

The Knowledge Trust: Applying the Public Trust Doctrine to Global Scientific and Historical Archives for Intergenerational Equity

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Abstract

The development of the Public Trust Doctrine is a major change in the world of legal philosophy as it moves from protecting physical natural resources to safeguarding a Knowledge Commons. Going back to the Roman law idea of *res communes*, this doctrine has generally claimed that some resources e.g. air, water, and sea are essential for human life so their preservation for public use must be a function of the state, and they cannot be privatized. However nowadays there is a new type of enclosure. The human mind and the overall scientific record are being locked up more and more, so the idea for a knowledge Trust emerges. This is based on the understanding that the international scientific and historical knowledge pool is a kind of *res* that the state, from both legal and ethical points of view, has to safeguard. Intergenerational equity really lies at the core of the Knowledge Trust. According to this concept, the present generation is the trustee of what one may call the intellectual alphabet of humanity, having a responsibility to ensure that the basis for scientific advancement and the cultural identity should still be available to the coming generations. The Public Trust Doctrine, when extended to world-level archives, signifies a step towards legally acknowledging knowledge as a fixed resource that is indispensable for human life and development. The present paper claims that without such a legally protective environment, the privatization of human intellect will result in an irreversible depletion of the global commons, thereby damaging the very foundation of human progress and fairness.

Keywords: Public Trust Doctrine; Knowledge Commons; Intergenerational Equity

1. Introduction

The Public Trust Doctrine (PTD) has been a fundamental basis¹ for legal responsibility regarding natural resources, generally expecting the State to maintain physical natural resources such as navigable waters, air, and seabed for public use and enjoyment. The idea of the doctrine comes from the Roman law of *res communes* which considers these resources as being common to all and not capable of being put under exclusive private ownership. Nevertheless, with the 21st century leading us towards a digital and electronic world, the “*res*” (the topic of trust) is digitally redefined. The primary resource for the modern day and the future public is not only the tangible environment, but the Knowledge Commons, the worldwide source of scientific findings, historical facts, and cultural heritage.

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¹ Joseph L. Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 Mich. L. Rev. 471, 475 (1970).

The present-day intellectual landscape is in danger of being enclosed or fenced in, a concept scholars call informational enclosure. The way that human knowledge has been closed off by commercial paywalls and proprietary interests can be likened to the historical enclosure of the commons by fencing. Present-day statistics show that a worrying proportion (50% to 70%) of the global scientific literature are stored in private databases and are inaccessible to the public, even though most of these works were publicly funded. This type of data colonialism² turns knowledge from a collective asset into a commodity that is sold for a high price. It creates a barrier that mainly affects the poorer countries and those researchers who work on their own. What is more, since there is no fiduciary duty enshrined in law to keep this data, bit rot or the decay of digital information along with the disappearance of the technological formats, can occur as a result of the decommissioning of private servers.

The principle of intergenerational equity stands at the very heart of this legal dilemma. According to this principle, the present generation should refrain from using up or damaging resources to such an extent that future generations will be left with less³. Moreover, if we let the intellectual alphabet of our species the main archives of our history and the unprocessed data of our science be turned into commodities or simply be deleted then in essence, we are depriving the future of certain information by way of intellectual theft. Therefore, not only should the government be considered as a regulator of intellectual properties, but it should also be a fiduciary trustee of the Knowledge Commons⁴. This research investigates the possibility of a Global Knowledge Trust, comparing the ways in which biological preservation models, like the Svalbard Global Seed Vault, are protected with the legal requirements of digital conservation in contemporary legislations such as the Bharatiya Nagarik Suraksha Sanhita (BNSS). Turning to the Public Trust Doctrine for global archives, a legal commitment can be created that ensures the intellectual climate is just as plentiful and accessible to future scholars as the natural setting must be preserved for the future generations. The next parts will discuss the practical implementation of this doctrine and the need for redefining knowledge as the Common Heritage of Mankind⁵.

