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Geopolitics, Digital Industry, and National Sovereignty: Brazilian information technology as a strategic axis in economic relations between Brazil and the United States (1960-1990)

Geopolítica, Industria Digital y Soberanía Nacional: la tecnología de la información brasileña como eje estratégico en las relaciones económicas entre Brasil y Estados Unidos (1960-1990)

Abstract: The United States (USA) played a central role in the emergence of the digital economy with public investments in technology, structural power in defining informational standards, and sanctions against emerging competitors. An emblematic case refers to the information technology industry dispute between Brazil and the USA during the Reagan era. Although widely examined in foreign policy analysis, few studies address the conflict from a geopolitical perspective. This study seeks to fill this gap and aims to analyze the American sanctions applied to the Brazilian informatics industry, highlighting their geopolitical nature. A qualitative-analytical methodology is used based on bibliographic sources and the application of geoeconomics fundamentals. The litigation transcended mere market competition and was a part of American geopolitical objectives. Retaliations under section 301 of the Trade Act aimed to project USA interests, infiltrate American multinationals into the Brazilian market, and undermine a competing industry in their zone of influence. Unilateral sanctions are considered "economic weapons" of trade war and their use harms Brazilian technological autonomy and sovereignty. Brazil faces difficulties breaking technological dependence, whereas the US capitalizes on its long-term geostrategic vision, gaining advantages in the digital era. Every national project must be linked to geoeconomics to guarantee its sovereignty.

Keywords: Digital Economy. Digital Industry; Geopolitics and Geoeconomics; Sovereignty; Brazil-USA Bilateral Relations.

Resumen: Estados Unidos (EE.UU.) tuvo un papel central en la concepción de la economía digital, a través de inversión pública en tecnología, poder estructural en la definición de estándares informativos y sanciones contra competidores emergentes. Un caso emblemático fue la disputa sobre la industria de tecnología de la información entre Brasil y Estados Unidos durante la era Reagan. Aunque ampliamente examinado en el ámbito del Análisis de Política Exterior, pocos estudios abordan el conflicto desde la perspectiva geopolítica. Este trabajo busca llenar este vacío y tiene el objetivo de analizar las sanciones estadounidenses aplicadas a la industria de tecnología de la información brasileña, resaltando su naturaleza geopolítica. Se utiliza una metodología cualitativa-analítica que se basa en fuentes bibliográficas, así como en la aplicación de los fundamentos de la geoeconomía. Se concluye que la disputa trascendió la mera competencia de mercado y formó parte de los objetivos geopolíticos de Estados Unidos para América del Sur. Las represalias en virtud de la sección 301 de *Trade Act* tuvieron como objetivo proyectar los intereses estadounidenses, infiltrarse en multinacionales estadounidenses y socavar una industria competidora en su zona de influencia. Sanciones unilaterales se consideran armas de guerra comercial y su uso perjudicó la autonomía tecnológica y la soberanía brasileña. Hoy, Brasil enfrenta dificultades para romper la dependencia tecnológica, mientras EE.UU. capitaliza su visión geoestratégica a largo plazo, obteniendo ventajas en la era digital.

Palabras clave: Economía Digital; Industria Digital; Geopolítica y Geoeconomía. Soberanía; Relaciones Bilaterales entre Brasil y Estados Unidos.

Francisco Luiz Marzinotto Junior
Universidade Federal do Rio de Janeiro.
Rio de Janeiro, RJ, Brasil
franciscomarzinotto@gmail.com

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1 INTRODUCTION

Information and communication technologies (ICT) transformed interstate relations in the 20th century. A large part of these technologies resulted from the United States (USA) containment geostrategy against the Union of Soviet Socialist Republics (USSR) during the Cold War, especially after the former launched the first satellite in the world: Sputnik, which led Eisenhower's administration to strengthen the American "military-industrial-academic complex" as a geopolitical response to Soviet advances, creating the Defense Advanced Research Projects Agency (DARPA) and the National Aeronautics and Space Administration (NASA) to ensure its technological supremacy.

DARPA has been particularly responsible for funding from about one-third to one-half of modern computer science innovations (Dertouzos, 1997)[1]. The creation of the current internet stands out among some of its important results. The development of a network of geographically dispersed and interconnected computers was intrinsically aligned with American foreign policy interests in the Cold War. After opening to trade in the 1980s, the internet evolved into the main infrastructure for the exchange of global information.

The growth of the internet has catalyzed technological innovation and driven the creation of new business models. Several companies were founded to explore the computer frontier in the 1990s (especially in the USA), such as Google and Amazon. Internet, e-commerce, digital media, social media, and online services industries have flourished, completely transforming social, political, and economic interactions in the 21st century. This context marked the advent of digital economy[2] and the strengthening of the power of the contemporary digital industry[3].

The USA designed the process of building the digital economy, which emerged as the largest power in the world after the Cold War. Build an information superhighway[4] became a pillar

1 Rather than developing the technology itself, the agency channels non-repayable public resources to strategic sectors in which the private sector is often unwilling to risk its capital.

