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THE PRICE OF SECRECY: A DOCTRINAL AND POLICY ANALYSIS OF COMPULSORY LICENSING OF TRADE SECRETS IN INDIA

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ABSTRACT

Trade secrets (TS) are emerging as major drivers of innovation. They shield internal know how, confidential business information, and other information not protected by patents. In the Indian context, there is no specific legislation related to TS. Due to this, they remain vulnerable to misappropriation. TS simultaneously restrict public access to information, even during dire need in times of emergencies. This article contributes to the discourse on compulsory licensing (CL) as a balancing mechanism between private secrecy and public needs, extending beyond traditional patent-centric models. It examines the present legal and policy landscape in light of the Protection of Trade Secrets Bill, 2024, which proposes narrowly tailored mechanisms for government-authorised use of TS during declared emergencies, while also embedding appropriate checks and balances, including limited scope, confidentiality obligations, and proportionate remuneration. Traditional IP frameworks alone cannot ensure equitable access to critical knowledge in complex industries, where TS monopolise proprietary processes and tacit knowledge as primary barriers to public-interest objectives. Neither TRIPS nor global mechanisms preclude well-designed CL for TS during emergencies. This article examines the doctrinal and policy effects of CL and highlights its structural lacunae in India's proposed domestic legislation. Subsequently, it proposes calibrated domestic reforms alongside international adjustments to FTAs and the WHO Pandemic Agreement. The analysis advances operational models like emergency-exclusive licensing, limited disclosure, and independent oversight, alongside enhancements for 'show-how' facilitation, tiered royalties, and post-transfer compensation to balance secrecy with access in pharmaceuticals and agritech. These reforms offer a framework for a future-ready TS regime in India while also meeting the minimum intellectual property protection mandate, thus resolving public-interest access challenges in both domestic and global contexts.

I. INTRODUCTION

"*Knowledge is power. Information is power. The secreting or hoarding of knowledge or information may be an act of tyranny camouflaged as humility.*"

\- Robin Morgan[1]

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[1] R. Morgan, *Knowledge is power. Information is power. The secreting or hoarding of knowledge or information may be an act of tyranny camouflaged as humility*, BRAINY QUOTE (Jan. 21, 2026, 3:15 PM), https://www.brainyquote.com/quotes/robin_morgan_271953.

Trade secrets [*hereinafter* "**TS**"] underpin India's innovation-driven economy, particularly in sectors where patent disclosure is commercially unviable or strategically risky.[2] Empirical research highlights their macroeconomic importance. Studies by the Indian School of Empirical Studies and OECD analyses indicate that stronger trade secret protection is positively associated with innovation outcomes, including higher levels of patenting activity and research and development ["**R&D**"] investment.[3] Misappropriation of TS is estimated to cost certain advanced economies 1-3% of their Gross Domestic Product (GDP) annually, reflecting both the value and vulnerability of TS.[4]

In India, this vulnerability is magnified by the absence of a dedicated statutory framework. India's Trade Secrets Protection Index score of 2.92 trails that of comparable economies.[5] This gap is estimated to cause nearly INR 20 billion in annual TS leakage and deters Foreign Direct Investment (FDI) in technology-intensive sectors.[6] Moreover, over 0.15 million Department for Promotion of Industry and Internal Trade (DPIIT)-recognised startups, contributing around 3.5% of the GDP, relies largely on confidential algorithms, business models, and proprietary processes.[7] Weak protection, therefore, directly threatens domestic innovation and may cause corporations to outsource their R&D activities to countries with more explicit protection regimes. This threatens an economy's global competitiveness as well, thus producing a regulatory race to the bottom.

At the same time, absolute secrecy *ipso facto* creates systemic risks. Especially in the pharmaceutical and agritech sectors, both of which will be examined in detail later in this article, confidential know-how accounts for nearly 40% of such firms' competitive advantage.[8] Secrecy of

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[2] Mahalakshmi S & Madhangi N, *Trade secrets in the Modern Economy: An analysis of the proposed Bill's ability to protect intellectual property and foster innovation*, 11 TIJER – INT'L RES. J. 5, 5–14 (Nov. 2024), https://tijer.org/tijer/papers/TIJER2411121.pdf.

[3] Douglas C. Lippoldt & Mark F. Schultz, *Uncovering Trade Secrets: An Empirical Assessment of Economic Implications of Protection for Undisclosed Data*, OECD Trade Pol'y Papers No. 167, at 1 (2014), https://doi.org/10.1787/5jxzl5w3j3s6-en; World Intellectual Property Organization (WIPO), *WIPO Guide to Trade Secrets and Innovation*, pt. II, https://www.wipo.int/web-publications/wipo-guide-to-trade-secrets-and-innovation/en/part-ii-strategic-roles-of-trade-secrets-in-the-innovation-ecosystem.html.

[4] Center for Responsible Enterprise And Trade & PricewaterhouseCoopers LLP, *Economic Impact of Trade Secret Theft: A Framework for Companies to Safeguard Trade Secrets and Mitigate Potential Threats*, CREATe.org-PWC REPORT (Feb. 2014, 12:00 AM), https://www.innovation-asset.com/hubfs/blog-files/CREATe.org-PwC-Trade-Secret-Theft-FINAL-Feb-2014_01.pdf.

[5] M. Schultz, *supra* note 3 at 2.

[6] Nimitt Dixit, *IPIC Series: Can India Plug Its INR 2,000 Crore IP Leak?*, ETLEGALWORLD (Nov. 5, 2025, 04:40 PM), https://legal.economictimes.indiatimes.com/news/law-policy/ipic-series-can-india-plug-its-inr-2000-crore-ip-leak/125107368.

[7] Govt. of India, Ministry of Commerce & Industry, Department for Promotion of Industry and Internal Trade, *Annual Report 2024-25*, DPIIT ANNUAL REPORT (June 2025, 12:00 AM), https://www.dpiit.gov.in/static/uploads/2025/06/3d9c9c2daeefb97bb9ce964370938b71.pdf.

[8] European Commission, Directorate-General for Internal Market and Services, *Study on Trade Secrets and Confidential Business Information in the Internal Market*, EU DOCSROOM STUDY (2013, 12:00 AM), https://ec.europa.eu/docsroom/documents/27703/attachments/1/translations/en/renditions/native

manufacturing processes, seed technologies, and data-driven formulations of essential medicines, seeds, and other technologies can undermine public health and food security. Such concerns are already acute in developing economies such as India. In the pharmaceutical industry, for one, TS protections over manufacturing processes and clinical data have delayed biosimilar approvals by years.[9] This has kept treatments for rheumatoid arthritis, anemia, multiple sclerosis, and cancer unaffordable for millions in developing countries.[10] In these countries, the cost of biologics can exceed annual incomes.[11] Moreover, even after patents expire, secrecy over cell lines and purification methods forces redundant testing, inflating generic prices and reducing access.[12] This is especially concerning for India, where medicines account for nearly 69% of household out-of-pocket healthcare expenditure.[13]

Similarly, in agritech, proprietary seed technologies are often shrouded as TS. BT cotton is a prime example. Its escalating costs after its introduction in 2002 have driven India's cottonseed market into illegal channels.[14] Unregulated sales in these channels command premium prices and thus increase farmer indebtedness.[15] It has also contributed to over 2,70,000 suicide cases recorded among farmers since 1995, especially in cotton belt regions.[16] Moreover, this perpetuates the risks of malnutrition by monopolising high-yielding technologies.[17] As per the annual report by the Food and Agriculture Organisation (FAO), 2024, India had 194 million people who were undernourished, the highest globally.[18]

Thus, the dual challenge of preventing misappropriation while avoiding overarching monopolisation of TS demands a carefully calibrated legal framework. In this setting, whether and to what extent TS should be subject to compulsory licensing [hereinafter referred to as "**CL**"] is a central issue in India's innovation and public-interest policy. In light of this, the article pursues three objectives. *First,* it examines India's existing TS framework in light of innovation and competition policy. *Second*, it analyses CL under Indian IP law. It assesses whether and to what extent TS falls within its scope. *Third*, it evaluates the Protection of Trade Secrets Bill, 2024 ["**the**

[9] T. Gebrye et al., *Economic Burden of Rheumatoid Arthritis in Low-, and Middle-Income Countries* (2025) 77 ARTHRITIS CARE & RES. (HOBOKEN) 1 (2025), https://pubmed.ncbi.nlm.nih.gov/40827016/.
[10] *Id.*, at 3.
[11] T. Gebrye, *supra* note 9 at 3.
[12] Professor T. Aplin & Dr. J. Liddicoat, *Discussion Paper on the Interplay between Patents and Trade Secrets in Medical Technologies*, WIPO DISC. PAP. ON IP & MED. TECH. 1, 55 (2023).
[13] Shreya Tayal & Sanjay K. Mohanty, *Why Medicines Are Unaffordable: An Investigation into the Role of Medicine Consumption, Pricing and Public Procurement in India*, 22 *BMC Health Servs. Res.* 649 (2022), https://link.springer.com/article/10.1186/s12913-022-08022-1.
[14] B. Ramaswami et al., *Spread of Illegal Transgenic Cotton Varieties in India*, 40 WORLD DEV. 177, 177–188 (2012).
[15] *Id* at 3.
[16] I. Plewis, *GM Cotton and Suicide Rates for Indian Farmers*, CCSR WORKING PAPER No. 4, 1–30 (2014).
[17] B. Harriss, *Innovation Adoption in Indian Agriculture*, 6 MOD. ASIAN STUD. 71, 71–98 (1972).
[18] M. Wiemers et al., *Global Hunger Index 2024*, 1–80.

TS Bill, 2024"].[19] The TS Bill was recommended by the 22nd Law Commission of India in March 2024 in its 289th Report titled "Trade Secrets and Economic Espionage" to identify structural, enforcement, and conceptual gaps.[20] On this basis, it proposes targeted reforms to balance confidentiality with legitimate access needs and support a globally sound, forward-looking TS regime for India.

