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Financing the AI Infrastructure Boom

Capital Structuring, Investment Risks, and the Bankability of Data Center Projects in Emerging Markets

[1]Peter Tobi Oke

[2]Aliyah Toyin Oyekade

[1]UC Berkeley, USA

Email: Peter.oke@berkeley.edu

[2]The university of Texas Rio Grande Valley (UTRGV) USA

https://orcid.org/0009-0003-1808-5305

oyekadealiyah@gmail.com

Abstract

Demand for artificial intelligence (AI) and cloud services is increasing the need for data center capacity, but little peer-reviewed evidence shows how such facilities are financed in emerging markets. This study asks how operators combine development finance, commercial debt, equity, and internal funding; which disclosed mechanisms address tenor, currency, construction, energy, and demand risks; and how an illustrative cash flow model responds to financing, electricity, and currency shocks. A purposive comparative documentary case study examines five case groups (Yondr in Malaysia, ODATA in Brazil, Africa Data Centres, WIOCC and OADC, and PAIX) comprising seven financing events disclosed between 2020 and 2024, with World Bank indicators for seven countries from 2015 to 2025. Structures ranged from a project company with initial loan ceilings of up to US$600 million against an estimated US$874 million cost to corporate loans, a regional facility whose first draw was 27.7% of its ceiling, and a US$20 million equity tranche. A development finance institution lent in four case groups. Only one event disclosed a tenor, one proposed a local currency tranche, and none disclosed loan pricing, hedging, or customer contract terms. Only one case linked demand explicitly to AI. In a hypothetical model, a base debt service coverage ratio of 1.50 stayed above an illustrative 1.20 under each single electricity, interest rate, and depreciation shock, but fell to 1.19 with a 10% revenue reduction and 0.82 in a combined scenario. Disclosures are informative but incomplete, and the cases are not representative.

Keywords: *data centers; project finance; development finance institutions; emerging markets; currency risk; artificial intelligence; bankability; infrastructure investment*

Introduction

Data centers have become a central part of the infrastructure behind AI, cloud computing, and digital services. The International Energy Agency (IEA, 2025) estimates that data centers used about 415 terawatt hours (TWh) of electricity in 2024, about 1.5% of global electricity consumption, and projects about 945 TWh by 2030 in its base case. Accelerated servers, mainly driven by AI adoption, account for almost half of the projected net increase. Most of this growth is expected in the United States and China, but the IEA also expects data center electricity demand in Southeast Asia to more than double by 2030. Earlier estimates showed that efficiency gains had moderated data center energy use as computing output grew (Masanet et al., 2020), whereas more recent work warns that AI workloads could reverse part of that pattern (de Vries, 2023). Whatever the exact trajectory, new capacity requires large, front-loaded investment in buildings, power, and cooling.

Financing that investment is harder in emerging markets. Long-lived infrastructure is usually financed with long-tenor debt, but lenders face higher political risk and, in some countries, weaker creditor rights and enforcement (Esty & Megginson, 2003; Hainz & Kleimeier, 2012). When debt is denominated in foreign currency and revenue is earned in local currency, depreciation raises the local cost of debt service, a problem that persists across many developing economies (Eichengreen et al., 2023). Data centers add specific features to these familiar problems. They combine real estate, electrical infrastructure, and rapidly changing technology; their revenue depends on tenants whose contract terms are rarely published; and their operating costs are exposed to electricity prices and supply reliability.

Emerging markets matter for this question because digital capacity is unevenly distributed. Lehdonvirta et al. (2024) show that public-cloud compute relevant to AI is unevenly distributed, with many countries, mostly in the Global South, hosting none, and the IEA (2025) reports that Africa has the lowest per capita data center electricity use of any region. Connectivity also has measurable economic effects: Hjort and Poulsen (2019) find that the arrival of fast internet raised employment in Africa. These patterns help explain why development finance institutions have supported data center investment in emerging markets, and why the terms on which such investment is financed are of interest beyond the individual transactions. They also raise a question that the energy literature does not answer: who supplies the capital for these facilities, on what terms, and with which risks left to sponsors, lenders, and investors.