2 The literature still lacks a consensus on the terms to define the disruption ICT caused in the 1990s, often using information age, new economy, and informational or digital capitalism. However, in recent decades, the term "digital economy" has been used ever more often in reports from international organizations that seek to systematize the current digital era, such as the United Nations Conference on Trade and Development (UNCTAD, 2019). The sectors of the digital economy are divided into three layers: i. core aspects [...], which comprise fundamental innovations (semiconductors, processors), core technologies (computers, telecommunication devices) and enabling infrastructures (Internet and telecoms networks); ii. Digital [...] sectors, which [...] rely on core digital technologies, including digital platforms, mobile applications and payment services; [...] iii. A wider set of digitalizing sectors, [...] (e.g. for e-commerce). (UNCTAD, 2019, p. 4-5).

3 In this study, the term "digital industry" refers to companies that produce digital technologies and products in the three layers of the digital economy.

4 This term became popular in the US in the 1990s to describe a high-performance communication and information network. This "information superhighway" infrastructure, particularly the internet, would become the backbone of the economy and society in the information age. Initiatives such as the High-Performance Computing Act (1991) and the Telecommunications Act (1996) favored the development of this infrastructure. From then on, the information superhighway became not only a means to economic growth but also a possible national security vulnerability if unprotected. These concerns are central to the National Security Strategy, the Quadrennial Defense Review, and other USA national security strategic documents.

of the strategic objectives of American policy during the Bush and Clinton administrations, which envisioned ICT as central to the geoeconomic and political future of the USA. Information had been constituting a valuable and strategic resource for nations, just as oil was from the 19th to 20th centuries, becoming a pillar of the "structural power" of political economy (Strange, 1998). Thus, the country had a strong presence in the development of digital infrastructure standards to have strategic advantages. This occurred by pressures to liberalize markets for the insertion of capital from American industries, implementation of protectionist policies, and application of sanctions against the rise of foreign competitors.

An emblematic case in this context refers to the IT litigation between Brazil and the USA in the Reagan era. Since the 1960s, Brazil had been trying to develop an autonomous national computer industry to reduce its external technological dependence and protect its sovereignty. Despite a few successful projects, local Brazilian industries had difficulty competing with large foreign companies. Thus, the Brazilian government adopted a series of protectionist policies in the sector, one of the most striking of which refers to its Information Technology Law (1984).

The Brazilian information technology development policy provoked a strong reaction from the USA. Some American companies, in partnership with its government diplomatic corps, advocated for the end of the incentives of the Brazilian law, claiming that its entry barriers affected their profits due to the loss of the promising Brazilian market. On September 7, 1985 (a symbolic date), Ronald Reagan threatened trade sanctions under the aegis of Section 301 of the Trade Act (1974) if Brazil failed to end its information technology law. This clash provoked one of the longest disputes in bilateral relations between Brazil and the United States, causing a diplomatic struggle in negotiations in the following years (Vigevani, 1995).

Although foreign policy analysis has widely examined the information technology litigation between Brazil and the United States (Bastos, 1993; Vigevani, 1995; Pagliari, 2010), few studies address the conflict from the perspective of geopolitics. Understanding the dynamics of the negotiation rounds and the involved actors is pertinent but it masks a broader geopolitical context of interstate power relations. Thus, this study seeks to fill this gap and aims to analyze the USA sanctions against the Brazilian computer industry, highlighting its geopolitical nature, by using a qualitative-analytical literature review, analysis of documents, and geoeconomics instruments (the area that unites geopolitics and economic territories), hoping to contribute to a deeper understanding of geopolitical dynamics and how they influence economic relations and technological development, especially in the digital sphere.

The first section of this study theoretically reviews classical geopolitics to evaluate how geographical factors influence political-economic relations between states. Its second section is dedicated to the geostrategy of the Cold War—a moment in which the USA's containment policy against the USSR applied many classical theoretical assumptions—focusing on the role of technology and the relation between technological innovation capacity and national security during conflicts. Its third section describes a case study of the Brazilian digital industry[5] to assess

5 In the context of litigation, the term used was "computer industry." This study will use the nomenclature "digital industry" to follow the contemporary trend of systematizing thought around the digital economy.

the process in which external pressures build, dismantle, and violate national sovereignty. Finally, the last section applies the discussed theoretical concepts to the case study.

2 CLASSICAL GEOPOLITICS: LAND AND SEA POWERS FROM RATZEL TO SPYKMAN

Geopolitics seeks to understand how geographical factors influence political and economic relations between states and other international actors. Throughout history, factors such as location, natural resources, and access to technologies and trade routes have shaped the behaviors of societies, limiting or facilitating border expansions and the power strategies of rulers. The institutionalization of studies in the area dates back to the end of the 19th century, ranging from the advent of Ratzel's Political Geography to Kjéllen's Geopolitics as autonomous fields of knowledge (Costa, 2005; Kaplan, 2013). The classical German roots and the English and American strands stand out in this context.

Of the German precursors, Friedrich Ratzel (1844-1904) was one of the leading pioneering geographers in political geography. His thought was marked by geographic determinism and Darwinian organic-spatial theories, famously developing the concept of living space (*Lebensraum*) which has become one of the pillars of classical geopolitics. The term assumes that states resemble living organisms that seek to expand their territories to guarantee them resources and living space for the prosperity of their population according to their size. Thus, nations would naturally tend to expand toward conquering the "living space" they need to survive. As the expansion generates clashes of borders, natural selection would favor the strongest over the weakest in the struggle for survival and control of vital spaces[6] (Mello, 1997).

