IDSCIPUB

Politeia
Journal of Public Administration and Political Science and International Relations

Check for updates

OPEN ACCESS

*CORRESPONDENCE
Vanessa Difasuci Purnomo,
vanessadp.2236030004@gmail.com

RECEIVED 06 June 2026
ACCEPTED 27 July 2026
PUBLISHED 30 July 2026

CITATION
Purnomo VD (2026) Core-Periphery Dynamics In Brazil's Artificial Intelligence Expansion, 2022-2025: A World-System Analysis. *Politeia : Journal of Public Administration and Political Science and International Relations*. 4 (3), 158-167.
doi: 10.61978/politeia.v4i3.1655

TYPE Original Research
PUBLISHED 30 July 2026
DOI 10.61978/politeia.v4i3.1655
VOL 4 Issue 3 July 2026

Core-Periphery Dynamics in Brazil's Artificial Intelligence Expansion, 2022-2025: A World-System Analysis

Vanessa Difasuci Purnomo

Universitas 17 Agustus Jakarta, Jakarta, Indonesia

Abstract

Despite growing scholarly attention to the political economy of artificial intelligence (AI) infrastructure, no study has yet empirically tested whether the expansion of AI data centers in a specific Global South location reproduces structural dependency patterns using an integrated, operational framework derived from World-Systems Theory, this is the gap the present study addresses. Focusing on São Paulo, Brazil (2022-2025), the research operationalizes three constructs from Immanuel Wallerstein's World-Systems Theory; (1) surplus value extraction, (2) capital accumulation, and (3) systemic marginalization of peripheral economies, as coding indicators applied through qualitative document and content analysis. Data were drawn from government reports, industry publications, international organization data, and peer-reviewed literature, then systematically coded against the three indicators to trace patterns of ownership, value distribution, and resource allocation. The findings show an asymmetrical core-periphery relationship: Brazil supplies land, energy, water, and fiscal incentives, while the highest value, arising from technological control, platform ownership, and capital accumulation, remains concentrated among core-country technology firms, with Brazilian policy reinforcing foreign firms' positions without generating commensurate technology transfer. By bridging classical dependency theory with contemporary digital-economy analysis, this study offers the first empirical operationalization of World-Systems Theory in the AI infrastructure context, contributing a replicable analytical framework to international political economy and AI governance scholarship.

KEYWORDS

artificial intelligence; data center; world system theory; brazil; global north-south relations

Introduction

Artificial Intelligence (AI) has emerged as a primary driver of global digital economy transformation since 2022-2023, following the launch of large language models such as ChatGPT in late 2022 (Syafira, 2025). The rapid advancement of Large Language Models, cloud computing, and data-driven automation has generated an escalating demand for large-scale computing capacity that only high-capacity data center infrastructure can support. This points to a reality often overlooked in discussions of the "virtual" digital economy: AI growth is increasingly dependent on energy-intensive and resource-intensive physical infrastructure, including substantial clean-water consumption for server cooling (Gabrys, 2016). Because this infrastructure is physically embedded in specific localities, its costs and benefits are unevenly distributed across geography, raising questions about who benefits and who bears the burden (Graham, 2020; Hu, 2015).

This global pattern is not evenly distributed across the Global South; it is concentrated in a small number of host

locations, of which Brazil is now the most prominent example in Latin America. By 2024-2025, Brazil hosts more than 190 operational data center facilities, the largest market in the region (Data Center Map, 2025), with approximately one-third concentrated in São Paulo, the country's economic center (Maria de Oliveira Nusdeo et al., 2025). Reports from the U.S. Department of State and International Trade Administration identify Brazil as a top investment destination for global technology firms (US Department of State, 2023). This expansion is resource-intensive: industry projections estimate that water consumption by Brazilian data centers will exceed 85.65 billion liters annually by 2030 (Friedmann, 2024; Luo & Tung, 2007; Mordor Intelligence, 2025a; Shumba et al., 2025; Strubell et al., 2019 ;Patel et al., 2025). The concentration of this demand in São Paulo is analytically significant precisely because the region experienced an acute water crisis in 2014, when reservoir levels fell sharply under combined climate and consumption pressures (Millington, 2018), meaning new AI-driven demand is layered onto an already stressed system rather than a neutral resource baseline.

The expansion carries measurable economic benefits. Foreign direct investment has grown substantially, with Microsoft announcing an investment plan of USD 2.70 billion for cloud infrastructure and AI ((Hu, 2015; Luitse, 2024; Therese, 2022), and Amazon Web Services committing approximately USD 1.80 billion to data center expansion through 2034 (Luitse, 2024). The Brazilian data center market is projected to grow at a compound annual rate of roughly 11 percent through 2029, the largest projected growth trajectory in Latin America (Morgan Stanley Institute, 2026; van Wynsberghe, 2021). The Brazilian government has treated this growth as a policy priority: in July 2024, the Ministry of Science, Technology and Innovation launched the Plano Brasileiro de Inteligência Artificial (PBIA) 2024-2028, "AI for the Good of All," allocating 23.03 billion reais (approximately USD 4.2 billion) to national computing infrastructure (Johansson Neto et al., 2024).

Set against these benefits, however, is a structural question about how value and burden are distributed between host country and investing firms, the question this study takes up directly. Brazil is projected to control 51.65 percent of South American hyperscale data center market revenue by 2025, yet 70 percent of São Paulo's active facilities are controlled by five operators headquartered in core countries (Mordor Intelligence, 2025b). Investment of this kind typically carries conditions that preserve the investing firms' position in the value chain: data collected from local populations functions as an input to AI models owned and developed abroad, later resold to the same population as a finished digital product (Kwet, 2019).

Correspondingly, the elements of highest value, platform ownership, data monetization, and technological control, remain concentrated among firms based in developed economies (Natashya, 2018). Researchers from the Universidade de São Paulo, Universidade de Brasília, and Fundação Getúlio Vargas find that Brazil has spent more than 23 billion reais (approximately USD 4.2 billion) since 2014 on software, cloud, and security licenses from firms such as Google, Microsoft, and Oracle, with comparatively little allocated to domestic technology development (Martins, 2025a). The host country, meanwhile, supplies land, energy, water, and fiscal incentives. Employment gains also appear more limited than announced: a Stargate facility in Texas employed roughly 1,500 workers during construction but only about 100 after completion (Martins, 2025b), a ratio that, if it holds in the Brazilian context, would further narrow the plausible economic justification for expansion on employment grounds.

Taken together, these asymmetries raise a question this study treats as empirically open rather than assumed: whether the relationship between Brazil and core-country technology firms reflects ordinary economic integration, or a more specific and recurring pattern in which capital and technology holders capture the principal benefits while the host region bears the material burden. Sustainability narratives are one channel through which such asymmetries can be legitimized rather than resolved, for instance, the sustainability criteria attached to Brazil's data center tax incentives were reportedly drafted without the Ministry of Environment's involvement, indicating a gap between stated environmental commitments and regulatory practice (Martins, 2025a).