Part II of this article will address the definition and legal nature of TS, as well as the law governing them. Part III will analyse CL, its rationale under the existing regime, and the limits of a patent-only approach in addressing TS. Part IV will set out possible legal bases for extending CL to TS. Part V will examine the domestic policy case for such a regime. Part VI will consider international policy dimensions, with a focus on strengthening cooperation for technology transfer during global emergencies. The article will conclude in Part VII.

II. TRADE SECRETS: MEANING, DEFINITION, AND LEGAL NATURE

A. Definition and Nature of Trade Secrets

TS are any confidential business information that confers a competitive advantage and is protected through secrecy rather than registration.[21] Legally, they must meet three conditions: (i) the information must be secret; (ii) be subject to reasonable protection measures such as NDAs, access controls, and security protocols; and (iii) it must have commercial value because it is confidential.[22]

TS also differ from other forms of intellectual property [hereinafter referred to as "**IP**"]. Know-how refers to practical, experience-based expertise that may or may not be secret but is essential for operational efficiency.[23] Regulatory data consists of safety and efficacy information submitted to drug regulators and is protected against unfair commercial use but not against disclosure, unlike TS.[24] Patents, by contrast, grant exclusive rights in exchange for public disclosure of the invention, protecting the "what," while TS typically protects the "how."[25]

Industry Case 1 (Agritech Sector): In the agricultural biotechnology sector, TS plays a central role because patent protection for plants and seeds is excluded under Section 3(j) of the Patents Act, 1970.[26] Proprietary hybrid seed lines and breeding data are protected through confidential parental lines, non-disclosure agreements, and restricted licensing grants with seed companies. One relevant

[19] Trade Secrets Bill, 2024, Bills of Parliament, 2024 (India).
[20] Law Commission of India, *Trade Secrets and Economic Espionage: 289th Report* (Report No. 289) 1 (Mar. 17, 2024), https://lawcommissionofindia.nic.in/report_twentysecond/.
[21] Mahalakshmi, *supra* note 3 at 2.
[22] *Id.*
[23] K. Linton, *The Importance of Trade Secrets*, J. Int'l Com. & Econ., Sept. 2016, at 1-17, 2.
[24] *Id* at 5.
[25] K., *supra* note 23 at 5.
[26] Patents Act, 1970, § 3(j), No. 39, Acts of Parliament, 1970 (India).

instance is of *Emergent Genetics India Pvt. Ltd. v. Shailendra Shivam* (2011), where the plaintiff alleged misappropriation of its TS after DNA fingerprinting showed genotypic identity between its hybrids and those sold by the defendants.[27] The court examined claims of breach of confidentiality and unauthorised reproduction of genetic sequencing formulae to successfully enforce secrecy obligations even in the absence of statutory plant variety rights for the breed concerned.

Industry Case 2 (Pharmaceutical Sector): The pharmaceutical sector provides an even clearer illustration of the centrality of TS, which became especially evident during the COVID-19 pandemic. In biologics and vaccines, production relies on particular, proprietary processes. Elements such as proprietary cell lines, fermentation conditions, purification methods, and analytical assays are closely guarded.[28] Much of this knowledge is tacit, and manufacturing depends on such subtle variables of temperature ranges, feed profiles, contamination control, and scale-up behaviour, all of which are typically kept as TS. These aspects cannot be fully captured in patent documents.[29] Without access to these confidential elements, even a manufacturer holding a CL for a patent cannot reliably produce a safe, effective, and regulator-compliant product.[30] Therefore, TS forms the backbone of pharmaceutical innovation and production. Patent licensing does not enable genuine technology transfer in itself.

B. Current Legal Framework Governing Trade Secrets in India

India's TS protection has developed without a dedicated statute. The Indian Contract Act, 1872, provides the legal basis for non-disclosure agreements (NDAs) and confidentiality clauses.[31] Common law equity, crystallised in cases such as *John Richard Brady v. Chemical Process Equipments* (1987), recognises breach of confidence as a protectable wrong.[32] The erstwhile Indian Penal Code, 1860, and the now Bharatiya Nyaya Sanhita, 2023, penalise theft, misappropriation, and criminal breach of trust involving confidential business material.[33] This framework was reinforced by India's accession to the TRIPS Agreement in 1995. TRIPS, under Article 39, requires the protection of undisclosed information.[34] The Information Technology Act, 2000, was enacted to penalise

[27] Emergent Genetics India Pvt. Ltd v. Shailendra Shivam, 2011 (125) DRJ 173.
[28] Cheryl L. Rowe-Rendleman, *Regulatory Requirements of Biosimilars: Drug Development in Ophthalmology, Part 1*, 40 *J. Ocular Pharmacology & Therapeutics* 487 (2024), https://doi.org/10.1089/jop.2024.0151.
[29] K. Hickey & E. Ward, *Role of Patents and Regulatory Exclusivities in Drug Pricing*, CRS REPORT R46679 1, 1–61 (Jan. 30, 2024), https://www.congress.gov/crs-product/R46679.
[30] Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information?*, 25 HJLT 545, 545–601 (2012), https://jolt.law.harvard.edu/articles/pdf/v25/25HarvJLTech545.pdf.
[31] Indian Contract Act, 1872, §§ 10, 27, 73–74, No. 9, Acts of Parliament, 1872 (India).
[32] John Richard Brady v. Chemical Process Equipments Private Limited, AIR 1987 Delhi 372.
[33] Indian Penal Code, 1860, §§ 378, 403, 405, No. 45, Acts of Parliament, 1860 (India); Bharatiya Nyaya Sanhita, 2023, §§ 303, 314, 316, No. 45 of 2023, Acts of Parliament, 2023 (India).
[34] Agreement on Trade-Related Aspects of Intellectual Property Rights, art. 39, Apr. 15, 1994.

offences concerning unauthorised access and breach of confidentiality.[35] Judicial development has further shaped the regime through High Court decisions that have applied the four-fold test for confidentiality. The test is that the information (i) is not public knowledge; (ii) has commercial value because it is secret; (iii) was disclosed or accessed in circumstances importing an obligation of confidence; and (iv) has been subject to reasonable steps to keep it secret.[36]

Assessments at a policy level, such as through the WIPO Country Report on India's trade secrets, consistently note the absence of a unified statute.[37] It notes India's reliance on a composite mix of contract, tort, criminal law, and international obligations. As the next section shows, CL in India has evolved only within patent law. There exist no corresponding authority empowering courts to compel disclosure of TS or technical know-how. This remains the case even in public or national emergencies.

III. COMPULSORY LICENSING: CONCEPT AND CONVENTIONAL APPLICATIONS

A. Rationale and Legal Framework for Compulsory Licensing

CL has its roots in public interest rationales of IP law. It seeks to strike an appropriate balance between private rights of exclusion and public interests.[38] It has been primarily justified based on public interests related to access to necessary technologies, which patents deny due to low affordability or poor availability.[39] In cases of emergency, say a pandemic, epidemic, or outbreak of disease, requiring immediate life-saving treatments, voluntary licences and market negotiations often fail due to delay, unaffordability, or refusal by rights holders.[40] CL offers a lawful mechanism to override patent exclusivity by authorising third-party production without the patent holder's consent. Even in the absence of emergencies, CL can serve as a means to solve the problem of access in low- and middle-income countries.[41] They limit the anti-competitive practices, protect against the abuse of monopoly power through the IP rights, and serve as an antidote to prevent violations of the right to health through IP.

[35] Information Technology Act, 2000, §§ 43, 66, 72, No. 21, Acts of Parliament, 2000 (India).
[36] Bombay Dyeing & Manufacturing v. Mehar Karan Singh, 2010 (112) Bom LR 375; Zee Telefilms v. Sundial Communications, 2003 (3) Mah LJ 695.
[37] WIPO, *Overview of National and Regional Trade Secret Systems: India* (2024).
[38] K. Vincent, *The Use of Compulsory Licenses*, WIPO REGIONAL SEMINAR ON PATENT-RELATED FLEXIBILITIES 1, 1–5 (2013).
[39] *Id* at 7.
[40] K. Vincent, *supra* note 37 at 7.
[41] H. Mowafi et al., *Emergency Care Surveillance and Emergency Care Registries in Low-Income and Middle-Income Countries*, 4 BMJ GLOB. HEALTH (SUPP. 6) e001442, 1–9 (2019).

At the international level, CL of patents is governed primarily by Articles 30 and 31 of the TRIPS Agreement.[42] Article 30 allows limited exceptions to exclusive patent rights.[43] Article 31 provides for the usage of a patented invention without authorisation in certain circumstances, including national emergency, public non-commercial use, or extreme urgency under certain conditions, including prior negotiation, adequate remuneration, and predominantly domestic use.[44] Most of these principles have been incorporated into the domestic law of India, Brazil, Thailand, and Germany, among others, in furtherance of the TRIPS Agreement.[45]

B. Compulsory Licensing of Trade Secrets: Gaps and Absence of Explicit Mechanisms

Unlike patents, for which Article 31 TRIPS sets out a detailed CL framework, TRIPS contains neither an explicit mechanism nor an express prohibition on CL of TS. This creates a regulatory silence regarding compulsory TS transfer. Article 39 protects undisclosed information only against unfair acquisition, use, or disclosure.[46] Many scholars read this formulation as leaving room for a CL regime.[47]

WTO jurisprudence on TRIPS flexibilities confirms this position. *Canada-Patent protection of pharmaceutical products* (WT/DS114) iterates that Members may regulate IP rights in the public interest.[48] The case acknowledges that since Articles 30 and 31 operate within the patents chapter, they cannot be directly extended as exceptions to Article 39. At the same time, it provides that member states are constrained only by an express TRIPS prohibition, and since no such prohibition exists for TS, CL remains legally conceivable. It only remains institutionally and procedurally constrained.