Ratzel's idea of living space influenced Rudolf Kjellén (1864-1922), the Swedish political scientist who coined the term "geopolitics." While Ratzel focused more on the relationship between the physical environment and human organizations, i.e., political geography, Kjellén approached it more scientifically and incorporated specific branches of study from the "science of the state." Among them, geopolitics would be responsible for studying the State as an organism or unit of analysis in space that constituts itself by a politically organized territory with three other sub-branches: *topopolitics* (geographical location), the *morphopolitics* (political and territorial cohesion), and *physiopolitics* (resources of the territory).

In the U.S., Alfred Thayer Mahan (1840-1914), a former U.S. Navy officer and a classic strategist of American geopolitics, studied the evolution of sea power as the main source of global power. Mahan (1890) extensively reviewed the British naval power and how it favored English hegemony, highlighting that wealth has historically

6 This tendency of expansionism to conquer "living space" is clear in the *7 Laws of the Spatial Growth of States* from Ratzel (1905): (1) the need for space grows with the culture of the States; (2) the growth of states follows other symptoms of development: ideas, commercial production, missionary activity; (3) the growth of states is processed by the amalgamation and absorption of smaller units; (4) the frontier is the peripheral organ of the State and, as such, it is the indication of the growth of the strength and modifications of this organism; (5) in their growth, states tend to absorb valuable political sectors: coastlines, riverbeds, plains, resource-rich regions; (6) the first impulse for territorial growth comes to the primitive state from without, from a superior civilization; (7) the tendency to annex territories and assimilate them grows as new acquisitions are made (Moraes, 1990).

centered itself around coastal zones. In this context, inland economic activities of a territory are articulated around and depend on foreign maritime trade. Thus, the control of maritime routes, ports, and naval bases favors a privileged position in world trade and becomes a fundamental element in sustaining the national interests of any power.

In counterpoint to sea power, Halford John Mackinder (1861-1947) developed his approach to land power, highlighting that land power would surpass naval power with the advent of railroads. In one of his most influential works, Mackinder (1904) developed the theory of *Heartland*, which predicts that the control of Central Eurasia, i.e., the vast area that extends from Europe to Asia, would be fundamental to control the direction of global politics. The Eurasian *Heartland* forms a large world island that concentrates 85% of the population and vast strategic resources, the pivot area of which mainly falls under the domination of the Russian land power. Thus, Mackinder argues that control over this key area would give its holder a significant strategic advantage on the world stage, serving as a platform for projecting power and influence across regions.

Nicholas J. Spykman (1893-1943), another great exponent of classical American geopolitics, developed a perspective that complemented and expanded Mahan's and Mackinder's ideas, mainly by the theory of *Rimland*, which places the coastal regions that surround the pivotal region of the *Heartland* as the most important for world politics. This peripheral region is rich in resources, densely populated, and strategically close to shipping lanes, making it a key region for global influence and power projection. Thus, Spykman inverts Mackinder's formula and offers an intermediate approach to land and sea power. Although the control of the *Heartland* is important, the *Rimland* was even more significant geopolitically as it has access to important maritime resources and trade routes. Thus, the balance of global power would depend on the interaction between the nations that controlled the *Heartland* and those who dominated the *Rimland*.

It is important to highlight that Spykman's thought was influenced by classical geopolitics and was developed in a context in which air power became increasingly relevant with technological advances, reducing the spatiotemporal distance between territories. Thus, the three-dimensionality of armed conflicts brought the United States much closer to European wars than before, forcing its classic isolationist policy to become an interventionist policy. In the mid-interwar period, U.S. foreign policy aimed at maintaining a balance of power in the geography of Eurasia as a way to ensure their own national security, primarily by forming strategic alliances between outside powers.

In addition to the attention given to Eurasia, Spykman (1942) also evaluated geopolitics in South America. A central issue in his *America's Strategy in World Politics* refers to the possibility of an eventual alliance between Argentina, Brazil, and Chile (A.B.C.) threatening the USA internal national security despite its deemed uncontestable hegemony over the Americas. A union of these countries would create a significant counterweight that could challenge the predominance of the USA and its

ambitions in South America, justifying a military intervention to ensure its interests in the region[7].

The ideas Spykman synthesized underpinned the policy of containment against the expansion of the USSR throughout the Cold War, illustrating how classical geopolitics influenced the USA strategy over subsequent decades, which sought to stop the expansion of rivals in its zones of influence.

3 THE GEOSTRATEGY OF THE COLD WAR: THE ROLE OF TECHNOLOGY AND AEROSPACE AND CYBER POWERS AS THE LAST GEOPOLITICAL FRONTIER

George Kennan formulated the geopolitics of the USA containment against the USSR during the Cold War in his "Long Telegram" against the "Soviet conduct," which the Truman Doctrine implemented at first (Tuathail; Dalby; Routledge, 2006). The fundamentals of this policy followed the classical view that Eurasia would configure the basic continent in the global power struggle following the *Heartland-Rimland* opposition. On the one hand, the isolated dominant terrestrial power of the Asian *Heartland* embodied in the USSR would tend to expand to the Eurasian periphery (*Rimland*), seeking new zones of influence. On the other hand, the transoceanic projection of the United States required influence over the powers of the *Rimland* to contain the expansionism of the Soviet *Heartland*. The defense system the USA promoted in the post-war period, founding the North Atlantic Treaty Organization, the Southeast Asian Treaty Organization, and the Central Treaty Organization, shows well the USA alliance with the *Rimland* to isolate the central pivot region (Mello, 1999).

