the long term.²⁰³ Accomplishing this goal requires ongoing collaboration between countries and institutions, which would guarantee that all repositories comply with shared technical standards.²⁰⁴ For best results, such a policy should be implemented by a coordinating international entity.

Several international organizations may initiate and manage such a project. One candidate is UNESCO, which advocates “access to information as a fundamental freedom and a key pillar in building inclusive knowledge societies.”²⁰⁵ In November 2021, UNESCO adopted the Recommendation on Open Science,²⁰⁶ which stresses the importance of international collaboration in the “efforts towards universal access to the outputs of science,”²⁰⁷ although no specific clause addresses TDs.

Another candidate is WIPO. Recently, scholars in the field of intellectual property have suggested that WIPO promote measures to balance copyright and user rights to the products of research, which are important for the development of artificial intelligence systems.²⁰⁸ Copyright is one of main barriers to access to TDs, as discussed below.²⁰⁹ WIPO, the international organization dealing with copyright norms, may help design standards for accessing TDs, as an aspect of the right to research and open science.

B. Reasons Supporting Special Treatment of Theses and Dissertations

The special academic nature and purpose of TDs justifies their reconceptualization. Their unique status as a qualification for an advanced academic degree justifies their special treatment and the establishment of a mandatory open access framework for TDs. The

²⁰³ For further discussion on the technical barriers associated with archives, including repositories, and on the need to set some shared standards for interconnectivity between repositories, see *infra* Part VII D.

²⁰⁴ See Joseph A. Williams & Elizabeth M. Berilla, *Minutes, Migration, and Migraines: Establishing a Digital Archives at a Small Institution*, 78 AM. ARCHIVIST 84, 86–88 (2015).

²⁰⁵ *Right to Information*, UNESCO, <https://www.unesco.org/en/communication-information/right-information?h ub=370> [<https://perma.cc/9BY8-FUJJ>].

²⁰⁶ See *Recommendation on Open Science*, *supra* note 116.

²⁰⁷ *Id.*, art. (vii)22b.

²⁰⁸ See Flynn, Geiger & Quintais, *supra* note 26, at 393.

²⁰⁹ See *infra* Part V.C.

various reasons supporting a special treatment of TDs are discussed below.

It should be noted that there are differences between master's theses and doctoral dissertations. While both are a final works representing the culmination of advanced study, the level and quality of students' research in each may differ.²¹⁰ At some institutions, doctoral students are considered employees of the institutions, and therefore their status is different from that of master's students.²¹¹ Therefore, while the following claims and arguments apply to both master's theses and doctoral dissertations, a global and uniform standard should be designated for doctoral dissertations only, at least as a first step.

1. Theses and Dissertations as a Special Academic Product

TDs are unique products of academic research, not studies conducted by researchers in the regular course of their careers. Rather, it is research conducted under the supervision of the academic institution.²¹² In many modern societies, academic institutions are permitted to grant academic degrees subject to state regulation,²¹³ which denotes that the student has met the requirements of the given degree, including a thesis or dissertation for some of the programs. TDs are the products of a particular type of research intended to secure an academic certificate attesting to a personal achievement of the student. The certificate grants several benefits, the most important of which is the potential qualification for serving as an instructor at the university, which was the initial reason for academic

²¹⁰ See Sid Bourke & Allyson P. Holbrook, *Examining PhD and Research Masters Theses*, 38 *ASSESSMENT & EVALUATION IN HIGHER EDUC.* 407, 414–16 (2013).

²¹¹ A respondent of the survey stressed that in the Netherlands secondary degree final written work should not be regarded as scholarly material as opposed to doctoral dissertation. Whereas doctoral degree students are usually considered university staff members, Master's degree students are not treated as such, and are not expected to meet the standards of academic scholars.

²¹² See Bao et al., *supra* note 15, at 526.

²¹³ See Mary Catharine Lennon, *Learning Outcomes Policies for Transparency: Impacts and Promising Practices in European Higher Education Regulation*, in *EUROPEAN HIGHER EDUCATION AREA: THE IMPACT OF PAST AND FUTURE POLICIES* 527, 528 (Adrian Curaj et al. eds., 2018); DuS, *supra* note 60; Bao et al., *supra* note 15, at 526; USNEI, *Structure of U.S. Education*, <https://www2.ed.gov/about/offices/list/ous/international/usnei/us/edlite-structure-us.html> [<https://perma.cc/KR6K-69GE>].

degrees.²¹⁴ Over the years, as was discussed earlier, the academic degree has come to serve other purposes as well, especially in the labor market.²¹⁵

The special status of TDs has potential implications for the policy governing their accessibility. We propose a new understanding, according to which TDs reflect a social contract, in which a person receives a certificate that serves as a means to leverage personal, social, and economic benefits,²¹⁶ and in exchange, the academic research should be fully disclosed to society to promote the public good. A similar kind of social contract is underlying the granting of a patent: the patentee receives exclusivity for a limited time, which serves as means for economic gain, and in exchange the patented invention must be fully disclosed to society, to serve the public interest by encouraging the incremental growth of knowledge for the public good.²¹⁷

An academic degree, in this sense, can be perceived as social benefit similar to a patent right, which should be granted under full disclosure terms. At the same time, some exceptions should be acknowledged, justifying a limited period of embargo, for example, in cases where there is an intention to file a patent application based on the research, which therefore necessitates non-disclosure of the relevant knowledge.²¹⁸ Such an exception, which is further discussed in the following Part V, is consistent with public interest, because it serves the end goal of full disclosure of knowledge, yet with a limited period of suspension.²¹⁹ After the patent application has

²¹⁴ See BEVIS, *supra* note 11. As we can see, the resources available on this search site vary from partner to partner and it does not have a standard meta-data standard., at 39.

²¹⁵ Bao et al., *supra* note 15, at 526.

²¹⁶ See Charles A. Reich, *The New Property*, 73 YALE L.J. 733, 785 (1964) (proposing to perceive State licenses as a form of new property). In this context, Reich's seminal article serves as an analogy to the benefit given by an academic degree, which may also be viewed as a type of a State license.

²¹⁷ See Katherine J. Strandburg, *User Innovator Community Norms: At the Boundary Between Academic and Industry Research*, 77 FORDHAM L. REV. 2237, 2237–38 (2009).

²¹⁸ See, e.g., 35 U.S.C. § 101 (stating that qualifying inventions may be patented subject to the conditions and requirements of this title, which includes disclosure of the invention); see also Howard K. Schachman, *From "Publish or Perish" to "Patent and Prosper"*, 281 J. OF BIOLOGICAL CHEMISTRY 6889, 6896–97 (2006).

²¹⁹ See *infra* Part V.

been filed, the research can be released for open access because the patent would also be subject to full disclosure.²²⁰ Such an exception is also consistent with another public interest of encouraging technology transfer from academia to the industry by filing patents on knowledge developed in the course of academic research.²²¹ The default rule, however, should be full and immediate accessibility of TDs.