C. Limitations of Restricting Compulsory Licensing to Patents

CL of patents addresses only the formal, codified layer of innovation. It does not extend to the TS, tacit know-how, process optimisations, and operational protocols that make a technology commercially workable. In most sectors, these critical elements are protected as TS.[49] They are

[42] Agreement, *supra* note 32 at 6, arts 30, 31.
[43] Agreement, *supra* note 32 at 6, art 30.
[44] Agreement, *supra* note 32 at 6, art 31.
[45] R. D. Anderson et al., *Competition Policy and Intellectual Property in Today's Global Economy* (part 1 chp 3), 62 CUP 62, 62–98 (2021).
[46] Agreement, *supra* note 32 at 6, art 39.
[47] O. Gurgula & J. Hull, *Compulsory licensing of trade secrets*, 16 JIPLP. 1242, 1242–1261 (2021).
[48] *Canada-Patent Protection of Pharmaceutical Products*, WT/DS114/R (Mar. 17, 2000).
[49] K. Linton, *supra* note 23 at 5.

neither disclosed in patents nor transferable under a patent licence. As a result, patent-only CL leaves licensees legally authorised but remains technically unable to use the technology in practice.[50]

Industry Case 1 (Agritech Industry): The agricultural sector offers a clear illustration. In *Monsanto Technology LLC v. Nuziveedu Seeds Ltd* (2018) in India, Monsanto and its joint venture Mahyco Monsanto Biotech exercised tight control over Bt cotton trait technology imbuing TS, and continued to exploit Indian farmers even after court holdings against their practice of demanding excessively high trait fees.[51] There were related CCI proceedings (2020) as well, which triggered challenges under both patent law and competition law.[52]

In *Bowman v. Monsanto Co.* (2013), before the United States Supreme Court, Monsanto used its patents. Monsanto also used its confidential control.[53] The control was over Roundup Ready soybean technology. This was used to prevent farmers from replanting harvested seeds. This reinforced a model in which self-replicating technologies and critical agronomic information remained proprietarily controlled. Similar patterns also appear in disputes involving Pioneer Hi-Bred and other seed multinationals, where proprietary parent lines and breeding data were held as TS, which limited follow-on breeding and constrained competition.[54]

Moreover, in both India and Argentina, Monsanto's TS associated with Bt traits outlived the patent and even substituted for a patent by allowing a similar manner of commercial exclusivity. In India, Mahyco Monsanto Biotech embedded high trait value royalties in seed prices and resisted state and central attempts to cap them even while the patent status of Bollgard I and II was contested, prompting scrutiny for abuse of dominance.[55] In Argentina, where Monsanto could not secure patents on first generation Roundup Ready soybeans, it relied on contracts and technology fees backed by private grain testing to extract royalties on later varieties such as Intacta RR2 Pro despite the absence or expiry of patents, demonstrating how a non-disclosed technological package protected through contracts and TS can sustain a *de facto* monopoly long after formal patent rights weaken.[56]

Industry Case 2 (Pharmaceutical Industry): The CL of patents provides only one layer of pharmaceutical protection. For modern medicines, particularly biologics, vaccines, and advanced therapies, patents rarely provide sufficient information. Critical inputs such as cell lines,

[50] *Id* at 9.
[51] Monsanto Technology LLC v. Nuziveedu Seeds, (2019) 3 SCC 381.
[52] Nuziveedu Seeds Ltd. v. Mahyco Monsanto Biotech, (2020) SCC OnLine Del 598.
[53] Bowman v. Monsanto Co., 569 U.S. 278 (2013).
[54] Competition Commission of South Africa v Pioneer Hi-Bred International, CCT 58/13), (2013).
[55] Monsanto, *supra* note 50 at 9.
[56] M. Municoy, *Judicial Decision in Argentina Tackles the Interplay between Enforcing Patent Rights and Antitrust Law*, GLOBAL COMP. POL'Y (Release One), June 2009, 1.

purification methods, stability conditions, and analytical assays are protected as TS rather than patents.[57] This information is needed to enable replication.

One instance of rigid monopolisation was observed during COVID-19. Leading vaccine developers declined to share critical manufacturing TS with capable producers, especially in low- and middle-income countries. For instance, Pfizer BioNTech and Moderna refused to transfer mRNA technology initiatives, such as the WHO mRNA hub in South Africa, to other manufacturers.[58] This withholding of TS occurred despite substantial public funding for the underlying research, which was widely seen as having entrenched global vaccine inequity.

Furthermore, a related but distinct problem concerns proprietary quality-control data, validation methods, and process-consistency information. The first issue relates to TS sharing under CL, while the second concerns data exclusivity. This article confines itself to the former.

IV. LEGAL FOUNDATIONS FOR EXTENDING COMPULSORY LICENSING TO TRADE SECRETS

A. An Equity and Human Rights-based Justification for Compulsory Licensing

CL of TS lies at the intersection of two powerful ethical claims. One claim is the right of innovators to protect legitimately acquired commercial advantages. The other claim is the right of populations to access essential innovations in emergencies.

The UN Sub-Commission on the Promotion and Protection of Human Rights (2000) established "*the primacy of human rights obligations over economic policies and agreements,*" including those on IP.[59] Similarly, UN Special Rapporteur on Cultural Rights Farida Shaheed (2015) affirmed: "*Where patent rights and human rights are in conflict, human rights must prevail.*"[60] This occurs due to human rights' superior status under international law. Human rights are also fundamentally imbued in national constitutions and predate economic treaties like TRIPS. Hence, most TS should fall under the ambit of these obligations.

Industry Case 1 (Agritech Industry): The agricultural sector illustrates this tension sharply. The right to food security is protected under Article 11 of the International Covenant on Economic, Social, and Cultural Rights (ICESCR) and Article 25 of the Universal Declaration of Human Rights

[57] Robin Feldman, *Trade Secrets in Biologic Medicine: The Boundary with Patents*, 24 CSTLR 1, 1–36 (2022).
[58] Andreas Panagopoulos & Katerina Sideri, *From Lab to Mass Production*, 11 FRONT. PUB. HEALTH 1151713, 1–10 (2023).
[59] Sub-Commission on the Promotion and Protection of Human Rights, *Intellectual Property Rights and Human Rights*, U.N. Doc. E/CN.4/SUB.2/RES/2000/7 (2000).
[60] UNGA, *Report of the Special Rapporteur in the Field of Cultural Rights on Patent Policy and the Right to Science and Culture*, U.N. Doc. A/70/279 (2015).

(UDHR).[61] International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)'s Article 9 and the Convention on Biological Diversity (CBD) similarly require IP regimes to be balanced against farmers' rights to genetic resources, implying that TS barriers in seeds and agritech must give way when they undermine access to food.[62]

For this purpose, Article 19 of the United Nations (UN) Declaration on the Rights of Peasants (2018) protects peasants' rights to "*save, use, exchange and sell farm-saved seed or other propagating material*" and access to quality seeds.[63] UN Special Rapporteur on the Right to Food Olivier De Schutter (2009) warned that "*stringent plant variety protection based on UPOV 1991 restricts small-scale farmers' access to seeds and puts their Right to Food at risk*."[64] This occurs as it limits seed saving and exchange practices. These practices are essential for food sovereignty.

In the Indian context, research asserts "*trade secret cannot have priority over right to safe and nutritious food*," as citizens' right to information under Article 19(1)(a) and life under Article 21 prevail over proprietary secrecy in food items, implying that withholding agricultural TS could undermine public access to vital technologies.[65]

Industry Case 2 (Pharmaceutical Industry): The pharmaceutical sector raises comparable concerns. The right to health was first recognised as a fundamental human right in 1946 in the World Health Organisation (WHO) Constitution, which declared that "*the enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being.*"[66] It was later affirmed in the UDHR, 1948, and the ICESCR, 1966.[67] This creates a strong ethical claim in favour of sharing life-saving technologies when they conflict with proprietary control. The case for sharing is reinforced by the scale of public funding behind many pharmaceutical innovations. Moderna, for example, received nearly $1 billion from the United States (US) government for COVID-19 vaccine development, raising serious questions about its obligations to the public good.[68] Where taxpayer money has materially contributed to innovation, there is a compelling moral and ethical case for sharing TS

[61] International Covenant on Economic, Social and Cultural Rights, art. 11, Dec. 16, 1966, 993 U.N.T.S. 3; Universal Declaration of Human Rights, art. 25, G.A. Res. 217 (III) A, U.N. Doc. A/810 (Dec. 10, 1948).
[62] International Treaty on Plant Genetic Resources for Food and Agriculture, art. 9, Nov. 3, 2001, 2400 U.N.T.S. 303; Convention on Biological Diversity, June 5, 1992, 1760 U.N.T.S. 79.
[63] United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas, art. 19(d), G.A. Res. 73/165 (Dec. 17, 2018).
[64] Olivier De Schutter, *Report of the Special Rapporteur on the Right to Food: Crisis into Opportunity: Reinforcing Multilateralism*, U.N. HUM. RTS. COUNCIL REP. A/HRC/12/31 (July 21, 2009).
[65] Dr. R.R. Mishra & M. Chakrabarty, *Right to Safe Food: Constitutional Perspectives*, LAW MANTRA QUARTERLY ONLINE J. 1 (2016).
[66] Constitution of the World Health Organization, July 22, 1946, 14 U.N.T.S. 185.
[67] Universal Declaration of Human Rights, art. 25, G.A. Res. 217 (III) A (Dec. 10, 1948); International Covenant on Economic, Social and Cultural Rights, art. 12, Dec. 16, 1966, 993 U.N.T.S. 3.
[68] B. A. Dahl et al, *Global VAX: A U.S. Contribution to Global COVID-19 Vaccination Efforts, 2021–2023*, 42 VACCINE (SUPP. 3) 125827, 125827–125827 (2024).

during a global health crisis, not merely as corporate social responsibility but as an obligation arising from public investment.