The first years of the implementation of the containment geostrategy (1947-1962) marked the most important period of the Cold War, establishing the main characteristics that would last throughout the conflict (Pecequilo, 2011). During this phase, the USSR was able to develop autonomous strategic technologies and catch up with the USA, especially after acquiring mastery in nuclear weapons and intercontinental missiles. One of the most important events in this context was the USSR launching the first space satellite (Sputnik) in 1957. This event conveyed the idea that the U.S. was losing its supremacy and technological momentum in favor of the Soviets, ushering in the era of space power in geopolitics.

The launch of Sputnik showed the Soviet technological superiority in using space weapons, gravely threatening the U.S. national security. In addition to being used for espionage and military reconnaissance, this technology could be adapted for space attacks on the American geographic territory, with a power of reach far beyond traditional land, sea, and air powers. The Soviet launch kicked off the space race, in which the two powers competed with each other for aerospace superiority.

7 "The A.B.C. states represent a region in the hemisphere where our hegemony, if challenged, can be asserted only at the cost of war" (Spykman, 1942, p. 62).

The USA, in particular, reformulated its "military-industrial-academic complex" during Dwight Eisenhower's administration (Medeiros, 2004)[8]. The then president modernized the Department of Defense and created agencies to promote technological innovation to compete against Soviet advances, including NASA and DARPA. On the one hand, NASA has focused development efforts on the post-Sputnik aerospace realm. On the other hand, DARPA, although initially also funding aerospace technologies, later became one of the main USA technological funding mechanisms in the emerging ICT in the 20th century.

About one-third to one-half of innovations in modern computer science have stemmed from DARPA investments (Dertouzos, 1997). The results achieved after 1960 included the miniaturization of GPS technology, the creation of modern computer mechanisms (hypertext links, video monitors, screen windows, etc.), the first computer mouse, ARPANET (the computer network that precursed the internet) and the TCP/IP protocol—the technical basis of the contemporary internet that enables the exchange data packets across different machines on a global scale (Pecequilo; Marzinotto JR, 2022). DARPA funded these technologies by channeling distributed public resources to the American innovation ecosystem via the partnership between the interests of the state during the Cold War and the commercial interests of large American companies such as IBM.

At the same time DARPA served U.S. geopolitical interests during the Cold War, it subsidized the development of key technologies of the globalized economic order that would emerge in the 1980s and 1990s. A large part of the emerging state technologies, developed under the concept of "dual-use technology" (for civil and military applications), were released to the private sector for trade during the cooling of the Russian-American bias. This strategy by the U.S. military-industrial-academic complex aimed to ensure its economic and military superiority, guaranteeing a dynamism of innovation with the help of the partnership between the State and the private sector. Commercialization rapidly expanded ICT around the world, profoundly impacting and transforming all post-1990 economic sectors.

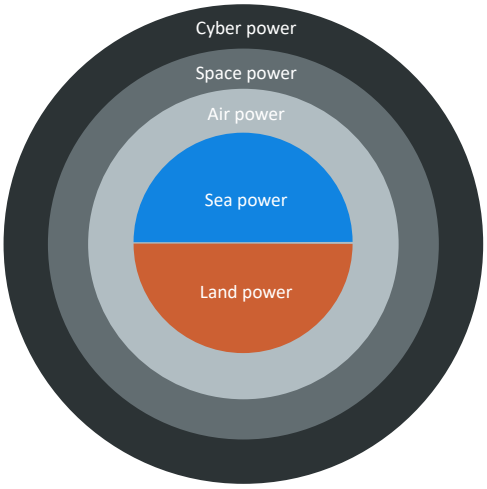
The USA and its multinationals led the movement of global expansion of new information technologies, especially the internet, which emerged as the remaining great unipolar power after the Cold War (Krauthammer, 1990). ICT catalyzed technological innovation around the new "digital economy" on the rise of the 1990s. This context marked the emergence of a new type of digital industry which encompasses activities related to the production, distribution, and consumption of digital goods and services based on the internet, information, online platforms, and hardware, especially on Big Tech companies such as Apple, Microsoft, Google, and Amazon.

The digital economy and its industries have become strategic centers for states in the 21st century. The sector generates a large part of global economic wealth and configures an important factor in guiding international politics and contemporary social relations. In addition to the

8 Eisenhower popularized the term "military-industrial complex," used to define the interconnection between the private industrial sector (which produces critical technologies) and the government and military institutions that finance, purchase, and use the equipment. Medeiros (2004) adds the term "academic" to highlight the role of universities in the technological development of the USA.

economic and business revolution, the digitalization of social relations created the last frontier of operational dominance of nations, inaugurating cyber power and the "geopolitics of cyberspace" (Portela, 2018). This power is multidimensional to the land, sea, and air powers (as predicted by classical geopolitics) (Figure 1).