Extending the Public Trust Doctrine to cover digital and archival data is essentially a profound conceptual shift in the social contract. Traditionally, following the Westphalian model, a state's source of legitimacy was the capability of securing its geographical area and physical borders⁶. But, in today's world, where development of society is largely through data-driven decisions and preservation of history, the government's role should cover the protection of intellectual sovereignty. Besides that, the government must secure the right to know so that it does not get compromised by algorithmic gatekeeping and also the concentration of information in the hands of a few multinational corporations. If scientific facts and historical materials, which are the cornerstone of societal knowledge, are for sale instead of being a public res, then the government is negligent in its most important role as the provider of order and continuity in society.

Besides this, the pressing need to create a knowledge trust is made even more apparent by how digitally living things can be so easily influenced in a way that is totally different from physical forests or waterways, for example, that might have some natural resilience to a certain extent. In contrast, Knowledge Commons is by its very nature a fragile entity. It is continually undergoing technological changes. In the absence of a formalized trust

² Nick Couldry & Ulises A. Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism* 82–90 (2019)

³ Edith Brown Weiss, *In Fairness to Future Generations: International Law, Common Heritage, and Intergenerational Equity* 17–28 (1989)

⁴ See Elinor Ostrom & Charlotte Hess, *Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource*, 66 *Law & Contemp. Probs.* 111, 120–25 (2003)

⁵ Cf. *Juliana v. United States*, 217 F. Supp. 3d 1224, 1250 (D. Or. 2016)

⁶ Montevideo Convention on the Rights and Duties of States art. 1, Dec. 26, 1933, 165 L.N.T.S. 19

framework, the evolution from one data generation to the next (from physical manuscripts to local servers, and from servers to decentralized clouds) is largely determined by market forces. If a private person who owns a very important historical archive dies or changes the way of their business, normally the legal vacuum will result in the permanent disappearance of the common heritage. Whereas a model based on trust can solve this problem by giving a positive duty to migrate, it means that the trustee must do everything possible to keep the intellectual res alive through continuous updating in the face of technological changes.

In conclusion, this doctrinal shift poses a challenge to the long-held view of Intellectual Property (IP) laws. IP law offers the creators an exclusive right for a limited time to encourage them to innovate. However, it was never meant to support the indefinite monopoly of the human intellect. The Knowledge Trust is not in favour of copyright abolition but would legislate a minimum level of access. It claims that when information becomes of a fundamental nature such as a medical discovery or a historical document it legally transforms. It goes beyond being a private possession and becomes a trust property, thus preserving the intellectual world as a communal, inherent basis for human exploration.

2. Objectives

- To establish a fiduciary framework for intergenerational informational equity
- To propose a model for global knowledge governance and data integrity
- To analyse the technical and legal mechanisms of digital permanence

3. Research Questions

- Can the legal concept of Res Communes (things that belong to no one and are for the use of all) be evolved to include digital scientific and historical archives under the Public Trust Doctrine
- Should the State exercise its power to declare essential scientific data as a public trust to prevent the digital enclosure by private monopolies
- To what extent does the right to information inherently require the application of the Public Trust Doctrine to global archives to ensure substantive equality

4. Hypothesis

In the digital age, the State acts as a legal trustee of human knowledge therefore, allowing the digital enclosure of essential archives through private paywalls constitutes a breach of trust against both current and future generations.

5. Literature Review

The transformation of the idea of Knowledge Trust marks a fundamental change in modern legal studies, departing from the old view of information as something that can be bought and sold to the new view of information as a shared public good. In this paper, we look at how the Public Trust Doctrine (PTD), the principle of Intergenerational Equity, and legal issues raised by the digital enclosure of scientific and historical archives interact. The fast digitization of human record-keeping and the increasing privatization of scientific research have highlighted a major issue regarding the preservation of the world's intellectual heritage for the future. The Public Trust Doctrine (PTD) was, until recently, a key element of environmental law, based on the idea that certain natural elements like air, flowing water, and the sea belong to everyone and that the government as the public's trustee should ensure their protection. However, in the face of the gigantic challenges of climate change and the digital dark age, researchers are now advocating that the PTD needs to be reconsidered and modernized. Knowledge Trust is a new theoretical framework that is starting to be used in the discussion to extend these fiduciary responsibilities to the