Another unique attribute of TDs which merits their special treatment has to do with the evaluation process. The call to acknowledge a right to research is based on the understanding that research provides individuals and humanity with new knowledge.²²² This rationale reinforces the call to provide access to TDs. As described in Part I, TDs are subject to strict academic supervision and assessment.²²³ They are supervised by a senior researcher and are evaluated by other academic scholars in the relevant field. In other words, TDs are subject to at least a double peer-review process and are usually evaluated according to strict requirements that attest to their high academic quality. By contrast, not all academic publications, including open access publications, necessarily undergo peer review or strict evaluation.²²⁴ Therefore, if TDs are not preserved in a separate repository, they might become mixed with other types of research publications and disappear in the “sea of information.” To avoid the problem of flooding of information, and to overcome the concern that not all publications are trustworthy and are of the same

²²⁰ 35 U.S.C. § 122(b)(1)(A) (requiring an eighteen-month patent application waiting period prior to publishing).

²²¹ Jason Owen-Smith & Walter W. Powell, *To Patent or Not: Faculty Decisions and Institutional Success at Technology Transfer*, 26 J. TECH. TRANSFER 99, 99 (2001).

²²² See Arjun Appadurai, *The Right to Research*, 4 GLOBALISATION, SOC'YS & EDUC. 167, 167–68 (2006).

²²³ See *supra* Parts I.A, and I.B, and in particular text accompanying notes 61, 68, 82, 94–95.

²²⁴ See, e.g., *ARXIV*, <https://arxiv.org/> [<https://perma.cc/Y6DU-X2CD>] (“[E]e-prints posted on arXiv are not peer-reviewed by arXiv; they should not be relied upon without context to guide clinical practice or health-related behavior and should not be reported in news media as established information without consulting multiple experts in the field.”).

academic credibility,²²⁵ a specially designated repository for TDs should be established.

2. Public Expenditure Policy

Public expenditure provides another reason justifying the unique status of TDs as academic research that should be subject to a special open access policy. Masters and doctoral students are instructed at their universities, which requires the investment of various resources. The resources invested in graduate students' studies and their final research projects include the instructors' time and attention, direct funds in form of scholarships, and indirect funds in facilities and other material and non-material resources needed to support the research.²²⁶ The expenditure on graduate students far exceeds the immediate investment in their academic research in general.²²⁷ The training of new cohorts of scientists requires additional and special efforts, taking into consideration that these scholars are not experienced yet and that this is a long and demanding process for both the student and the institution.²²⁸ This argument is closely related to the proposition that publicly funded research belongs to the public. The public should not pay twice for the same research, once for conducting the research and then for gaining access to its results.

²²⁵ See WILLINSKY, *supra* note 144, at 8–9; Yehuda Baruch et al., *Open Access—The Wrong Response to a Complex Question: The Case of the Finch Report*, 24 BRIT. J. MGMT. 147, 147–51 (2013).

²²⁶ See, e.g., *Fast Facts, Expenditures*, NAT'L CTR. EDUC. STAT. (2022), <https://nces.ed.gov/fastfacts/display.asp?id=75> [<https://perma.cc/J2HL-88BM>]; *Annual Reports and Information Staff (Annual Reports), Postsecondary Institution Expenses*, NAT'L CTR. EDUC. STAT. (May 2022) [hereinafter *Annual Reports*], <https://nces.ed.gov/programs/coe/indicator/cue> [<https://perma.cc/B9SP-HWBF>] (“Instruction, including faculty salaries and benefits, was the largest single expense category at public 2-year [3940 percent], public 4-year [26 percent], and private nonprofit 4-year [(30 percent)] degree-granting postsecondary institutions in 2019.”).

²²⁷ See, e.g., *Annual Reports*, *supra* note 226. (referring to the rising instruction expenses per full-time equivalent student at degree-granting postsecondary institutions in the United States).

²²⁸ Peter Schneider et al., *Success and Failure of PhD Programmes: An Empirical Study of the Interplay Between Interests, Resources and Organisation*, GOV. & PERFORMANCE IN THE GERMAN PUB. RSCH. SECTOR. 107, 109–10 (2010).

Given that most academic institutions that train students for advanced degrees are public or supported by public funds,²²⁹ the policy regarding the publication of TDs should serve the public interest. According to the open science movement and the open access approach to publication, open access to research promotes the public good based on the various considerations discussed above.²³⁰ The extensive public investment in advanced degree students reinforces the logical conclusion that TDs should be subject to the general recommendation to impose an open access policy on academic works. The effort in training advanced degree students, some of which is a “sunk cost” in economic terms,²³¹ suggests that the final outcome of this academic effort should be subject to stringent accounting that guarantees the return of investment to the public. The public expenditure argument is therefore particularly convincing in support of a mandatory scheme of open access policy toward TDs.

The open access publishing of TDs may also result in more efficient use of research funds and better development of science. Open access may reduce overlapping studies; enhance the exposure of researchers to other scientific fields; and generate collaborations through wide exposure of the studies. Moreover, open access helps confirm research results more easily; shorten the time of bringing the research to the attention of the scientific community; and provide a convenient and systemic option for conducting follow-up research based on prior research.²³²

The design of the repositories plays a crucial part in the implementation of open access policies. As noted, uploading TDs to an institutional repository does not necessarily mean that these works are widely accessible.²³³ Repositories may be open only to particular

²²⁹ See Adrian Ziderman & Douglas Albrecht, *Financing Universities in Developing Countries*, in 16 THE STANFORD SERIES ON EDUCATION AND PUBLIC POLICY 5–19 (Henry M. Levin ed., 2013); Bikas C. Sanyal & D. Bruce Johnstone, *International Trends in the Public and Private Financing of Higher Education*, 41 PROSPECTS 157, 159 (2011).

²³⁰ See David, *supra* note 20, at 19; David & Uhler, *supra* note 18.

²³¹ Yahya Alshehhi, *Is Training A Sunken Cost?*, in ANNALS OF THE UNIVERSITY OF ORADEA, ECONOMIC SCIENCES 287, 293 (2016).

²³² See Kitchin et al., *supra* note 136, at 665–66.

²³³ Joachim Schöpfel & Hélène Prost, *Degrees of Secrecy in an Open Environment: The Case of Electronic Theses and Dissertations*, 6 J. COMMUN. STUD. 65, 65–66 (2013).

groups, such as the community of the host institution.²³⁴ Yet, the public investment in academic institutions often includes support for building and maintaining the academic repositories, as in the UK, Spain, and Israel.²³⁵ The underlying rationale is that the role of the academic sector is also to facilitate the dissemination of knowledge, its storage, and preservation.²³⁶ Thus, a mandatory policy allowing full access to academic repositories can best serve the end goal of access to knowledge for the public good.

The justification for limiting access to academic repositories to certain communities is questionable. Although in a highly competitive academic environment, such limitations may provide a short-term advantage to the scholars of the institutions, it is nevertheless inefficient and inappropriate from a broader national perspective. The guiding principle of the open science movement is that if science is more open, the better the research outcomes being generated are.²³⁷ Therefore, a policy of fully open access is warranted. Given that the activities of public institutions, as well as their repositories, are supported by public funds, it may also necessitate giving all scholars equal opportunities in access to the sea of knowledge, in contrast to granting a manipulative advantage to the scholars of the more established universities.²³⁸

Another potential concern regarding the transition to digital repositories is the lack of sufficient budgetary resources and the economic burden on the institutions, mainly due to the cost of creating and maintaining the repositories.²³⁹ The budgetary concerns and the potential gaps between the various academic institutions support the establishment of national TDs repositories, serving the entire academic sector in a given country. Such repositories may be part of existing national libraries. Our survey found that digital repositories

²³⁴ See, e.g., *Dissertations @ Saint Louis University*, *supra* note 177.

