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BETWEEN TECHNO-FEUDALISM AND NOONOMY: LATIN AMERICA AND THE CARIBBEAN IN THE CONFIGURATION OF A NEW GLOBAL ORDER

Abstract: This paper examines the structural position of Latin America and the Caribbean in the context of the transformation of the contemporary world-system, characterized by the transition towards a multipolar order and the emergence of new technological paradigms. Through the analysis of techno-feudalism and noonomy theories, it is argued that the region faces a structural duality, in which its role as a provider of critical minerals for the energy transition and its persistent technological and digital dependence are highlighted. The central hypothesis holds that a regional strategy based on digital integration, regulatory coordination, and South-South cooperation could strengthen the region's bargaining power and reduce its structural vulnerabilities. The analysis is supported by empirical data on Research and Development investment, patent production, and foreign direct investment flows in digital technologies, revealing persistent asymmetries in the global innovation system in the region.

Keywords: techno-feudalism, noonomy, world order, technological dependence, South-South cooperation, Latin America, digital sovereignty.

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在技术封建主义与智慧型经济之间:新世界秩序形成时代的拉丁美洲和加勒比地区

摘要: 本文探讨了当代世界体系转型背景下拉丁美洲和加勒比地区的现状, 该转型以向多极化(多极秩序)过渡和新型技术范式的出现为特征。基于对技术封建主义和智慧经济理论的分析, 本文认为该地区正面临结构二元性: 一方面, 其作为能源转型所需关键矿产供应方的角色日益凸显; 另一方面, 其技术与数字领域的依赖性依然存在。文章的主要推断为: 基于数字一体化、协调监管和南南合作的

区域战略能够增强该地区的谈判地位,并降低其结构上的脆弱性。该分析以研发投资、专利生产投资以及数字技术领域外国直接投资流量的实证数据为依据,揭示了该地区与全球创新体系之间依然存在的失衡现象。

关键词:技术封建主义、智慧型经济、世界秩序、技术依赖、南南合作、拉丁美洲、数字主权。

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Introduction

The contemporary international system is going through a phase of systemic chaos characterized by the weakening of traditional power dynamics [Wallerstein, 2015; Arrighi, 2007] and what could be the gradual transition from a unipolar hegemony to a multipolar or polycentric configuration, implying a redistribution of economic, technological, and military capabilities between centers and peripheries [Amin, 1990]. In any case, as in previous hegemonic transitions, the established rules of the international order become contingent and susceptible to renegotiation [Friedman and Chase-Dunn, 2005], forcing states and transnational actors to redefine strategies, alliances, and forms of governance in a context of increasing fragmentation. This structural transformation deeply reconfigures the foundations of economic and technological power, generating uncertainty about the contours of the emerging global order, but also opens windows of opportunity for the renegotiation of peripheral positions in the world-system.

In this context, the Fourth Industrial Revolution and the Big Data era are defining much of the rhythms and speeds of this global transformation. The control and processing of data have become a central axis of global rivalries, fundamentally reconfiguring international hierarchies [Zuboff, 2019; Couldry & Mejias, 2019; Nye, 2020]. Technological transformation also strains the institutional configuration of the emerging new world order. In this sense, figures such as Peter Thiel [2007; Thiel & Masters, 2014]¹ advocate technological innovation, institutional disruption, and initiatives such as “autonomous zones” or projects of private sovereignty, suggesting a reconfiguration of the political order in which leadership does not emerge from democratic consensus but from strategically capable minorities within the context of technological capitalism. As Yanis Varoufakis [2023] argues, this posture reflects the emergence of what he terms “techno-feudalism,” a system in which digital platforms operate as feudal lords, extracting algorithmic rents while fragmenting state sovereignty². In contrast, Sergey Bodrunov [2020] proposes an alternative vision grounded in the noonomy paradigm, suggesting that knowledge can become the primary source of value, with an emphasis on cooperative knowledge production and the development of endogenous scientific capabilities.

This theoretical tension reflects real political options for peripheral economies that debate between the reproduction of technological dependence or the construction of digital sovereignty through investment in scientific and institutional capabilities. Latin America and the Caribbean

¹ Peter Thiel is a billionaire entrepreneur, co-founder of PayPal, and influential investor known for his libertarian-leaning views on technology and politics.

² For Yanis Varoufakis, this technofeudalism implies that traditional capital is subordinated to digital capital, while society acts as “serfs” that generate value, often unpaid, for a new dominant elite.

find themselves in a particularly vulnerable position within this global reconfiguration, especially because the countries of the region combine a historical dependence on commodity exports with new forms of digital subordination, maintaining a peripheral insertion in the new dynamics of contemporary capitalism [Cimoli, Primi, and Ferraz, 2014; Pérez, 2010]. Paradoxically, the concentration of reserves of critical minerals necessary for the energy transition and the development of advanced technologies confers upon the Latin American and Caribbean region a negotiation potential that has not been fully articulated. Therefore, the hypothesis of this paper proposes that regional agency capacity depends on the development of endogenous technological capabilities and strong digital governance institutions, which requires a strategy of South-South cooperation and a redefinition of links with the great powers in struggle and competition in the ongoing systemic chaos.