In the global digital economy, technological dependence allows value extraction while development narratives legitimize these patterns AI physical infrastructure is placed in developing countries while technological control remains in developed countries (Mishra, 2024). Similar to how party campaigns are carried out using identity politics as a tool to seek support (Fitri et al., 2022), digital development and sustainability narratives, frequently employed as legitimizing tools, may obscure underlying power relations.

Distinguishing between "ordinary integration" and "structural dependency" is not a semantic exercise: it determines whether the appropriate policy response is incremental adjustment or a reconsideration of the terms on which Brazil participates in AI infrastructure expansion. This distinction is precisely what existing literature has not yet tested empirically, which motivates the framework developed below.

Several studies have examined dimensions of Brazil's position in the global AI infrastructure landscape, each contributing important insights while leaving gaps that this research addresses. Three bodies of work bear most directly on this question, and each addresses part of it while leaving the integrated empirical question untested. Nusdeo et al. (2025) examine Brazil's position as an AI data center hub from the standpoint of regulatory capacity and socio-environmental risk, finding that expansion has proceeded amid regulatory gaps, including fiscal incentives granted without adequate environmental permitting, and conclude that Brazil currently lacks the legal-institutional capacity to ensure equitable and sustainable outcomes. This work establishes the regulatory context but does not analyze how the distribution of economic benefits and ownership structures maps onto broader patterns of structural relations in the global economy (de Oliveira Nusdeo et al., 2025).

Prates and Chiarini (2024) address that distributional question directly, showing through venture capital investment data that AI investment from the United States and China concentrates in high-value sectors in core countries, while investment into Latin America, including Brazil, flows to traditional sectors such as finance and commerce rather than AI development itself; this empirically positions Brazil as an infrastructure recipient rather than a technology developer, but the study does not examine policy mechanisms that could alter this pattern, nor does it address physical resource consumption (water, energy) associated with infrastructure expansion.

Rikap (2021) supplies the theoretical bridge: her concept

of a "digital innovation race" describes how large technology firms control the full value chain from data collection to AI deployment, forming a digitally mediated core-periphery hierarchy. This is conceptually central to the present study but remains at the level of theory, without empirical testing against a specific national case or region (Jubaidi & Khoirunnisa, 2024).

No existing study, in other words, has combined these three contributions, regulatory analysis, distributional/investment analysis, and World-Systems theorizing, into a single empirical test of whether AI data center expansion in a specific location reproduces structural dependency, using indicators that can be consistently applied and, in principle, replicated for other cases. This is the gap the present study is designed to close, and it is the basis of its claim to originality: rather than describing asymmetries qualitatively or theorizing them abstractly, this study operationalizes World-Systems Theory into three measurable indicators, surplus value extraction, capital accumulation, and systemic marginalization, and applies them systematically to a bounded empirical case.

Brazil and São Paulo are not selected merely as a large or convenient market; each satisfies a specific analytical requirement of the research design. Brazil is the largest data center market in Latin America, with more than 190 operational facilities, which provides sufficient empirical density for pattern analysis rather than a single-facility case study. As a semi-periphery country in Wallerstein's typology, Brazil occupies a theoretically distinctive position: neither a core technology producer nor a peripheral economy with negligible digital infrastructure, making it an informative test of whether semi-periphery status mitigates or reproduces core-periphery dynamics. São Paulo's 2014 water crisis provides a documented baseline of resource vulnerability against which new AI-driven demand can be assessed, rather than treating water and energy consumption as a hypothetical concern. Finally, Brazil's national AI policy response (PBIA 2024-2028) offers a concrete, contemporaneous test case for how a semi-periphery state attempts to negotiate the terms of digital transformation, which is directly relevant to the policy contribution this study aims to make.

Based on this gap, the study asks: How does the expansion of core-country-owned AI data center infrastructure in São Paulo, Brazil (2022-2025) reproduce structural dependency patterns predicted by World-Systems Theory, specifically with respect to surplus value extraction, capital accumulation, and systemic marginalization of the host economy? The study pursues three objectives: (1) to analyze whether AI data center expansion in São Paulo exhibits surplus value extraction patterns; (2) to examine whether ownership structures reflect capital accumulation by core-country actors; and (3) to assess whether Brazil's position reflects systemic marginalization as an infrastructure provider rather than a technology developer. Empirically, the study focuses on the 2022-2025 period because it captures the post-ChatGPT acceleration phase in AI investment, during which major capital commitments were announced and socio-environmental tensions became empirically visible, providing a bounded and data-rich window for analysis.

This research contributes to the literature in four ways: first, it provides the first empirical test of World-Systems Theory mechanisms in the specific context of AI data center expansion; second, it integrates previously separate analytical dimensions, regulatory, distributional, and theoretical, into a single coherent framework; third, it concentrates on the 2022-2025 acceleration phase as a bounded empirical window; and fourth, it generates policy-relevant analysis for semi-periphery states navigating digital transformation, applicable beyond the Brazilian case.

Theoretical Framework

This study builds its analytical framework in three integrated layers, each answering a different part of the same underlying question, why Brazil occupies its structural position, how value moves out of that position, and what that movement costs in material terms,rather than treating World-Systems Theory, digital colonialism, and infrastructure studies as separate bodies of theory to be reviewed in turn.

Layer 1 : structural position. Immanuel Wallerstein's World-Systems Theory supplies the "why," explaining the hierarchical division between core, semi-periphery, and periphery according to technological mastery, capital accumulation capacity, and role in the international division of labor (Chirot & Hall, 1982; Wallerstein, 2011). Core economies dominate high-value-added, technologically advanced sectors; peripheral economies supply raw materials, agricultural products, and low-cost labor; the semi-periphery, Brazil's position in this study, combines features of both and functions as a buffer within the system (Anibal et al., 2022).

Wallerstein specifies three mechanisms that sustain this hierarchy: surplus value extraction through unequal exchange, capital accumulation that requires ever-expanding access to low-cost peripheral resources, and systemic marginalization, in which peripheral subordination is not a developmental failure but a structural outcome the system actively reproduces (Budhathoki, 2025; Chirot & Hall, 1982; Wallerstein, 2011). Critically, the theory's unit of analysis is the structure of the global system itself, not states as isolated actors, a feature that makes it adaptable to a system increasingly organized around firms rather than states alone (Chirot & Hall, 1982). In the context of the digital economy, global technology companies can be understood as operational actors operating within such structures (Benteng & Amar, 2021).