²³⁵ See Rigby & Jones, *supra* note 165, at 1390.

²³⁶ See *supra* notes 102–103; David, *supra* note 20, at 19; Friesike, *supra* note 19, at 585.

²³⁷ See Friesike, *supra* note 19, at 598.

²³⁸ For the emergence of the “higher education market” and for the impact of competitiveness on higher education, see Ngai-Ling Sum & Bob Jessop, *Competitiveness, The Knowledge-Based Economy and Higher Education*, 4 J. KNOWLEDGE ECON. 24, 24 (2013).

²³⁹ See Kitchin et al., *supra* note 136, at 668–69.

already exist in most institutions of higher education,²⁴⁰ and the marginal cost of adding a section designated to TDs is not substantial. The additional costs associated with the maintenance of a TDs repository, including operational costs of information security²⁴¹ and privacy, do not appear significant.

Finally, it is important to designate a special part of the repository to TDs, or at least designate TDs by special indexing, to allow their easy identification. Such identification and differentiation of TDs from other studies may promote transparency of academic standards required to qualify for advanced degrees. Greater transparency in the competitive academic environment is imperative to promote an efficient “academic market” as well as values of fairness and equality when it comes to the use of public funds for training advanced degree students.²⁴²

3. Academic Innovation Policy

A policy aimed at fostering academic innovation is at the heart of another prominent justification for adopting an open access policy. TDs in particular are targeted by this policy as unique academic research. The open science movement is based on the understanding that knowledge develops in an incremental process.²⁴³ As noted, the historic roots of the requirement to submit the final product of advanced degree studies in print have created a culture of exchange of printed TDs, which generated an exchange of knowledge. Such culture enabled the sharing of new and innovative information with the global research community.²⁴⁴ All studies on the economics of innovation stress openness as a building block of a thriving innovative

²⁴⁰ See *supra* Part III.B.

²⁴¹ See John A. Robertson, *Bioterrorism and the Right to Research*, 4(4) NATURE REV. GENETICS 248, 248 (2003) (exploring the fear that knowledge in the biological field included in scientific publications will be misused, and therefore should be kept confidential for security reasons). We propose to allow limited exceptions to the rule of open access to TD, which may be based on similar security reasons.

²⁴² For the importance of transparency in higher education “market,” including in the accreditation system, institution rankings and performance contracts with the state, see Jongbloed et al., *supra* note 40, at 445–50.

²⁴³ See text accompanying *supra* note 1044.

²⁴⁴ See *supra* Part I.A.

environment.²⁴⁵ Open access to the outputs of academic research fosters an efficient innovation environment.²⁴⁶ Likewise, the policy underlying patent law is that the public interest justifies the granting of exclusive rights to provide incentives to invest in research and development, but only for a limited time. After the expiring of the patent period of time, the invention becomes part of the public domain, allowing further research and development.²⁴⁷ These principles of knowledge sharing are prevalent in modern societies.

With regard to academic research, the underlying principles favoring open knowledge are particularly robust. The academic sector serves as the engine of progress in science, and its most important role is to develop human knowledge.²⁴⁸ Making academic knowledge, and thereby academic innovation, open is also an endeavor pursued worldwide. This basic justification for open academic science is even stronger when it comes to TDs, which are the products of a unique type of academic research, in which innovative merit is a strict prerequisite.²⁴⁹ Moreover, in all other academic research, the mechanism that inspects the value of a contribution to science is based on peer reviews conducted by the journal that accepts the research for publication;²⁵⁰ in the case of TDs, in contrast, this inspection is institutional. TDs are the only academic research that receives a university approval that they have met the threshold of innovation. Scientific journals also implement a rigorous peer review mechanism to ensure that the research published meets the

²⁴⁵ See generally *supra* text accompanying notes 1444–145.

²⁴⁶ See Madhavi Sunder, *Cultural Environmentalism @ 10: The Invention of Traditional Knowledge*, 70 LAW & CONTEMP. PROBS. 97, 102 (2007).

²⁴⁷ See, e.g., U.S. CONST. art. I, § 8, cl. 8, (“To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries”); 35 U.S.C. § 154(a)(1)-(2).

²⁴⁸ See Vijay Kumar Soni & Sadananda Sahoo, *Law, Technology and Freedom of Knowledge Production: Contextualizing Higher Education in a Globalised World*, 11 GNLU J.L. DEV. & POL. 60, 68 (2021).

²⁴⁹ See Rigby & Jones, *supra* note 165, at 1405–6.

²⁵⁰ Though there are many flaws in the “peer review” method, it is still the customary one in most scientific journals. See, e.g., Richard Smith, *Peer Review: A Flawed Process at the Heart of Science and Journals*, 99 J. ROYAL SOC’Y MED. 178, 178 (2006); Neha Vora & Tom Boellstorff, *Anatomy of an Article: The Peer-Review Process as Method*, 114 AM. ANTHROPOLOGIST, 578, 578 (2012).

innovation threshold to maintain their prestige and credibility.²⁵¹ This is particularly important to journals that are acting in a competitive environment. Journals are not subject to any official public oversight, while universities are—at least with regard to their authority to grant academic degrees.²⁵² It is possible to argue that the approval of TDs is not different from the peer review mechanism of the journals, particularly given the academic freedom that grants universities the autonomy to examine TDs as they deem fit. But universities, whether private or public, are subject to state regulation when it comes to their authority to grant academic degrees.²⁵³ Therefore, the approval of TDs is usually subject to rigorous institutional inspection.²⁵⁴ As noted, already in the early days of the universities, the acquiring of a master's or a doctoral degree involved great effort, and the degree was regarded as one of the students' most important scientific achievements.²⁵⁵ Although the doctoral dissertation model is controversial today, there are still strong advocates for this method as the most appropriate way of disseminating academic knowledge.²⁵⁶ The essence of TDs as the flagship of academic scientific innovation supports a policy of open access to them and of differentiating them in designated repositories to promote an efficient innovation environment.

²⁵¹ See Martin Fenner, *Altmetrics and Other Novel Measures for Scientific Impact*, in *OPENING SCIENCE: THE EVOLVING GUIDE ON HOW THE INTERNET IS CHANGING RESEARCH, COLLABORATION AND SCHOLARLY PUBLISHING* 187 (Sönke Bartling & Sascha Friesike eds., 2014).

²⁵² See, e.g., John Bohannon, *Who's Afraid of Peer Review?*, 342 *SCI.* 60, 64 (2013) (discussing open access journals that accept articles for publication without any process of peer review).

²⁵³ See Bao et al., *supra* note 15, at 526. It should be noted that the Bologna Process introduced in the EU was aimed to “increas[e] standardisation of curriculum for the purposes of comparability, and devising common methods for reporting on skills, and competencies acquired through academic studies.” See Mary Catharine Lennon, *Learning Outcomes Policies for Transparency: Impacts and Promising Practices in European Higher Education Regulation*, in *EUROPEAN HIGHER EDUCATION AREA: THE IMPACT OF PAST AND FUTURE POLICIES* 527, 528 (Adrian Curaj et al. eds., 2018).