In this panorama, the objective of this work is to analyze the scientific and technological capabilities of Latin America and the Caribbean in the context of the current systemic chaos and the possible transition towards a new global order. The analysis is supported by data on investment in Research and Development, patent production, and foreign direct investment flows in digital technologies to evidence the asymmetries of the global innovation system. The text is organized into four sections. The first one accounts for techno-feudalism and noonomy as competing paradigms; the second part exposes the dual structural condition of Latin America and the Caribbean between its capacity and technological backwardness; the third part highlights the tensions in trade and technological investment in the region; the work closes with a section of conclusions.

1. Techno-Feudalism and Noonomy as Competing Paradigms

The present historical moment is inscribed in what Immanuel Wallerstein identifies as a period of structural uncertainty, characterized by the exhaustion of historical capitalism as a world-system and the terminal crisis of its mechanisms of accumulation and legitimation in force since the 16th century [Wallerstein, 2015]. This exhaustion is evidenced in the impossibility of sustaining the secular trends of the system, geographical expansion, intensification of the international division of labor, and concentration of capital [Harvey, 2003], faced with market saturation, the rise of new powers, and the systemic ecological crisis [Moore, 2015], configuring a contemporary systemic chaos that manifests itself in geopolitical conflicts, geo-economic competition between powers, and technological rivalries [Ikenberry, 2018; Allison, 2017]. As Wallerstein warns, historical hegemonic transitions do not constitute simple replacements of dominant powers, but deep reconfigurations where peripheries can experience both ascending semiperipheralization and deepening of dependence [Wallerstein, 1983], so that the emerging new order does not automatically guarantee a favorable redistribution of power but can generate fragmentation and conflicts in the absence of robust multilateral institutions. For Latin America and the Caribbean, this situation represents simultaneously the threat of dependent reproduction, but also perhaps a historical opportunity for diversification of international links [Jaguaribe, 1970].

In this framework of transition, the concept of techno-feudalism elaborated by Yanis Varoufakis [2023] allows us to understand the mutation of contemporary capitalism towards a configuration where large technological platforms operate as “digital fiefs,” replacing traditional capitalist profit with rent as the dominant form of surplus appropriation through the control of interfaces, the appropriation of data, and the imposition of fees on transactions in closed ecosystems [Varoufakis, 2023]. This model is dialectically articulated with the “Straussian moment” identified by

Peter Thiel, who recovers the political philosophy of Leo Strauss (1899-1973)¹, for whom decadent liberal societies required “great men” and extraordinary measures, even deceptive or authoritarian ones, to preserve civilizational order, thus justifying technological authoritarianism as a fatalistic response to Western decline. From this perspective, advanced surveillance technologies and biotechnologies function as a restraint (Katechon) to what Thiel calls the Antichrist, understood as a global totalitarian system based on technological stasis and bureaucratic control, thus justifying the expansion of companies like Palantir through military and intelligence contracts [Thiel, 2007].

The implications of this “Straussian” techno-feudalism for Latin America are of structural scope, as the region is configured as a peripheral space for the extraction of data and digital rents, where infrastructure financed from the centers generates critical vulnerabilities in technological sovereignty, data control, and tax flight [Varoufakis, 2023], replicating the classic asymmetry where the periphery supplies material inputs while the center controls platforms and intangible rents [Marini, 1991]. However, the systemic chaos offers strategic loopholes for the articulation of alternatives based on expanded South-South cooperation that transcends traditional mercantile logic, through the transfer of capabilities, joint construction of digital infrastructure, and development of regional institutions for knowledge governance, allowing for the negotiation of better conditions for technology transfer and market access by taking advantage of inter-hegemonic competition [Lin and Wang, 2017], provided that this transition is accompanied by institutional frameworks that articulate knowledge production and social development.

As an alternative horizon to this configuration, Bodrunov’s noonomy theory [2020] proposes a civilizational reconfiguration where knowledge constitutes the main source of economic and social value, deriving from the Greek *noos* (mind/intellect) and *nomos* (law/order) to describe an economy where data-driven and algorithmic automation processes generate value through cooperative knowledge production, transcending the mercantile logic of exchange value². This proposal does not represent mere technological change but a civilizational transformation that questions the domination of exchange value, based on principles of endogenous technological re-industrialization, construction of a knowledge society, development of sustainable bioeconomy, technological and digital sovereignty, cooperation in Investment plus Development, and regional management of intellectual property [Bodrunov, 2020], thus configuring a path to overcome the asymmetries of the world-system that demands investment in science and technology together with the creation of institutions capable of articulating knowledge and social development in an emancipatory key.