A large literature examines project finance, syndicated lending, and the role of development banks, but peer-reviewed evidence on how data centers in emerging markets are actually financed remains thin. Public

information comes mainly from lender disclosures and sponsor announcements, which report selected terms and omit others. The current AI boom also creates a labeling risk: facilities built for general cloud and colocation demand may be described as AI infrastructure without evidence of AI-specific use. A study that keeps disclosed facts, missing terms, and interpretation separate can therefore add useful evidence even with a small number of cases.

This study addresses three research questions. RQ1: How do the selected emerging market operators combine development finance, commercial debt, equity, and internal funding? RQ2: Which disclosed mechanisms address financing tenor, currency exposure, construction risk, energy requirements, and demand uncertainty? RQ3: How does a transparent illustrative cash flow model respond to financing, electricity cost, and currency shocks?

The study treats bankability as a set of financing conditions that can be examined from disclosures, such as the instruments obtained, their tenor and currency, the lenders and investors involved, and the contractual or operational mechanisms described, rather than as an observed profitability outcome. It combines a comparative documentary analysis of five case groups and seven financing events with country indicators and a clearly separated illustration of debt repayment sensitivity. The contribution is threefold: a source-located evidence matrix of disclosed financing conditions for data center investments in emerging markets; a structured account of what these disclosures omit, which is itself relevant to lenders and policymakers; and a transparent model that links the risks discussed in the literature to debt service coverage. The study does not estimate a causal effect of development bank participation, identify an optimal capital structure, or claim a representative global sample.

Section 2 reviews the literature, Section 3 describes the design and data, Section 4 reports the results, Section 5 discusses them, and Section 6 concludes.

Literature Review and Analytical Framework

Project Finance and Corporate Finance

Project finance funds a single asset through a legally separate project company, with debt repaid mainly from that asset's cash flows and limited recourse to the sponsors. Esty (2004) argues that project finance deserves separate study and sets out a research agenda on how its high leverage, detailed contracts, and concentrated equity ownership affect managerial incentives and asset values. Theoretical work explains project financing as a way to support high leverage for risky assets (Shah & Thakor, 1987) and to reduce

the underinvestment costs of risky debt while preserving tax shields by giving the sponsor and the project separate capital structures (John & John, 1991). Brealey et al. (1996) argue that sponsor equity, high debt, and a dense web of contracts reduce agency problems and assign each risk to the party best able to assess and control it. Steffen (2018) finds that, in power generation, project finance is used mainly by independent sponsors with limited balance sheet capacity, which may also apply to specialist data center developers.

Corporate finance offers a contrasting route: an established operator borrows against its whole balance sheet and funds several facilities from one loan, equity, and retained cash flow. Because the cases include a project company, corporate loans, a regional facility, and platform equity, treating all of them as project finance would misstate who bears repayment risk.

Empirical studies show that project finance loans differ from other syndicated credits. Kleimeier and Megginson (2000) find that they have longer maturities, more third-party guarantees, and larger syndicates, and are more often extended to borrowers in riskier countries, despite high leverage. Sorge and Gadanecz (2008) document a hump-shaped relationship between credit spreads and maturity in project finance, which they attribute partly to uncertainty that is resolved as projects advance. Gatti et al. (2013) show that prestigious lead arrangers certify project quality and lower spreads, and Ahiabor and James (2019) find that domestic lead arrangers lower spreads on emerging market project loans, consistent with local information advantages. Data centers also have a real estate dimension: Marzuki and Newell (2019) identify them as an emerging alternative property sector whose listed vehicles earned higher but riskier returns than other real estate investment trusts.

2.2 Risk Allocation, Contracts, and Creditor Protection

A central claim in this literature is that contracts shape financing terms. Corielli et al. (2010) show that lenders rely on the network of nonfinancial contracts, such as construction, supply, offtake, and operating agreements, when pricing project finance debt, and that the identity of contract counterparties affects how much risk lenders treat as transferred. Byoun et al. (2013) find that project companies borrow more when risk is high but less when offtake agreements and similar features reduce risk, and conclude that leverage and contract structure work together as risk management tools. The legal environment also matters: Esty and Megginson (2003) find that syndicates are smaller and more concentrated where creditor rights and enforcement are strong, and Subramanian and Tung (2016) find that project finance acts as a contractual substitute for weak investor protection.

