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Geoeconomic Fragmentation and the Erosion of TRIPS Flexibilities in Technology Access and Distributive Justice in the Global South

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Abstract

The rise of geoeconomic fragmentation and techno-nationalism is fundamentally reshaping the global intellectual property (IP) regime. While the TRIPS Agreement was originally presented as a carefully balanced bargain that preserved flexibilities for developing countries, contemporary security-driven export controls, investment screening, industrial subsidies, and strategic technology restrictions are increasingly constraining those flexibilities. This paper critically examines how the securitisation of technology and the weaponisation of supply chains are eroding the policy space of Global South countries to access, adapt, and diffuse critical technologies in pharmaceuticals, green energy, digital infrastructure, and artificial intelligence. Drawing on international trade law, political economy, and distributive justice frameworks, the paper analyses the interplay between TRIPS Articles 7, 8, 31, and 66.2 and the expanding use of national security exceptions. It argues that the current trajectory risks transforming IP from a development tool into an instrument of technological hierarchy and proposes pathways for reclaiming regulatory sovereignty and reconstructing a more equitable technology governance architecture in a multipolar world.

INTRODUCTION

The international trade regime that was established after the Uruguay Round and the formation of the World Trade Organization in 1995 operated on the assumption that there would be continuing economic integration within an essentially stable geopolitical environment. This assumption has been challenged repeatedly in recent times (Howse & Langille, 2023). The proliferation of policies that seek to safeguard national security, technological independence and strategic autonomy has resulted in what the scholars refer to as geoeconomic fragmentation, which is an intentional de-integration of global economy with strategic concerns taking precedence over economic considerations alone (Aiyar et al., 2023). In this larger context, the phenomenon of techno-nationalism has assumed particular significance. According to Luo (2022), modern-day techno-nationalism represents a complex amalgam of geopolitical, economic, national security, and ideological concerns in which technological capabilities are considered to be inseparable from state power. This version of techno-nationalism differs from the previous versions in the sense that it operates on the basis of realist assumptions about competitive and zero-sum games and uses legal and regulatory tools like export control, investment screening, and technology flow restrictions to impede the diffusion of knowledge across borders (Chen, 2026).

They have direct relevance to the regime on intellectual property rights. The Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) was introduced from the outset as a finely balanced compromise (Saggi, 2016). It set standards of protection while leaving room for flexibilities meant to retain some policy space, particularly for developing nations, especially regarding public health, technology transfers, and fostering technological development (Articles 7, 8, 31, and 66.2). There have been empirical cases showing the usage of these flexibilities regularly. During the period between 2001 and 2024, there were at least 199 cases of TRIPS flexibilities used all around the world, the most of which were compulsory licenses or the pharmaceutical transition for least developed countries (Boulet et al., 2026). However, it has been noted that there have been efforts to implement more measures to prevent technology flows across the border in order to secure national security during the same period. This means that the scope of these flexibilities has become narrower (Gangaraj & Biddappa, 2025).

The problem motivating this research paper is thus defined in concrete terms. Geoeconomic fragmentation coupled with the increasing prevalence of techno nationalism is undermining the effectiveness of TRIPS

flexibilities as far as Global South countries are concerned (Lim & Trachtman, 2026). Limits on transfers of dual-use technologies, semiconductors, AI-related tools, and green technologies constrain the stock of knowledge that developing economies have access to and can adapt and disseminate. Equally, the proliferation of security-based justifications by major economies is creating a context in which the use of compulsory licensing, parallel imports or technology transfer requirements is increasingly difficult (Snarska et al., 2025). The consequence is a process of regulatory erosion precisely in those areas where technology access is of critical importance.

This erosion has direct societal consequences. Constrained access to essential medicines, climate mitigation and adaptation technologies, and digital infrastructures deepens existing inequalities in health outcomes, climate vulnerability and digital participation (Li et al., 2025). Industrial upgrading failures in technology intensive sectors further limit the capacity of many Global South economies to generate decent employment and to reduce structural dependence. In this sense, the transformation of intellectual property governance under conditions of geoeconomic fragmentation is not merely a technical trade law issue; it is a question of distributive justice and of the broader social contract that underpins the multilateral trading system (Rahimi-Ardabili et al., 2022).

This paper addresses three interrelated research questions. First, through what channels does contemporary techno-nationalism constrain the practical availability of TRIPS flexibilities for developing countries? Second, how do these constraints redistribute technological capabilities and deepen North–South asymmetries? Third, what normative and institutional responses remain available within or beyond the WTO framework to restore meaningful policy space? The analysis makes three contributions. It situates the literature on TRIPS flexibilities within emerging research on geoeconomic fragmentation and techno-nationalism, revealing a structural shift overlooked by earlier work on access to medicines and technology transfer. It adopts an interdisciplinary approach that combines doctrinal analysis of TRIPS with international political economy insights into the weaponisation of interdependence. Finally, it centres Global South perspectives on distributive justice and regulatory sovereignty, demonstrating how current trends threaten to convert intellectual property law into an instrument of technological hierarchy.