2. Dual Structural Condition of Latin America and the Caribbean

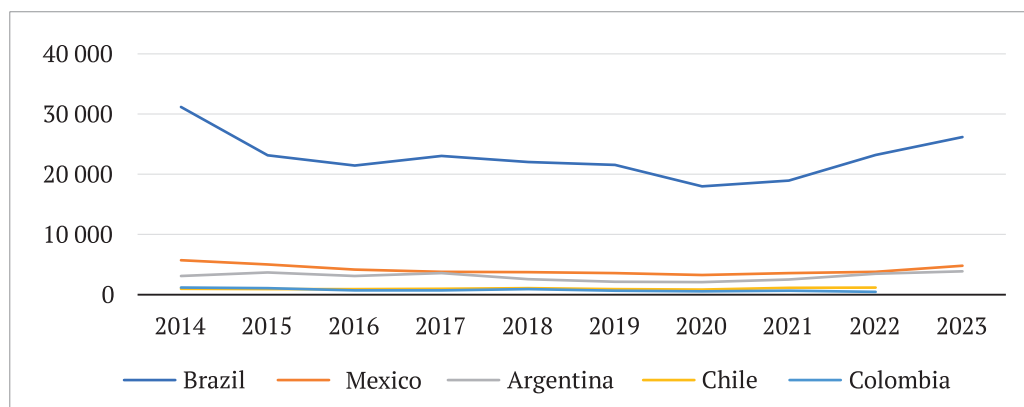
Latin America and the Caribbean occupy an ambivalent position in the contemporary global political economy. On the one hand, the region has become a critical geoeconomic actor due to its concentration of strategic minerals for the global energy transition. According to data from the Economic Commission for Latin America and the Caribbean, the region concentrates

¹ The thought of Leo Strauss centers on a critique of modernity, a defense of classical political philosophy, and the idea that political truth may need to be safeguarded by elites rather than entrusted to the masses.

² In this context, networked collective production, based on digital commons, distributed collaboration, and open Access, reduces the centrality of private property and weakens market exchange as an organizing principle. Thus, value is no longer defined by its market price, but by its social utility and capacity for collective reproduction, foreshadowing post-capitalist forms centered on the commons rather than on accumulation [Bodrunov, 2020].

approximately 60% of global lithium reserves¹, in addition to important deposits of copper, nickel, and rare earths [ECLAC, 2023]. This position confers significant negotiation potential on the region in a context where the decarbonization of advanced economies depends on access to these inputs.

However, this potential contrasts markedly with the limited scientific and digital capabilities of the region, which reinforce its external dependence. As Mario Cimoli, Annalisa Primi, and João Carlos Ferraz [2014] demonstrate in their analysis of “structural technological capabilities,” Latin America has maintained a persistent gap in terms of investment in research and development, higher scientific education, and production of innovative knowledge. This gap is the result of historical patterns of productive specialization that discourage investment in high technological content activities and the accumulation of endogenous innovative capabilities. Spending on research and development constitutes a key indicator of the level of investment in science, technology, and innovation, reflecting the financial resources that States allocate to strengthening their scientific systems and technological capabilities. Available data for the main Latin American economies reveal worrying patterns of underinvestment and regional concentration, as can be seen in the following graph.



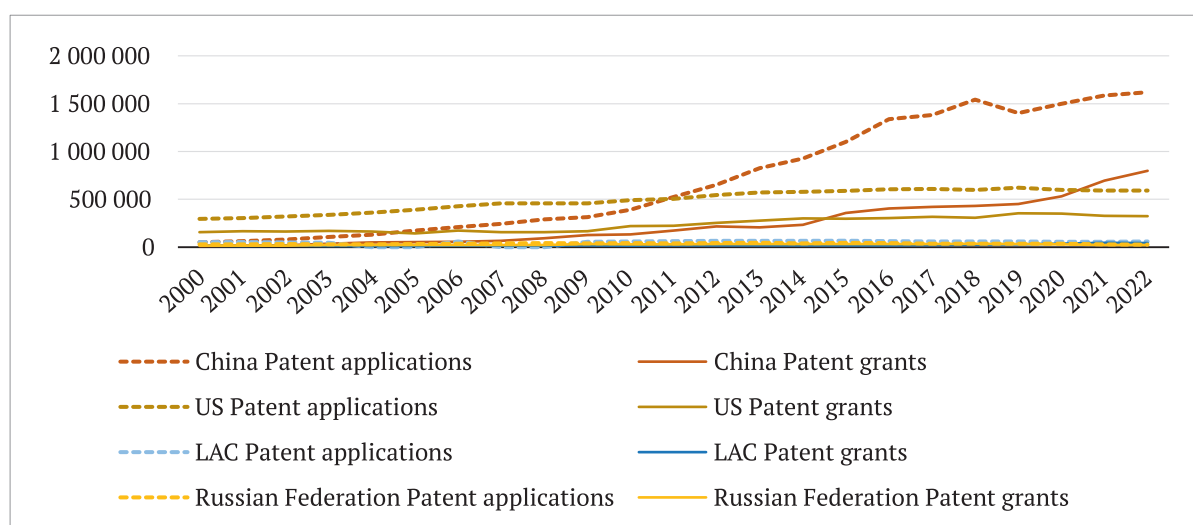
Graph 1. Research and development expenditure in dollars

Source: RICYT [2026].

Brazil concentrates most of the regional spending on research and development, representing more than 60% of the total for Latin America and the Caribbean. Mexico and Argentina follow at a considerable distance, with approximately 11% and 9% respectively. Chile and Colombia contribute around 3% each, while the rest of the region contributes approximately 12% [RICYT, 2026]. This concentration reveals a highly unequal regional structure, in addition to the fact that absolute investment levels remain significantly below international standards. While developed economies and emerging powers in East Asia invest between 2% and 4% of their GDP in research and development, most Latin American countries are below 0.5% [ECLAC, 2023]. The 2020 shock, related to the COVID-19 pandemic, also exposed the structural fiscal fragility of national science and technology systems, many of which suffered significant budget cuts that affected the continuity of research projects and the retention of scientific talent.