Layer 2 : mechanism in the digital economy. Classical World-Systems Theory was built for a world of physical trade in goods and labor; three shifts require it to be adapted rather than applied unmodified. Multinational technology corporations, not states, are now central actors in the global economy (Luitse, 2024) data functions simultaneously as raw material and finished product (Fauzan et al., 2024) and extraction operates through platform ownership, algorithmic control, and data monetization rather than direct trade (Rikap & Lundvall, 2021). Rikap (2021) provides a crucial theoretical bridge between classical World-Systems Theory and contemporary AI infrastructure expansion through the concept of the "digital innovation race," demonstrating that large technology companies control the entire value chain from data collection to the application of AI, forming a new digital-based center-periphery system. This is the specific contribution of the digital colonialism literature: Kwet (2019) describes how core-country technology firms extract user data from peripheral populations as an input to AI systems, retain control over the resulting platforms and infrastructure, and sell the finished digital product back to the same population, reproducing core-periphery relations in digital form, with the periphery supplying raw material and cost while the core retains the means of production (Kwet, 2019; Mollema, 2024). Zuboff's (2019) "surveillance capitalism" specifies the accumulation

Figure 1. Data center infrastructure locations in Brazil, Sao Paulo as the largest owner
Source: DataCenterMap, Brazil DataCenterMap, 2025

mechanism further, describing behavioral data extraction as a new raw material for capital accumulation, Liu & Song, (2026) show how global development narratives around digital expansion legitimize this arrangement by presenting it as mutually beneficial, obscuring the underlying asymmetry. Rikap (2021) supplies the direct bridge back to World-Systems Theory: her "digital innovation race" concept describes technology firms controlling the entire value chain from data collection to AI deployment, forming a digitally mediated core-periphery hierarchy.

Read together, World-System Theory's structural position and mechanism in the digital economy are not two competing theories but one mechanism at two levels of specificity: World-Systems Theory names the structural pattern, and digital colonialism specifies its concrete operation in AI-driven markets.

Layer 3 : material cost and environmental governance. Infrastructure studies supply the "what is at stake," grounding Layers 1 and 2 in physical terms rather than leaving extraction abstract. Gabrys (2016) and Hu (2015) show that digital infrastructure, including data centers, is materially embedded in specific localities with measurable environmental and social footprints, echoing older patterns of resource extraction. Shehabi et al. (2018), Strubell et al. (2019), Morrison et al. (2025), and Li et al. (2023) document the energy and water costs of data centers and large language models specifically, framing water and energy consumption as a hidden but significant cost of AI development. Applied to Brazil, Bezerra & de Brito, (2025) identify São Paulo as a region exposed to AI-driven water risk, Millington (2025) documents the region's already-stressed water system following the 2014 crisis, and Nusdeo (2025) shows that Brazil's regulatory framework has granted fiscal incentives without commensurate environmental permitting, meaning the environmental governance gap is not incidental but part of how the extraction described in WST's structural position and digital economy mechanism is permitted to proceed materially. Furtado & Cunha, (2024) draw this connection explicitly, linking AI infrastructure's environmental and geopolitical impacts directly to digital colonialism.

The three layers converge into the study's operational indicators, each drawing on all three bodies of literature rather than on World-Systems Theory alone. Surplus value extraction is observed where Brazil supplies material resources and fiscal incentives (Layer 3) while core-country firms capture value through data ownership, model development, and platform monetization (Layers 1-2). Capital accumulation is observed where core-country firms own and control AI infrastructure sited in Brazil (Layer 3) while profits are repatriated and reinvested in further expansion (Layers 1-2). Systemic marginalization is observed where policy facilitates core-country expansion, including environmental permitting gaps (Layer 3), without building commensurate domestic technological capability (Layers 1-2). This layered structure is what the empirical analysis in the following sections tests against the São Paulo case.

Methods

This research employs a qualitative analytical approach based on systematic document analysis, treating written and numerical data as the primary evidentiary basis for interpretive analysis. This design was selected because the research question, how power, economic value, and dependency are distributed in the expansion of digital infrastructure, is a structural and relational question better addressed through interpretive analysis of textual and numerical evidence than through statistical generalization from a sample to a population.

Documents were identified through a defined, repeatable search protocol rather than ad hoc collection. Searches were conducted in Google Scholar, institutional academic databases, and the public repositories of the specific institutions listed below, using the following search terms, applied individually and in combination: "Brazil data center," "AI infrastructure Brazil," "São Paulo data center," "AI water consumption Brazil," "Brazil AI policy," "digital colonialism Brazil," and "World-Systems Theory digital economy." Searches covered the period January 2022 to June 2025 and were conducted in both English and Portuguese to reduce language-based exclusion.

Screening proceeded in three stages. At the identification stage, sixty-four documents were retrieved across all search terms and sources. At the screening stage, titles and abstracts (or executive summaries, for reports) were reviewed against the inclusion criteria below, narrowing the pool to fifty. At the eligibility stage, full documents were read in full to confirm relevance, credibility, and non-duplication, yielding a final corpus of fourty-three documents. This three-stage flow is reported so the selection process can be audited and replicated by other researchers, rather than presented only as a general description of sources consulted.

Four categories of documents constitute the corpus: (1) government and policy documents, including the PBIA 2024-2028 and related ministerial announcements; (2)

industry and international organization reports, including DataCenterMap (facility locations and ownership records), Mordor Intelligence (market size, growth, and water consumption projections), the International Trade Administration (investment climate assessments); (3) international and specialized media coverage, including Reuters, Tech Policy Press, and Data Center Dynamics, used specifically to capture externally reported social and environmental impacts not present in government or industry self-reporting; and (4) peer-reviewed academic literature on World-Systems Theory, digital colonialism, AI infrastructure, and Brazilian political economy, prioritized wherever a claim required theoretical or conceptual, rather than purely factual or statistical, support.

Each general criterion was applied as a specific, checkable threshold rather than a broad standard: (1) The document must make direct, substantive reference to AI infrastructure, data centers, or digital transformation in Brazil, and not merely mention Brazil or AI in passing. (2) The document must be published or substantively updated between January 2022 and June 2025; documents outside this window were retained only where explicitly used for historical or theoretical background (e.g., Wallerstein's foundational texts, the 2014 water crisis literature), and are flagged as such in-text rather than treated as evidence of the 2022-2025 period itself. (3) The document must originate from a government ministry or agency, an established market intelligence or industry analytics firm, a peer-reviewed journal or academic press, or a media outlet with an established editorial and fact-checking standard (e.g., Reuters). (4) the final corpus must include documents from at least three of four stakeholder categories, government, industry, civil society/media, and academia, for any claim used to support a core finding, to avoid conclusions resting on a single institutional viewpoint. (5) The document must be publicly available or retrievable through an institutional database, to keep the evidentiary basis independently verifiable by other researchers.

Three validation procedures were applied to the corpus, beyond the initial screening described above. First, triangulation: any quantitative figure 1. used as evidence (e.g., investment amounts, water consumption projections, market share) was cross-checked against at least one independent source before inclusion; figures reported by only a single source are identified as such and treated with corresponding caution in the analysis. Second, authority-based weighting: where sources disagreed, government sources were treated as authoritative for policy content, industry analytics firms (e.g., Mordor Intelligence, DataCenterMap) for market and infrastructure data, and peer-reviewed literature for theoretical claims; disagreements that could not be resolved this way are reported as open discrepancies rather than adjudicated by assumption. Third, currency verification: publication dates were checked against the 2022-2025 window for all sources used as evidence of current conditions, with pre-2022 sources restricted to explicitly labeled historical or theoretical use.