world's scientific and historical records, thus treating collective human knowledge as a resource not only for life but also for the well-being of future generations. This change is coming from the fact that the knowledge, as much as a stable climate or clean water, is a condition for a society that works well. Nowadays archives suffer a lot from digital enclosures that is, access restrictions through paywalls, licensing that is very limited, and political instability that can lead to the disappearance or hiding of very important data. When climate data sets are deleted because of changing political administrations, or when historical records die simply because of the non-availability of proprietary software, the damage is not only the present one, it is the theft of the future times⁷. The scholars of the Knowledge Trust, by referring to the intergenerational equity, are stating that the current generation both morally and legally has to hand over a usable past and a verifiable present.

6. The Digital Enclosure and the Risk of Social Amnesia

Much of the literature concentrates on the new threats that justify the need for a knowledge trust. Often the phrase Digital Enclosure is employed to refer to the manner in which information that was previously public or freely accessible is being put behind paywalls or severely restricted through stringent Intellectual Property (IP) laws⁸. Academics in law, such as James Boyle, caution that a second enclosure movement which privatizes the mind is in the making, just as the first one which privatized common land. Besides that, the literature also talks about Data Fragility, which is a new threat with technological change. Scientific data digital form differs from paper records since it needs to be continuously curated to remain accessible. According to those knowledgeable in archival science, governments and private sector players who are not given the trustee mandate to keep the records intact (including their backward compatibility) will not see the sense in doing so. It is always assumed that people have a short lethal memory whereby, records of previous events are either destroyed/unreadable or simply get lost during changing of governments. Social Amnesia in such a case will be one consequence, leaving a scenario where future generations will be without the foundational data necessary to address global problems like climate change and pandemics⁹. A major concern raised by literature is the vulnerability of the technical aspect of the archives themselves. The digital data, unlike the physical objects such as Rosetta Stone or the Dead Sea Scrolls that survived for thousands of years, is format-fragile. Archival scientists are sounding the alarm about a potential Digital Dark Age, a time when historical records could disappear because the hardware or software needed to access them will no longer be available. Indeed, the danger here extends beyond the mere disappearance of files, it is the complete loss of context. If a future generation receives knowledge trust that remains inaccessible to them because of proprietary file formats that have long become defunct, the concept of the trust fails. Literature in this area points out that the fiduciary responsibility under the Public Trust Doctrine should also encompass a provision for interoperability and preservation in open- source. If there is no legal requirement for governments to keep data in humanreadable or open formats, then the archive is nothing more than a locked treasure chest whose key has been lost. Social Amnesia might be the most important risk highlighted in the research on the present day. This term means intentionally or unintentionally erasing collective memory in order to achieve short-term political or economic goals. Several papers refer to sudden changes in the government leading to taking down scientific data from public servers, especially

⁷ James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 *Law & Contemp. Probs.* 33, 37–40 (2003)

⁸ James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 *Law & Contemp. Probs.* 33, 37–39 (2003)

⁹ Russell Jacoby, *Social Amnesia: A Critique of Contemporary Psychology from Adler to Laing* 4–10 (1975)

those related to the environment. According to a typical government property perspective, these records can be changed or erased at the discretion of the current government. But, if we think about these records in terms of the Public Trust Doctrine, researchers mention that such erasures amount to a violation of trust. The archives are not the property of the government that is in power, they are the property of the public and their future generations. Scholars argue that the Knowledge Trust serves as a constitutional stabilizer which guarantees that the scientific and historical foundation of a community remains unaltered even in times of political turmoil.