¹ Lithium is concentrated mainly in the Lithium Triangle, a geographical region located in the southern Andes, at the intersection of Argentina, Bolivia, and Chile.

Without sustained investment, the construction of an autonomous knowledge economy is unlikely. As Pérez [2010] argues, peripheral economies that fail to articulate their natural comparative advantages with the development of endogenous technological capabilities tend to become trapped in “dependence paths” where productive specialization is historically reinforced in low technological complexity sectors. Low investment in research and development in the main Latin American economies is reflected in the relatively reduced number of patent applications and grants, evidencing the region’s limited capacity to transform scientific investment into technological innovation. This indicator is particularly revealing when compared with countries like China and the United States, which concentrate a significantly greater proportion of global patent applications and grants, as can be seen in the following graph.



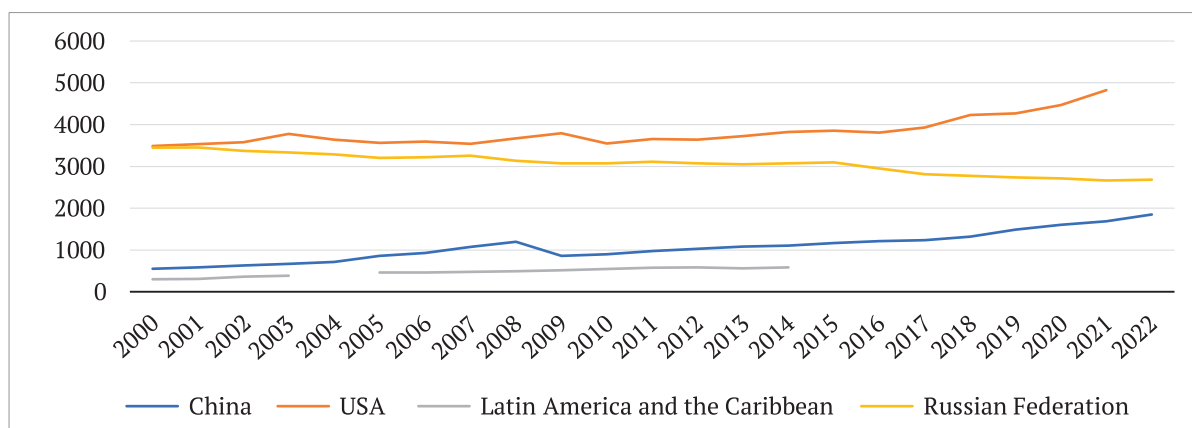
Graph 2. Patent applications and patents granted for China, the United States, and Latin America and the Caribbean

Source: WIPO [2026].

As seen in the graph, China has experienced accelerated expansion of its patent applications since 2010, currently exceeding one and a half million annual applications. The United States maintains a consistently high baseline, with hundreds of thousands of annual applications. In contrast, Latin America and the Caribbean remain marginal in intellectual property production, with fewer than 59,000 applications and 41,000 patents granted annually in the entire region [WIPO, 2026]. Brazil shows the most robust regional growth, while Argentina, Chile, and Colombia remain in relative stagnation. However, it should be said that this gap does not necessarily imply an absence of scientific capabilities. The case of Russia is illustrative, as despite having solid scientific and technical capabilities, with the second largest scientific force in the world according to the World Bank [World Bank, 2024], its model prioritizes state control and technological reproduction over the commercialization of knowledge [Moser, 2013; Lee, 2024]. This challenges the Western assumption that more patents imply greater innovation, opening the debate on technological hierarchies and the various ways of organizing national innovation systems.

So, for Latin American and Caribbean countries, the central question is not simply to increase the number of patents, but to develop innovation models appropriate to their development con-

ditions, which prioritize the resolution of specific social and productive problems over the mimicry of Western intellectual property models [Arocena & Sutz, 2010]. The number of researchers in research and development per million inhabitants constitutes another crucial indicator of a country's scientific and technological capacity, reflecting the size of the human capital dedicated to knowledge generation, innovation, and technological development, but in this indicator, Latin America and the Caribbean also show significant lags and discontinuous progress compared to global scientific powers, as can be seen in the following graph.



Graph 3. Researchers dedicated to research and development in China, the U.S., and LAC (per million people)

Source: World Bank [2024].