²⁵⁴ See Anita Lazurko et al., *What Will a PhD Look Like in the Future? Perspectives on Emerging Trends in Sustainability Doctoral Programs in a Time of Disruption*, 12 *WORLD FUTURES REV.* 369, 372 (2020).

²⁵⁵ See *supra* Part I.A.

²⁵⁶ See Rigby & Jones, *supra* note 165, at 1390.

Our argument takes doctoral dissertations back to their origins. Today, master's and doctoral programs are intended to prepare the future generation of teachers in academia, and just as important, to prepare the future generation of leaders of industry. The pursuit of innovation is embedded in academic research, and is particularly enshrined in the final written work reflecting the culmination of advanced degree studies. In the past, the "disputation" stage that was part of the training process of doctoral studies was held in public and was open to the academic world.²⁵⁷ Today, the opening of TDs may reflect a return to the roots of advanced degree studies: the search for innovation and collaboration with colleagues for the advancement of science. A global policy of open access toward TDs can help accomplish this goal.

V. POTENTIAL BARRIERS TO OPEN ACCESS POLICY OF THESES AND DISSERTATIONS

There may be some challenges to our proposed policy of mandatory open access to TDs. The interests of the various stakeholders, including the advanced degree students, the universities, and the publishers of the research may conflict with the need to publish TDs in open access format that allows maximal dissemination. These conflicts may serve as the basis for exceptions to the general policy of open access, safeguarding stakeholders' interests. Such exceptions may help reduce resistance to the adoption of the general mandatory policy and facilitate its broad implementation.

A. *Patents, Trade Secrets, and Commercialization of Academic Knowledge*

One of the main obstacles to the open access policy to TDs is the interest of students and the academic institutions in commercializing academic knowledge and transforming it into applied innovation that may generate profits.²⁵⁸ A prominent vehicle for such

²⁵⁷ See Weijers, *supra* note 51, at 24–26.

²⁵⁸ See generally DAVID C. MOWERY ET AL., *IVORY TOWER AND INDUSTRIAL INNOVATION: UNIVERSITY-INDUSTRY TECHNOLOGY TRANSFER BEFORE AND AFTER THE BAYH-DOLE ACT IN THE UNITED STATES* 8 (2004).

commercialization is the registration of patents and their licensing.²⁵⁹ The academic institution may be registered as the owner of the patent, and the student may be identified as the inventor whose share in the profits is determined by the policies and bylaws of the institution.²⁶⁰ Thus, academic institutions use patents to realize the commercial potential of academic knowledge.

Over the decades, academic institutions have increasingly commercialized academic knowledge.²⁶¹ The process of transfer of knowledge or “technology transfer” has intensified since the 1990s with the emergence of the knowledge-based economy.²⁶² Technology transfer worldwide has been discussed extensively by policymakers and in the literature.²⁶³ A key question concerns the justification for such activity and the purpose of academic research. When it comes to academic research, most people prioritize curiosity and scientific advancement over commercialization. Yet, in the knowledge-based economy, the academic sector plays an important role in contributing to the economic growth for the public good.²⁶⁴ Thus, developing and disseminating academic knowledge should be

²⁵⁹ See Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1666, 1693-95 (1996). See also Arvids A. Ziedonis, *Empirical Analyses Related to University Patenting*, in 2 RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW 273 (Ben. Depoorter et al. eds., 2019). See generally HENRY ETZKOWITZ & CHUNYAN ZHOU, *THE TRIPLE HELIX: UNIVERSITY-INDUSTRY-GOVERNMENT INNOVATION IN ACTION AND ENTREPRENEURSHIP* 3 (Routledge ed., 2018).

²⁶⁰ Hagit Messer-Yaron, *Capitalism and the Ivory Tower: The Gordian Knot Between Money and Science*, 57 ISR. J. OF ECOLOGY & EVOLUTION 331, 333 (2011).

²⁶¹ See generally ETZKOWITZ & ZHOU, *supra* note 259; Neil Netanel & Niva Elkin-Koren, *Introduction: The Commodification of Information*, in *THE COMMODIFICATION OF INFORMATION: POLITICAL, SOCIAL AND CULTURAL RAMIFICATIONS* viii (Elkin-Koren & Neil W. Netanel eds., 2002) (discussing the commercialization of knowledge).

²⁶² See Henry Etzkowitz & Loet Leydesdorff, *Emergence of A Triple Helix of University-Industry-Government Relations*, 23 SCI. & PUB. POL’Y 279, 279 (1996).

²⁶³ See, e.g., Peter Lee, *Patents and the University*, 63 DUKE L.J. 1, 30 (2013); Christopher J. Ryan Jr. & Brian L. Frye, *An Empirical Study of University Patent Activity*, 7 N.Y.U. J. OF INTELL. PROP. & ENT. L. 51, 57 (2017); Patricia E. Campbell, *University Inventions Reconsidered: Debunking the Myth of University Ownership*, 11 WM. & MARY BUS. L. REV. 77, 77 (2019).

²⁶⁴ See ETZKOWITZ & ZHOU, *supra* note 259, at 3; Loet Leydesdorff, *The Triple Helix Model and The Study of Knowledge-Based Innovation Systems*, 42 INT’L J. OF CONTEMP. SOCIO. 1, 1 (2005).

settled within the innovation ecosystem of the private sector, which is based on patenting and licensing.²⁶⁵

Academic scholars strive to disseminate their research by way of publications, an interest that they must reconcile with an additional one of commercializing their academic knowledge.²⁶⁶ The two opposing interests generate a conflict regarding the openness of academic research: the interest of dissemination of knowledge entails policies supporting open access to research; by contrast, the interest of commercialization of knowledge requires keeping the products of research confidential to reap its potential economic benefits. A requirement for the granting of a patent is that the applied knowledge, *i.e.*, the patented invention, be new.²⁶⁷ The novelty requirement means that a patent is not granted for something that is already “patented, described in a printed publication, or in public use, on sale, or otherwise available to the public.”²⁶⁸ In practice, novelty is examined with reference to the “prior art,” meaning that to be eligible for a patent, an invention cannot be disclosed in any previously published knowledge.²⁶⁹ Novelty is the most basic principle of patent law, and it requires preserving the secrecy of the invention until the filing of the patent application.²⁷⁰ Therefore, the two interests of dissemination of academic research and its commercialization are conflicting.

This conflict is also reflected in the underlying motivation regarding the outcomes of research. As members of the academic sector, scholars have the ambition to publish their research to gain

²⁶⁵ See, e.g., Mansfield Edwin, *Patents and Innovation: An Empirical Study*, 32 MGMT. SCI. 173, 180 (1986); Brian K. Krumm, *University Technology Transfer—Profit Centers or Black Holes: Moving Toward a More Productive University Innovation Ecosystem Policy*, 14 NW. J. TECH. & INTELL. PROP. 171, 176 (2016).

²⁶⁶ See REBECCA S. EISENBERG, *Bargaining Over The Transfer Of Proprietary Research Tools*, in EXPANDING THE BOUNDARIES OF INTELLECTUAL PROPERTY 223, 240 (Rochelle Cooper ed., 2001).