Figure 1. Geopolitical powers of the 21st century



Source: prepared by the authors based on the doctrine Full Spectrum Dominance of the U.S. DoD.

The idea of multidimensionality implies that global power follows a complex combination of several elements rather than a single factor. In the 21st century, this includes the fundamentals of classical geopolitics, such as territory, geography, military (sea, land, air), and economic power but also new technological dimensions: information and cybernetics.

Cyber power refers to the ability of a state or non-state actor to use new digital technologies and the internet to exert global influence, carry out information operations or cyberattacks, or defend against such assaults. This power encompasses physical (such as the control of infrastructures and the production capacity of advanced hardware) and virtual issues (such as the development of algorithms and artificial intelligence). The integration of this power into classical geopolitics creates an additional dimension of global power analysis in which the control of living space and the struggle for survival are reflected in the search for technological supremacy, autonomy, and influence over territories containing infrastructures, networks, and strategic industries.

Although some liberal views claim that the advancement of digital technology is intrinsic to the market—such as Milton Friedman's followers—the "digital economy" and "national security" have shown a strong association (Peng, 2023) since the origin of the internet. With each passing year, States launch new cyber defense strategies, bringing together military and private sector efforts to protect critical infrastructures[9].

9 In the US, the most recent is the National Cybersecurity Strategy 2023. Available at: https://www.whitehouse.gov/wp-content/uploads/2023/03/National-Cybersecurity-Strategy-2023.pdf. Accessed on: Oct. 23, 2023.

Even before the global expansion of the internet, American statesmen were aware that the digital industry would become one of the most important strategic sectors of the 21st century. The Reagan and Clinton administrations sought to build an information superhighway to ensure the geoeconomic and geopolitical future of the USA in cyberspace, creating an environment conducive to the development of new technologies. As a result, the USA began to adopt market liberalization strategies to insert USA capital and technological multinationals into markets and sabotage potential competing industries.

Brazil particularly endured intense commercial retaliations against the development of its national computer industry, being constantly pressure by Reagan to open itself to American companies. This occurred in the context of the construction of the USA "hemispheric agenda" for South America, in which it sought to launch its interests to maintain its hegemony in the region (Padula, 2015).

4 THE BRAZILIAN DIGITAL INDUSTRY: CONSTRUCTION, SANCTIONS, AND THE BRAZIL-USA INFORMATICS LITIGATION (1960-1990)

In the second half of the 20th century, the Brazilian Foreign Policy sought a more autonomous insertion into the international market to reduce its economic, technological, and military dependence in several sectors considered strategic, such as nuclear, energy, the defense industry, and information technology. It established several policies in this context, and scientific-technological training acquired a central role in the development of Brazil. Robust guidelines that would guide national development emerge in the I National Development Plan and in the I Basic Plan for Scientific and Technological Development in the 1970s (Helena, 1980).

The strategies of the period served as important instruments to guarantee the Brazilian autonomy and sovereignty in the interstate system. As Rattenbach (1975, p. 58, our translation) states, "economic policy becomes synonymous with geopolitics," configuring an important tool for national autonomy. Brazilian plans must be understood in a broad conjuncture of the search for the increase of national power, in which economic growth began to be conditioned to the increase of industrial competitiveness and the advances of national science and technology (Salles Filho, 2002). Thus, economic policy, industrialization, science, and technology became pillars for autonomy and Brazilian geopolitical insertion in the 20th century.

In this context, the Information Technology Policy Brazil implemented configured a sensitive area and an important strategic axis for its development. From the 1960s onward, the Brazilian government financed the creation of an autonomous national computer industry to break its dependence on imports from advanced economies. This policy became a priority, especially during Medici's government, which created a Special Working Group with members of the Ministries of the Navy and Planning to develop a prototype for a national computer.

The Commission for Coordination of Electronic Processing Activities, linked to the Planning Secretariat of the Presidency of the Republic, was created in 1972. It initially aimed to coordinate the acquisition of computers by the public administration and, during Geisel's government, began to act directly in the industry, regulating imports and formulating a strategy

for the sector. In 1979, it was renamed Special Informatics Secretariat and was subordinated to the National Security Council (Pagliari, 2010).

The technological development plans in information technology received strong support from public institutions, such as Ministries, Universities, the Armed Forces, the Brazilian Development Bank, and private companies. As a result of the initiatives and support in the 1960s-1970s, some national projects obtain successes. Brazil relished with the construction of the first national computers, such as "Zezinho" of the Aeronautics Institute of Technology (ITA/1961) and "Patinho Feio" from Universidade de São Paulo (USP/1972). In 1974, two state-owned companies were founded to develop autonomous technology: Computadores e Sistemas Brasileiros and Empresa Digital Brasileira (Borges, 2011). Computadores e Sistemas Brasileiros, in particular, had, as short-term objectives, the development of the Argus 700 computer to prepare market studies, serve the Navy, and train personnel to work in information technology (Helena, 1980).

However, the Brazilian industry faced difficulties with foreign competition, which provided cheaper and more efficient equipment, especially USA multinationals, such as IBM and AT&T, which had already been developing decades earlier with financial support from the USA government and the protectionist policy of the Buy American Act (1933). IBM and AT&T offer two of the main cases that have benefited from the "dual-use" technology transfer developed by the U.S. military-industrial-academic complex. In addition to protectionism, U.S. industrial policy during the Cold War favored U.S. computer companies, giving them a competitive advantage and enabling them to dominate their industries for decades.