At the same time, ethicists caution against regimes that normalise mandated disclosure. Any compulsory access should be confined to clearly defined emergencies, accompanied by fair remuneration, and embedded in governance structures that prevent opportunistic use for purely economic gain. Under the UN Guiding Principles on Business and Human Rights, corporations have human rights responsibilities, but states remain the primary duty bearers under international law, and corporate responsibility cannot become a pretext for state inaction.[69] The architect of this framework, John Ruggie, notes that companies engaged in public functions, such as healthcare, may bear heightened responsibilities, but it is ultimately for states to protect human rights through the provision and regulation of public services.[70]

B. The Protection of Trade Secrets Bill, 2024: Key Provisions and Implications

The TS Bill, 2024, directly acknowledges this lacuna by proposing a domestic mechanism for government-authorised use of TS in situations of national emergency or public interest, illustrating how Member States can legislate where TRIPS provides no mandatory model.[71] While TRIPS protects undisclosed information, it leaves mechanisms for compulsory access undefined. Building on this space, the TS Bill introduces a narrowly tailored government-use CL framework with four core safeguards: activation only on government notification of a "*circumstances of national emergency or extreme urgency involving substantial public interest, including situations of public health emergency, national security etc.*" under clause 6(1); government determined compensation reflecting the value and development costs of the TS under clause 6(2); identifying the rights holder backed by strict confidentiality peri and post transfer and termination under clause 6(3); and automatic termination once the emergency ends under clause 6(4).[72] The silence of the TRIPS on CL of TS specifically creates doctrinal space for such measures while remaining consistent with TRIPS, since these mechanisms operate within its flexible, minimum-standards structure.

C. Aligning Trade Secret Licensing with TRIPS Obligations

Extending compulsory access to TS is reconcilable with the existing TRIPS framework. *Firstly*, Article 1(1) of the TRIPS grants Members the freedom to choose the "appropriate method" of

[69] United Nations Guiding Principles on Business and Human Rights, U.N. Doc. A/HRC/17/31 (Mar. 21, 2011).
[70] Conectas Human Rights, *The Ruggie Framework*, SUR.CONECTAS.ORG, https://sur.conectas.org/en/the-ruggie-framework/.
[71] *Supra* note 17 at 4, cl 6.
[72] *Id.*

implementing their obligations, allowing States to adopt domestic laws that permit government-mandated access to TS, so long as minimum standards of protection are preserved.[73] This flexibility underpins national emergency regimes, such as India's TS Bill, 2024.

Secondly, Article 39 reinforces this space.[74] Article 39.2 protects undisclosed information only against "unfair" use. Article 39.3 expressly permits disclosure of regulatory data. This is permitted when necessary to protect the public. This signals that controlled, non-public disclosure in exceptional circumstances is not *per se* incompatible with TRIPS. WTO practice treats Article 39 as a negative right. It is a right against unfair conduct and is not treated as an absolute property right.[75] This leaves Member States free to mandate access.

Thirdly, as discussed before, Articles 30 and 31 apply solely to patents.[76] However, the Doha Declaration on TRIPS and Public Health (2001) has affirmed that no TRIPS Article prevents Members from protecting public health.[77] It affirmed that each State may determine what constitutes a national emergency. Under Article 31 of the Vienna Convention on the Law of Treaties (VCLT), these provisions should be read in light of TRIPS Articles 7 and 8.[78] These Articles place technology transfer and public health at the centre of the TRIPS. For instance, if pharmaceuticals are considered, Article 8(1) authorises measures "*necessary to protect public health and nutrition*" if consistent with TRIPS, allowing States to justify CL for vaccine processes, biologics manufacturing steps, or diagnostic protocols during crises, provided the measures are proportionate and confidentiality-preserving.[79] Conversely, post-COVID scholarship by Gurgula and Levine (2025) argues that Article 8 operates as an interpretive principle rather than an independent exception, meaning that any compulsory access to TS must be narrowly tailored, proportionate, and confidentiality preserving, in the same way that patent CL is accepted when read with Articles 7, 8, and 31.[80]

Lastly, domestic emergency powers supply the legal machinery for such access. Many constitutional and statutory systems contain expropriation, government use, or national security powers that allow States to compel access to proprietary TS subject to compensation and procedural safeguards

[73] Agreement, *supra* note 32 at 6, art 1(1).
[74] Agreement, *supra* note 32 at 6, art 39.
[75] Rajat Kathuria & Julien Corcelle, *TRIPS, Pharmaceutical Patents and Access to Medicines: India's Options Under International Law*, IIFT-WTO CENTRE WORKING PAPER No. 1, 1–42 (2012), https://wtocentre.iift.ac.in/Papers/1.pdf.
[76] Agreement, *supra* note 32 at 6, arts 30, 31.
[77] Declaration on the TRIPS Agreement and Public Health, WTO Doc. WT/MIN(01)/DEC/2 (2001).
[78] Agreement, *supra* note 32 at 6, arts 7, 8; Vienna Convention on the Law of Treaties, 1969, 1155 U.N.T.S. 331. art 31.
[79] Agreement, *supra* note 32 at 6, art 8(1).
[80] O. Gurgula, *supra* note 46 at 9.

to preserve confidentiality, such as India's TS Bill, 2024.[81] Other jurisdictions rely on similar tools. Israel's Defence Regulations Order No. 3737 of 2020 authorised government use of patents and TS for COVID-19 technologies.[82] New Zealand's COVID-19 Public Health Response Act 2020 empowered the Prime Minister to use CL and to issue government use orders for patents and TS relating to vaccines.[83] In Brazil, the Industrial Property Law, Law No. 9.279 of 1996, provides for the CL of patents in national emergencies but not for the TS.[84] Subsequently, Law No. 14.200 of 2021 proposed extending this to include know-how, but key provisions were vetoed, leaving emergency decrees as the remaining route for compelled disclosure.[85] In the European Union, a 2023 proposal for an EU-wide CL regime includes supplementary protection that could extend to TS for crisis-relevant technologies, although it remains under negotiation.[86] Comparable authority also exists under the United States Defence Production Act,[87] EU crisis-response regulations,[88] and China's national-emergency IP requisition powers.[89] Together, these frameworks show that compulsory access to TS, while exceptional, is legally anchored in sovereign emergency powers and remains compatible with TRIPS' flexible, minimum standards architecture.

V. DECODING POLICY CONSIDERATIONS FOR A COMPULSORY LICENSING REGIME OF TRADE SECRETS: A DOMESTIC PERSPECTIVE

A. Selecting an Appropriate Model for India's Trade Secret Licensing Framework

The design of CL regimes for TS must balance effective technology transfer with robust confidentiality preservation, fair remuneration, and enforcement mechanisms. Cross-jurisdictional analysis shows that there are five major operational models that can emerge as viable frameworks for implementing CL for TS.

1. Public-Repository Compulsory Licensing Model

Under this model, a national or multilateral technology-transfer authority acts as an intermediary between originators and licensees. CL requires right-holders to deposit specified TS in a secure public repository, which grants time-bound, non-exclusive access to pre-approved manufacturers on harmonised terms. Platforms such as the WHO mRNA Technology Transfer Hub and

[81] Trade, *supra* note 17 at 4, cl 6.
[82] Defence Regulations (Authorisation of Government Use of Patents and Trade Secrets for COVID-19), Order No. 3737, Defence Regulations, 2020 (Israel).
[83] COVID-19 Public Health Response Act, No. 12 of 2020, Public Acts, 2020 (N.Z.).
[84] Industrial Property Law, Law No. 9,279, arts. 68–71, Diário Oficial da União, 1996 (Brazil).
[85] Law Amending the Industrial Property Law, Law No. 14,200, Diário Oficial da União, 2021 (Brazil).
[86] Proposal for a Regulation of the European Parliament and of the Council on Compulsory Licensing for Crisis Management, COM (2023) 224 (European Union).
[87] Defense Production Act of 1950, 50 U.S.C. §§ 4501–4568 (United States).
[88] Regulation on Serious Cross-Border Threats to Health, Regulation (EU) 2022/2371, O.J. (L 314) (European Union).
[89] Patent Law of the People's Republic of China, arts. 49–50, Order No. 11 of the President, 2020 (China).

COVID-19 Technology Access Pool (C-TAP) demonstrate how a centralised system could be used for the aggregation of standardised technology packages, the approval of manufacturers, and the enforcement of harmonised clauses on confidentiality agreements and quality controls.[90] Recognising that complex technologies cannot be transferred through manuals alone, they also provide structured training, troubleshooting, and technical assistance, typically through Technical Assistance Agreements that combine a licence with hands-on instruction.[91]

Yet the model's limitations are stark. Although the WHO mRNA Hub in South Africa reverse-engineered Moderna's vaccine at laboratory scale, it could not obtain Moderna's full manufacturing dossier, including key TS, despite the company's public pledge not to enforce its COVID-19 vaccine patents.[92] This shows that even institutionally strong pooling mechanisms cannot overcome TS hold-outs, making them an unreliable foundation for a permanent Indian TS CL framework.

2. Emergency-Exclusive Compulsory Licensing Model

This approach limits the CL of TS to tightly defined emergencies. These are limited through statutory triggers and sunset clauses. The clauses parallel, but remain distinct from, Article 31 TRIPS for patents. Both India's TS Bill and the ongoing European Union (EU) crisis-time CL proposals show how legislation can authorise government-mandated access only for national security threats, public health emergencies, or circumstances of extreme urgency.[93] Tying access to formal declarations, such as WHO Public Health Emergencies of International Concern (PHEIC) or domestic emergency decrees, curbs mission creep and gives legal certainty to innovators and states.[94]

France's emergency law n° 2020-290 of March 23, 2020, illustrates this model. It authorises the Prime Minister to requisition all goods and services necessary to combat the health crisis.[95] Core design features include prior efforts at voluntary cooperation, non-exclusive and non-assignable licences, and strict purpose limitations, such as the manufacture of specified products for domestic use. They include automatic termination upon the end of the emergency.