THEORETICAL FRAMEWORK: DISTRIBUTIVE JUSTICE, REGULATORY SOVEREIGNTY, AND THE TRIPS BARGAIN

The TRIPS Agreement was introduced as a grand bargain between developed and developing Members of the newly constituted World Trade Organization. The developing world committed to enforcing higher minimum standards of intellectual property protection in exchange for the prospect of technology transfer, maintenance of certain flexibilities in policies, and access to market opportunities (Correa, 2005). Articles 7 and 8 of the Agreement expressed this developmental intention by requiring that the protection and enforcement of intellectual property rights would serve to promote technological innovation and to ensure the transfer and dissemination of technology in a way that would contribute to social and economic welfare, and by recognizing the right of Members to take measures to protect public health and to promote the public interest in fields of critical importance to their socio-economic and technological development (Chelsea, 2023). The Doha Declaration on the TRIPS Agreement and Public Health affirmed the validity of these flexibilities. However, thirty years into the implementation process, it has become evident that there exists a gap between the bargain and its substance. Technology transfer obligations under Article 66.2 have remained weakly enforced, while the practical utility of flexibilities has been constrained by legal, political, and, more recently, security-based obstacles (Syam, 2026).

The question posed by this difference is one of distributive justice as it pertains to international economic law. Distributive justice involves the issue of how benefits and burdens of cooperation should be distributed between the participants in the common institutional setting (Rygh et al., 2026). For the multilateral trading regime, distributive justice demands that any rule regarding the production and dissemination of knowledge does not create technological hierarchies or transfer rents from technology-importing economies to technology-exporting economies without offering sufficient developmental gains in return (Yanisky-Ravid, 2024). The global justice conception of intellectual property laws includes readings that criticize the role of the TRIPS Agreement in creating international injustice, stating that strict and uniform standards of patent laws can result in significant income flows from poorer to richer nations, while denying access to the needed technologies (Pogge, 2023). From the capability-oriented perspective, meaningful development also requires expanding the substantive freedoms of people, which include their access to technologies essential for ensuring health, protection against climate change, and economic productivity (Bartolomei et al., 2024). As applied to the governance of intellectual property, these conceptions provide for a reading of TRIPS that prioritizes technology dissemination and capacity building over the establishment of exclusive rights (Syam, 2026). Recent scholarly assessments of the Agreement's thirty-year record conclude that these distributive and developmental objectives have remained largely unfulfilled for least developed and many developing countries, particularly with respect to technology transfer and the building of viable technological bases.

Regulatory sovereignty provides an alternative concept that counters the phenomenon of technological dependence that emerges when the substantive flexibility of laws is eroded due to the presence of material factors (Yeung & Ranchordás, 2024). Regulatory sovereignty means the ability of a state to create domestic regulations about economic activity which includes acquisition, modification, and distribution of technology as per the developmental needs and objectives of public interest of the country (Edler et al., 2023). In the case of intellectual property, it means the proper exercise of compulsory licenses, the setting of the standards of patentability, creation of exemptions, and negotiations regarding technology transfer arrangements which build national capabilities (Vawda, 2022). Another associated concept of policy space which has been emphasized for quite some time now by the developing countries in the WTO process also emphasizes the requirement to maintain enough flexibility for upgrading activities in industries and technology (Mayer, 2026). Technological dependence emerges when critical knowledge inputs, production inputs, and digital technologies continue to be controlled by only a few jurisdictions and firms with access to them restricted through licensing, export restrictions, or investments screening based on the strategic interests of the technology owners (Edler et al., 2023). The expansion of national security rationales into technology policy intensifies this dependence by designating entire classes of dual use and frontier technologies as matters of essential security interest, thereby restricting the cross-border movement of knowledge that would otherwise support industrial upgrading in the Global South (Hauge et al., 2025).

Securitising technologies is thus directly implicated in the broader crisis of neutrality confronting the WTO. The structure of the multilateral trading system was built on the premise that the trade rules could be implemented in a relatively neutral fashion vis-à-vis Members, and that competing commercial interests could be reconciled through the mechanism of non-discrimination, transparency and dispute settlement. Geoeconomic fragmentation has challenged that premise, and states use trade, investment and intellectual property measures as instruments of strategic competition (Wolff, 2023). Trade controls, investment screening and the invocation of the exceptions contained in TRIPS Article 73 and the parallel provisions of GATT turn commercial or developmental issues into issues of national security. In such an environment, the neutrality of the rule-based governance of the WTO is put

in jeopardy (Mantilla, 2020). If the flexibilities under the TRIPS agreement continue to exist textually but cannot be accessed in practice since the technologies at issue have already been securitised, then the compromise on which the agreement was based is further eroded (Dunn et al., 2026).