For data centers, the analogous contracts are tenant leases, power purchase agreements, and construction contracts. Where such contracts are not disclosed, outside observers cannot assess the risk allocation that lenders relied on, so this study codes disclosure rather than inferring terms from silence.

Emerging Market Constraints and Development Finance

Emerging markets add political, currency, and funding risks. Hainz and Kleimeier (2012) find that higher political risk makes both project finance structures and development bank participation in loan syndicates more likely, consistent with a role in reducing that risk. Broccolini et al. (2021) find that multilateral development bank lending increases subsequent private bank lending, the number of lenders, and loan maturities in developing countries. Gurara et al. (2020) find that loans with multilateral development bank participation carry higher spreads and longer maturities, suggesting that these banks finance riskier borrowers that private lenders would otherwise avoid. Higher costs of capital in developing economies can also deter capital-intensive renewable energy investment (Ameli et al., 2021). These studies support mobilization and risk mitigation as plausible mechanisms, but they do not show that any individual transaction would have failed without development finance.

Currency risk is a second constraint. Eichengreen et al. (2023) document that many emerging and developing economies still cannot borrow abroad in their own currencies, so foreign currency borrowing leaves borrowers exposed to depreciation. Du and Schreger (2016) show that even local currency sovereign debt carries substantial credit risk premia. For infrastructure with local currency revenue, a dollar loan creates a mismatch unless revenue is indexed to dollars, a hedge is available, or the loan is provided in local currency.

A third strand concerns who invests in infrastructure. Andonov et al. (2021) find that institutional investors seek stable long-term returns from infrastructure but invest mainly through private funds whose cash flows are as volatile and cyclical as other private equity. Sawant (2010) finds that firms use project finance in large infrastructure investments mainly to limit hold-up by suppliers and buyers, with weaker evidence that it reduces country risk. Gabor (2021) criticizes the wider approach of using public institutions to absorb investors' demand, currency, and political risks. Platform equity, observed in one case here, funds a growing operator rather than a single project.

Data Centers, Electricity, and AI

Data center research has focused mainly on energy use. Andrae and Edler (2015) projected rapid growth in electricity use by communication technology, whereas Masanet et al. (2020) estimated that efficiency gains had kept growth in global data center energy use far below popular forecasts. Koot and Wijnhoven (2021) show that usage growth is not fully offset by efficiency gains, and Mytton and Ashtine (2022) find that many published energy estimates rest on proprietary or poorly documented sources. Strubell et al. (2019) drew attention to the energy cost of training large AI models, and in a commentary, de Vries (2023) argues that AI could add substantially to electricity demand. Fitiwi et al. (2024) estimate that data center growth in Ireland raises power system costs, and the IEA (2025) notes that geographic concentration can complicate grid integration.

Electricity reliability is especially relevant in emerging markets. Cole et al. (2018) find that power outages reduce firm sales in Sub-Saharan Africa, especially for firms without generators, which implies that a data center operator may need backup generation and fuel storage that add cost. Together with the evidence on uneven compute capacity and the economic effects of connectivity discussed in Section 1, these studies may help explain why data centers in emerging markets attract development finance interest, but none examines how the facilities are financed.

Analytical Framework

The framework draws on these strands to define seven dimensions of disclosed financing conditions: capital structure, tenor and repayment, currency exposure, energy and operations, demand and counterparties, development finance, and construction and regulation. For each, the analysis records what the sources disclose and what that implies for who supplies capital and bears risk. Bankability is treated as the combination of these conditions rather than as a single score. A financing secured is evidence of access to capital under particular terms; it is not evidence of profitability, nonrecourse status, or future repayment.