The U.S. Defence Production Act ["**DPA**"] provides a parallel emergency framework, empowering the President to prioritise contracts and allocate knowledge and processes needed for

[90] T.A. Adekola & B. Mercurio, *mRNA Technology Transfer Hub and Intellectual Property*, 24 WTR 1, 1–19 (2025).
[91] T.A. Adekola, *supra* note 90 at 15.
[92] R. D. Anderson, *supra* note 45 at 7.
[93] Trade, *supra* note 17 at 4, cl 6; Regulation, *supra* note 86 at 16.
[94] Law No. 2020-290, *Law on Emergency to Address the COVID-19 Epidemic*, Mar. 23, 2020 (Fr.).
[95] French Health Emergency Act, Law No. 2020-290, Mar. 23, 2020 (Fr.).

the production of a certain IP during "*natural or man-caused disasters*."[96] The DPA also allows confidential information to be "*published or disclosed*" when "*the President determines that the withholding thereof is contrary to the interest of the national defence.*"[97] India's TS Bill already manifests this model, evident in clause 6(1) of the TS Bill, 2024.[98]

3. Limited-Disclosure Compulsory Licensing Model

Under a limited-disclosure model, authorities compel only the minimum subset of "essential" TS necessary to achieve the public-interest objective, rather than full access to the owner's entire platform. This requires granular scoping of elements, with the grant clause strictly defining what the licensee may manufacture, store, sell, and distribute, and treating any use outside that scope as both infringing and a contractual breach. Courts and regulators in competition disputes have long used such tailored access orders, offering a template for narrowly circumscribed, purpose-specific disclosure.[99]

The model is reinforced by layered confidentiality protections. These include field-of-use restrictions, prohibitions on reverse engineering beyond the licensed product, and continuing secrecy obligations after expiry, supported by physical security, secure IT systems, need-to-know disclosure, and employee confidentiality clauses.[100] CL must also deal with ownership of the improvements, which will revert to the licensor, subject to competition law, and a licence term that is limited to the emergency period, with its post-termination secrecy agreements intact.

This targeted approach becomes imperative since unrestricted access will undermine the TS itself and will disincentivise R&D. United Kingdom Intellectual Property Office ["**UKIPO**"] research (2021) warns that while stronger TS protection encourages R&D, overly broad access reduces knowledge spillovers and future innovation.[101] Olga Gurgula (2025) stresses that any CL regime must include strict confidentiality, non-exclusivity, prior negotiations, and adequate compensation to remain consistent with Article 39 of the TRIPS.[102] The COVID-19 experience illustrated that unprotected disclosure will result in industrial unwillingness; hence, limited and protected access becomes the only workable model, and India's TS Bill imbibes that.[103] For India, however, defining

[96] Defense, *supra* note 85 at 16, § 4502(1).
[97] Defense, *supra* note 85 at 16, § 4512.
[98] Trade, *supra* note 17 at 4, cl 6(1).
[99] Federal Trade Commission v. Mallinckrodt ARD Inc. & Mallinckrodt plc, Case No. 1:17-cv-00120 (D.D.C. Jan. 30, 2017).
[100] *Id* at 18.
[101] O. Gurgula, *supra* note 46 at 9.
[102] Agreement, *supra* note 32 at 6, art 39.
[103] Trade, *supra* note 17 at 4, cl 6.

"essential" remains the central challenge. Although Section 2(f) of the TS Bill, 2024, defines "trade secrets," it does not clearly specify the extent of disclosure required under CL.[104]

Comparative practice offers guidance. The US,[105] EU,[106] European Medicines Agency (EMA),[107] France,[108] and China[109] allow public interest access to TS through regulatory and inspection powers. Germany's Trade Secrets Act (GeschGehG) permits mandatory inventory disclosure.[110] It also permits expert verification and statutory inspection once a licensee is designated. In cases such as the US Federal Trade Commission's (FTC) *Mallinckrodt/Questcor* consent order (2017) involving ACTH and the FTC consent order in Hospira and Mayne Pharma (2007), firms were compelled to provide detailed documentation.[111] They were also required to provide facility access, staff support, and operational guidance. COVID-19 transfers further show the need for structured, supervised disclosure. Relevant examples also include Oxford University to the Serum Institute of India,[112] Corbevax's open licensing,[113] and the NIH's support to Afrigen.[114]

A workable Indian CL regime must precisely define (i) the scope of transfer, (ii) confidentiality protections, (iii) limits on future use, (iv) compensation, and (v) enforcement and remedies. The scope must cover not only patents but also TS, manufacturing know-how, technical documents, and relevant samples. These must be identified against standards of suitability for production and good faith.

1. Hybrid Compulsory Licensing Model

In practice, effective technology transfer requires more than a patent licence or a TS licence in isolation. Hybrid mechanisms, therefore, bundle compulsory patent licences with obligations to share essential manufacturing know-how and, where necessary, targeted waivers or exceptions to

104 Trade, *supra* note 17 at 4, cl 2(f).
105 Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 374(a), Pub. L. No. 75-717, 52 Stat. 1040 (1938) (U.S.); Defense Production Act, § 101, Pub. L. No. 81-774, 64 Stat. 798 (1950) (U.S.); Freedom of Information Act, 5 U.S.C. § 552(b)(4).
106 Regulation (EC) No. 726/2004, art. 57, 2004 O.J. (L 136) 1 (EU); Regulation (EU) 2019/933, art. 3, 2019 O.J. (L 153) 1 (EU); Directive (EU) 2016/943, art. 1(2), 2016 O.J. (L 157) 1 (EU).
107 European Medicines Agency Policy 0043, *Access to Clinical-Trial Data*, EMA/240810/2013 (EU).
108 Public Health Code (Code de la santé publique), art. L.5121-8, L.5311-1 (Fr.); Law No. 2020-290, *Law on Emergency to Address the COVID-19 Epidemic*, Mar. 23, 2020 (Fr.).
109 Patent Law of the People's Republic of China (2020 Amendment), art. 53 (China); Drug Administration Law of the People's Republic of China, art. 72, 2019 (China); Anti-Unfair Competition Law of the People's Republic of China, art. 9 (China).
110 Act on the Protection of Trade Secrets (Gesetz zum Schutz von Geschäftsgeheimnissen- GeschGehG), § 5, BGBl. I at 466 (2019) (Ger.).
111 Federal, *supra* note 97, at 18.
112 Serum Institute of India & University of Oxford, *Landmark Licensing Agreement for a Protein-Based Vaccine*, (Apr. 16, 2024), SERUMINSTITUTE.COM, https://www.seruminstitute.com/press_release_sii_160424.php.
113 F. M. Abbott, *Intellectual Property and Technology Transfer for COVID-19 Vaccines*, WIPO, at 1–117 (Nov.2023).
114 O. Kolawole et al., *Open Science, Intellectual Property and the South African mRNA Vaccine Hub*, OPEN AIR BRIEFING PAPER, Apr. 2024, 1.

regulatory data and market exclusivity. International COVID-19 policy work recommends a single administrative decision or judicial order that covers the complete package of relevant patents, TS elements, access to regulatory dossiers, and cooperation duties, such as training and troubleshooting, supported by a unified remuneration framework.[115]

The EU illustrates this approach. While EU pharmaceutical law provides 8 years of data exclusivity plus 2 years of market exclusivity,[116] the European Commission's recent pharmaceutical package permits the suspension of regulatory data protection (RDP) for products made under a CL, thereby enabling licensees to rely on the originator's clinical trial data for marketing approval.[117] This reflects a broader reading of "unfair commercial use" under TRIPS Article 39.3, as was also mentioned in paragraph 4 of the TRIPS Ministerial Decision (2022).[118] In parallel, the EMA grants third-party access to clinical trial data under Regulation 1049/2001/EC and Policy 0070, subject to an overriding public interest,[119] and the Court of Justice of the European Union has held there is no general presumption of confidentiality for clinical and toxicological study reports.[120]

This integrated approach avoids gaps between patents, TS, and regulatory submissions, which together constitute the practical "recipe" for complex technologies. India does not follow a data exclusivity regime.[121] However, it still requires interoperability between patent and TS compulsory licences, as pursuing separate compulsory licenses across multiple IP layers is time-consuming, costly, and impractical in emergencies.

2. Independent Monitor Compulsory Licensing Model

This is the approach India should embed in its domestic regime. The public-repository model is attractive in theory, but it depends too heavily on cooperation that may not materialise, as the WHO mRNA Hub experience showed when full manufacturing know-how was not shared. The emergency-exclusive model is useful as a trigger mechanism, but it does not solve the harder problem of how confidential know-how is actually transferred. The limited-disclosure and hybrid models improve on that, yet they still leave the state without a strong institutional mechanism to

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[115] C.M. Correa & R.M. Hilty (eds.), *Access to Medicines and Vaccines* 1, 1–369 SPRINGER NATURE 2022, https://www.hepcoalition.org/IMG/pdf/2022_book_accesstomedicinesandvaccines.pdf.
[116] Directive 2001/83/EC (EU), art. 8(3); Regulation (EC) No. 726/2004 (EU), art. 14(11).
[117] Council of the European Union, *Note from the Presidency to Steering the Policy Debate on the Pharmaceutical Package*, (May 31, 2024),ST 10034/24 INIT, https://data.consilium.europa.eu/doc/document/ST-10034-2024-INIT/en/pdf.
[118] Agreement, *supra* note 32, at 6, art 39; Ministerial Conference, Twelfth Session, *Ministerial Decision on the TRIPS Agreement*, WT/MIN(22)/W/15/Rev.2 (June 17, 2022).
[119] Regulation (EC) No. 1049/2001 (EU), art. 4(2); European Medicines Agency Policy 0070, *Publication of Clinical Data for Medicinal Products for Human Use*, EMA/240810/2013 (EU).
[120] Opinion of Advocate General Hogan, *MSD Animal Health Innovation GmbH & Intervet International BV v. EMA*, Case C-178/18 P (Sept. 11, 2019).
[121] Prashant R. T., *The Data Exclusivity Debate in India*, 10 IJLT 1 (2014), https://repository.nls.ac.in/cgi/viewcontent.cgi?article=1073&context=ijlt.

police what is disclosed, how it is used, and whether the transfer remains confidential. By contrast, the independent monitor model is superior because it combines emergency access with structured supervision: it limits disclosure to what is necessary, preserves secrecy through monitored transfer, and provides a neutral actor to oversee training, site access, documentation, and compliance. For that reason, it is the only model that turns CL from a formal entitlement into an operationally workable transfer system while still protecting innovation incentives and post-transfer confidentiality.