In this context, Brazilian protectionism against the entry of foreign multinationals into its market, which refers to the direct action of the Commission in Geisel's government, began to gain more strength in the period. These policies aimed to create a temporary market reserve for Brazilian companies until they could grow and compete on an equal footing with the rest of the world. Some companies that were qualified for production and market reserve included the state-owned Computadores e Sistemas Brasileiros and four private ones: SID, Labo, Edisa, and Sisco. The central idea was that state investments and protectionism would favor the national industry, which, once developed, would eliminate the market reserve[10].

The Brazilian protectionist policies in the period provoked a strong reaction from USA companies and its government as they affected their interests and profits in the region. After the intensification of Brazilian restrictions in 1977, some companies operating in the country, such as IBM, requested that the USA government pressure the Brazilian government to end the market reserve, claiming that the barriers affected their profits due to the loss of the Brazilian market. The issue was taken to the General Agreement on Tariffs and Trade for negotiation, obtaining no concrete result. President Ronald Reagan, on a visit to Brazil in 1982, six years after the failure of the multilateral sphere, offered an agenda for bilateral negotiations on the issue of information technology. However, Brazil opposed the inclusion of this item for discussion in the official agenda (Pagliari, 2010).

10 The development experience of the Brazilian computer industry described in this study resembled the experience of the USA in certain aspects. As in the previous section of this study, DARPA state investments funded from about one-third to one-half of computer science innovations in the USA. DARPA funneled non-repayable funds to sectors in which the private sector was often unwilling to invest and risk its capital. The easy access to financial resources, together with the protectionist policy of the Buy American Act (1933), strengthened the development of the American computer industry in the first half of the 20th century.

During this period, the U.S. Department of Commerce released a report that criticized the Brazilian protectionism. USA companies at that time depended more and more on foreign profits than those coming from the internal USA economy (Tigre, 1981). "Operating in Brazil in a very free way, without any kind of national competition, companies in the computer sector obtained extraordinarily high profits in the country with relatively small investments" (Tigre, 1981, p. 49, our translation). Thus, American multinationals and Reagan's administration, pressured by the sector that was unable to enter the Brazilian market, joined forces more systematically to advocate for the repeal of the Brazilian protectionism.

However, in 1984, Brazil enacted its National Information Technology Policy[11] to further strengthen the protection of its emerging national industry. This law provoked a strong reaction from USA companies and the government. From then on, litigation gains a different qualitative configuration and acquires the characteristics of a trade war.

In 1985, the Reagan administration threatened Brazil with economic retaliation if it failed to change its program to promote its computer industry. This announcement took place on a symbolically chosen date, September 7, and indicated that Brazil would be investigated under Section 301 of the Trade Act of 1974. The application of this section would enable the USA to impose retaliation on Brazilian exports if it proved that the information technology policy had been harming USA trade. The USA threat provoked one of the most prolonged diplomatic disputes between Brazil and the United States, initiating a long period of negotiations between various actors (Vigevani, 1995).

Due to the announcement of trade retaliation and the slowness for an agreement, the Reagan administration began to research the impacts of the implementation of sanctions in 1986. In the midst of the litigation, a new crisis arose due to the refusal of the Special Informatics Secretariat to approve the distribution of Microsoft MS-DOS software in Brazil, claiming an available Brazilian substitute. The Minister of Foreign Affairs at the time, Abreu Sodré, called for more negotiations to overcome the crisis, arguing that "The Brazilian point of view is stated on the informatics law, which is in the interest of our country. . . . We should negotiate with the U.S., defending our sovereignty" (Gallagher, 1989, p. 518).

Despite the efforts, President Reagan announced tariffs totaling $105 million on Brazilian exports for lack of cooperation. In response, José Sarney ordered a study of American imports that could be the target of retaliation, calling the action of the White House "an undue and discriminating threat" (Gallagher, 1989, p. 518). From then on, it would be up to the Brazilian government to decide whether it would be possible to continue in the trade war under the political turbulence of its redemocratization and the economic turbulence due to its foreign debt crisis[12].

Brazil tried to appeal the sanctions to the General Agreement on Tariffs and Trade, unsuccessfully arguing that the unilateral American imposition, based on domestic law, violated its international trade rules. Faced with the increase in USA retaliation, Brazil saw a movement to reduce the impacts of the economic war. In 1988, the decision that barred the entry of the

11 Available at: https://www.planalto.gov.br/ccivil_03/Leis/L7232.htm#:~:text=LEI%20N%C2%BA%207.232%2C%20DE%2029%20DE%20OUTUBRO%20DE%201984.&text=Disp%C3%B5e%20sobre%20a%20Pol%C3%ADtica%20Nacional,Art.:. Accessed on: Oct. 20, 2023.

12 This economic turmoil stemmed from the 1979 Paul Volcker-led FED monetary policy rate shock. The rise in USA interest rates caused the Brazilian foreign debt, post-fixed in dollars, to reach an unprecedented level (Tavares, 1985).