²⁶⁷ 35 U.S.C. § 102 (1999) (discussing the requirements for granting novelty).

²⁶⁸ *Id.*

²⁶⁹ See Timothy R. Holbrook, *Patent Prior Art and Possession*, 60 WM. & MARY L. REV. 123, 139 (2018).

²⁷⁰ 35 U.S.C. § 101; see, e.g., Sean B. Seymore, *Rethinking Novelty in Patent Law*, 60 DUKE L.J. 919 (2011).

academic prestige and advance their careers.²⁷¹ By contrast, as members of an industrial sector, their ambition is to reap the economic benefit of their research, which is achieved by commercialization of the knowledge through intellectual property rights; in the cases of patents and trade secrets, this requires confidentiality.²⁷² The commercialization of knowledge and the prevention of immediate publication of new studies has additional negative consequences for academic research, such as delay in the development of incremental knowledge based on that prior knowledge.²⁷³ Moreover, this delay generates a chilling effect on scientific cooperation, which hampers innovation by suppressing the publications of cutting-edge research.²⁷⁴

TDs are part of academic knowledge that can be commercialized. Particularly in the life sciences (*e.g.* biology, chemistry) and exact sciences (*e.g.* mathematics, engineering), the research conducted by advanced degree students is part of wider research projects led by the supervising professor.²⁷⁵ Thus, the products of TDs are subject to the same conflict between the competing interests of openness of research and its commercialization. But once a patent application has been filed, the invention may be disclosed, and confidentiality is no longer required. Moreover, there is a clear incentive to file a patent application as soon as possible given the “first-to-file

²⁷¹ See Mark De Rond & Alan N. Miller, *Publish or Perish: Bane or Boon of Academic Life?* 14 J. MGMT. INQUIRY 321, 321 (2005) (critically analyzing the academic “publish or perish” ethos).

²⁷² For the requirement of secrecy in the patent system, see *supra* text accompanying notes 269–70. See also Mark A. Lemley, *The Surprising Virtues of Treating Trade Secrets as IP Rights*, 61 STAN. L. REV. 311, 315 (2008) (discussing trade secrets as a form of intellectual property right).

²⁷³ See Murray & Stern, *supra* note 127, at 651.

²⁷⁴ See Joseph P. Martino, *The Role of University Research Institutes in Technology Transfer*, 10 INDUS. & HIGHER EDUC. 316, 319 (1996). Thomas Schildhauer & Hilger Voss, *Open Innovation and Crowdsourcing in the Sciences*, in OPENING SCIENCE: THE EVOLVING GUIDE 255, 255–56 (Sönke Bartling & Sascha Friesike eds., 2014).

²⁷⁵ See, *e.g.*, Namrata Gupta, *Doctoral Research Environment in an Indian Institute of Higher Learning in Science and Technology*, 15 SCI., TECH., & SOC’Y 113, 114, 121 (2010); Franz Barjak & Simon Robinson, *International Collaboration, Mobility and Team Diversity in the Life Sciences: Impact on Research Performance*, 3 SOC. GEOGRAPHY DISCUSSIONS 23, 23 (2007).

takes all” principle that governs patents.²⁷⁶ Therefore, the competing interests may be balanced by an embargo period, which exempts the TDs from the general open access for a limited period of time, enabling the student and the institution to file a patent application.²⁷⁷ Typically, the embargo may last up to six months or up to two or three years.²⁷⁸ The embargo may be used to reconcile other conflicts of interest as well, such as aspects of state security and privacy.²⁷⁹ But when the academic knowledge does not qualify for a patent, the desire to keep it as a trade secret for commercial purposes is not legitimate because the secrecy is not limited in time. The underlying principle of the embargo is to allow commercial interests to override the accessibility interest for a short period of time.²⁸⁰

B. Publication on Ranked Platforms

Advanced degree students often seek to publish their TDs as articles in scientific journals or as a book. These publications are important for those who wish to develop an academic career. Academics’ reputations are based first and foremost on their list of

²⁷⁶ See Leahy-Smith America Invents Act 2011, 125 STAT. 284 (2011) (highlighting the move of the United States’ patent system from “the first to invent” principle to “the first to file” principle, which is the accepted rule worldwide); Shuba Haaldodderi Krishnamurthy, *U.S. Patent Reform Act of 2011 (America Invents Act): The Transition from First-to-Invent to First-to-File Principle*, 5 J. INTELL. PROP. INFO. TECH. & ELEC. COM. L. 39, 39 (2014). See also Gideon Parchomovsky, *Publish or Perish*, 98 MICH. L. REV. 926, 928–29 (2000).

²⁷⁷ See Jorge L. Contreras, *Data Sharing, Latency Variables, and Science Commons*, 25 BERKELEY TECH. L.J. 1601, 1640–41 (2010).

²⁷⁸ Ann R. Hawkins et al., *Mandatory Open Access Publishing for Electronic Theses and Dissertations: Ethics and Enthusiasm*, 39 J. OF ACAD. LIBRARIANSHIP 32, 37 (2013). The Israeli Forum for Access to Knowledge in Israeli Higher Education Institutions, established in 2009 and directed by the authors of this article, is currently promoting a policy of open access to TDs. As part of the project, we created a form that should be completed by advanced degree students to request up to three years of embargo for various reasons, including the filing of a patent application. Such requests should be approved by an institutional committee. See *Access to Knowledge in Higher Education*, HAIFA UNIV. SCH. OF L. (2013), <https://law.haifa.ac.il/2018/08/29/%D7> [<https://perma.cc/W9TV-LW63>].

²⁷⁹ See Victoria Stodden, *Intellectual Property and Computational Science*, in OPENING SCIENCE: THE EVOLVING GUIDE 225, 230–31 (Sönke Bartling & Sascha Friesike eds., 2014) (identifying the obstacles in releasing scientific data).

²⁸⁰ Martino, *supra* note 274, at 319; Rebecca S. Eisenberg, *Academic Freedom and Academic Values in Sponsored Research*, 66 TEX. L. REV. 1363, 1396–97 (1988).

publications.²⁸¹ Scientific journals and publishers are ranked by various methods.²⁸² Publishing one's research on a highly ranked platform is important for one's professional reputation and academic promotion.²⁸³ Therefore, a policy requiring mandatory open access publication of TDs may prevent its concurrent publication in a scientific journal or as a book and conflict with the students' interests to publish their research on highly ranked platforms. Thus, the open access policy promotes societal interests but undermines the ability of individual students to fully reap the fruits of their academic studies.