Analysis proceeded in four stages: data extraction, thematic coding, pattern identification, and interpretation. Data extraction involved recording both quantitative data points (investment figures, market shares, water and energy consumption figures) and qualitative data points (policy statements, regulatory provisions, stakeholder statements) from each document into a structured extraction log, indexed by source, publication date, and document category.

Thematic coding applied the three theoretical indicators developed in the Theoretical Framework as a fixed coding scheme, summarized in Table 1. Each extracted data point was coded against one or more indicators; data points that did not correspond to any indicator were retained in the log but excluded from the thematic analysis.

Pattern identification involved comparing coded data across the four document categories to identify recurring patterns, note where categories converged or diverged, and flag cases that did not fit the expected pattern (negative cases), which are reported alongside supporting evidence rather than omitted. Interpretation involved assessing the coded and cross-referenced evidence against the three-layer theoretical framework (World-Systems Theory, digital colonialism, and infrastructure/environmental governance) to determine the extent to which the evidence is consistent with structural dependency as theorized, rather than with an alternative reading of the same data (e.g., ordinary market integration).

Several limitations should be acknowledged. As a document-based study, it relies on publicly available secondary sources; proprietary data such as internal company records or confidential government negotiations were not accessible, which may understate the extent of value capture in some areas. Although Portuguese-language sources were included, English-language sources remain more numerous in the corpus, which may introduce a residual bias toward internationally reported framings over domestic ones. As a single-case study, findings from Brazil are not directly generalizable to other semi-periphery countries, although the case selection (detailed in the Introduction) was designed to maximize analytical, rather than statistical, generalizability. The 2022-2025 window, while short, was chosen specifically because it captures the acceleration phase following the launch of ChatGPT in late 2022, through the point at which major investment commitments and regulatory debates had become empirically observable; longer-term structural effects fall outside the scope of this study and are noted as a direction for future research.

Result and Discussion

Indicator 1: Surplus Value Extraction

Rising AI computing demand has a direct and measurable resource cost: some AI models are reported to emit carbon equivalent to 98 U.S. households annually and consume 2,769 liters of water, equivalent to roughly 24.5 years of one person's U.S. water consumption (Laughing et al., 2025; Morrison et al., 2025; Shehabi et al., 2018; Laras et al., 2025, Patel et al., 2025) . At the aggregate level, AI systems' carbon footprint has been compared to that of New York City in 2025 (de Vries-Gao, 2026), and Brazil's data center water consumption is projected to exceed 85.65 billion liters annually by 2030 (Mordor Intelligence, 2025c). This demand is layered onto a system with a documented vulnerability baseline: São Paulo experienced a severe water crisis in 2014 driven by climate change and overconsumption (Millington, 2018), meaning current expansion adds pressure to a system already shown to be fragile rather than to a neutral resource base.

On the economic side, Brazil has spent more than 23 billion reais (USD 4.2 billion) since 2014 on software, cloud, and security licenses from Google, Microsoft, and Oracle, with only a limited share of that spending directed toward domestic technology capacity (Martins, 2025a). This mirrors a broader regional pattern: U.S. and Chinese technology investment into Latin America concentrates in traditional sectors such as finance and commerce rather than in AI

development itself (Prado Prates & Chiarini, 2024; Negrão Andrade & Gobbi, 2026), while sustainability criteria attached to Brazil's own data center tax incentives were reportedly compiled without the Ministry of Environment's involvement (Martins, 2025a). AWS illustrates the value-capture side of this relationship directly: having operated in São Paulo since 2011, it channeled 19.2 billion reais (USD 3.39 billion) in infrastructure investment into Brazil between 2011 and 2023 (Luitse, 2024), operates in a Brazilian cloud market valued at USD 3.24 billion by 2025 (Mordor Intelligence, 2025a), and can repatriate resulting profits without dividend tax, since Brazil does not tax dividends transferred to a foreign parent company (Colombo & Cruz, 2023).

Water and carbon figures alone do not establish structural dependency, a domestically owned data center sector would generate comparable resource demand. What distinguishes this case is the asymmetry in who bears the cost and who captures the resulting value: Brazil supplies the water, land, energy, and fiscal incentives, but neither taxes the resulting profit repatriation nor requires reciprocal technology transfer as a condition of the incentives it grants. This is a different claim from "foreign investment is costly," and a stronger one: the evidence indicates Brazil is not merely hosting resource-intensive infrastructure but is structurally positioned so that even the fiscal tools available to capture some domestic benefit from that hosting (dividend taxation, technology-transfer conditions) are not being used. The efficiency measures reported in the literature, training AI models in water-efficient regions or during off-peak hours (Li et al., 2025), do not alter this asymmetry, since decisions about where and when to train remain with the core-country firm rather than the host region, meaning the periphery bears the residual cost of whatever efficiency choices are made elsewhere. At the same time, this reading should be qualified rather than treated as absolute: Brazil does derive some benefit from this arrangement, including construction-phase employment and infrastructure development, and the Brazilian state is an active participant in structuring the incentive regime rather than a passive recipient of externally imposed terms, a distinction addressed further under Indicator 3.

Similar patterns, resource-intensive data center expansion without commensurate technology transfer, have been documented in South Africa, Chile, and India (Okolo, 2021; Rovai, 2011), suggesting the Brazilian case is not an isolated policy failure but part of a recurring arrangement across semi-peripheral and peripheral hosts. What appears to distinguish Brazil within this group is the combination of market scale (the largest data center market in Latin America) with a documented, pre-existing water-scarcity baseline (the 2014 crisis), which sharpens the material stakes of the same structural pattern rather than establishing a fundamentally different one. This suggests the mechanism generating unequal exchange is systemic rather than country-specific, while its severity in any given case depends on local resource conditions, a distinction the existing literature has not yet examined comparatively across cases.

Indicator 2: Capital Accumulation

Rising demand for AI data centers has driven substantial capital inflows into Brazil, though domestic investment in the sector still trails foreign investment, a pattern associated in the literature with the risk of unbalanced dependence between capital owners and service providers (Cuervo-Cazurra & Genc, 2008). Brazil hosts more than 190 operational data center facilities as of 2024-2025, roughly a third of them in São Paulo (Data Center Map, 2025), yet five foreign operators control more than 70 percent of active capacity and pipeline in São Paulo, and Brazil captures only about 51.65 percent of Latin American hyperscale data center market revenue despite hosting the region's largest facility count (Mordor Intelligence, 2025b). Major foreign commitments underpin this structure: Microsoft has announced USD 2.70 billion for cloud and AI infrastructure in Brazil, and AWS has committed USD 1.80 billion through 2034 (Luitse, 2024), with São Paulo's data center capacity projected to roughly triple via a 1,800 MW expansion by 2029 (van Wynsberghe, 2021; Mordor Intelligence, 2025b).