US FTC's *Mallinckrodt/Questcor* consent order (2017) provides a concrete model for supervised compulsory access to both patents and TS.[122] The company had to supply the licensee not only with IP rights but also with manufacturing documentation. It also had to supply process know how, facility access, and technical support. All of this was under an independent monitor appointed by the competition authority.[123]

The monitor was tasked with ensuring that all required information was delivered in an organised and usable format, supervising site visits and staff training, resolving disputes and preventing over-disclosure. The order required a "*complete copy of all tangible documentation and records embodying the Licensed IP and Manufacturing Technology.*"[124] These had to be provided "*in good faith, promptly, and in an organised and comprehensive manner.*"[125] The order also mandated access to manufacturing sites and required reasonable access to personnel for instruction and problem-solving.[126]

This model illustrates that the CL of TS must be paired with institutionalised oversight. Oversight may be through a regulator, a specialised agency, or a court-appointed expert. The presence of a trusted independent monitor can integrate technological transfer with the preservation of secrecy. The monitor can also help manage cross-border enforcement challenges in an enforced licensing relationship.

B. Facilitating Technical Knowledge Transfer through 'Show-How' Facilitation

Written documentation is inadequate for complex technologies. Effective transfer depends on tacit knowledge, experienced personnel, and on-site coaching. This raises the question of whether CL can operate as a mandatory injunction to compel the licensor's staff to travel, supervise plant setup, guide operations, and train personnel. It also raises the question of how such duties can be enforced across borders. If country A issues a CL against a technology owner in country B and

[122] Federal, *supra* note,97 at 18.
[123] Federal, *supra* note 97, at 18, 18-21.
[124] Federal, *supra* note 97, at 18, 11.
[125] Federal, *supra* note 97, at 18, 11.
[126] Federal, *supra* note 97, at 18, 13.

the licensor refuses in-person training, enforcement depends on cross-border recognition of orders. Many jurisdictions do not grant such recognition. The *Moderna/BioNTech* case hints that even when patent rights are overridden, production can still take years without the guided transfer of TS.[127] Although clause 6 allows governments to override secrecy claims and compel access to TS for life-saving drugs or vaccines, it does not address the operational reality of transferring process-embedded expertise. Thus, CL risks becoming a paper entitlement.

A workable statutory design would require reasonable technical assistance proportionate to complexity. It would mandate site visits and personnel access, set time-bound training milestones and empower an independent monitor to assess compliance. This mirrors the US FTC's antitrust consent orders. Scholars O. Gurgula and L. McDonagh (2025) define training obligations.[128] They acknowledge that on-site support is often essential and specify where and how instruction is delivered. This is supported by specific performance, strong confidentiality duties, government guarantees of secrecy, and remuneration reflecting both the value of technology and the assistance burdens. Remote training is treated only as a partial substitute.

The UN mRNA Technology Transfer Hub at Afrigen demonstrates that supervised training with milestone-based handholding converts legal rights into real capacity.[129] This is a structure that India currently lacks. Singapore's biologics licensing framework further mandates sequential validation milestones before scale-up.[130] It requires that each phase of knowledge transfer be demonstrated in practice. Applied to India, this staged validation model would ensure that CL deliver actual production capability.

C. Maintaining Peri-Transfer Confidentiality to Avoid Secrets' Leakage

CL of TS raises acute enforcement challenges because it involves not only documents but also tacit, experiential know-how transmitted through people, site visits, training, and technical support. Even with a carefully drafted order, there is a persistent risk of over-disclosure, onward leakage to affiliates or regulators, and of learning-by-doing that cannot be contained once engineers internalise the knowledge. Since TS must remain confidential to retain value, any compulsory transfer to a single manufacturer risks wider circulation, while the licensor must rely on the government's best efforts and limited indemnities rather than selecting a trusted partner. Employee

[127] BioNTech Manufacturing GmbH v. ModernaTX, UKSC/2025/0160 (U.K. Sup. Ct.).
[128] O. Gurgula, *supra* note 46, at 9.
[129] O. Kolawole, *supra* note 114, at 19.
[130] S. Yang et al., *Aspects and Implementation of Pharmaceutical Quality by Design from Conceptual Frameworks to Industrial Applications*, 17 MDPI 623 (2025).

mobility is the greatest leakage risk, especially where courts struggle to distinguish TS from general skill and experience.

Comparative regimes show how deterrence can be strengthened. The EU Trade Secrets Directive (EU TSD) provides injunctions, damages, and confidentiality protections in litigation.[131] The US, under the Uniform Trade Secrets Act (UTSA),[132] the Defend Trade Secrets Act (DTSA), 2016,[133] and the Economic Espionage Act (EEA), 1996,[134] provides civil and criminal remedies of seizure and recovery of unjust enrichment. For India, the TS Bill, 2024 must therefore be backed by Rules that clearly specify the extent, scope, and responsibilities of non-disclosure for both the compulsory licensee and the government.

D. Post-Transfer Monetary Obligations of the Government for Compromised Trade Secrets

Clause 6(3) of the TS Bill requires peri- and post-transfer measures.[135] For putting the clause in force, this requires the TS Bill to also define both the parties and the scope of CL through a three-party order naming the TS holder, the qualified licensee, and the Government, and limits the authorisation to a non-exclusive, non-assignable, and non-sublicensable licence confined to the specified product, field of use, and territory. Confidentiality is preserved through statutory non-disclosure duties, government vetting of licensees, independent monitoring with audit rights, site access and reporting obligations, and penalties for leakage. Government-compelled disclosure may either make a TS public or permit limited third-party use under secrecy conditions. In either case, compensation for loss of value addresses concerns of regulatory expropriation, but this requires clear national legal authority to compel and supervise sharing.

Since TS loses all value once it is publicly disclosed, and since neither secrecy nor confidentiality can be maintained if a TS is breached, it is essential that the TS Bill, 2024, include appropriate provisions for security, accountability, and management. A workable model is under the US Defense Production Act,[136] which provides that: (i) The government indemnifies or compensates the right owner for loss or assumed risk for compelled access; (ii) Such compelled information shall be treated only within federally managed environments with appropriate government-set standards for security, which places the responsibility for that security on the State;[137] (iii) There

131 Directive 2016/943 of the European Parliament and of the Council, arts. 9–15, 2016 O.J. (L 157) 1 (EU).
132 Uniform Trade Secrets Act (UTSA) §§ 2–4.
133 Defend Trade Secrets Act of 2016, 18 U.S.C. § 1836, Pub. L. No. 114-153, 130 Stat. 376 (2016).
134 Economic Espionage Act of 1996, 18 U.S.C. §§ 1831–1832, Pub. L. No. 104-294, 110 Stat. 3488 (1996).
135 Trade, *supra* note 17, at 4, cl 6(3).
136 Defense, *supra* note 84, at 16.
137 Defense Federal Acquisition Regulation Supplement (DFARS), 48 C.F.R. pts. 200–299 (U.S.); National Institute of Standards and Technology, *NIST Special Publication 800-171* (rev. 2, 2020) (U.S.).

shall be independent federal bodies that impose penalties for non-compliance; and (iv) all compelled information is protected similar to as under Exemption 4, Freedom of Information Act (FOIA), which protects "*trade secrets and commercial or financial information obtained from a person [that is] privileged or confidential.*"[138] Any unauthorised disclosure thus attracts a penalty under 18 US Code Section 1905.[139] India should strengthen the Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM) to perform these four functions and reinforce penal codes to ensure equivalent protection of secrecy.

E. Expressly Iterating the Article 31bis TRIPS Clarification for Trade Secrets

Article 31(f) of the TRIPS Agreement on territorial restrictions and Article 31(h) on adequate remuneration protect other markets from low-cost CL-enabled products while ensuring fair returns and sustaining innovation.[140] Since Article 31 applies only to patents, Article 31(h) on adequate remuneration doesn't extend to TS in principle; however, the TS Bill, 2024, has voluntarily adopted it.[141] Similarly, domestic-market supply rules under Article 31(f) do not automatically extend to TS. For patents, Article 31bis of the TRIPS Agreement was brought in to address the limitation Article 31(f) creates, and Section 107A of the Patent Act, 1970, incorporates the principle domestically for patented products.[142] TRIPS imposes no such limits on TS, but the domestic regime should consider clarifying it regardless to avoid any ambiguity. Clause 6 of the TS Bill should explicitly acknowledge this flexibility and adopt a framework that avoids the procedural and export complications associated with Article 31bis, ensuring smoother transfers of products involving the use of compulsory licensed TS to nations facing an emergency but either lacking or only having insufficient manufacturing facilities.[143]

F. Addressing Compensation Uncertainty

There is a clear policy tension in setting remuneration. Rates that are too low appear expropriatory and weaken incentives to innovate, while overly generous payments make licences economically unworkable for public manufacturers in low- and middle-income countries.[144] TRIPS requires adequate remuneration based on the economic value of the authorisation and permits adjustment for emergency conditions, rather than relying on ordinary market pricing. Clause 6(2) of the proposed TS Bill follows this approach by requiring the government to promptly set remuneration

[138] Freedom, *supra* note 105, at 19.
[139] 18 U.S.C. § 1905 (U.S.).
[140] Agreement, *supra* note 32, at 6, arts 31(f), 31(h).
[141] Trade, *supra* note 17, at 4, cl 6(2).
[142] Agreement, *supra* note 32, at 6, arts 31bis; Patents Act, 1970, § 107A, No. 39, Acts of Parliament, 1970.
[143] Agreement, *supra* note 32, at 6, art 31bis.
[144] K. Outterson, *Pharmaceutical Arbitrage*, 5 YJHPLE 193, 193–291 (2005).

that reflects the nature, value, and development and maintenance costs of the TS.[145] Because CL overrides consent, royalties must balance public health with fair compensation. Article 31(h) TRIPS offers no formula.[146] It provides no guidance for TS, leaving wide national discretion and creating uncertainty and retaliation risks, such as Abbott's withdrawal from Thailand after a human immunodeficiency virus (HIV) licence, and heavy reliance on domestic capacity to manage Article 39 secrecy.[147] Broad waivers may also weaken R&D incentives if firms anticipate losing control over their TS.[148]