This barrier to a policy of open access to TDs may be partially eliminated in several ways. First, in our opinion, the assumption that publishing TDs in an open institutional repository undermines the ability to concurrently publish the research in scientific journals and books needs to be examined empirically. The question is whether the mere disseminating of research to the public in institutional repositories undermines its potential publication in a journal or a book. This situation should be distinguished from the different situation in which there is a prior publication of a certain research in another journal or a book. Publishers seek exclusivity in the books and articles they print, and so they generally avoid content that has already been published. Publishers seek exclusivity in publishing the article, therefore prefer to accept research for publication if it was not published before in a journal or a book. However, prior access to the research in an institutional repository or even in other academic repositories may not conflict with their interests. A survey conducted by Ramírez, McMillan, Dalton, Hanlon, Smith, and Kern in 2011 supports the conclusion that the concern regarding the barrier to publication is largely misplaced: according to the data collected in the United States, 82.8% of journal editors and 53.7% of university publishers would not automatically refuse to publish TDs

²⁸¹ See Marita Carnelley, *Publish or Perish*, 21 POTCHEFSTROOM ELEC. L.J. 1, 3 (2018); see also IMAD A. MOOSA, *PUBLISH OR PERISH: PERCEIVED BENEFITS VERSUS UNINTENDED CONSEQUENCES I* (2018).

²⁸² See P. Nivethadevi et al., *An Analytical Study on Rating of Agricultural Research Publications*, 845 IJRASET INT'L J. FOR RSCH. IN APPLIED SCI. & ENG'G TECH. 907, 909, 911–12 (2020).

²⁸³ Carnelley, *supra* note 281, at 3.

manuscripts because of their prior circulation in open access repositories.²⁸⁴ Despite this, the barrier may still exist to a certain extent.²⁸⁵ Of 53 American university publishers (members of the Association of American University Presses (AAUP)), 9.8% indicated that publications of TDs were always welcome, 43.9% reported that a decision is made on a case-by-case basis, 26.8% welcomed a publication only if it was substantially different from the one already circulated, and 7.3% indicated that they would not consider publishing the open access TDs at all.²⁸⁶ This suggests that if a mandatory policy of wide circulation of TDs in institutional repositories is adopted, some journals and publishers would generally adjust their policies to allow concurrent publication.

Another way to overcome this hurdle is to rank the platforms on which the TDs are made available. The current method for ranking academic publications, the impact factor,²⁸⁷ is controversial because it is based on the number of citations. We should consider the impact factor thoroughly before adopting it.²⁸⁸ Citations were shown to be subject to biases and manipulations, and therefore are an inaccurate means for assessing the quality of a journal or of an article.²⁸⁹ The academic ranking culture has been criticized for relying too heavily on quantitative measurements rather than on qualitatively assessing each publication on an in-depth level.²⁹⁰

²⁸⁴ See Ramirez et al., *supra* note 159, at 368.

²⁸⁵ *Id.* at 377.

²⁸⁶ *Id.* at 373; see also Jill Cirasella & Polly Thistlethwaite, *Open Access and the Graduate Author: A Dissertation Anxiety Manual*, in *OPEN ACCESS AND THE FUTURE OF SCHOLARLY COMMUNICATION: IMPLEMENTATION* 203, 206 (Kevin L. Smith & Katherine A. Dickson eds., 2017).

²⁸⁷ See Benedikt Fecher & Sascha Friesike, *Open Science: One Term, Five Schools of Thought*, in *OPENING SCIENCE: THE EVOLVING GUIDE ON HOW THE INTERNET IS CHANGING RESEARCH, COLLABORATION AND SCHOLARLY PUBLISHING* 17, 40 (Sönke Bartling & Sascha Friesike eds., 2014).

²⁸⁸ See KANJILAL & DAS, *supra* note 144, at 62.

²⁸⁹ *Citation Statistics*, JOINT COMM. ON QUANTITATIVE ASSESSMENT OF RSCH. (June 12, 2008), <http://www.mathunion.org/fileadmin/IMU/Report/CitationStatistics.pdf> [<https://perma.cc/8WWP-3435>]; Fenner, *supra* note 251, at 184.

²⁹⁰ See Mathias Binswanger, *Excellence by Nonsense: The Competition for Publications in Modern Science*, in *OPENING SCIENCE: THE EVOLVING GUIDE ON HOW THE INTERNET IS CHANGING RESEARCH, COLLABORATION AND SCHOLARLY PUBLISHING* 49, 53 (Sönke Bartling & Sascha Friesike eds., 2014).

An alternative ranking system is the article level metrics (Altmetrics) that takes into account the impact factor of the journal, as well as the amount of times the article is cited, the number of times the article has been viewed, the number of times the article has been downloaded, and the number of discussions about the article that have taken place on social media, blogs, and news websites.²⁹¹ The advantage of the Altmetrics method is that it assesses articles individually, not merely the ranking based on journal rank and citation amount,²⁹² alleviating some of the flaws of the impact factor method, based on the number of citations. Although the Altmetrics method is based on quantitative measurements as well, it uses a range of factors that are transparent.²⁹³

Given the failures of the current rankings systems for journals, a specially designated ranking for TDs, that uses measurements to assess each publication should be considered, using measures that considers every area of research. This system ranks universities as well as independent journals and other non-university institutions.²⁹⁴ Therefore, the TDs ranking system may be needed in particular for the graduates of non-prestigious institutions that are not regarded as “first tier,” to allow them to gain personal reputations unassociated with their institutions. The dedicated ranking for TDs will promote advanced degree students’ interest in reaping the academic benefit of their research and it will facilitate the adoption of a mandatory policy of circulating TDs in designated repositories.

Lastly, students may request a two- to three-year embargo period on their TDs, allowing prior publication of their TDs, and granting publishers full exclusivity to the future publication of the students’ TDs.²⁹⁵ In the case of commercial publishers, the embargo also would allow such publishers to make a profit from their recovering the investment and gaining profit.²⁹⁶ Such embargoed publications

²⁹¹ See *id.* at 62.

²⁹² See Fenner, *supra* note 251, at 184.

²⁹³ See Binswanger, *supra* note 290, at 61.

²⁹⁴ See generally José María Nyssen, *The Social Dimension and University Rankings*, in EUROPEAN HIGHER EDUCATION AREA: THE IMPACT OF PAST AND FUTURE POLICIES 155 (Adrian Curaj et al. eds., 2018).

²⁹⁵ See KANJILAL & DAS, *supra* note 144, at 33.

²⁹⁶ See *id.*

should be subject to a general norm whereby, after the end of the embargo, the TDs is circulated in the designated open access repository.

C. Copyright Concerns

Copyright may also raise difficulties promoting open access TDs repositories. Some challenges are related to past TDs, others are related to contemporary TDs. In the pre-digital world, a physical copy of a thesis or dissertation was deposited in the library at the student's academic institution.²⁹⁷ As concerning the arguments for open science, particularly the benefits it tracking the development of knowledge and scientific perceptions of various themes,²⁹⁸ access to old TDs has scientific importance.²⁹⁹ Therefore there is a public need to digitize old TDs to enable their access within the repositories.³⁰⁰ But copyright concerns may raise barriers to making old TDs digitally available. Students, who are the authors of the TDs, are presumably the rightful copyright owners. Thus, it could be claimed, the digitization and dissemination of their TDs infringes upon their copyright.³⁰¹

Concerns about copyright infringement of TDs may be diminished, however, by a record of consent previously given by the student to any: acts, authors (either explicitly, or implicitly), or by relevant bylaws of the institution that settled the use of the TDs. A few decades ago, it was less common to require the students' consent—many institutions did not have a clear policy on the matter³⁰²—and

²⁹⁷ See Pamela Samuelson, *The Google Book Settlement as Copyright Reform*, 2011 WIS. L. REV. 479, 493–94 (2011).