AWS's own financial pattern illustrates the accumulation mechanism at firm level: its USD 3.39 billion investment in Brazil (2011-2023) sits alongside a Brazilian market position worth USD 3.24 billion (Mordor Intelligence, 2025a), tax-free profit repatriation (Colombo & Cruz, 2023), and a reinvestment rate near 90 percent of operating cash flow into AI infrastructure, well above Microsoft's and Google's reported 40-60 percent (Luitse, 2024). AWS's capital expenditure rose from roughly USD 83 billion in 2024 to USD 125 billion in 2025, with a projected USD 200 billion by 2026 (Luitse, 2024), while its operating margin grew from 29.6 percent in Q4 2023 to 36.9 percent in Q4 2024, and its 2024 operating revenue of USD 39.8 billion accounted for about 57 percent of Amazon's total operating revenue from just 18 percent of total company revenue (Luitse, 2024). Part of this surplus is reinvested in proprietary chip development (Trainium, Inferentia) that reduces AWS's reliance on Nvidia while reinforcing client lock-in through pricing and performance advantages (Luitse, 2024).

The relevant question is not whether capital is accumulating, it plainly is, at firm level, in dollar figures well documented above, but whose reinvestment cycle it feeds. AWS's reinvestment rate is nearly double that of its major competitors, and that reinvestment funds proprietary infrastructure (custom chips, expanded capacity) that further entrenches the firm's cost and performance advantage over any potential domestic or third-party alternative. This closes rather than opens a competitive window for Brazilian firms to enter the value chain at a higher tier than infrastructure hosting: each cycle of reinvestment raises the capital and technical bar for entry rather than lowering it. An alternative reading, that this is simply the normal behavior of a capital-intensive, scale-driven industry, and would look the same regardless of where the infrastructure sat, is worth taking seriously, since hyperscale cloud economics do favor concentration everywhere, including within core countries. What the Brazilian evidence adds beyond that general pattern is the state-competition dimension: U.S. and Chinese firms are reported to be competing specifically for hegemonic position in Latin America, using different strategies toward the same end (Negrão Andrade & Gobbi, 2026; Vila Seoane, 2021), which indicates the concentration is not only an efficiency outcome but is actively pursued as regional market control. Brazil's semi-periphery status, per Wallerstein's typology, is not eliminated by this state-level competition for its market, if anything, being contested by two core-country blocs is itself evidence of the semi-periphery position rather than a departure from it.

The U.S.-China competitive dynamic documented for Brazil (Vila Seoane, 2021) is explicitly regional in the cited literature, meaning the same competitive logic is understood to apply across other Latin American markets, not uniquely to Brazil. Combined with the South Africa, Chile, and India cases already noted under Indicator 1 (Okolo, 2021; Shumba et al., 2025), this suggests capital accumulation via infrastructure ownership is a general feature of core-firm expansion into semi-peripheral and

peripheral digital markets, rather than an artifact of Brazil's specific policy environment. This comparative reading strengthens rather than weakens the World-Systems interpretation: if the same ownership and reinvestment pattern recurs across multiple, institutionally distinct host countries, the more parsimonious explanation is a structural one rather than a series of unrelated national policy failures (Ghozali, 2025; Graham, 2020; Herlambang et al., 2025; Maiwan, 2017).

Capital Accumulation analysis proves the tendency of core countries to dominate high-value-added sectors such as technology control and capital, while AI is seen as a legal object whose entire responsibility for its actions remains with the developer, owner or human user behind it (Jubaidi & Khoirunnisa, 2025; Kijewski et al., 2024)

Indicator 3: Systemic Marginalization of Peripheral Economies

Brazil's marginalization is not only due to the usual market expansion, but also the contribution of the United States which is actively building a regulatory and geopolitical architecture that places developing countries in a semi-periphery position (Khoirunnisa et al., 2025). The U.S. International Trade Administration identifies Brazil as a leading investment destination for global technology firms in Latin America, citing a favorable investment climate and government incentives (Colombo & Cruz, 2023), while multinationals with strong institutional capability tend toward minority ownership specifically in lower-regulatory-quality jurisdictions (Falaster & Silva Portugal Vasconcelos Ferreira, 2022). Rikap's account of Big Tech controlling the full digital value chain, from data collection to AI deployment, positions Brazil as an infrastructure recipient rather than an AI developer, with limited transfer of innovation capacity accompanying that investment.

Even in the medical world, patients are often unaware of the role of artificial intelligence (AI) in their diagnosis or treatment, raising questions about whether consent is really based on adequate information, and the existing legal framework, provides only limited guidance on the disclosure of the extent of the technology's involvement (Khoirunnisa et al., 2025). This positioning is echoed at firm-orientation level: Brazilian multinationals themselves have historically pursued resource- and market-seeking strategies rather than innovation-based asset-seeking ones, indicating Brazil has not yet moved up the global value ladder from either the inbound or outbound investment side (Gomes et al., 2021; Rovai, 2011).

State policy plays an active role in sustaining this position rather than merely permitting it. Brazil's data center incentive policy commits limited natural resources without a clearly reciprocal domestic benefit (Zuboff, 2019), the sustainability criteria attached to those incentives were compiled without Ministry of Environment involvement (Martins, 2025a), and PBIA 2024-2028's BRL 23.03 billion allocation is directed predominantly at computing infrastructure rather than domestic technology-capacity development (Johansson Neto et al., 2024), This dynamic extends beyond routine market expansion into direct regulatory contestation: on May 2, 2023, Meta, Google, and Telegram campaigned against Bill 2630/2020 (the "fake news bill"), which would have required algorithmic transparency, accountability for misinformation, and limits on monopolistic conduct, and the bill's vote was reportedly obstructed following this campaign (Tomaz, 2023). Google's 2021 decision to end unlimited educational cloud storage in Brazil, requiring universities to pay for services previously treated as standard infrastructure, illustrates the same dependency at institutional scale (Tomaz, 2023). In September 2025, Brazil introduced data center tax incentives and withdrew a planned tax on Big Tech firms, reportedly to ease trade tensions following the imposition of U.S. tariffs on Brazilian goods (Ayres & Caram, 2025).

The evidence here supports a more specific claim than "Brazil has weak tech regulation": it supports a claim that regulatory weakness is actively reproduced under external pressure at the moment Brazil moves to change it. The fake news bill and the September 2025 tax reversal are not instances of Brazil failing to regulate, they are instances of Brazil attempting to regulate or tax, followed by successful pushback from Big Tech firms or geopolitical pressure from the firms' home government. This is the strongest evidence in the dataset against reading Brazil's position as simple market underdevelopment, since underdevelopment does not generate active resistance to correction. At the same time, this reading requires holding two things together without collapsing one into the other: Brazil is not a passive object of external control, its own incentive design, tax non-collection, and infrastructure-first PBIA allocation are domestic policy choices, and Brazil's capacity to reverse those choices is nonetheless constrained by external leverage when it tries.