Microsoft MS-DOS operating system was reversed, enabling its entry into the Brazilian market. This decision led Brazilian executives to send a letter to the U.S. Trade Representative requesting an end to the threat of sanctions. "Proceed with sanctions now they said, 'would be throwing a nuclear bomb after having won the war'" (Gallagher, 1989, p. 519).

Other sectors gradually opened up from the end of 1988 onward. The Brazilian fragility in the face of the projection of American interests dismantled incentive policies and the national industry in the following years. The implemented policies and the Brazilian companies had their flaws, being often accused of being inefficient "clone assemblers" focused on fast consumption, rather than on the development of advanced production techniques. However, the way in which trade opening occurred, which was in fact necessary to expand internal access to foreign technological innovations, hindered Brazil's own development. Other emerging countries, such as China, also came under pressure but managed to impose efficient technology transfer clauses without unrestrictedly opening their market, guaranteeing them a certain autonomy and lasting long-term benefits.

The USA sanctions against the Brazilian computer industry seriously attacked its technological autonomy. Several sectors of the government, military, and industrialists understood the litigation as an affront to national sovereignty, especially after its escalation on September 7. The dismantling in the following years reimposed the historical condition of technological dependence and delayed national development for decades.

5 GEOPOLITICS, GEOECONOMICS, AND "ECONOMIC WEAPONS": REINTERPRETING THE SANCTIONS AGAINST BRAZILIAN INFORMATION TECHNOLOGY

In the mid-1970s, studies on geopolitics incorporated concepts beyond their classical foundations. The period included the emergence of events such as the ICT revolution, the first electronic transaction markets (which enabled the mobility of capital in real time), and the increased influence of private multinationals in global affairs. It also included the disruption of the post-Bretton Woods international monetary pattern, shocks to the USA interest rates and oil prices, and the intensification of financial globalization and economic interdependence. This new reality has contributed to popularizing "geoeconomics" as a lens of fundamental analysis in an increasingly complex and interconnected world.

Blackwill and Harris (2016, p. 19) define geoeconomics as the "systematic use of economic instruments to achieve geopolitical objectives" and defend national interests. These tools include a variety of strategies, such as applying economic and financial sanctions, protectionist policies, trade war, and tariff barriers, using monetary policies to manipulate exchange rates and the flow of capital from other countries, and receiving foreign direct investment in infrastructure and economic assistance to control and gain influence over weaker actors. Thus, geoeconomics unites geopolitics to economics, and its instruments are considered weapons of destruction in the 21st century (Blackwill; Harris, 2016; Csurgai, 2017).

Notably, economic issues have always configured an important source of national power in geopolitical studies. However, due to the level of interdependence and financial

globalization from new technologies in the 20th century, they began to play a central role in determining a country's influence, serving as weapons for the geopolitical objectives of the great powers. While some authors consider geoeconomics as a branch of geopolitics, others point out epistemological inconsistencies with the argument that both concepts constitute the same phenomenon as old as man: the use of trade and money as an instrument of political and military power (Kosinski; Barcellos, 2020).

In addition to the new economic and technological issues of the 20th century, the emergence of events such as the Non-Aligned Movement and the rise of the Third World, which demanded a "New International Economic Order," offered new challenges to the established post-war order. During the Cold War, the USA sought to consolidate its global hegemony and counter Soviet influence in the Third World by a foreign containment policy. This context considered South America (especially Brazil) as strategic for these objectives. The region became an important stage in which tensions between antagonistic blocs manifested themselves and in which Third World countries sought to assert their independence.

Great thinkers of geopolitics in Brazil, such as Mário Travassos, Therezinha de Castro, and General Golbery, were always aware of the importance of the country in defining the direction of South America and global politics. The privileged geographical position of Brazil, extending from the heart of the continent to the coast of the South Atlantic, gives its great influence in regional affairs. During the Cold War, the USA recognized this importance and designated Brazil as a "key country" in South America. The literature on USA foreign policies widely uses this term, which was applied by great American strategists such as Henry Kissinger. A "key country" is a geopolitically relevant country in a certain area of the planet, to which the USA delegates power and maintains as a preferred ally to use it for its own interests in the region in question.

In the 1970s, Brazil received the label of key country due to its geostrategic position in the American foreign policy objectives, including its presence in the South Atlantic, the land and air importance of the Brazilian Northeast for the defense of its western portion, its natural wealth, and continental size. Yves Lacoste (1976) advocated that geography serves, in the first place, to make war. With this, the USA sought to maintain the region as a zone of exclusive influence to sustain its power in the geography of South America and stop the advance of the USSR in its vicinity.

The political, economic, and technological influence of a power over a key country constitutes a significant part of that relationship. Geoeconomic instruments such as direct investments, economic assistance, and trade and technological agreements can strengthen bilateral relations between countries, but also project geopolitical interests from the stronger side and hinder the rise of competing regional powers on the more vulnerable side.

Reagan's pressures against the Brazilian National Information Technology Policy can be understood as part of this USA geostrategy for South America. Retaliations against Brazil under the aegis of section 301 of the Trade Act aimed to inject U.S. multinational companies in the region, project U.S. interests, and undermine a competing strategic industry in their zone of influence. These unilateral trade sanctions are now considered weapons of trade war (Mulder, 2022), being one of the geoeconomic artifices most used by great powers in the projection of their interests.