Collectively, these elements form the theoretical framework for the present analysis. The original TRIPS grand bargain is interpreted as a distributive structure that is itself contentious and one whose developmental potential has been partially fulfilled (Howse & Langille, 2023). Distributive justice, taking into account global justice considerations and the idea of capabilities, provides normative standards against which the distributive justice of technology governance decisions can be assessed. Regulatory sovereignty and policy space are identified as the institutional competencies necessary to counteract technological dependency and to implement flexibilities towards the goal of domestic development. Connecting with the crisis of neutrality at the WTO, intellectual property governance is placed within the context of the overall structural transformation of the multilateral trading system due to multipolarity and geoeconomic fragmentation (Stewart & Badin, 2011). The framework centres on how security-based restrictions on technology transfers constrain the effective implementation of TRIPS flexibilities and reshape the distribution of technological capabilities within the international system.

DOCTRINAL FOUNDATIONS OF TRIPS ARTICLE 73

Article 73 of the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) provides for the exceptions of security available to the Members of the WTO. The wording of this article is almost identical to that of Article XXI of the General Agreement on Tariffs and Trade 1994 (GATT) (Syam & Abbas, 2025). It reads that nothing in the TRIPS Agreement shall be interpreted as requiring a Member to supply any information the publication of which it considers to be contrary to its essential security interests, or as preventing a Member from undertaking any actions which it considers necessary for the protection of its essential security interests (Olga, 2023). The respective sub-paragraphs are the same as those of GATT Article XXI, and deal with measures concerning fissionable materials, arms traffic, actions taken during wartime or another emergency in international relations, and actions taken under the obligations of the United Nations Charter for maintaining international peace and security (Lindsay, 2003).

The close textual correspondence between TRIPS Article 73 and GATT Article XXI has led WTO panels to treat the two provisions as parallel (Office of the United States Trade Representative, 2019). In the only TRIPS specific dispute to examine the security exception in detail, *Saudi Arabia – Measures Concerning the Protection of Intellectual Property Rights* (DS567) (World Trade Organization, 2020), the panel explicitly drew on the analytical framework developed for GATT Article XXI in *Russia – Traffic in Transit* (2019) (Olga, 2023). The panel confirmed that the security exception is justiciable and that a Member invoking it must demonstrate the existence of an emergency in international relations and a connection between the measures taken and the protection of essential security interests. Subsequent scholarly analysis has affirmed that the core interpretive elements established under GATT Article XXI are transferable to TRIPS Article 73 (Oke, 2024).

There was limited early WTO case law concerning security exceptions. Before 2019, Members generally eschewed the dispute settlement procedure of bringing litigation to the provision owing to their joint recognition of the fact that the provision was meant to be invoked in exceptional cases. Russia – Traffic in Transit represents a departure from the past practice (Olga, 2023). The case dismissed the idea that the security exception is self-judging and affirmed that panels still maintain the ability to determine whether the requirements for the invocation of the provision have been fulfilled. It defined an emergency in international relations as a condition of war, threat

of war, increased tension, crisis or general unrest surrounding or threatening a state. It further stipulated that the decision as to what can be considered as an essential security interest is primarily left to the discretion of the Member in good faith (Oke, 2024).

There has been very little refining of these thresholds in relation to the TRIPS context. For example, in Saudi Arabia - Protection of IPR, the panel recognized that the severing of diplomatic and economic relations between Saudi Arabia and Qatar, which was due to a larger regional crisis, was an international emergency as per Article 73(b)(iii). The panel determined that certain measures that prevented the enforcement of intellectual property rights fit the conditions for the exception whereas others did not (WTO, 2020). It has been argued in the scholarly literature that the good faith condition is very important. Those measures that actually bring about or exacerbate the emergency can't be protected under the exception (Gurgula, 2023; Oke, 2024).

The traditional conception of "essential security interests" has concentrated on military and defence considerations. The concept of "emergency in international relations" has been defined in a broader sense than declaration of war, but still in terms of heightened tension or an emergency situation, not a business or economic dispute. The panels have refused to find that one party should be responsible for the state of conflict or emergency, which is beyond their jurisdiction (Oke, 2024).

Despite the fact that the security exceptions provisions in Articles XXI of the GATT, XIVbis of the GATS and 73 of the TRIPS use almost identical wording, significant differences are present between them in the context. The GATT and GATS exceptions have a general exceptions provision (Articles XX and XIV respectively) incorporated into their framework (Hrynkiv, 2026). The TRIPS does not provide such a general exception provision. Therefore, the Article 73 exception is a freestanding one. However, there is a difference in the subject matter of TRIPS – rights related to intellectual property are territorial and enforcement-based, which leads to issues of how extraterritorial enforcement can take place and the relationship between claims of national security and the minimum standards of protection and enforcement provided for in Parts II and III of the TRIPS Agreement (Kennedy, 2016). While panels have thus far used the analytical framework established under GATT, the lack of an exceptions architecture in TRIPS might mean that more importance will be placed on the security clause when Member states try to justify non-enforcement or suspension of intellectual property rights obligations (Oke, 2024).