This is consistent with, rather than contradictory to, Wallerstein's semi-periphery concept: the state's role is not simply victimhood or simple complicity, but active facilitation under an external constraint the state did not choose and cannot easily exit, which is the specific structural position World-Systems Theory attributes to the semi-periphery rather than to the periphery. At the same time, this reading requires holding two things together without collapsing one into the other: Brazil is not a passive object of external control, its own incentive design, tax non-collection, and infrastructure-first PBIA allocation are domestic policy choices, and Brazil's capacity to reverse those choices is nonetheless constrained by external leverage when it tries. This is consistent with, rather than contradictory to, Wallerstein's semi-periphery concept: the state's role is not simply victimhood or simple complicity, but active facilitation under an external constraint the state did not choose and cannot easily exit, which is the specific structural position World-Systems Theory attributes to the semi-periphery rather than to the periphery.

The regulatory-pushback dynamic observed in Brazil is not presented in the literature as unique to Brazil: Okolo (2021) documents comparable "algorithmic colonization" dynamics elsewhere in the Global South, in which Big Tech firms' market position translates into leverage over domestic policy attempts. Read alongside the ownership and investment patterns already noted for South Africa, Chile, and India (Shumba et al., 2025), this indicates that regulatory pushback of the kind Brazil experienced with Bill 2630/2020 is a plausible recurring mechanism by which semi-peripheral states' attempts at self-directed policy are constrained, rather than a Brazil-specific political outcome. The distinguishing feature in Brazil's case is the direct linkage to great-power trade politics, the 2025 tariff dispute tied specifically to unrelated geopolitical grievances (the Bolsonaro prosecution, U.S. tech-regulation complaints) being resolved partly through Brazilian tax concessions on data infrastructure, which suggests the leverage available to core-country firms in a semi-periphery setting can be reinforced by, and is not limited to, the direct commercial relationship between the firm and the host state.

Taken together, the three indicators point to a coherent structural pattern rather than three independent findings: Brazil supplies the resources for extraction (Indicator 1), the resulting capital accumulates on terms that reinforce rather than narrow the technology and ownership gap (Indicator

2), and this arrangement persists and is defended even when Brazil moves to change it, through mechanisms operating from firm lobbying up to bilateral trade pressure (Indicator 3). The comparative evidence from South Africa, Chile, India, and the broader U.S.-China competitive dynamic in Latin America suggests this is a general feature of core-firm expansion into semi-peripheral digital markets, with Brazil's scale and water-scarcity baseline determining the intensity, rather than the existence, of the pattern.

Conclusion

The three World-Systems Theory indicators tested in this study point consistently in the same direction: the expansion of AI infrastructure in São Paulo (2022-2025) reflects an asymmetrical, structurally reproduced pattern rather than ordinary global economic integration. Brazil bears the material burden of resource-intensive expansion and forgoes available fiscal tools (e.g., dividend taxation, technology-transfer conditions) to capture value from it (surplus value extraction); the resulting surplus is reinvested by core-country firms in ways that raise, rather than lower, the technical and capital barrier to Brazilian entry into higher-value tiers of the same industry (capital accumulation); and this arrangement persists, and is actively defended, even when Brazilian policy attempts to change it, through mechanisms ranging from firm-level lobbying to bilateral trade pressure (systemic marginalization). Read together, these three findings describe a digital-era instance of the classic core-periphery relationship: material burden concentrated in the host region, value concentrated in the core, and the arrangement sustained through a combination of technological control, host-facilitated policy, and external regulatory pressure rather than through any single mechanism alone.

This study's contribution is methodological as much as empirical. Prior literature had separately established Brazil's regulatory gaps (Nusdeo et al., 2025), the sectoral concentration of Global South-directed AI investment (Prado Prates & Chiarini, 2024), and a theoretical account of digitally mediated core-periphery hierarchy (Rikap, 2021), but no study had integrated these three strands into a single empirical test using operationalized World-Systems Theory indicators. By translating surplus value extraction, capital accumulation, and systemic marginalization into codeable indicators applied to a bounded case, this study offers a replicable analytical template that can, in principle, be applied to other semi-periphery AI infrastructure hosts, rather than a one-off descriptive account of the Brazilian case. It also extends World-Systems Theory itself by demonstrating how its classical mechanisms manifest specifically through data ownership, platform control, and algorithmic infrastructure rather than through the physical commodity trade the theory was originally built to explain — a contribution to both international political economy and the emerging AI governance literature, which have so far largely developed these conversations separately.

The findings suggest that Brazil's current data center incentive architecture, fiscal benefits granted without reciprocal conditions, is a policy design choice rather than an unavoidable feature of hosting foreign AI infrastructure, and is therefore a point at which outcomes could plausibly change without abandoning the goal of attracting investment. Three specific adjustments follow from the analysis: conditioning fiscal incentives on measurable technology-transfer commitments (e.g., local R&D partnerships or joint IP arrangements) rather than on capacity commitments alone; revisiting the current non-taxation of repatriated profits, at least for firms above a defined revenue threshold operating in Brazil; and formally incorporating the Ministry of Environment into sustainability-criteria design for future incentive packages, closing the gap identified in the data between stated environmental commitments and regulatory practice. These are offered as evidence-based directions for policy deliberation rather than settled prescriptions, since their feasibility depends on considerations, trade relations, fiscal capacity, administrative bandwidth, outside the scope of this study.

As a qualitative, document-based study, this research is constrained in its ability to quantify the precise magnitude of value extracted versus value retained, and it relies on publicly available secondary sources rather than internal firm or government data, which may understate the extent of the patterns identified. Its single-case design means findings are analytically, rather than statistically, generalizable to other semi-periphery contexts. The 2022-2025 window captures an acceleration phase but not the longer-term equilibrium this pattern may settle into, and the corpus, while including Portuguese-language sources, still weights English-language material more heavily, which may favor internationally reported framings of events over domestically reported ones.

Three directions follow directly from these limitations. First, a quantitative extension could estimate the actual gap between value generated within Brazil and value repatriated abroad, using firm financial disclosures or national accounts data where available, to move from a directional finding to a measurable one. Second, a comparative multi-case study, applying this study's same three-indicator coding scheme to South Africa, Chile, and India, all referenced here only through existing secondary literature, could test whether the structural pattern identified in Brazil holds with similar intensity elsewhere, or whether it varies systematically with factors such as market size, resource scarcity, or regulatory capacity. Third, a longitudinal follow-up beyond 2025 could assess whether Brazil's PBIA and related policy instruments produce measurable gains in domestic innovation capacity over time, providing an empirical test of whether current policy is capable of shifting Brazil's position on the global value chain or is more likely to reproduce the pattern this study identifies.