²⁹⁸ See Tatiana Sanches, *Shrink to Fit or Prune to Strengthen: Adapting the Strategic Plan in an Academic Library as Response to Environmental Change*, 24 NEW REV. OF ACAD. LIBRARIANSHIP 312, 322–23 (2018).

²⁹⁹ See *id.*

³⁰⁰ See *id.*

³⁰¹ See Tatjana Brzulović Stanisavljević & Dragana Stolić, University Library “Svetozar Marković”, Belgrade, Serbia, *Digitization of Doctoral Dissertations as a Part of Scientific Heritage: Objectives, Mission and Copyright Issues*, INFORUM 2015: 21st Annual Conference on Professional Information Resources (May 26–27, 2015); see also Karlene Robinson et al., *Digital Accessibility: Overcoming the Challenges of Managing Grey Literature in Jamaica: The Case of the University of the West Indies Mona Library*, 79 THE SERIALS LIBRARIAN 326, 327–31 (2020).

³⁰² See *id.*

such records are often difficult to track.³⁰³ Therefore, as seen in other cases of digitizing old copyrighted materials, academic libraries would need to adopt a policy concerning the digitization of old TDs. This issue is beyond the scope of the present paper, but it could be suggested that TDs are a special case in this regard as well. The digitization of other copyrighted materials and orphan works by libraries has been extensively discussed by policymakers and scholars,³⁰⁴ yet not enough public attention has been paid to the unique case of digitizing TDs.

The United States' fair use doctrine, which permits the use of copyrighted works in various circumstances,³⁰⁵ may be applied in cases of digitizing and circulating old TDs. Under United States copyright law, the fair use of copyrighted works for "purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research" is not an infringement of copyright.³⁰⁶ The fair use doctrine is based on a four-factor analysis determined retroactively by the court: the purpose and character of the use, the nature of the used work, the amount taken, and the potential market harm.³⁰⁷ Fair use is an evolving doctrine that extends its application to new types of uses, which were not anticipated by the legislature, whenever it is necessary to achieve the intended purpose of the copyright.³⁰⁸

Given the special nature of TDs, as discussed above, it is reasonable to expect a fair use finding in cases of institutional digitization of old TDs. Preservation of TDs is needed primarily for

³⁰³ See *id.*

³⁰⁴ See, e.g., Giancarlo F. Frosio, *Google Books Rejected: Taking the Orphans to the Digital Public Library of Alexandria*, 28 SANTA CLARA COMPUT. & HIGH TECH. L. J. 81, 89 (2011); Katharina de la Durantaye, *H is for Harmonization: The Google Book Search Settlement and Orphan Works Legislation in the European Union*, 55 N.Y. L. SCH. L. REV. 157, 159 (2010); Jonathan Band, *The Long and Winding Road to the Google Books Settlement*, 9 J. MARSHALL REV. INTELL. PROP. L. 227, 251 (2009).

³⁰⁵ See 17 U.S.C. § 107 (2014).

³⁰⁶ See 17 U.S.C. § 107 (2014); see also Niva Elkin-Koren, *Fair Use by Design*, 64 UCLA L. REV. 1082, 1094–109 (2017); Peter K. Yu, *Fair Use and Its Global Paradigm Evolution*, 2019 U. ILL. L. REV. 111, 127 (2019); Michael W. Carroll, *Copyright and the Progress of Science: Why Text and Data Mining Is Lawful*, 53 U.C. DAVIS L. REV. 893, 908–22 (2019).

³⁰⁷ Carroll, *supra* note 306, at 908–22.

³⁰⁸ See Lessig, *supra* note 97, at 61.

scholarship and research, which are enumerated as purposes supporting a fair use finding.³⁰⁹ Furthermore, the digitization and preservation will be carried out by non-profit institutions of higher education, for non-commercial needs;³¹⁰ and publishing relatively old research will not harm the potential market value of the TDs, but will instead revive exposure for the research and its author.³¹¹ Outside the United States, there are many countries that have special exceptions in regard to copyright aimed at promoting scholarship and research, and the non-commercial and non-injurious character of the use may support its legitimization worldwide.³¹²

A different obstacle stemming from copyright, concerning its contemporary practice, is a new trend in which PhD students are allowed to publish a line of articles in scientific journals, instead of a single final dissertation.³¹³ In such cases, these students are expected to publish their research outside the institution, and each publication is expected to meet the scope of a research paper rather than that of expectations set forth by TDs.³¹⁴ By publishing articles in various journals, the copyright may be transferred to the publisher,³¹⁵ at least for a certain period, unless they are published in an open access journal. The question, is therefore, whether these articles should also be included in the TDs repositories, due to copyright concerns.

As this trend becomes more popular, a systematic and uniform solution should be devised. One option is to exempt these PhD articles from the general policy regarding open access to TDs, on the basis that these articles do not have the scope and standard characteristics of TDs in scope and standards. Other options are to include requiring students to identify these articles as part of their PhD

³⁰⁹ See 17 U.S.C. § 107 (2014); Elkin-Koren, *supra* note 306; Carroll, *supra* note 306.

³¹⁰ See KANJILAL & DAS, *supra* note 144, at 38.

³¹¹ See *id.*

³¹² See, e.g., Sec. 29, The Copyright Act, R.S.C., 1985, c. C-42 (Can.); CCH Canadian Ltd. v. Law Society of Upper Canada, [2004] 1 S.C.R. 13; Sec. 29, The Copyright, Designs and Patents Act 1988 (UK).

³¹³ See Deem & Dowle, *supra* note 14, at 153–54; Jet Katgert & Trudi Noordermeer, *The Dissertation in the Twenty-First Century*, in *HORA EST! ON DISSERTATIONS* 91, 932 (Leiden: Universiteitsbibliotheek, Leiden 2005).

³¹⁴ See Deem & Dowle, *supra* note 14, at 157.

³¹⁵ See Priest, *supra* note 7, at 418.

studies, which necessitates publication in institutional repositories, or to require the publication of these articles in open access journals, and whereby institutions must support the costs demanded by the publishers to that end.

D. Technical Barriers

The proposed scheme of open access TDs repositories aspires to create a global network where scholars and the public have full access to all TDs worldwide.³¹⁶ However, some technical barriers may hinder the accomplishment of this vision. One obstacle is the “survival” of digital archives and concerns with their long-term operational infrastructure.³¹⁷ The fear is that the digital materials will not be well preserved.³¹⁸

Various solutions may be used to overcome this technical obstacle, which are expected to emerge in the future. For example, the e-Depot project of the National Library in the Netherlands compiles articles according to the standard of the Open Archival Information System (OAIS),³¹⁹ which enables the permanent storage of all electronic materials.³²⁰ Some of the leading publishers in the world, including Elsevier, Oxford University Press, Springer, and others, are partners in the e-Depot project, including Elsevier, Oxford University Press, Springer, and others.³²¹

³¹⁶ See generally, Lessig, *supra* note 97.

³¹⁷ See, e.g., John W. Lamp, *Open Access: Just One Item in a Pandora's Box*, 37 COMM. ASS'N FOR INFO. SYS. 366, 368-70 (2015).