It should be mentioned that some of the security interests that form the basis of using these exceptions are indeed legitimate. Countries do have legitimate interests in securing critical infrastructure, preventing dual-use technology from being used in military purposes and keeping the technologies needed for national defence (Walker-Munro, 2024). However, problems occur when the concept of "essential security interests" gets so broad that regular technology transfer for civil industrial development, health care and climate change adaptation is considered a threat (Park, 2018). Under these conditions, the use of the security exception may evolve into a mechanism for technological stratification, rather than a specific remedy. The conflict between justified security concerns and the development goals of the TRIPS Agreement is the context within which securitization is to be discussed.

THE SECURITISATION OF TECHNOLOGY AND THE CONSTRICTION OF POLICY SPACE

In the last ten years, national security considerations have become quite broad to include the sphere of technology and intellectual property policy. Modern techno-nationalism considers high technologies to be

components of the power and national security of states and not merely economic tools (Luo, 2022). It has changed the approach to the regulation of technological transfers, foreign investments in sensitive spheres, and protection of intellectual property into tools of strategic rivalry. Measures that used to be explained only in commercial, industrial, and developmental terms are increasingly explained as measures necessary for security reasons. It leads to the securitization of technologies, which contradicts with the developmental goals of the TRIPS Agreement (Aggarwal & Reddie, 2025).

This development in security rationales can be attributed to the fact that technological superiority provides an economic as well as a military advantage to nations. Within such an environment, the conventional dichotomy between civilian and military technologies has become increasingly hard to preserve (Beckley, 2010). Technologies previously controlled mainly by the existing multilateral export control regimes are now governed by more unilateral controls aimed at securing the technological superiority of the nation in question. Even intellectual property rights have not remained immune to such a paradigm shift (Kop, 2026). Intellectual property protection, licensing and transfer have ceased to be purely understood as means to encourage innovation or market transaction. Instead, they are seen in terms of the contribution that they make to the relative technological position of rival nations (Lohrey & Willoughby, 2025).

The tools for securitization are export controls, investment screening measures, and dual use technology controls. The leading economies have expanded the scope of goods requiring a license, have made their controls extraterritorial in scope, and have established outbound investment screening in areas like semiconductors, artificial intelligence, and quantum technologies (Svetlicinii & Su, 2025). They thereby exercise control over the cross-border movement of goods and intangible knowledge. Since the transfer of technology is often done through licensing agreements, joint ventures, FDI, and human capital migration, the result of such actions is to limit the number of ways through which the developing countries can access, assimilate, and disseminate cutting edge technologies (Saggi, 2008). As research on geoeconomic fragmentation shows, the developing nations will suffer the most from reduced technology diffusion and knowledge spillover (Aiyar et al., 2023). All in all, this amounts to the division of the global market of technologies along geopolitical line.

The constriction of policy space is particularly evident in relation to core TRIPS flexibilities. Both compulsory licensing under Article 31 and the specific instrument under Article 31bis require the presence of the relevant technological know-how and capacity to produce the relevant technology (Dunn et al., 2026). If critical elements of production, such as inputs, production facilities, or technological know-how are themselves controlled exports, the practical relevance of the compulsory license is reduced even though the legal power to issue the compulsory license is preserved (Le, 2022). Similarly, parallel imports require the availability of authorized products elsewhere. Technology restrictions may reduce the availability of such products geographically and hence make exhaustion doctrines less effective (Acquah, 2026). The Article 66.2 of the TRIPS Agreement stipulates that the developed country Members shall create an enabling environment in which enterprises and institutions in those Members are encouraged and assisted to facilitate and promote the transfer of technology to least developed country Members in order for them to build up a viable technological capacity (Zaman, 2013). Empirical evaluation of the implementation of this provision has repeatedly shown its inefficacy. The annual reports to the TRIPS Council have often contained general capacity-building actions but not transfer of proprietary technology (Syam, 2026). Moreover, the increase in security measures limits the inclination of private actors in developed economies to enter into technology transfers with developing economies, which are not allies, thus limiting the effectiveness of a provision that was inadequately complied with in the first place (Syam & Abbas, 2025.

These limitations are not formal changes in the language of the TRIPS Agreement. Rather, they function through changing the context under which the flexibilities of the agreement may be implemented (Dunn, 2026). The possibility of granting a compulsory license or obtaining a technology transfer under Article 66.2 remains intact in law (Shashikant & Khor, 2010). The ability of doing so is increasingly limited by the securitization of the technology in question and the unwillingness of the technology owner to transfer any technology identified as strategically sensitive (Chen & Gao, 2022).