Methods and Data

Design and Unit of Analysis

The study uses a purposive comparative documentary case study with descriptive secondary data and an illustrative financial model (Eisenhardt, 1989; Yin, 2018). Document analysis suits dated organizational disclosures that can be located and rechecked (Bowen, 2009). The primary unit of analysis is the operator or investment program (the case group); a financing event is a nested observation, and a source document

is evidence about an event. The extraction contains five case groups, seven events, eight transaction sources (S01 to S08), and 23 numeric or binary facts. Multiple events for one operator are not independent projects.

Case Selection

Cases were included if a publicly accessible, dated primary disclosure identified a borrower or investee, a financing instrument, a numeric amount, and emerging market asset exposure. Program and corporate financings were retained with their scope coded separately, while duplicate news reports, unsupported market estimates, and construction budgets without an identifiable financing instrument were excluded. Because the cases were assembled through targeted searches rather than a systematic census, the selection is purposive (Seawright & Gerring, 2008). The five case groups were chosen to vary the financing mechanism (Table 1).

Emerging markets are defined in the broad development finance sense, covering the developing economies where the selected assets are located; this is not an MSCI equity market classification. The Democratic Republic of the Congo (DRC) is included through the development finance exposure of the WIOCC program. Regional facilities are not assigned a single national exposure or allocated across countries.

Table 1 *Case Selection and Scope*

Case group	Study role	Countries named in sources	Events (disclosure date)	Sources	AI link in sources
Yondr	Hyperscale project finance	Malaysia (Johor)	Initial (2023-12-08); later (2024-12-23)	S01, S02	Explicit: later sponsor statement links demand to AI and digital services
ODATA	Corporate expansion financing	Brazil (São Paulo state)	Initial (2020-05-01); follow-on (2022-01-14)	S06, S07	Not established
Africa Data Centres (ADC)	Development finance facility and drawdown	South Africa, Kenya and other DFC-eligible countries	First draw (2022-08-15)	S03	Not established
WIOCC and OADC	Currency and sustainability conditions	South Africa, Nigeria, DRC	Program loan (2023-11-22)	S04, S05	Not established
PAIX	Institutional growth equity	Ghana, Kenya	Equity tranche (2022-02-16)	S08	Not established

Note. Dates are disclosure or announcement dates, not necessarily financial close. "Not established" means the sources do not state an AI-specific use, not that the facilities serve no AI workloads. DFC = U.S. International Development Finance Corporation. Source identifiers refer to the register in Supplementary Material S1.

Transaction Data Extraction and Verification

Each fact records a metric, value, unit, qualifier, scope, event, and source identifier, and is interpreted only with all of these fields. Qualifiers are retained: "up to" marks a ceiling, "estimated" a forecast cost, and "strictly greater than" a lower bound. Original disclosures and later announcements are separate events, and overlapping loans are not summed. Unknown values are left blank; "not disclosed" is distinguished from "absent", and ownership shares, contract terms, loan pricing, and hedging are not inferred from omission. Appendix A records how overlapping or differing figures were reconciled. The extraction was checked

against the primary sources, and all 23 facts were rechecked against the same pages; each matched its source and locator. Portal status fields updated after the events are treated as retrieval-date metadata.

Country Data

Country context comes from the World Bank World Development Indicators (WDI) for Brazil, Ghana, Kenya, Malaysia, Nigeria, South Africa, and the DRC from 2015 to 2025: the lending interest rate (World Bank, 2026d), the official exchange rate in local currency units (LCU) per U.S. dollar (World Bank, 2026e), consumer price inflation (World Bank, 2026c), internet users (World Bank, 2026b), and real GDP growth (World Bank, 2026a). The data were retrieved through the WDI version 2 interface. Of 385 possible country-indicator-year values in 77 country-year rows, 355 are reported and 30 are missing. Missing values are not filled with zero, interpolated, or replaced from nearby years.

The series are context, not measures of project conditions. The lending rate is a national benchmark, not the borrowers' loan rate, and its definition differs across countries. Exchange rates are annual averages; a rise in LCU per dollar indicates depreciation, and annual averages do not capture intra-year volatility. Because transaction evidence spans 2020 to 2024, 2025 values are labeled as later context that was not available to lenders at the time.