In practice, CL royalties vary widely, ranging from 4% in Malaysia to 2% in Mozambique, 2.5% in Zambia, and 0.5% in Indonesia, in the context of HIV drugs.[149] On the contrary, private pharma licences for such HIV drugs clustered around 4-5%, among the highest across industries.[150] To avoid such disparity, scholars propose mixed valuation methods, including benchmarking against comparable patent royalties, discounted cash flow of profits attributable to the secret, and avoided R&D and scale-up costs for the licensee.[151] Royalty setting weighs value, affordability, public and private R&D costs, urgency, market returns, and competitive conduct, but TS are harder to price because R&D inputs, the profit contribution of know-how, and the value of secrecy are opaque.[152] The United Nations Development Programme (UNDP) Guidelines 2001 propose a 4% baseline for the generic price, adjustable by ±2 %.[153] The Japanese Patent Office Guidelines 1998 set a 2-4% adjustable range of 0-6% with a utilisation ratio for multiple inventions.[154] Canada's 2005 export rules use a sliding scale from 0.02% to 4% based on the Human Development Index (HDI).[155] The Tiered Royalty Method links rates to high-income prices, adjusted for income or disease burden, and is supported by the UNDP and the WHO.[156] The Medical Innovation Prize Fund replaces royalties with national prize payments based on health impact.[157]

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145 Trade, *supra* note 17, at 4, cl 6(2).
146 Agreement, *supra* note 32, at 6, art 31(h).
147 *Abbott withdraws HIV drugs from Thailand after patent row*,(Mar. 21, 2007), PHARMAFILE.COM, https://pharmafile.com/news/abbott-withdraws-hiv-drugs-thailand-after-patent-row/.
148 *Id* at 26.
149 *Intellectual Property and Access to Medicines: Papers and Perspectives*, (2013), SOUTH CENTRE, https://www.southcentre.int/wp-content/uploads/2016/05/Bk_2013_IP-and-Access-to-Medicines_EN.pdf.
150 *Id* at 26.
151 J. Baron et al., *Contribution to the Debate on SEPs*, EUROPEAN COMMISSION (2021).
152 *Remuneration Guidelines for Non-Voluntary Use of a Patent on Medical Technologies* (WHO Technical Cooperation for Essential Drugs and Traditional Medicine Series No. 18, 2005).
153 *Id* at 26.
154 I. Nakayama, *Patent Ownership and Rewards for Inventions in Japanese Public Research Organizations*, 7(2) INNOV. JOUR., art. 4 (2002).
155 Export Controls Division, *Export Controls Handbook*, (May 2009), FOREIGN AFFAIRS AND INTERNATIONAL TRADE CANADA, https://publications.gc.ca/collections/collection_2010/maeci-dfait/FR2-9-2009-eng.pdf.
156 WHO, *Assessment of Medicine Pricing and Reimbursement Systems in Health Insurance Schemes*, WHO REGIONAL OFFICE FOR AFRICA, (2016), https://iris.who.int/bitstream/handle/10665/246416/9789290233145-eng.pdf?sequence=1.
157 *Medical Innovation Prize Fund (MIPF)*, IMED PROJECT- INNOVATING MEDICINES ENTREPRENEURSHIP AND DELIVERY, https://imedproject.org/proposals-database/mipf/.

It is suggested that it is most practical to adopt a statutory structure with patent-style royalty bands, for example, 2-4% in health emergencies, adjusted for R&D, public funding, and secrecy costs, for India. The law should permit interim royalties upon issuance, with a true-up after independent valuation, secured through escrow and with fixed timelines, and compensation should cover both access to the TS and the licensor's technical assistance costs.

G. Innovation Disincentives and Their Implications for Private R&D and Investment

Concerned about patent CL, firms may lean even more on TS, which some authors describe as "*among the most powerful legal weapons against the public.*"[158] Because TS can, in principle, last indefinitely, firms invest heavily in process optimisation, scale-up expertise, and platform technologies on the assumption that these TS will not be forcibly shared.[159] A poorly defined, overly broad, or readily triggerable CL regime can threaten to chill investment in complex technologies that rely on TS.[160] In the TS Bill, the only recognised exceptions are reverse engineering or independent creation.

Scholars have long treated reverse engineering as a lawful means of learning from protected know-how. The Defend Trade Secrets Act expressly excludes reverse engineering and independent derivation from "improper means,"[161] and Pamela Samuelson and Suzanne Scotchmer explain that reverse engineering can support follow-on innovation and interoperability when the later entrant can prove acquisition through proper means rather than through tainted disclosure.[162]

However, CL for TS also creates a paradox. Once licensees access confidential know-how, they become "contaminated" and can no longer rely on the two exceptions to recreate the TS. If all major competitors eventually become compulsory licensees, these exceptions may be substantially undermined in practice as this would lead to a *de facto* elimination of these exceptions to a large extent, as no firm within the industry could rely on them, and actors outside the industry would lack sufficient incentive to do so. Subsequent innovation pathways would be tainted by prior access to compelled disclosures. This creates what may be termed a 'universal-licensee' paradox: trade secret law still recognizes acquisition through reverse engineering and independent development, but that balance depends on the absence of tainted access. Once the same confidential know-how is disclosed to multiple competitors through compulsory licensing, the statutory defenses lose

[158] Li Liu, *Patent Quality*, 55 IIC IRIPCL. 499, 499–529 (2024), https://doi.org/10.1007/s40319-024-01444-w.
[159] European Commission, *Study on Trade Secrets and Confidential Business Information in the Internal Market- Final Study* (Apr. 2013).
[160] *Id* at 27.
[161] Defend Trade Secrets Act of 2016, 18 U.S.C. § 1839(5)-(6) (2018).
[162] Pamela Samuelson & Suzanne Scotchmer, *The Law & Economics of Reverse Engineering* (Dec. 3, 2001), https://people.ischool.berkeley.edu/~pam/papers/l%26e%20reveng5.pdf.

much of their practical force, because later replication must be shown to rest on a genuinely untainted development path rather than on licensed access to the secret.[163]

India should therefore preserve reverse engineering and independent creation as default defences, while restricting their use by compulsory licensees. Non-licensee competitors must retain these defences to prevent a perpetual monopoly. A workable solution is a statutory clean room pathway in which licensees cease using or disclosing compelled secrets after termination, but may pursue independent R&D through documented clean room procedures that demonstrate non-reliance on the compelled information. Under such a model, one team reduces the licensed technology to high-level specifications, a separate team with no exposure to the secret performs the actual development, and a coordination layer screens inputs and documents the separation. Properly implemented, that process does not eliminate the reverse-engineering or independent-development defences; it helps preserve them by creating evidence that the resulting product was independently generated without improper means.[164]

Samuelson and Scotchmer explain that one proposed way to permit decompilation or disassembly is to separate the team that studies the product from the team that uses the resulting specifications to build the new one, so that lawful reverse engineering remains possible without allowing tainted copying.[165] Elkins's article on *NEC v. Intel* makes the same point by presenting the case as a guide to using clean-room procedures as evidence,[166] while the Federal Judicial Centers' Trade Secret Case Management Judicial Guide describes clean-room protocols as isolated research teams, documented independent work, and a coordination layer that screens information entering and leaving the room.[167] Pooley likewise describes the clean room as the "gold standard" for proving independent development, but cautions that a hermetically sealed room is not always necessary or practical; what matters is the evidentiary record showing non-reliance on the secret.[168] In effect, any post-CL restrictions should remain limited and proportionate and not become absolute perpetual bans.

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[163] 18 U.S.C. § 1839(6)(B) (2022); *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 476 (1974); *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 155 (1989); Jerome H. Reichman, *How Trade Secrecy Law Generates a Natural Semicommons of Innovative Know-How*, in *The Law and Theory of Trade Secrecy: A Handbook of Contemporary Research* 185, 189–90 (Rochelle C. Dreyfuss & Katherine J. Strandburg eds., 2011).

[164] Randall E. Kahnke & Kerry L. Bundy, *Clean Rooms Are Not Just for Kids: How to Demonstrate Independent Development to Avoid a Trade Secret Claim*, *Faegre & Benson Trends*, Mar./Apr. 2008, at 1, 3–4.

[165] Pamela Samuelson & Suzanne Scotchmer, *The Law and Economics of Reverse Engineering*, 111 Yale L.J. 1575, 1652–53 (2002).

[166] David S. Elkins, *NEC v. Intel: A Guide to Using "Clean Room" Procedures as Evidence*, 10 Computer L.J. 453 (1990).

[167] *Trade Secret Case Management Judicial Guide* 2-26 to 2-27 (Fed. Jud. Ctr. 2023).

[168] James Pooley, *Planning for Independent Development* (May 1, 2023), https://pooley.com/planning-for-independent-development/.

H. Empowering Private Parties to Pursue Compulsory Licensing of Trade Secrets

The current framework does not allow private parties to apply for CL. In the patent system, the only effective CL ever granted was *Bayer v. Natco* (2016).[169] By contrast, Section 100 government use powers have never been exercised, and the absence of any CL during COVID-19, despite full statutory authority, reflects a broader reluctance to deploy CL in ways that could unsettle multinational innovators and place India on the United States Special 301 report.[170]

In matters of overriding public interest, most jurisdictions' grounds for patent CL are in line with Article 31 of the TRIPS. In India, it is Section 84 of the Patents Act, 1970.[171] A mechanism parallel to Section 84, which permits private applications, is what the CL regime needs to greatly increase the likelihood that CL for TS is actually used.

If private applications are permitted, additional safeguards must also be implemented. The applicant should demonstrate suitability and good faith through GMP-ready facilities. They should have qualified personnel. They should have established Quality Assurance and Quality Control. They should have robust confidentiality policies. They should have strong TS controls since designating an unfit licensee increases the risk of production failure and increases the risk of TS leakage.