Empirical patterns across three strategic sectors illustrate these dynamics with greater precision. In semiconductors and advanced computing, capacity is highly concentrated. Recent data indicate that a small number of U.S. hyperscalers (Amazon, Google, Meta, Microsoft and Oracle) held roughly 71 percent of global AI compute capacity as of late 2025, with Chinese ownership remaining around 5 percent (Emberson et al., 2026). Recent export control regimes have formalised a tiered access structure: unrestricted access for a core group of allies, controlled and volume-capped access for most other countries (including the large majority of Global South Members), and near-total restriction for a third category of designated entities and jurisdictions (Allen et al., 2025). Parallel concentration characterises semiconductor manufacturing equipment, the bulk of whose value added is generated in a limited set of advanced economies (Ma et al., 2026). For developing countries seeking to build or expand domestic capabilities, the combination of restricted access to advanced chips, manufacturing equipment, and related know-how raises both the cost and the uncertainty of industrial upgrading (Luo & Van Assche, 2023).

In the case of green and low carbon technologies, for example, an empirical investigation featured in *Science* revealed that more than 90 percent of low carbon technology trade takes place between high-income countries and China alone (Bandara et al., 2025). Other developing economies and emerging markets are excluded from most of these trading networks, acting only as net importers (Bandara et al., 2025). Being excluded from production networks makes it difficult for countries not only to have affordable access to key technologies but also to build their capacity in terms of manufacturing and adaptation (Xiao et al., 2024). In such a case, where carbon border adjustment measures increase the cost of producing carbon-intensive goods while technology transfer is restricted, developing nations face a double challenge that makes the flexibilities within TRIPS even less useful in relation to climate change (Sagone & Cellura, 2025).

AI and associated technologies also exhibit similar trends of concentration and segmentation. There is an overwhelming concentration of global AI computing and specialized data center capacity in relatively few countries of the Global North. Only a tiny fraction of global AI computing capacity is located in Africa and Latin America (Kim et al., 2026). Restrictions on the export of supercomputer hardware and dual-use algorithms make most developing countries part of either the controlled or restricted categories, creating additional obstacles for both engagement in research and the deployment of sophisticated systems. Data localization and digital sovereignty policies pursued by some developing countries reflect efforts to preserve regulatory autonomy but at the same time could be detrimental to their integration into global digital value chains in the context of security-based limitations (Tridgell, 2025).

Together, the effect of all these developments is to increase the costs and decrease the possibility of acquiring technology for Global South states that lack indigenous capacity at the cutting edge. Securitisation of technology thus constitutes a further form of soft constraint on the effective exercise of TRIPS flexibilities. The text of the treaty stays the same. The practical environment in which it can be implemented effectively changes because of

the definition of certain technologies as issues of national security and the limitation imposed on their dissemination (Arnone et al., 2024).

Consequences in terms of distributive justice in the international technology system are important. If on the one hand, formal legal flexibilities are kept in the text of the treaty, but on the other hand, the possibilities of using them are reduced through security-related instruments, it becomes difficult to keep the original balance of development interests embodied in TRIPS agreement. Thus, developing countries that need technology transfer and adaptation have fewer choices (Mendez, 2013). As a result, it only reinforces technological stratification and does not lead to its reduction through learning and diffusion. These hierarchies, in turn, have direct consequences for health equity, climate justice, digital participation, and the prospects for structural economic transformation in the Global South.

GLOBAL SOUTH EXPERIENCES AND DIFFERENTIAL IMPACTS

The costs associated with geoeconomic fragmentation and growing securitization of technology are felt differently in the Global South. Differences in the structure of industries, capacities, prior engagement with the TRIPS flexibilities, and geopolitical positions lead to substantial differences in constraints and adaptive possibilities. States with more advanced systems of regulation and technological capabilities enjoy more, although not complete, policy space. Countries with less developed manufacturing and institutional capacities face tighter limitations in accessing technology and industrial development (Zadmehr et al., 2026).

There is perhaps no better example in this regard than India. Years of experience in applying TRIPS flexibilities, especially in the pharmaceutical industry, created institutional know-how that could be to some extent applied to other technological sectors. Research into climate technology transfer demonstrates that national capacities and national policy designs often matter more than intellectual property regulations (Jee et al., 2026). India's initiatives related to building digital public infrastructure have also been framed as mechanisms for South-South cooperation and provided examples of public digital infrastructures that could be used by partner countries (Ministry of Electronics and Information Technology, 2026). Nevertheless, these attempts take place in the context of the limited availability of frontier semiconductor and high-performance computing technologies which are still export-controlled and coordinated through allied cooperation amongst leading technology exporters. The contradiction between the domestic digital policy aspirations and the restricted availability of key hardware is an example of the constraints that exist under the condition of technological securitization (Broeders et al., 2025).