Coding of Risks and Mechanisms

The supplied qualitative evidence matrix was reviewed against the sources and extended to the seven dimensions in Section 2.5, with a source and locator for every coded claim. Entries use four evidence labels: explicit disclosure, not disclosed, not applicable, or scope uncertain. The labels describe the evidence, not credit quality, and are not combined into a bankability score. Lender statements, sponsor statements, and analyst interpretations are kept distinct. A facility is coded as AI-linked only where a source states that link.

Illustrative Financial Model

Because project cash flows and loan terms are not disclosed, the study uses a one-year illustrative model with analyst-chosen inputs that represent no selected case (Section 4.5). Annual debt service is a level payment on principal P at annual rate r over n years, $P \times r / (1 - (1 + r)^{-n})$. Cash flow available for debt service (CFADS) equals collected revenue less electricity cost, other cash operating costs, cash taxes, maintenance capital expenditure, and the increase in working capital, and the debt service coverage ratio (DSCR) is CFADS divided by debt service. All flows are in a common base-date currency equivalent. Receipts are entirely in local currency, a share s of debt service is in unhedged foreign currency, and a

depreciation of d multiplies debt service by (1 + s × d); the shock is not applied to receipts. A rate shock of 200 or 400 basis points adds 0.02 or 0.04 to the annual rate and represents floating-rate exposure or refinancing, not the repricing of a fixed-rate loan. The electricity, revenue, rate, and depreciation shocks listed in Table 7 are applied one at a time and then jointly. The 1.20 threshold is an analyst assumption, not an observed covenant or a universal lender requirement. The model omits imported costs, indexation, hedging, construction drawdowns, capitalized fees, and grace periods. No actual case DSCR, cost of capital, net present value, internal rate of return, or default probability is estimated.

Analysis and Ethics

The analysis is descriptive. A short chronology for each case precedes the cross-case comparison, and only matched-scope ratios are calculated, reported as proposed or disclosed financing ratios rather than realized leverage, returns, or current utilization. Country trends are summarized by the mean and range of inflation and lending rates over 2015 to 2024, the latest reported year, and annual exchange rate changes where adjacent years are observed, with observation counts. No regression of bankability is estimated, because there is no observed bankability outcome, no comparison group of rejected financings, and too few independent cases; country-year rows do not add independent financing cases.

This study analyzes publicly available organizational financing disclosures and aggregate country indicators. No participants were recruited, no interviews or surveys were conducted, and no identifiable private information was collected. Under the definition used by the Office for Human Research Protections (2021), such a design generally falls outside human subjects research. Python scripts in Supplementary Material S1 reproduce all calculations.

Results

Case Chronologies

Yondr (Malaysia). In December 2023, the International Finance Corporation (IFC) disclosed a proposed investment in a 96 MW greenfield hyperscale data center in Sedenak Tech Park, Johor, developed through Yellowwood Properties Sdn. Bhd., a special purpose vehicle wholly owned by Yondr Group. The estimated project cost was US$874 million. IFC proposed an A loan of up to US$150 million, or the Malaysian ringgit equivalent, on its own account, alongside parallel loans of up to US$450 million from other lenders, with equity covering the balance (International Finance

Corporation [IFC], 2023c). In December 2024, Yondr announced more than US$900 million of project financing to fund the construction and initial operation of its 98 MW Johor development, which forms part of a planned 300 MW campus, from seven lenders: DBS Bank, Deutsche Bank, Global Infrastructure Partners (part of BlackRock), HSBC, IFC, ING, and Natixis CIB (Yondr Group, 2024). The two events differ in scope (96 MW and 98 MW) and are not additive.