References

Anibal, A. M., Ausín, T., Liedo, B., Toboso, M., Aparicio, M., & López, D. (2022). Ethical Governance of AI in the Global South: A Human Rights Approach to Responsible Use of AI. *The 2021 Summit of the International Society for the Study of Information*, *136*. https://doi.org/10.3390/proceedings2022081136

Ayres, M., & Caram, B. (2025). Brazil launching data center incentives next month to woo big tech, sources say. *Reuters*. http://reuters.com/sustainability/climate-energy/brazil-launching-data-center-incentives-next-month-woo-big-tech-sources-say-2025-08-29/

Benteng, A., & Amar. (2021). Teori World System dan Pemenuhan Tenaga Kerja Kompeten. *Jurnal Tekstil: Jurnal Keilmuan Dan Aplikasi Bidang Tekstil Dan Manajemen Industri*, *4*(1). https://doi.org/10.59432/jute.v4i1.13

Bezerra, R. B. L., & de Brito, A. L. (2025). The Thirst of the Digital Leviathan:

Global Water Risk, Artificial Intelligence, and the Socioenvironmental Crisis of Infrastructure in the Global South. *Revista Dataveni*. https://doi.org/10.18391/9cbm5k51

Budhathoki, D. (2025). Capitalism and Global Inequality: Core-periphery Relations in the Context of World System Theory. *International Research Journal of MMC*, *6*(4), 89–98. https://doi.org/10.3126/irjmmc.v6i4.85258

Chirot, D., & Hall, T. D. (1982). World-System Theory. *Annual Review of Sociology*, *8*, 81–106. https://doi.org/10.1146/annurev.so.08.080182.000501

Colombo, D. G. e., & Cruz, H. N. da. (2023). Impact assessment of innovation tax incentives in Brazil. *Innovation and Management Review*, *20*(1), 28–42. https://doi.org/10.1108/INMR-11-2020-0167

Cuervo-Cazurra, A., & Genc, M. (2008). Transforming Disadvantages into Advantages: Developing-Country MNEs in the Least Developed Countries. *Journal of International Business Studies*, *39*(6), 957–979. https://doi.org/10.1057/palgrave.jibs.8400390

Data Center Map. (2025). *Brazil Data Centers*. https://www.datacentermap.com/brazil/

de Oliveira Nusdeo, A., Rezende Martins, F., Paula Resende Gallucci Rodriguez, M., Stella Palmeira Martins, D., de Oliveira, G., Morozetti Silva, L., Eduarda Fonseca Sant, M., de Queiroz, M., & Luiza Spessoto, M. (2025). O Brasil como Polo de Data Centers de IA no Sul Global: limites regulatórios e riscos socioambientais. *Revista Jurídica Direito & Realidade*, 56–86. https://revistas.fucamp.edu.br/index.php/direito-realidade/article/view/4036

de Vries-Gao, A. (2026). The carbon and water footprints of data centers and what this could mean for artificial intelligence. *Patterns*, *7*(1). https://doi.org/10.1016/j.patter.2025.101430

Falaster, C., & Silva Portugal Vasconcelos Ferreira, M. A. (2022). How Latin American multinational companies' institutional capabilities influence ownership in cross-border acquisitions. *Internext*, *18*(1). https://doi.org/10.18568/internext.v18i1.699

Fauzan, A., Rukmana, G. M., Muhammadiyah, U., & Timur, K. (2024). Dinamika Kerjasama Perusahaan Multinasional dalam Hubungan Internasional: Tinjauan dari Sudut Pandang Ekonomi Global. *INNOVATIVE: Journal Of Social Science Research*, *4*(3), 1766–1771. https://j-innovative.org/index.php/Innovative/article/view/10691/7376

Fitri, M., Padmi, M., & Ningrum, M. A. (2022). Politik Identitas dan Gerakan Black Lives Matter dalam Kampanye Politik Joe Biden-Kamala Harris pada Pemilu Amerika Serikat Tahun 2020. *Global Insight Journal*, *07*(1). https://doi.org/10.52447/gij.v7i1.5661

Friedmann, J. (2024). *Data Center Water Use*. https://icef.go.jp/wp-content/themes/icef_new/pdf/roadmap/2024/15.5_ICEF2.0%20Text%20Box-Data%20Center%20Water%20Use_stand%20alone.pdf

Furtado, R., & Cunha, S. (2024). Inteligência artificial, data centers e colonialismo digital: impactos socioambientais e geopolíticos a partir do Sul Global. *Liinc Em Revista*, *20*, e7272. https://doi.org/10.18617/liinc.v20i2.7272

Gabrys, J. (2016). *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet*. https://doi.org/10.5749/j.ctt1b7x5gq

Ghozali, I. F. (2025). Decolonizing Algorithms: Artificial Intelligence Bias and Digital Colonialism in Global South AI Governance. *Nawala Politika*, *3*(1). https://doi.org/10.24843/jnp.v3i1.342

Gomes, J., Costa, C., Gallon, S., & Ferasso, M. (2021). The Maturation of the Internationalization of Portuguese and Brazilian Multinational Companies. *International Journal of Business and Emerging Markets*, *1*. https://doi.org/10.1504/IJBEM.2021.10037598

Graham, M. (2020). Regulate, replicate, and resist–the conjunctural geographies of platform urbanism. *Urban Geography*, *41*(3), 453–457. https://doi.org/10.1080/02723638.2020.1717028

Herlambang, K., Mirongsenggo, S., Kusuma Rissing, D., & Rumbrapuk, F. (2025). Pengaruh Perkembangan Teknologi AI terhadap Kenaikan Harga GPU. *Jurnal Teknik Informatika Dan Teknologi Informasi*, *5*(3), 520–525. https://doi.org/10.55606/jutiti.v5i3.6370

Hu, T.-H. (2015). *A Prehistory of the Cloud*. https://doi.org/10.7551/mitpress/9780262029513.001.0001

Johansson Neto, G. P., da Costa, V. C., & Gaspar, W. B. (2024). Brazil's Artificial Intelligence Plan (PBIA) of 2024: Enabler of AI sovereignty? *The African Journal of Information and Communication (AJIC)*, (34), 1–15. https://doi.org/10.23962/ajic.i34.20424

Jubaidi, D., & Khoirunnisa, K. (2024). Artificial Intelligence in the Perspective of Indonesian Law: Subject or Object of Law? *Asian Journal of Education and Social Studies*, *50*(11), 302–314. https://doi.org/10.9734/ajess/2024/v50i111655

Jubaidi, D., & Khoirunnisa, K. (2025). Legal Perspectives on the Risks of Medical Malpractice in the Implementation of Artificial Intelligence and Telemedicine Technologies. *ALADALAH: Jurnal Politik, Sosial, Hukum Dan Humaniora*, *3*(4). https://doi.org/10.59246/aladalah.v2i4

Khoirunnisa, K., Indrawati, Ambarwati, Rahmadan, Y., & Jubaidi, D. (2025). Cyber Warfare and National Security: Modernizing Defense Strategies in the Context of China's Evolving Cyber Influence. *China Quarterly of International Strategic Studies*, *11*(1), 1–20. https://doi.org/10.1142/S2377740025500010

Kijewski, S., Ronchi, E., & Vayena, E. (2024). The Legal Governance of AI Around the World. In *Research Handbook on Health, AI and the Law* (pp. 254–272). Edward Elgar Publishing Limited. https://doi.org/10.4337/9781802205657.ch15