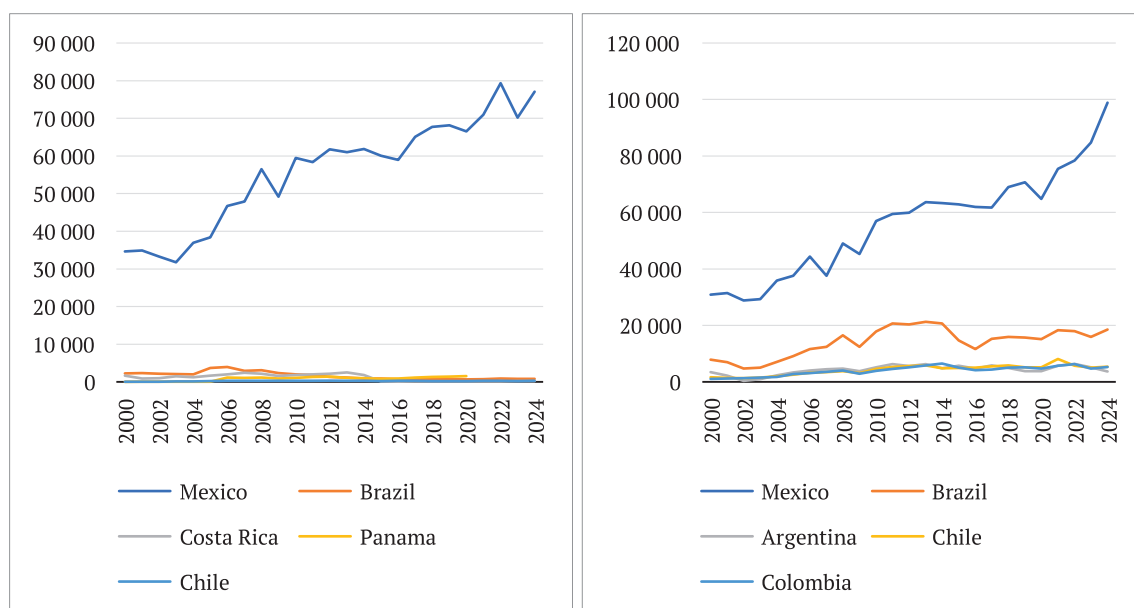
As can be seen in the graph, the United States has a higher density of researchers, closely followed by the advanced economies of Western Europe. China has achieved rapid convergence through sustained state investment, doubling its researcher density in the last decade. This expansion reflects a deliberate strategy of accumulating scientific capabilities, articulated with five-year plans for technological development [Chen and Wu, 2025]. In Latin America and the Caribbean, Argentina leads in researcher density, followed by Brazil and Mexico, but progress remains limited due to chronic budgetary constraints and weak private sector participation in research financing. The regional scientific deficit is aggravated by brain drain to Northern scientific centers, a phenomenon that has persisted despite repatriation programs implemented by some countries [Meyer et al., 2023].

Russia, despite the deceleration of its scientific growth in recent years, maintains a considerable reserve of human capital that continues to be the backbone of its research ecosystem. However, sanctions and structural restrictions that have affected the Russian scientific system have limited technology transfer to Latin America, a historical avenue of access to technological knowledge for the region during the Soviet and post-Soviet periods. In any case, the persistence of these scientific and technological capabilities suggests that for Latin America and the Caribbean, this situation is inscribed in broader structural tensions of the international system, in which the region seeks to diversify its technological partners and reduce its dependence on traditional innovation centers, but continues to face asymmetries in access to knowledge, financing, and scientific infrastructure that condition its insertion in the emerging world order.

3. Structural Tensions in Trade and Technological Investment

Historically, Latin America and the Caribbean has exported low-complexity manufactures and commodities, while importing higher value-added technological components and technology that manages productive processes and digital services that increasingly mediate economic and social activities. This asymmetry has generated persistent trade deficits in the technology sector and capital flight towards global innovation centers [Marini, 1991]. Therefore, in the current moment of systemic chaos, the Latin American and Caribbean region faces evident structural tensions in its foreign trade patterns, as the region mainly exports low-complexity goods, such as maquiladora production in Mexico, and imports software, digital services, and high-tech components, reinforcing its peripheral position and technological dependence.

Mexico dominates regional exports of information and communication technology goods, through maquiladora production, but in this manufacturing assembly model, local value added is limited and dependence on imported inputs is high [Dussel Peters, 2020]. The rest of the region participates only marginally in this trade, with some exceptions in electronic device assembly in countries like Costa Rica and Brazil. Likewise, foreign direct investment flows in digital technologies in Latin America and the Caribbean between 2005 and 2024 reflect different geopolitical and strategic priorities among the main actors, configuring a map of multifaceted technological dependence, as can be seen in the following graph.

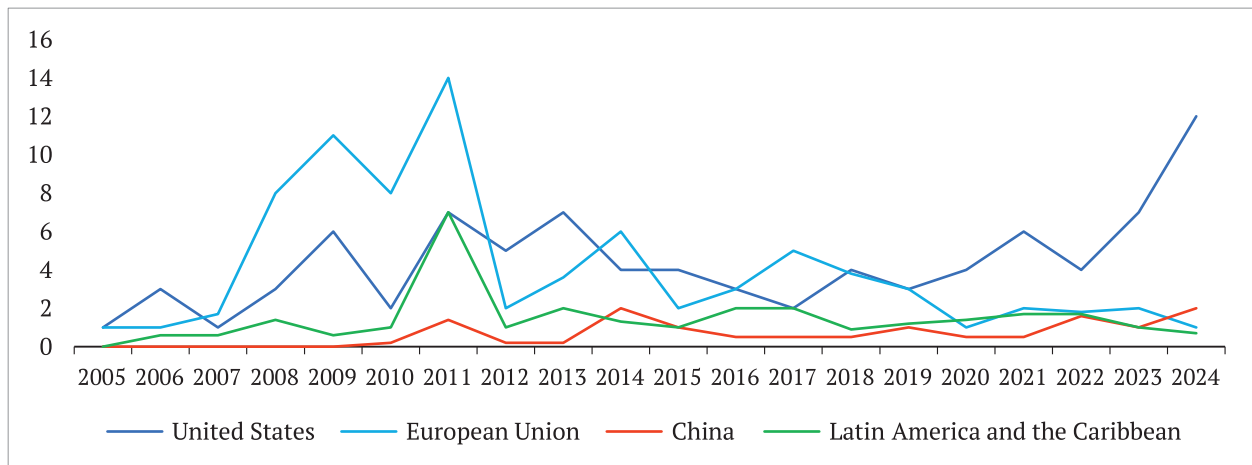


Graph 4. Exports and Imports of ICT goods, in millions of US\$

Source: UNCTAD [2025].