7. Globalization of the Trust: Towards an International Framework

One of the most recent and major changes in research (after 2025) is the use by the International Court of Justice (ICJ) Advisory Opinions of intergenerational equity as a legal binding standard which should be adhered to when interpreting international law, instead of a moral ideal only. The authors of legal research mention that if governments are held responsible by law to exercise due diligence in avoiding environmental damages which may harm future generations, then carry the same responsibilities must a government preserving the scientific and historical records required for managing such damages. The worldwide spreading of the Knowledge Trust therefore depends on the interpretative bedrock of the climate and human rights treaties that are currently in force, such as the UNFCCC¹⁰ and the UNESCO¹¹ Recommendations on Documentary Heritage.

Scholarly works highlight that a worldwide framework entails more than just legal theory; it also entails institutional anchor points. According to the scholarship, the main architects of a Transnational Trust through organizations such as UNESCO and the International Council on Archives (ICA)¹² change the perspective of these institutions. They advocate the Memory of the World model which leads member states to recognize their national archives as the heritage of the whole world. Besides, a globalized trust should have, as noted by scholars, the developing countries will be helped technically to digitize and protect their archives by the developed countries, which will provide the necessary technical infrastructure, thus avoiding knowledge piracy and Standardized Open-Source Protocols¹³, this will avert the Digital Enclosure that was mentioned before, and it will make sure that the data is interoperable in all national jurisdictions. The scholarship dives into the idea of Universal Jurisdiction over the obliteration of knowledge. Along the same lines as some environmental offenses being viewed as crimes against humanity, legal scholars are pondering if intentional destruction of worldwide scientific databases could be tried in international courts. Consequently, the Globalization of the Trust envisions a time when the most valuable archives of the planet climate control data, genetic information, and oral histories are safeguarded under a “Global Covenant of Stewardship. This plan makes sure that the Trust is not at the mercy of the ever-changing politics of one nation only but is firmly based on a joint global pledge to the survival of future generations and the preservation of human intellect. One of the turning points in recent legal writings is the fact that intergenerational equity, which was once considered as a soft law goal, has now become a hard law interpretative standard. After the 2025 International Court of

¹⁰ United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107.

¹¹ UNESCO, Recommendation Concerning the Preservation of, and Access to, Documentary Heritage Including in Digital Form, Oct. 27, 2015, in Records of the General Conference, 38th Session, Paris, 3–18 November 2015, vol. 1: Resolutions, at 55 (2016)

¹² Anne J. Gilliland, The Role of International Professional Organizations in the Development of Archival Theory and Practice, in 4 Encyclopedia of Library and Information Sciences 120, 125–28 (Marcia J. Bates ed., 4th ed. 2017)

¹³ Yochai Benkler, The Wealth of Networks: How Social Production Transforms Markets and Freedom 310–15 (2006)

Justice (ICJ) Advisory Opinions¹⁴, some of the legal scholars maintain that the obligation to conserve the essential resources for future generations has now reached the level of Customary International Law¹⁵. This raising of the status means that the protection of worldwide scientific records is no longer an issue of national discretion but a binding obligation. According to this view, if a country's data policy results in the irreversible loss of Global Trust data, then it is not just a policy failure but a breach of a sovereign responsibility as per Article 38 of the ICJ Statute.

Increasingly, the UN Global Digital Compact (GDC) is being recognized in literature as the main institutional instrument of the Knowledge Trust. Whereas previous declarations treated Open Access merely as a matter of goodwill, the GDC, by the introduction of structural mandates, resemble still trust law. The idea of "Interoperability as a Fiduciary Duty" is one of the most important concepts to be developed here. Legal scholars believe that if a trustee does not keep a digital archive in a readable, non-proprietary format, it is basically the same as locking the doors of the trust. In order to meet this worldwide requirement, states have been regarded as having a duty of maintenance so that Global Public Good data are kept in a technologically accessible manner throughout the generations, thus preventing a digital lockout by proprietary software interests.