Kwet, M. (2019). Digital colonialism: US empire and the new imperialism in the Global South. *Race & Class*, *60*. https://doi.org/10.1177/0306396818823172

Laughing, S. M., Gustav, B. E., & Ruvalcaba, H. (2025). *AI Doesn't Drink a Bottle of Water per Prompt: The Engineering Reality of AI Infrastructure*. https://www.researchgate.net/publication/392129990

Li, P., Yang, J., Islam, M. A., & Ren, S. (2025). *Making AI Less "Thirsty": Uncovering and Addressing the Secret Water Footprint of AI Models*. http://arxiv.org/abs/2304.03271

Liu, Y., & Song, W. L. (2026). Navigating digital colonialism: Sovereignty models and development paths in the Global South. *Social Sciences and Humanities Open*, *13*. https://doi.org/10.1016/j.ssaho.2026.102546

Luitse, D. (2024). Platform power in AI: The evolution of cloud infrastructures in the political economy of artificial intelligence. *Internet Policy Review*, *13*(2). https://doi.org/10.14763/2024.2.1768

Luo, Y., & Tung, R. L. (2007). International Expansion of Emerging Market Enterprises: A Springboard Perspective. *Journal of International Business Studies*, *38*(4), 481–498. https://doi.org/10.1057/palgrave.jibs.8400275

Maiwan, M. (2017). Geografi, Geopolitik, dan Globalisasi: Suatu Analisa Terhadap Teori Sistem Dunia Immanuel Wallerstein. *Spatial: Jurnal Geografi*. https://journal.unj.ac.id/unj/index.php/spatial/article/view/2290

Martins, L. (2025a). *Brazil is Handing Out Generous Incentives for Data Centers, But What it Stands to Gain is Still Unclear*. https://www.techpolicy.press/brazil-is-handing-out-generous-incentives-for-data-centers-but-what-it-stands-to-gain-from-it-is-still-unclear/

Martins, L. (2025b). *Brazil is Learning Achieving Tech Sovereignty is Easier Said Than Done*. https://www.techpolicy.press/brazil-is-learning-achieving-tech-sovereignty-is-easier-said-than-done/

Millington, N. (2018). Producing water scarcity in São Paulo, Brazil: The 2014-2015 water crisis and the binding politics of infrastructure. *Political Geography*, *65*, 26–34. https://doi.org/10.1016/j.polgeo.2018.04.007

Mishra, S. (2024). The Evolution of Data Centers in the Age of AI. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, *10*(5), 363–368. https://doi.org/10.32628/cseit24105107

Mordor Intelligence. (2025a). *Brazil Data Center Market Size & Share Analysis – Growth Trends and Forecast (2026–2031)*. https://www.mordorintelligence.com/industry-reports/brazil-data-center-market

Mordor Intelligence. (2025b). *Brazil Data Center Water Consumption Market Size, Share & 2030 Growth Trends Report*. https://www.mordorintelligence.com/industry-reports/brazil-data-center-water-consumption-market

Mordor Intelligence. (2025c). *South America Hyperscale Data Center Market Size & Share Analysis – Growth Trends and Forecast (2026–2031)*. https://www.mordorintelligence.com/industry-reports/south-america-hyperscale-data-center-market

Morrison, J., Na, C., Fernandez, J., Dettmers, T., Strubell, E., & Dodge, J. (2025). *Holistically Evaluating the Environmental Impact of Creating Language Models*. http://arxiv.org/abs/2503.05804

Natashya, J. (2018). Dampak Globalisasi dan Lahirnya MNCs terhadap Munculnya North-South Development Gap. *Foreign Policy*, 50–67. https://doi.org/10.26593/sentris.v1i1.4156.50-67

Okolo, C. T. (2021). AI in the Global South: Opportunities and Challenges Towards More Inclusive Governance. *International Journal of Innovative Research in Arts, Education and Technology*, *2*. https://doi.org/10.48028/iiprds/ijiraet.v2.i1.09

Prado Prates, B., & Chiarini, T. (2024). Dependência na Era Digital: a divisão centro-periferia em Inteligência Artificial. *Liinc Em Revista*, *20*(2). https://doi.org/10.18617/liinc.v20i2.7305

Rikap, C., & Lundvall, B.-Å. (2021). *The Digital Innovation Race: Conceptualizing the Emerging New World Order*. https://doi.org/10.1007/978-3-030-89443-6

Rovai, R. (2011). *Multinacionais Brasileiras – Evolução e Perspectivas Teóricas: Caracterização de uma Tipologia*.

Shehabi, A., Smith, S. J., Masanet, E., & Koomey, J. (2018). Data center growth in the United States: Decoupling the demand for services from electricity use. *Environmental Research Letters*, *13*(12). https://doi.org/10.1088/1748-9326/aaec9c

Shumba, N., Tshekiso, O., Li, P., Fanti, G., & Ren, S. (2025). A Water Efficiency Dataset for African Data Centers. *Computers and Society*, 453–460. https://doi.org/10.1145/3715335.3735483

Strubell, E., Ganesh, A., & McCallum, A. (2019). *Energy and Policy Considerations for Deep Learning in NLP*. https://doi.org/10.18653/v1/P19-1355

Syafira, F. (2025). *Analisis Sentimen Dampak Perkembangan Artificial Intelligence (AI) pada Media Sosial Twitter Menggunakan Metode Support Vector Machine dan Lexicon Based* [Universitas Islam Negeri Syarif Hidayatullah Jakarta]. https://repository.uinjkt.ac.id/dspace/handle/123456789/73414

Therese, M. (2022). At the Tensions of South and North: Critical Roles of Global South Stakeholders in AI Governance. *ACM International Conference Proceeding Series*, 1434–1445. https://doi.org/10.1145/3531146.3533200

Tomaz, T. (2023). Brazilian Fake News Bill: Strong Content Moderation Accountability but Limited Hold on Platform Market Power. *Javnost*,

30(2), 253–267. https://doi.org/10.1080/13183222.2023.2201801
US Department of State. (2023). *2023 Investment Climate Statements: Brazil*. https://www.state.gov/reports/2023-investment-climate-statements/brazil/
van Wynsberghe, A. (2021). Sustainable AI: AI for sustainability and the sustainability of AI. *AI and Ethics*, *1*(3), 213–218. https://doi.org/10.1007/s43681-021-00043-6
Vila Seoane, M. F. (2021). Chinese and U.S. AI and Cloud Multinational Corporations in Latin America. In T. Keskin & R. D. Kiggins (Eds.), *Towards an International Political Economy of Artificial Intelligence* (pp. 85–111). Springer International Publishing. https://doi.org/10.1007/978-3-030-74420-5_5
Wallerstein, I. (2011). *The Modern World-System I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. University of California Press. https://doi.org/10.1525/9780520948570
Zuboff, S. (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (1st ed.). Public Affairs. https://doi.org/10.1007/s42438-019-00086-3