These figures must be interpreted with caution, as much of Latin America and the Caribbean's technological exports correspond to medium-technology goods or products assembled with imported inputs, rather than innovations developed locally [OECD, 2025]. Consequently, the region presents relatively low levels of productive complexity, as according to the economic complexity index, most Latin American economies are positioned in medium or low positions in the global ranking, below comparable Asian economies such as Vietnam or

Malaysia¹ [Hausmann et al., 2014]. The United States remains the main source of foreign direct investment in digital technologies in the region, concentrating between 60% and 90% of the annual total; this investment grew rapidly between 2005 and 2011, going from approximately 0.5 billion dollars to 7.2 billion, in parallel with the regional expansion of large U.S. technology corporations such as Google, Amazon, Microsoft, Facebook, and Uber [Monge-González, Rivera, Mulder, and Meneses, 2025; Dussel Peters, 2021], as can be seen in the following graph.



Graph 5. Amounts of announced foreign direct investment projects in LAC related to digital technologies (in billions of US\$)

Source: ECLAC [2025].

The United States maintains primacy in technological investments in the region through the expansion of Big Tech, such as Google, Amazon, Microsoft, Meta, Uber, operating in Latin American and Caribbean countries². This expansion is intertwined with the new National Security Strategy of the Donald Trump government, which is oriented towards preserving U.S. hegemony in the hemisphere [The White House, 2025, December 4], leading the United States to concentrate its attention on critical infrastructures, including digital platforms, cloud and data services, generating critical dependencies in regional digital infrastructure [Bateman, 2022]. The European Union maintains a smaller presence, but with a strong regulatory and market-oriented focus, seeking access to sectors such as renewable energies, telecommunications infrastructure, and digital financial services.

For its part, China has substantially increased its investment through the Digital Silk Road and various technological cooperation initiatives. This expansion includes telecommunications infrastructure (notably 5G), data centers, and e-commerce platforms, offering alternatives to exclusive dependence on Western suppliers [Arsentyeva, 2024; Chunzhi, 2025]. Likewise, Russia maintains selective and relatively limited technological engagement, although gradually growing in sec-

¹ Unlike Latin America, these Asian countries have advanced toward exports with higher technological content through active industrial policies, the attraction of foreign direct investment, and the gradual development of local capabilities

² China is reinforcing its technological influence in Latin America by expanding its state-owned telecommunications corporations (Huawei, ZTE, Alibaba Cloud), establishing a hardware-centric dominance over critical infrastructure, controlling 44.6% of the 5G market in Brazil and approximately 55% of 4G networks in Mexico, while extending its presence through submarine cables to the Amazon and data centers in Mexico City and São Paulo to boost AI and the regional cloud [BNamericas, 2026; D'Sola, 2024].

tors such as cybersecurity, nuclear energy, and space cooperation with specific countries in the region (mainly Venezuela, Cuba, and Nicaragua), which represents a much greater threat to the United States than that of China [Ellis, 2022, January 19; Pelcastre, 2023, January 13]. Therefore, in response to this, the United States promotes and supports ideological and political currents aligned with its interests among Latin American and Caribbean countries, with elitist visions of technological power, associated with “Straussian” interpretations of leadership and technological governance that seek to reinforce a global architecture where the control of knowledge and digital infrastructures is concentrated in a reduced number of state and corporate actors [Drury, 1997; Thiel, 2014].

The problem is that most of the regional digital infrastructure is externally financed and therefore Latin American and Caribbean countries are more vulnerable to the loss of technological sovereignty and data control. Dependence on foreign platforms for the processing of national data, cloud storage, and provision of critical digital services poses national security risks and limits the region’s capacity to develop its own digital industries [Guerra, Suárez, and Cerratto-Pargman, 2022]. These dynamics reinforce the peripheral position of Latin America and the Caribbean in the global political economy of data and a new form of digital imperialism, in which the value generated by digitalization tends to concentrate in the technological centers of the international system, reproducing new forms of dependence compatible with the logic of techno-feudalism.

Institutional discontinuity, asymmetries between countries, and limited investment in Research and Development have made it difficult to consolidate a sustained regional strategy capable of counteracting the emerging technological hierarchies in the new world order. Despite this, Latin America and the Caribbean has a significant history of South-South cooperation initiatives aimed at reducing structural technological vulnerabilities, although these efforts have been fragmented and unevenly implemented. Since the last quarter of the 20th century, regional projects in science, technology, and innovation have been tested that have sought to strengthen endogenous capabilities through research networks, scientific cooperation programs, and technological integration mechanisms. The following table, for example, summarizes the main South-South cooperation initiatives in Latin America and the Caribbean that since the 1980s have attempted to articulate themselves to reduce technological vulnerabilities among Latin American and Caribbean countries.