³¹⁸ See, e.g., *id.*; WALT CRAWFORD, *supra* note 105, at 27–28, 33–35; see generally Heather Morrison, *Small Scholar-Led Scholarly Journals: Can They Survive and Thrive in an Open Access Future?*, 29 LEARNED PUB. 83 (2016).

³¹⁹ See International Standard ISO 14721:2003(E) 1 (1st ed. 2003), replaced in 2012 by International Standard ISO 14721:2012(E) 1 (2nd ed. 2012) (enumerating the various responsibilities that an archive must meet to be recognized as a long-term archive); see also KANJILAL & DAS, *supra* note 1444, at 28; LOCKSS, *Preservation Principles*, LOTS OF COPIES KEEP STUFF SAFE, <https://www.lockss.org/about/principles>, [<https://perma.cc/8RS9-KXEU>] (describing the project, established in 1999 at Stanford University, which sets some criteria for ensuring long-term archiving).

³²⁰ See generally NATIONAAL ARCHIEF [THE NATIONAL ARCHIVES OF THE NETHERLANDS], *e-Depot*, <https://www.nationaalarchief.nl/> [<https://perma.cc/BSN9-JBHN>].

³²¹ See the list of archiving partners at *National Library of the Netherlands: Archiving Partners - Royal Library*, <http://www.kb.nl/en/organisation/research-expertise/long-term-usability-of-digital-resources/archiving-partners> (last visited May 23, 2022).

Another project aimed at establishing a long-term archive, was initiated by the Directory of Open Access Journals (DOAJ) in collaboration with the Swedish Library Association and the e-Depot project, allowing all open access journals to store their articles permanently on this system.³²² The same solutions can be applied to TDs repositories, guaranteeing a long-lasting archive. Other solutions exist for maintaining a long-term archive, such as the German model imposing the obligation of establishing the adequate infrastructure on the national library.³²³ Long-term archiving must also address the technical issues concerning the retrieving of information, which is subject to various standards.³²⁴

Opening access to TDs is not always enough, and additional technical barriers to full accessibility may need to be removed to achieve full accessibility.³²⁵ Of these, the language barrier is the most severe, since TDs may be written in many languages. If the aim is to accelerate the development of knowledge worldwide and to promote efficiency, the language obstacle must be overcome. Although there are currently various developments in automatic translation, machine translations have not yet matured into trusted systems.³²⁶

³²² Sonja Brage, *Directory of Open Access Journals and Its Impact on the Open Access Movement with a Special Perspective on Latin America*, in CALIDAD E IMPACTO DE LA REVISTA IBEROAMERICANA 501, 507–08 (Ana María Cetto Kramis & José Octavio Alonso Gamboa comps., 2011).

³²³ See Ute Schwens & Reinhard Altenhöner, *Open Access and Long-term Archiving*, in OPEN ACCESS: OPPORTUNITIES AND CHALLENGES 58, 59 (Eur. Comm'n & Ger. Comm'n for UNESCO, 2008).

³²⁴ See Wolfram Horstmann, *Data-processing, Date-Transfer and Search: Further Technical Challenges for Open Access*, in OPEN ACCESS, *supra* note 324, at 66 (Eur. Comm'n & Ger. Comm'n for UNESCO, 2008).

³²⁵ See Peter Suber, *Creating an Intellectual Commons Through Open Access*, in UNDERSTANDING KNOWLEDGE AS A COMMONS: FROM THEORY TO PRACTICE 171, 178 (Charlotte Hess & Elinor Ostrom eds., 2006).

³²⁶ See *id.*; see also Sam Berner, *Lost in Translation: Cross-Lingual Communication, and Virtual Academic Communities*, ECOGNUS (2003), <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.130.2973&rep=rep1&type=pdf> [<https://perma.cc/KB29-929V>].

CONCLUSION

TDs are academic research products with unique characteristics. They are the final written works required to qualify for advanced academic degrees, in particular PhDs. The role of advanced academic degrees has changed over the years, from training the future cohorts of university teachers and scholars to the preparation of the professional workforce.³²⁷ Yet, TDs of all kinds are assessed according to strict requirements for meeting high academic standards.³²⁸ TDs represent the flagship of scientific progress and as such, must show significant contribution to the relevant field.

The progress of science is incremental.³²⁹ Over the last few decades, there has been growing awareness of the need to open science for the sake of the public good.³³⁰ The underlying agenda is to allow the public, and the academic community worldwide, access to the products of research.³³¹ The open science movement and the growing acknowledgment of the right to research are gaining much attention and legal recognition. Various initiatives have emerged from this development, including the open access publication format, aimed at replacing the “behind paywalls” model that hinders access to research.³³²

Despite the importance of an open access policy particularly to TDs, there is no uniform global standard in the matter. Various projects around the world have attempted to establish a comprehensive TDs database, but all of them are based on voluntary participation, and, occasionally, on commercial interests.

Our survey confirmed that there is no unified standard. Although many (but not all) academic institutions operate electronic TDs repositories, these repositories are not always open to the public at large. Sometimes they are only open to the closer academic community, even though these repositories are not necessarily differentiated from the general institutional repository. The result

³²⁷ See Bao et al., *supra* note 15, at 526.

³²⁸ See Deem & Dowle, *supra* note 14, at 166.

³²⁹ See generally Sanches, *supra* note 298, at 323.

³³⁰ See Lessig, *supra* note 97, at 123.

³³¹ See *id.*

³³² See Leible et al., *supra* note 102, at 5.

is that there is no global access to TDs, and in practice, science is closed.

We propose a mandatory policy for global open access to TDs. The uniform standard needed for the “open worldwide web of TDs” requires international cooperation. Coordination between countries and between institutions in each country is indispensable for building interconnected open access repositories designated for TDs. Several arguments support such a policy. We have listed the prominent reasons.

First, we offered a novel reconceptualization of TDs as a unique academic product that provides students with social and economic benefits—cultural capital, in Bourdieu’s terms³³³—that justify the disclosure of the knowledge to society. This reasoning, known as the “social contract” principle, underlies patent law; allowing the patentee to acquire exclusivity in exchange for fully disclosing the invention to the public worldwide.³³⁴

Next, we discussed accepted arguments supporting the open access initiatives, which are particularly compelling with regard to TDs. We reviewed public expenditure and academic innovation policies, that require fair and efficient treatment of the fruits of public investments and supports open access to TDs as well. The effort associated with training advanced degree students is immense, and it involves a significant investment of financial and other resources.

Therefore, TDs in particular should be subject to a stringent open access policy. The open science movement celebrated a significant milestone with the adoption of the UNESCO Recommendation on Open Science, in November 2021.³³⁵ The agenda of the open science movement should be translated into concrete measures. The vision of an open worldwide web of TDs is feasible, with limited barriers to overcome, and is a good starting point to turn the ethos of open science from science fiction into reality.

³³³ See generally Pierre Bourdieu, *Cultural Reproduction and Social Reproduction*, in 71 KNOWLEDGE, EDUCATION, AND CULTURAL CHANGE: PAPERS IN THE SOCIOLOGY OF EDUCATION (Richard Brown ed., 1973).

³³⁴ See 35 U.S.C. § 102.

³³⁵ See UNESCO, Open Science, *supra* note 116.