I. Ambiguities in Review Duration, Wind-Down, and License Termination

Clause 6(4) of the TS Bill addresses automatic termination upon expiry of an emergency, and it should be linked to post-termination obligations, including maintaining confidentiality, imposing use limitations, deleting and returning material through escrow, and demounting facilities to prevent leakage.[172] A more specific sunset clause, based on Sections 84 and 100 of the Patents Act of 1970, would be required in this TS Bill. It would include an annual review to assess the continued necessity for a CL. It would permit use only for essential purposes. It would provide automatic termination when there is no longer a public exigency. These sections already have a well-established precedent in periodic review, proportionality, and automatic termination of CL. The TS Bill should adopt a similar statutory framework. This would ensure licences remain narrowly tailored, essential, and time-bound.

[169] Bayer Corporation v. Natco Pharma Limited, 2014(60) PTC 277 (BOM).
[170] Patents Act, 1970, § 100, No. 39, Acts of Parliament, 1970.
[171] Patents Act, 1970, § 84, No. 39, Acts of Parliament, 1970,
[172] Trade, *supra* note 17 at 4, cl 6(4).

VI. FOSTERING INTERNATIONAL COLLABORATION FOR TECHNOLOGY TRANSFER DURING GLOBAL CRISES: A GLOBAL PERSPECTIVE

India cannot ensure equitable access to IP-protected innovations through domestic CL alone. This is particularly true when foreign entities outside its jurisdiction hold critical manufacturing TS. Existing international mechanisms need to be ramped up to better meet these needs.

A. Addressing Structural Gaps in Patent-Centric IP Frameworks

IP waiver and access frameworks have mostly come around the pharmaceutical sector, especially during the COVID-19 pandemic. The WHO's C-TAP, despite its solidarity-driven mandate, received no TS contributions throughout the pandemic.[173] The Medicines Patent Pool (MPP) was successful in HIV and hepatitis C therapies.[174] It was extended to COVID-19 antivirals.[175] However, it remained largely limited to patents.[176] It offered minimal TS transfer. Similarly, while the COVAX Manufacturing Task Force mapped global production capacity, it lacked the authority to compel TS disclosure.[177] Moreover, TRIPS Article 31bis facilitated export-oriented CL of patents. It did not cover TS and was never applied to biologics.[178] These gaps expose a systemic inability of existing global mechanisms to enforce technology transfer for sophisticated technologies. Reform must address the shortcomings of the above measures to ensure access to critical technologies during global emergencies.

B. Building Trade-Secret-Sensitive Future Free Trade Agreements (FTAs)

Article 39.3 of TRIPS and its FTA counterparts usually protect undisclosed information against unfair commercial use. However, they rarely provide explicit exceptions for domestic emergencies or public crises.[179] This blocks emergency access to TS, which complements the CL-enabled patent, even when lives are at risk. A review of the IP provisions in major FTAs reflects such dynamics,

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[173] Ellen F.M. 't Hoen, *Private Patents and Public Health: Changing Intellectual Property Rules for Access to Medicines* 87–91 (2016).
[174] Medicines Patent Pool, *Pfizer and The Medicines Patent Pool (MPP) Sign Licensing Agreement for COVID-19 Oral Antiviral Treatment Candidate to Expand Access in Low- and Middle-Income Countries* (Nov. 2021), https://www.pfizer.com/news/press-release/press-release-detail/pfizer-and-medicines-patent-pool-mpp-sign-licensing.
[175] *Id.*; see also Frederick M. Abbott & Jerome H. Reichman, *The Doha Round's Public Health Legacy: Strategies for the Production and Diffusion of Patented Medicines Under the Amended TRIPS Provisions*, 10 J. Int'l Econ. L. 921, 950–52 (2007).
[176] Agreement on Trade-Related Aspects of Intellectual Property Rights art. 31bis, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299; Frederick M. Abbott, *The WTO Medicines Decision: World Pharmaceutical Trade and the Protection of Public Health*, 99 Am. J. Int'l L. 317, 339–41 (2005).
[177] F. Luna & F. Holzer, *What Vaccine Inequity Has Taught Us*, 36 GLOB BIOETHICS 2497602 (2025).
[178] M. Schutz, *supra* note 176 at 31.
[179] Agreement, *supra* note 32 at 6, art 39(3).

such as the Trade and Economic Partnership Agreement (TEPA), and the Comprehensive Economic and Trade Agreement (CETA), among others.[180]

One workable model would be to negotiate exceptions for declared public emergencies in future FTAs. This must be coupled with a revision of existing agreements. This can be done by exchanging side letters or protocols. These would establish legal authority to access TS alongside patents in such emergencies. For example, a model clause could read:

"*Notwithstanding any other provision of this Chapter, in circumstances of national emergency or other extreme public health urgency declared by the World Health Organization or a Party, a Party may authorise the use or disclosure of undisclosed information or trade secrets protected under this Article without the consent of the right holder, provided that: (i) the use is strictly limited to addressing the emergency; (ii) the right holder is notified promptly; (iii) the authorisation is non-exclusive, non-assignable, and non-sublicensable; (iv) adequate remuneration is paid; and (v) the authorisation terminates once the emergency subsides.*"

C. Harnessing Article 11 of the Pandemic Accord for Technology Transfer

The framework in Article 11 of the WHO Pandemic Agreement represents an improvement in equitable transfers, but it remains inadequate, particularly in addressing CL for TS, as evidenced by the COVID-19 pandemic.[181] Though it facilitates "mutually agreed" transfers through paragraphs 1(a) and (e), "reasonable royalties" in paragraph 1(d), and information exchange in emergencies in paragraph 1(f), it adopts soft obligations in "encourage," "promote," and "as appropriate" objectives, which provide no "fallback position" in cases where property owners in civil law systems are unwilling to cooperate.[182] Moreover, references to capacity-building under paragraph 2, international cooperation under paragraph 3, and mechanism development under paragraph 5 are aspirational. They do not guarantee mandatory sharing.[183] This risks inequitable access where commercial priorities outweigh global health needs.

To address these gaps, the Pandemic Agreement must be amended. Future epidemic-triggered waiver frameworks under the WHO and related multilateral processes should be designed to learn from the loopholes in the present Agreement. The Pandemic Agreement should reflect that in the event of any future public emergency, such waivers should automatically trigger mechanisms to escrow relevant TS at a WHO-coordinated or multilateral hub upon a declaration of a PHEIC.

[180] Trade and Economic Partnership Agreement (TEPA), India–EFTA, Mar. 10, 2024; Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), Mar. 8, 2018; United States–Mexico–Canada Agreement (USMCA), Nov. 30, 2018; Comprehensive Economic and Trade Agreement (CETA), Can.–E.U., Oct. 30, 2016.
[181] World Health Organization, *WHO Pandemic Agreement (Draft)*, art. 11 (2024).
[182] World Health Organization, *WHO Pandemic Agreement (Draft)*, art. 11 ¶¶ 1(a), 1(d), 1(e) & 1(f) (2024).
[183] World Health Organization, *WHO Pandemic Agreement (Draft)*, art. 11 ¶¶ 2, 3 & 5 (2024).

Where voluntary arrangements are not concluded within a defined period, this escrow should enable non-exclusive, time-limited CL to qualified manufacturers in developing countries.

VII. CONCLUSION

This article has argued that the debate on CL must move beyond its conventional patent-centric orientation and confront the realities of contemporary innovation systems, where commercially valuable knowledge is frequently embedded not in patents, but in TS. In doing so, the article advances a central doctrinal contribution: while the TRIPS Agreement expressly regulates compulsory patent licensing under Article 31, its silence on compulsory access to TS under Article 39 does not amount to prohibition. Rather, when read together with Articles 7 and 8 of TRIPS, the Doha Declaration on Public Health, and States' sovereign emergency powers, international IP law leaves sufficient normative and interpretive space for narrowly tailored, confidentiality-preserving compulsory licensing regimes for TS during public emergencies. The article further demonstrates that patent-only CL is structurally incomplete in knowledge-intensive sectors such as biologics, vaccines, and agritech, where the practical ability to replicate technology depends upon access to tacit manufacturing knowledge and operational know-how that patents alone do not disclose. In this respect, the analysis extends and operationalises the scholarship of Olga Gurgula and John Hull by moving beyond the theoretical legality of compulsory TS licensing toward an institutional design framework grounded in comparative regulatory practice, antitrust consent decrees, and emergency governance models.

The article's second contribution lies in identifying the institutional paradoxes generated by compulsory TS transfer. Unlike patents, TS derive their value from continued secrecy; compelled disclosure therefore risks both destroying the protected asset and contaminating future independent innovation pathways. The article conceptualises this tension through the "universal-licensee paradox," in which widespread compulsory access may erode the practical availability of reverse-engineering and independent development defences across an industry. To address this, the article proposes a calibrated Indian framework centred on emergency-exclusive licensing, limited-disclosure obligations, hybrid patent–TS bundling, supervised "show-how" transfer, independent monitoring, confidentiality-preserving disclosure protocols, and post-transfer compensation mechanisms modelled in part on the United States Defence Production Act. These proposals seek not to weaken innovation incentives, but to preserve the long-term legitimacy of TS protection by ensuring that secrecy cannot serve as an absolute barrier to essential medicines, vaccines, food security technologies, and other public-interest goods during crises.

At the international level, the article has also argued that current global mechanisms remain structurally inadequate. Instruments such as the Medicines Patent Pool, Article 31bis of TRIPS, and the WHO's pandemic technology-transfer initiatives continue to focus predominantly on patents and voluntary cooperation, leaving the institutional framework for compulsory transfer of manufacturing know-how underdeveloped. Future reforms must therefore move toward explicit treaty-based public-interest exceptions permitting confidentiality-preserved TS disclosure during declared emergencies, particularly within future free trade agreements and the WHO Pandemic Agreement framework. Yet several unresolved questions remain. Future research must examine the long-term innovation effects of compulsory TS access, the feasibility of cross-border enforcement of technical-assistance obligations, valuation methodologies for secrecy-loss compensation, and the interaction between TS licensing and competition law in digital and AI-driven industries. Equally important is the need to study whether international institutions can develop neutral supervisory bodies capable of administering confidential technology transfers without undermining commercial trust. Ultimately, the future of intellectual property law will depend not merely on protecting innovation, but on designing legal architectures capable of reconciling innovation incentives with equitable access to indispensable knowledge in moments of collective vulnerability