ODATA (Brazil). In May 2020, IFC disclosed a senior secured A loan of up to US$30 million to ODATA, a carrier-neutral multi-tenant operator with three data centers in São Paulo state, to support a US$78.5 million capital expenditure program for 2020 to 2023. The loan was a corporate finance loan with an eight-year tenor including a two-year grace period, and ODATA was to fund the remaining cost through equity and internal cash flow (IFC, 2020). In January 2022, IFC announced a new US$30 million tranche (about BRL 165 million) for which it had mobilized Itaú BBA and Sumitomo Mitsui Banking Corporation (SMBC) as new investors (IFC, 2022).

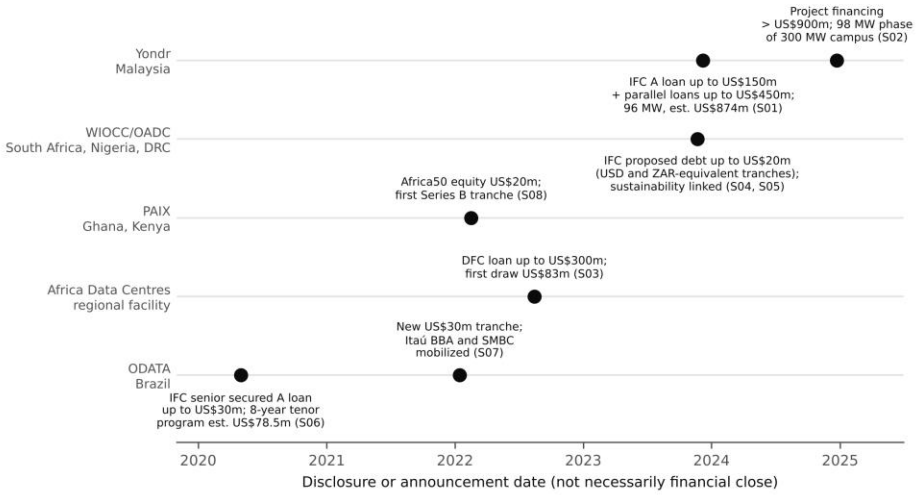
ADC (regional). In August 2022, the U.S. International Development Finance Corporation (DFC) announced the first disbursement of US$83 million from a loan of up to US$300 million to Africa Data Centres. The loan supports data centers in South Africa, Kenya, and other DFC-eligible countries, and the first disbursement mainly supports expansion in South Africa. DFC expected the financing to unlock approximately 31.3 MW of IT load capacity over the next three years (DFC, 2022).

WIOCC and OADC (regional). In November 2023, IFC disclosed proposed debt of up to US$20 million for a program to develop a pan-African data center network in South Africa, Nigeria, and the DRC through OADC, the data center business of the WIOCC group, which also operates connectivity services. The proposal comprised two A loans of up to US$10 million each, one in U.S. dollars and one in the South African rand equivalent, within a total program cost estimated at US$379 million. The board-approved investment table shows US$20.67 million, labeled indicative (IFC, 2023b). The environmental and social review summary describes the facility as a sustainability-linked loan with targets for energy efficiency and IFC EDGE certification (IFC, 2023a).

PAIX (Ghana and Kenya). In February 2022, Africa50 announced a US$20 million equity investment in PAIX Data Centres, forming the first tranche of its Series B financing. Africa50 was described as PAIX's first institutional investor, and the funds were intended for capacity expansion

and entry into new African markets. PAIX then operated carrier-neutral colocation facilities in Accra and Nairobi (Africa50, 2022). Figure 1 places the seven events on a common timeline.

Figure 1 *Financing Chronologies of the Five Case Groups, 2020 to 2024*



Note. Each marker is a financing event at its disclosure date. Amounts appear as text with their qualifiers and are not plotted on a common scale, because ceilings, disbursements, lower bounds, and equity tranches are not comparable.

Financing Comparison

Table 2 compares the seven events. Five distinct mechanisms appear. Yondr used project-level lending to a special purpose vehicle, initially structured as a development finance anchor loan with parallel loans and later as a seven-lender facility. ODATA used corporate lending, first from IFC's own account and then with mobilized commercial banks. ADC made a first draw on a development finance loan facility, and WIOCC's proposed program loan combined two currency tranches with sustainability targets. PAIX raised institutional equity at the platform level.