These initiatives, promoted by CELAC, Mercosur, the Andean Community, the Pacific Alliance, CARICOM, and SICA, cover critical dimensions such as digital infrastructure, biotechnology, renewable energies, academic mobility, and technological foresight. Although fragmented, they suggest emerging forms of regional integration based on knowledge that could be articulated into a coherent strategy within the framework of contemporary technological development. The Argentina-Brazil Integration and Cooperation Program (PICAB) constitutes the most enduring example of bilateral technological cooperation in the region, covering everything from nuclear and space projects to biotechnology and defense. Its persistence through government changes and economic cycles demonstrates the potential of South-South technological cooperation when there is sustained political will. However, the current reality shows significant tensions when articulating these schemes with other emerging powers of the Global South.

Technological cooperation with China, for example, which has been growing in the 21st century [Wise, 2020], the United States attempts to block through direct diplomatic pressures, threats of sanctions, and tariffs to restrict projects in critical infrastructure such as telecommunications,

Table 1
Initiatives of South-South cooperation in Latin America and the Caribbean
to reduce structural technological vulnerabilities.

Dimension	Initiative / Mechanism / Year	Status
Technological cooperation	Argentina-Brazil Integration and Cooperation Program (PICAB), Mercosur -- 1986	Active
Knowledge society	CELAC Action Plan -- 2022	In force
Energy transition	Caribbean Renewable Energy Initiative, CARICOM -- 2013	Implementation
Technological foresight	Technological Observatory, Pacific Alliance -- 2014	Operational
Intellectual property	Common Industrial Property Regime, Andean Community -- 2000	In force
Academic mobility	Pacific Alliance Scholarship Program -- 2013	Active
Digital infrastructure	CELAC Data Center Interconnection Network -- 2021	Under development
Space cooperation	Mercosur Space Agency -- 2019	Implementation
Biotechnology	Mercosur Biotechnology Institute -- 2003	Active
Circular economy	Andean Circular Economy Strategy -- 2021	Approved
Digital technologies	Regional Cooperation Agreement on ICT, SICA -- 2017	In force
Knowledge value chains	CELAC Strategic Value Chain Projects -- 2022	Approved

Source: Own elaboration

submarine fiber optic cables, and strategic ports [Hundman, 2026]. The United States has adopted a broad and explicit strategy to marginalize Chinese interests in the region [The White House, 2025, December 4], which has generated paralysis in some socioeconomic development projects and has forced Latin American and Caribbean countries to navigate growing tensions between the search for diversified technological cooperation and the demands of geopolitical alignment. Cooperation of some Latin American and Caribbean countries with Russia, historically important in sectors such as nuclear energy and space, has also been affected by Western sanctions and the reorientation of its geostrategic priorities towards Eastern Europe. This has reduced the margin for sustained scientific cooperation with Latin America and the Caribbean, displacing part of these interactions towards more selective or bilateral schemes.

The region shows incipient, although uneven, foundations for what could be a new political economy of knowledge. Initiatives such as Argentina-Brazil cooperation (PICAB) and the CELAC knowledge agenda demonstrate noonomic potential, to use Bodrunov's words [2020]. In fact, applying Bodrunov's theoretical categories [2020], it is possible to evaluate the state of progress of Latin America and the Caribbean towards a knowledge society, as despite the scientific and technological backwardness, it also possesses relevant capabilities in some countries, particularly in Brazil, Mexico, and Argentina, which could be the potential basis for more autonomous technological development, considering the articulation between science, industry, and policies for the transformation of knowledge into productive systems based on innovation and the transition towards a knowledge-centered economy, as shown in the following table.

As observed in the previous table, Latin America and the Caribbean would be situated in what could be characterized as an early noonomic phase, still strongly conditioned by the technological hierarchies of the international system, with persistence of capitalist and neo-developmental paradigms that perpetuate precisely the contradictions that Bodrunov identifies as fundamental

Table 2

Synthesis by noonomic categories in Latin America and the Caribbean

Bodrunov's Noonomic Principle	Identified Initiatives	Development Level
Technological reindustrialization	PICAB (Mercosur), Technological Observatory of the Pacific Alliance, Mercosur Biotechnology Institute	Medium
Knowledge society	CELAC Action Plan, Pacific Alliance Scholarships, IberCultura Viva	Medium-High
Bioeconomy and sustainability	Caribbean Renewable Energy Initiative, Andean Circular Economy Strategy, Nagoya Protocol	Medium
Technological/digital sovereignty	CELAC Data Center Network, ALADI Payment System, SICA cybersecurity cooperation	Low-Medium
R&D cooperation	PICAB, Mercosur Space Agency, Andean Telemedicine Network	Medium
Regional intellectual property	Andean Decision 486, genetic resources regulation	Medium

Source: Own elaboration

obstacles for the transition towards noonomy, as the exchange value continues to predominate over use value, the concentration of knowledge as merchandise, and the subordination of technological development to the logic of capitalist accumulation [Bodrunov, 2020]. It should be remembered that noonomy is not merely a technological development model, but a new civilizational paradigm oriented towards cognitive sovereignty and the social management of knowledge.