Brazil is an illustrative case of a different but similar path. The history of its involvement in intellectual property policies in the health sector is complemented by more recent attempts to increase production of renewable energy technologies. The external climate-related trade policies, such as carbon border adjustments, increase competition for carbon-intensive exports (Chaves et al., 2024). Meanwhile, the proprietary technologies which can lead to decarbonization rapidly are available only within a few suppliers. According to the empirical analysis of low carbon technology trade, more than 90 percent of such trade takes place between high-income countries and China (Bandara et al., 2025 Consequently, other developing countries remain predominantly net importers of these products, thereby excluding them from global production networks. The practical value of TRIPS flexibilities is correspondingly diminished when critical technology inputs remain subject to security-based controls.

South Africa continues to find itself at the junction between domestic industry goals and international technology constraints, specifically regarding its energy transition and advanced manufacturing. A case study on climate

technology transfers in South Africa indicates that absorptive capacity, financial availability, and institutional coordination can matter more than mere intellectual property concerns in deciding whether the technology is adopted and transferred (Jee et al., 2026). This is even more true in other African states and certain Southeast Asian economies where less developed industrial sectors and R&D make their limitations even more pronounced. As a result, such nations continue to rely on imported technologies and have greater difficulty developing innovation paths. Moreover, the accumulation of AI compute capabilities and infrastructure in data centers makes the situation even more difficult with Africa and Latin America collectively accounting for only a tiny percentage of worldwide AI compute capacity (Sampath, 2014).

Climate technologies, on the other hand, highlight in an especially clear manner the connection between green industrial policies in leading economies and the functioning of TRIPS flexibilities. As advanced countries use carbon border tariffs together with technology transfer regulations, developing nations face a two-fold problem (Tundang, 2025). On one side, gaining access to export markets for carbon-intensive products is increasingly expensive, while at the same time, the technology necessary for decarbonization is still out of reach due to its proprietary nature. Intellectual property law is usually mentioned as one of the reasons behind this issue, although careful empirical studies show that absorptive capacity of a country, financial considerations and the overall structure of the industrial policy framework may play a more significant role in determining the outcome (Jee et al., 2026). In sum, there is a risk that the climate mitigation technologies will be structured in a hierarchical way, thus furthering, not mitigating the asymmetries.

The digital and artificial intelligence spheres exhibit comparable dynamics of exclusion within the friendshoring phenomenon and formation of techno blocs. Advanced artificial intelligence capabilities and high-performance computing technologies are concentrated to an extremely high degree. Export controls on advanced semiconductors and dual use technologies contribute to the process of segregation along geopolitical lines (Schindler et al., 2024). Developing nations without domestic semiconductor manufacturing capacity and computing power experience additional obstacles in their pursuit of advanced research and implementation of artificial intelligence. Efforts of data localization and digital sovereignty undertaken by certain developing nations are intended as means of preserving regulatory independence. Such efforts can become a source of additional costs for integration into global digital value chains when intersected with security based limitations set by technology exporting nations. The result is a growing digital and artificial intelligence divide, paralleling the more traditional industrial and climate technology divides, affecting such aspects of life as education, job opportunities, and involvement in the knowledge economy (Shahid et al., 2023).

South-South cooperation has proved to be one possible solution to the above-stated structural challenges. Cooperation through the use of shared digital infrastructure, research facilities, and technology transfer systems between developing countries aims to avoid exclusive dependence on classical North-South transfers. Some evidence has been gathered in the area of pharmaceuticals and digital health technologies about the benefits of this kind of cooperation and conditions that make it work (Pandey et al., 2022). Similar processes are taking place in the field of renewable energy technologies and AI aimed at local development needs. However, the scale, complexity, and costs of such cooperation are still low in comparison with the concentration of frontier capabilities in just several economies. In the absence of changes in the functioning of TRIPS flexibilities and in the security-related constraints to knowledge dissemination, South-South approaches will not be enough to prevent technological divergence (Kim et al., 2026).

Combining the cases of India, Brazil, South Africa, and some selected countries of Africa and Southeast Asia show that geoeconomic fragmentation leads to an uneven contraction of policy space. Differential effects are brought about by the pre-existing industrial capabilities, the institutional experience in working with TRIPS flexibilities, and the ability to engage in other forms of cooperation. Despite the diversity in the cases, there is still an observable pattern in the way TRIPS flexibilities have been affected by geoeconomic fragmentation; legal flexibilities remain on paper while the material capacities needed to exploit them have been increasingly constrained by the securitization of technology and segmented flows of global knowledge (Dunn, 2026).