The concepts of classical geopolitics and geoeconomics, when applied in the case of the Brazilian National Information Technology Policy, provide a new interpretation that goes beyond mere commercial issues. Ratzel's idea of living space (*Lebensraum*) claims that States resemble living organisms that seek to expand their geographic or economic territories to guarantee the resources necessary for the prosperity of their population. By forcing the entry of multinationals into Brazil, the USA understood the region as an economic territory necessary for the prosperity and survival of its technology companies. Since natural selection favors the strongest to the detriment of the weakest, unrestricted openness without strategic planning dismantled Brazilian companies, which were unable to compete against American companies but that had been strengthened decades earlier due to State support.

On the other hand, Nicholas Spykman, in addition to complementing the classical theories of sea (Mahan) and land power (Mackinder) and paying attention to the *Heartland* in Eurasia, was also concerned with the geopolitics of South America and the position of Brazil. As seen, an eventual alliance between Argentina, Brazil, and Chile was understood as a threat to U.S. internal security since such a union would create a counterweight capable of challenging U.S. predominance in South America. In his analysis, the three countries were no real threats on their own due to the lack of energy, financial, and technological resources necessary to sustain military power, thus being easily defeated in war. However, because the major South American centers lie far from the center of American power, these nations enjoy a sense of independence, resisting intimidation by measures other than war: "The A.B.C. states represent a region in the hemisphere where our hegemony, if challenged, can only be asserted at the cost of war" (Spykman, 1942, p. 62).

Spykman's considerations are relevant to understanding the USA sanctions against the Brazilian computer industry. They can be interpreted as a broader geopolitical strategy to maintain political, economic, and technological influence over South America as the balance of local power would be crucial to the USA national security interests. Limiting the development of a strategic industry in Brazil not only protected the USA commercial and technological interests, but prevented Brazil from strengthening itself to the point of challenging those interests, thus ensuring a prosperous market for the development of USA companies.

Moreover, the application of sanctions took place in a context in which cyber power was emerging as the last frontier of geopolitics. At that time, global power was no longer only determined by the classic dimensions of geopolitics, such as geography, natural resources, and traditional maritime, land, and air powers. Cybernetic power emerged as multidimensional to the classic layers, encompassing physical issues, such as the control of infrastructures and the capacity to produce advanced virtual hardware, such as the development of algorithms and control of information flow. Thus, conquering living spaces now depends on technological autonomy and influence over territories that house strategic infrastructures and industries, which are essential to ensure survival in the current international reality.

The application of unilateral sanctions against Brazil has seriously injured its technological autonomy and national sovereignty. The country currently faces challenges in building a solid digital sovereignty, whereas the USA capitalizes on its long-term geostrategic vision, obtaining advantages in the digital age. The Brazil-USA information technology clash

transcended mere market competition, belonging to the USA geopolitical objectives for South America amidst the Cold War.

6 FINAL CONSIDERATIONS

This study shows a strong correlation between the economy, digital industry, geopolitics, and national sovereignty. Analyzing the USA (pioneers in the development of many ICT in the geostrategy of the Cold War) or Brazil (the Information Technology Policy of which constituted a matter of sovereignty) clearly evinces that information technology and its industries became strategic centers of development and national security in the 20th century. Since the digital economy is far from apolitical, it also shows a geopolitical dimension that includes a strong association between states and their industries in the competition for economic territories in cyberspace.

"Space," "power," and "external threat" configure key concepts in authors of classical geopolitics, from Ratzel to Spykman. The application of these theoretical conceptions offers valuable insights to understand global dynamics and power relations in the digital age. In classical geopolitics, control over geographic living space and its resources is crucial to power projection and state survival. In the digital age, this logic is reflected in the search for technological autonomy and influence over territories containing infrastructures, industries, and servers with strategic data. The cyberspace has emerged as a battlefield in which great powers launch their political-economic influence, constituting the last frontier of global power that transcends classic geographical borders.

This study proves that the information technology litigation between Brazil and the USA exceeded mere market competition, configuring a pillar of the USA geostrategy for South America during the Cold War. Sanctions and trade retaliation are now considered economic weapons and instruments of geoeconomics. The use of these weapons against the computer industry in Brazil under the aegis of section 301 of the Trade Act aimed to inject USA multinationals into the Brazilian market, project its interests in the region, and undermine a competing regional industry, representing a serious attack to the Brazilian technological autonomy and sovereignty. These measures can be interpreted as a broader geopolitical strategy to maintain influence over South America since the local balance of power is crucial to the USA national security interests. Limiting the development of a strategic industry in Brazil not only protected the USA commercial and technological interests, but also aimed to prevent Brazil from strengthening itself to the point of challenging those interests, thus ensuring a prosperous market for USA companies to thrive.

The history of the dismantling of the Brazilian digital industry and the comparison with USA own protectionist practices highlight the importance of national strategic policies to determine the technological destiny and autonomy of a nation. Brazil currently faces difficulties forging its solid digital sovereignty and breaking technological dependence, whereas the USA capitalizes on its long-term geostrategic planning, reaping unprecedented advantages in the digital age. The complexities, challenges, and opportunities of the digital political economy will largely shape the future of the 21st century. Every national project must be aware of this context and the economic weapons in contemporary trade wars to be able to promote efficient national defense.

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