Therefore, the reinforcement of Latin American and Caribbean South-South cooperation schemes has the potential to promote a “geopolitical cognitive disconnection” that, in line with Bodrunov, would allow us to imagine an inclusive and plural globalization. This vision is particularly convergent with the Global Development Initiative promoted by China, which proposes an alternative international order capable of responding both to contemporary structural crises and to the aspirations of an interconnected humanity [Vadell and Staiano, 2025], in contrast with the hierarchical and exclusionary approaches that have historically sustained the traditional liberal order directed from the West [Lascurettes, 2020]. Here it is important to distinguish between international cooperation processes in Latin America and the Caribbean that have the potential to be vectors of structural transformation and those that reproduce historical logics of dependence, as illustrated in the following table.

The comparison of Latin America and the Caribbean cooperation schemes in strategic areas reveals fundamental differences. While the mechanisms promoted by China and the BRICS tend to emphasize the construction of physical and digital infrastructure, with technology transfer processes that, although implicit, are not always formally institutionalized, the agreements promoted by Western actors prioritize trade openness, regulatory standards, and intellectual property protection. This latter approach tends to restrict the margin for maneuver for the development of autonomous technological capabilities in peripheral economies.

Therefore, Latin America and the Caribbean finds itself at a geostrategic crossroads that debates between the diversification of international links, widely recommended by the literature on dependence and autonomy [Jaguaribe, 1979], which offers potential to negotiate better condi-

Table 3

Main cooperation frameworks between Latin America and the Caribbean and the BRICS, the United States, and the European Union in strategic development areas

Agreement / Mechanism (Year)	Key Areas	Status
Belt and Road Initiative (2013) [participation depends on the country]	Infrastructure, energy, digital connectivity	Variable
New Development Bank (2014)	Infrastructure financing, sustainable development	Active
China-CELAC Forum (2015)	Technological cooperation, development projects	Active
Treaty between Mexico, the United States, and Canada (2020)	Trade integration, industrial supply chains	Active
EU-Mercosur Association Agreement (2019, political agreement)	Trade, regulatory cooperation	Not in force
Horizon Europe (2021) [open participation framework] (CELAC-EU)	Scientific research, innovation	Under implementation

Source: Own elaboration

tions, and the risks associated with global fragmentation, typical of systemic chaos, that leads peripheries to assume increasingly higher transaction costs associated with non-alignment. South-South cooperation with China, Russia, and other emerging powers must evolve towards shared technological capabilities and regional governance. This implies going beyond infrastructure financing towards the joint construction of scientific capabilities, effective knowledge transfer, and the development of regional technological standards that preserve decision-making autonomy.

Conclusions

In the current context of systemic chaos, advanced technologies have become a central axis of the debate on structural reconfiguration, posing fundamental questions about the nature of the emerging new world order. The discussion tends to bifurcate between the transformative potential of these technologies and the risk that they will deepen existing structural inequalities. From this perspective, Bodrunov argues that the expansion of artificial intelligence, digitalization, and knowledge-based economies could pave the way for new forms of socioeconomic organization centered on creativity and human development, configuring what he calls a noonomy era [Bodrunov, 2020]. In contrast, Thiel and Masters [2014] interpret technological innovation as a deeply disruptive factor of the contemporary global economy, emphasizing that the concentration of market power in strategic sectors intensifies geopolitical competition and reinforces the need, from the Western perspective, to maintain control over emerging technologies.

Therefore, Varoufakis warns that the growing concentration of technological power in large corporations and digital platforms could reinforce techno-feudal type dynamics, in which access to digital means of production is monopolized by hegemonic actors capable of extracting rents from global digital ecosystems [Varoufakis, 2023]. This trend suggests that the emergence of a new global order is developing in a context of systemic chaos, characterized simultaneously by profound technological transformations, growing geopolitical tensions between great powers, and the weakening of traditional mechanisms of global governance [Arrighi, 2007]. For Acharya [2014], these dynamics, in addition to constituting symptoms of the relative decline of the inter-

national order led by the United States, also account for the transition towards a more multipolar configuration, in which greater plurality of actors is observed, but also growing conflicts and global fragmentation.

In this scenario, advanced technologies gain importance as drivers of economic change and strategic instruments of power and interstate competition, which can redefine the hierarchies of the international system and reconfigure global leadership dynamics [Thiel, 2007]. Within this framework of structural transformation, Latin America and the Caribbean continue to occupy a structurally limited position due to persistent gaps in scientific research, technological innovation, and digital infrastructure, which places the region in a peripheral position with respect to the main centers of intellectual and technological capital accumulation. Consequently, the future trajectory of the region will depend less on the simple global diffusion of technologies and more on the capacity of States and regional mechanisms to articulate coherent strategies of scientific, industrial, and digital development that allow avoiding the reproduction of historical patterns of structural dependence.

The absence of coordinated regional strategies in matters of digital governance, investment in knowledge, and South-South cooperation reduces the region's margin of maneuver, increasing the risk that its insertion in the international system continues reproducing patterns of technological dependence and peripheral specialization. In this context, it is crucial for Latin American and Caribbean countries to advance towards higher levels of investment in research and development, strengthen their digital sovereignty, articulate productive strategies around critical minerals, and consolidate regional institutionality through expanded South-South cooperation processes, which could constitute a way to take advantage of the window of opportunity opened by the current moment of systemic chaos. Otherwise, the emerging technological order runs the risk of reproducing new forms of structural dependence. Although, if such transformations are strategically articulated, they could lay the foundations for a deeper structural change and even open the possibility of a transition towards the noonomy proposed by Bodrunov [2020] as an alternative horizon to the contradictions of contemporary capitalism.

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