8. The Right to Be Forgotten vs. the Duty to Remember

The academic discourse surrounding the Right to be Forgotten (RTBF) versus the Duty to Remember essentially presents a clash between the individual's right to control their personal information and the collective rights of the posterity¹⁶. When we talk about Knowledge Trust, this conflict is more than just a legal problem, it's a basic questioning of who really owns history. According to the studies, in order to apply the Public Trust Doctrine (PTD) properly to archives, it must be capable of dealing with the sanitization risk the danger that by exercising their right to erase personal data, the present generation might, without realizing it, blind the future. One major issue being debated in the literature is that an unconditional Right to be Forgotten could serve as a tool for Social Amnesia. Some legal theorists hold that if people are given the ability to erase their digital footprints from public archives without any control, the Quality of the Resource gets undermined. For example, in the environmental law, a trustee cannot waste the trust's assets and similarly scholars say the state being a knowledge trustee should prevent the wasting of the historical record. If vital data are taken out to safeguard individual privacy, then the coming generations get a manufactured or discontinuous past that is devoid of the complexity needed for deep understanding and learning.

A highly advanced idea suggested by researchers is the notion of the Temporal Maturation of data. The authors of papers pointed out that the RTBF (Right to be Forgotten) has the highest impact during the lifespan of an individual when very often digital ghosts can instantly bring about the loss of one's reputation or the firing of someone. However, over the course of time, the data starts to lose its private character while at the same time the historical value of the data increases. This in turn gives rise to the idea of a Shadow Period, a time when records are maintained in a Dark Archive. At this stage, the Right to be Forgotten is implemented by not making the data public to contemporary society, whereas the Duty to Remember is carried out by keeping the data instead of destroying it. After reaching a certain age (usually 75 to 100 years), the data is considered mature as a public trust resource, and thus the original privacy claim is overridden by the fiduciary

¹⁴ Obligations of States in Respect of Climate Change, Advisory Opinion, 2025 I.C.J. 1, 142–50

¹⁵ Statute of the International Court of Justice art. 38, 1(b), June 26, 1945, 59 Stat. 1055, 1060.

¹⁶ Case C-131/12, Google Spain SL v. Agencia Española de Protección de Datos, ECLI:EU:C:2014:317, 91–99 (May 13, 2014)

duty to disclose it to future historians. The role of the trustee in safeguarding authenticity is another very important aspect of this paper. With the help of AI in generating new history, the Duty to Remember is more and more becoming a Duty of Verification. Research has shown that the Knowledge Trust must employ methods like Cryptographic Provenance so that when documents are saved, their original state cannot be changed. This is like putting a lock on the files to prevent retroactive editing. Although the RTBF might be used to hide a person's identity, the actual historical event is still recorded in a trusted and verifiable ledger. This stops a post-Truth scenario in which the trust is used for propaganda instead of being a source of evidence. The main takeaway from the literature is that Knowledge Trust is like a Social Contract among the dead, the living, and the unborn. To some extent, RTBF safeguards the living from the infinite memory of a machine while the Duty to Remember is what keeps the right to know as a protected inheritance. The PTD (Public Trust Doctrine) acts as the mediator between these extreme forces so we don't leave a digital void behind us¹⁷. On the contrary, we hand down to the future generations a legacy that is ethically curated. Such a legacy not only upholds the dignity of the ancestors¹⁸ but also provides the descendants with their own unvarnished truth necessary for their intergenerational survival.

9. Conclusion

One of the biggest legal quandaries of the digital era is the conflicting interest between the Right to be Forgotten (RTBF) and the Duty to Remember. The author comes up with the Fiduciary Stewardship Model as a solution. It is a concept that changes the government role from only controlling intellectual property to being the caretaker of the knowledge commons.