RECLAIMING POLICY SPACE: NORMATIVE AND INSTITUTIONAL PATHWAYS

The growing trend towards the securitization of technology and consequently the tightening of flexibilities of TRIPS has raised important questions about the ongoing validity of the objectives and principles as contained in the Agreement. The Articles 7 and 8 of the TRIPS agreement are the main textual bases through which the quest for reclaiming of policy space will be pursued. As per Article 7, the protection and enforcement of intellectual property rights should be a means towards promoting technological innovation and dissemination and technology in such a way that benefits both producers and users of technological knowledge in an effective manner to ensure a balance of rights and obligations (Zhuang, 2017). The Article 8 recognizes the right of Members to take necessary measures towards ensuring public health and nutrition and also to protect the public interest in the fields of vital importance to their social and economic and technological development provided that such measures are consistent with the provisions of the agreement. Furthermore, appropriate measures can also be taken towards preventing the abuse of intellectual property rights and also unreasonable restraint on trade (Upreti & Guida, 2025).

In the face of a multipolar international order marked by geoeconomic fragmentation, such norms assume renewed relevance. They provide the normative basis for interpreting the Agreement in a way that would retain policy space for development instead of prioritising it under the guise of an expansive concept of national security. It has always been stressed in scholarly commentary that Articles 7 and 8 belong to the object and purpose of the TRIPS Agreement and ought to inform its interpretation and application (Geiger & Desaunettes-Barbero, 2021). Calls for a development-oriented review of the Agreement under Article 71.1 have highlighted that any revision needs to be based upon the concrete implications of TRIPS for the welfare of people, technology transfer and policy space in developing States, rather than reducing the Agreement to a purely compliance tool (Syam, 2026). Recasting Articles 7 and 8 in view of current technological hierarchies means acknowledging that the unbound securitisation of technology would make the transfer and diffusion aims of Article 7 irrelevant for many Global South Members, affecting health equity, climate justice, digital inclusion and industrial change.

The institutional channels for translating this normative recasting into action are disputed. One line of approaches is that of WTO-centric reform. The first path is characterized by the creation of an effective dispute resolution mechanism, the implementation of existing obligations for the transfer of technology under Article 66.2 and the comprehensive examination process under Article 71.1 with development considerations as the focus (Haselip et al., 2011). In practice, however, the expansion of security-based restrictions has made the effective operationalisation of Article 66.2 even more difficult, as private actors in developed economies face heightened commercial and regulatory risks when transferring technologies designated as strategically sensitive (Choudhary et al., 2026. The supporters claim that only through the multilateral system the most favoured nation principle

could be maintained and the fragmentation of intellectual property governance among different techno-blocs could be avoided. However, the proponents of the second path point out that the constant paralysis of the Appellate Body and the lack of agreement on reforms decrease the opportunities for a successful multilateral action (Sharma, 2022).

The second path is based on plurilateral and regional processes. Coalitions of the interested States could negotiate cooperation in relation to technology access and transfer as well as capacity building among certain groups of Members who have common development needs. Regional arrangements could also be used as a way of experiments in relation to intellectual property and technology sharing issues (Dimitropoulos, 2025). Still, there are certain risks connected with the plurilateralism. Selective rule making among smaller groups of countries can reinforce existing asymmetries if major technology holders remain outside the arrangements or if participation is structured in ways that exclude the most capacity constrained Members. The tension between the inclusiveness of multilateralism and the practicality of plurilateralism therefore remains unresolved (Dimitropoulos, 2025).

Efforts towards establishing an alternative governance system for technology governance thus aim to overcome this polarized approach. Several common features have emerged in current academic and policy discourse on this issue. More openness with regards to licensing conditions, cost of research and development, and technology transfers would help alleviate the information asymmetry in favor of developed country negotiators and manufacturers (Edler et al., 2023). A differentiated approach with regard to requirements based on levels of technological and industrial advancement would help address the one-size-fits-all nature of certain TRIPS articles. Special funds for technology purchases and adaptation could be established through existing multilateral organizations or new cooperation ventures. Cooperation in intellectual property law within the South represents another alternative pathway (Baby & Adaina, 2026). Collaboration for joint research, preferential licensing arrangements among developing countries, and efforts at building public digital infrastructure could represent additional technology pathways and not depend on the old North-South transfer paradigm.

Not all of these recommendations necessitate an actual amendment to the TRIPS Agreement itself. Many could be pursued through interpretive methods, soft law measures, and cooperation schemes which work parallel to the extant treaty regime. The importance of the normative foundation laid by the Articles 7 and 8 cannot be overstated (Subhan, 2006). Otherwise, institutional reforms might get sidelined in the context of prevailing trends of technologic securitization and geoeconomic competition. At the same time, it is necessary to take into account that there indeed are legitimate security concerns on the part of states. Such concerns relate to the safety of critical infrastructure as well as potential abuses of some technologies (Oskanian, 2021). What is the issue here is that such legitimate concerns must not be used as justification for the prohibition of technology transfer in general. Instead, the proper path lies in more thorough interpretation of the meaning of Article 73 as well as measures aimed at increasing access to technology by developing countries.

Thus, the problem of re-establishing policy space is both interpretive and institutional in nature. It involves interpreting the TRIPS Agreement in a way that acknowledges its developmental goals in a multipolar world, while developing institutions that enhance transparency, tailor obligations based on capacity, resource mobilization for accessing technologies, and foster South-South cooperation. It remains to be seen whether such paths would emerge via multilateral, plurilateral, or hybrid channels, depending on whether members prioritize technological equality and societal outcomes over tactical gains in the long run.

CONCLUSION

This paper has examined the ways in which geoeconomic fragmentation and the securitisation of technology are reshaping the practical operation of TRIPS flexibilities and constraining technology related policy space for Global South countries. The analysis began from the observation that national security rationales have expanded into domains previously governed primarily by commercial and developmental considerations. Techno nationalism has reframed advanced technologies as strategic assets, prompting the proliferation of export controls, investment screening mechanisms and dual use restrictions. These instruments alter the material conditions under which formal TRIPS flexibilities can be exercised.

The examination of doctrinal foundations confirmed that TRIPS Article 73 closely tracks GATT Article XXI and that panels have applied parallel interpretive frameworks. The traditional thresholds of essential security interests and emergency in international relations remain operative, yet their application in the intellectual property context raises distinctive questions about enforcement obligations and technology access. While certain security concerns are legitimate, the expansion of these exceptions' risks converting a narrowly tailored safeguard into a broader instrument of technological control.

The subsequent analysis of securitisation demonstrated that restrictions on semiconductors, green technologies and artificial intelligence related tools reduce the practical utility of compulsory licensing, parallel importation and technology transfer commitments under Article 66.2. Formal legal authority is not extinguished, but the underlying technological inputs required to give effect to that authority become harder to obtain. Empirical patterns of extreme concentration, more than 90 percent of low carbon technology trade occurring between high income countries and China, and the heavy skew of advanced AI compute capacity toward a small number of jurisdictions, underscore the material character of these constraints.

Case illustrations from India, Brazil, South Africa and selected African and Southeast Asian countries revealed differential impacts. Jurisdictions with stronger domestic capabilities and prior experience with TRIPS flexibilities retain comparatively greater room for manoeuvre. Economies with thinner industrial bases confront more severe barriers. Climate technology access, digital participation and industrial upgrading prospects are all shaped by these asymmetries, with direct consequences for health equity, climate justice and inclusive development.

Normative and institutional pathways for reclaiming policy space centre on the continued relevance of TRIPS Articles 7 and 8. These provisions supply a textual basis for interpreting the Agreement in a manner that prioritises technological dissemination, social and economic welfare, and the public interest in sectors of vital importance to development. Institutional options range from WTO centred reform, including a development-oriented review under Article 71.1, to plurilateral and regional initiatives and hybrid arrangements that emphasise transparency, differentiated obligations, dedicated technology funds and strengthened South–South intellectual property cooperation.

The findings carry significant implications for the future of multilateralism and the legitimacy of the WTO. The progressive hollowing out of TRIPS flexibilities through security based measures risks reinforcing the perception that the multilateral trading system no longer adequately accommodates the developmental interests of the majority of its Members. When formal legal flexibilities remain textually intact while their practical exercise is constrained by geoeconomic instruments operating outside or at the margins of WTO disciplines, the legitimacy of the institution is placed under strain. A system that cannot effectively mediate the tension between national security claims and technology access risks progressive marginalisation in the domain of intellectual property and technology governance, with wider repercussions for social equity and global cooperation.

An agenda for further research and policy action follows directly from these conclusions. Empirical work is needed to trace more systematically the causal pathways between specific export control regimes, investment screening practices and concrete outcomes in compulsory licensing, technology transfer projects and industrial upgrading across a wider range of Global South jurisdictions. Comparative analysis of plurilateral and regional technology cooperation arrangements can clarify the conditions under which such initiatives expand rather than further segment access. Normative research should continue to explore the interpretive potential of Articles 7 and 8 in light of contemporary technological hierarchies. On the policy side, priority should be given to operationalising transparency mechanisms, designing differentiated technology related obligations that reflect capacity differences, mobilising predictable resources for technology acquisition and adaptation, and supporting South–South platforms capable of scaling cooperative innovation. Without sustained attention to both the interpretive and institutional dimensions of policy space, the distributive justice concerns that originally animated the TRIPS flexibilities debate will remain unresolved under conditions of intensifying geoeconomic competition, with lasting consequences for health, climate resilience, digital inclusion and structural transformation in the Global South.

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Author contributions

All authors (author-1, author-2, author-3) conceived, researched, and wrote the manuscript. All work, including analysis and final approval.

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Consent for publication

The authors have reviewed the final manuscript and consents to its publication.

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The authors declare no competing interests.

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