With the use of the Public Trust Doctrine (PTD), this concept makes sure that the maintenance of world archives is governed by an inviolable obligation to safeguard intergenerational fairness. One of the main things to consider when balancing respects for individual dignity and collective memory is to implement Temporal Sealing. A permanent deletion or digital void in the history recording is not the only way of handling the issue of sensitive personal information. Actually, temporal sealing is a method of limiting access to personal, sensitive information from the view of public search engines and commercial entities during a person's life. It effectively resolves the creation of digital ghosts that lead to problems with reputation and employment. Still, instead of being obliterated, the data is stored as a dark archive that could be accessed for research purposes after a specified time. This way it is guaranteed that the living is shielded from direct reputational harm, while the bare truth is on hand for the social survival of coming generations. A major part of this management is stopping digital enclosure. Like the PTD that has been guarding physical entry to navigable waters, now it should also protect access to the intellectual climate. Here the writer is presenting his/her case for a legal requirement that Standardized Open-Source Protocols should be enforced for all scientific and historical data of public importance. By viewing the archival infrastructure as a public utility, governments make sure that essential is not lost due to the disappearance of proprietary software or the deliberate pay walling of information. In this way, the knowledge is compatible with different countries laws and thus a worldwide network of trust can be established. This model is supported by an increasing number of international law cases that mention the state's responsibility to future generations. In the Urgenda Foundation case against the

¹⁷ Michael C. Blumm & Rachel D. Guthrie, Internationalizing the Public Trust Doctrine: Natural Law and Constitutional and Statutory Approaches to Fulfilling the Fiduciary Duty, 45 Ecology L.Q. 341, 345–50 (2018)

¹⁸ Jacob Strahilevitz, The Right to Abandon, 158 U. Pa. L. Rev. 355, 390–95 (2010)

State of the Netherlands, the court declared a positive duty of the state to protecting people against environmental risks. This duty through the Knowledge Trust now includes safeguarding the information environment. Besides, the Right to Truth that was defined in the *VelsquezRodriguez v. Honduras* case¹⁹, is what legally grounds the argument that a state should not allow the permanent erasure of the records that are vital to the collective knowledge of history. Redefining knowledge as the Common Heritage of Mankind, the Fiduciary Stewardship Model effectively links the traditional Westphalian concentration on territorial sovereignty with the actual condition of worldwide digital interdependence. It makes sure that wealthy countries offer the technical equipment to the help the poor countries in safeguarding their historical records, thus knowledge piracy is avoided. In the end, the Public Trust Doctrine is the one who balances the person's right to a private life and the descendant's right to an available and truthful past, so that we do not create a situation of social amnesia but a strong legacy of human accomplishment and scientific truth. The creation of Knowledge Endowments funded through a given percentage of national Sovereign Wealth Funds (SWFs) constitutes an effective economic mean to disband the NorthSouth divide. According to the PTD, a state should allocate a certain portion of the interest earned from the natural resource fund (which are the assets of public trust) to the digital infrastructure of the future legally. This will be the source of the Duty to Assist that the 2025 ICJ Advisory Opinions talks about particularly, cover the server and cybersecurity costs for the developing nation's archives. The result of that will be PTD converted from a limiting protection to an enabling development doctrine. To tackle the technical death of records because of proprietary software, the author suggests that the use of Fiduciary Metadata should be mandatory. While regular metadata just describes a file, Fiduciary Metadata would have an embedded legal instruction set. This set of instructions would order the data to always be in an interoperable, hardware-agnostic format. If a private firm or a government body changes this data into a closed proprietary environment, the metadata will activate a legal warning within the knowledge trust system. This way the digital enclosure that was mentioned earlier is not only stopped at the technical stage but it cannot even reach the legal stage. A vital feature of the Knowledge Trust is the principle of Archival Non-Refolement. It has been a refugee law till now but here it means that once data has been put into a public trust, it cannot be returned to the state of non-existence or of being privately enclosed. The rule indicates that if scientific or historical data are made publicly available, then any deletion by a following political administration of this data, or even hiding or privatizing would be a breach of trust as per the fiduciary duty. By doing this, the future is not robbed and indispensable data are kept alive irrespective of changes in the national political ideology.

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¹⁹ *Velsquez-Rodriguez v. Honduras* Merits Judgment, Inter-Am. Ct. H. R. (ser. C) No. 4 (July 29, 1988)