Table 2 *Financing-Event Comparison*

Event	Instrument and provider	Amount (qualifier)	Scope	Matched-scope calculation
Yondr initial (S01)	IFC A loan and parallel loans from other lenders; equity for balance; project held in an SPV	Cost 874 (estimated); IFC up to 150; parallel up to 450	96 MW greenfield facility	Loan ceilings 600 = 68.6% of cost; conditional equity 274; IFC ceiling 17.2%
Yondr later (S02)	Project financing from seven lenders including IFC	More than 900 (lower bound)	98 MW development within 300 MW campus	None; scope differs and amounts not additive
ODATA initial (S06)	IFC senior secured corporate A loan; 8-year tenor with 2-year grace	Program 78.5 (estimated); IFC up to 30	Three São Paulo facilities, 2020 to 2023 capex	IFC 38.2% of program; 48.5 equity and internal cash
ODATA follow-on (S07)	New tranche; Itaú BBA and SMBC mobilized	30 (announced)	Brazil expansion	None; later budget not disclosed
ADC first draw (S03)	DFC loan facility; first disbursement	Facility up to 300; first draw 83	Regional; first draw mainly South Africa	First draw 27.7% of ceiling (historical)
WIOCC program loan (S04, S05)	Proposed IFC A loans: USD and ZAR-equivalent tranches; sustainability linked	Proposed up to 20 (10 + 10); board table 20.67 (indicative); program 379 (estimated)	Mixed data center and connectivity program	IFC 5.3% (proposal) or 5.5% (board table) of program
PAIX equity (S08)	Africa50 equity; first Series B tranche	20 (completed)	Platform; Accra and Nairobi assets	None; ownership share not disclosed

Note. Amounts in US$ million, nominal, as disclosed. Calculations are analyst ratios of disclosed ceilings or estimates within the same scope; they are not realized leverage, returns, or current utilization. SPV = special purpose vehicle.

Matched-scope ratios summarize the initial structures. If both initial Yondr ceilings were fully used, loans would cover 68.6% of the estimated cost, leaving US$274 million (31.4%) to equity; IFC's own ceiling equals 17.2% of the cost. IFC's initial ODATA loan ceiling equals 38.2% of the estimated program cost, leaving US$48.5 million to equity and internal cash generation. ADC's first draw equals 27.7% of its facility ceiling. For WIOCC, proposed IFC debt equals 5.3% of the program cost (5.5% using the indicative board figure), but the program also includes connectivity, so the ratio does not measure data center leverage. The later Yondr and ODATA events cannot be converted into updated ratios, because the later budgets and the relationship between facilities are not disclosed.

A development finance institution was a lender in four case groups (IFC in three, DFC in one), and Africa50 provided equity in the fifth. Their roles differed: anchor lender with parallel loans (Yondr), initial lender that later mobilized commercial banks (ODATA), facility lender (ADC), proposed program lender with a local currency tranche and sustainability targets (WIOCC), and equity investor (PAIX). Commercial lenders were named in two case groups.

Risks and Financing Mechanisms

Table 3 summarizes the coded mechanisms; the full matrix with locators is in Supplementary Material S1. Only ODATA disclosed a tenor (eight years including a two-year grace period); WIOCC cited a longer-tenor loan without stating the years, and Yondr cited financial additionality from terms unavailable from local investors. Local currency options or tranches were explicit in two cases: Yondr's initial IFC loan could be provided in U.S. dollars or the ringgit equivalent, and half of WIOCC's proposed debt was a rand-equivalent tranche. ODATA's disclosure cited scarce long-term dollar financing in Brazil during the COVID-19 crisis. No case disclosed revenue currency or hedging, so a currency mismatch is possible but not established.

Table 3 *Risk and Mechanism Matrix by Case Group*

Dimension	Yondr	ODATA	ADC	WIOCC and OADC	PAIX
Capital structure	Explicit: SPV loans; later 7-lender facility (S01, S02)	Explicit: corporate loan; equity and internal cash (S06)	Explicit: DFC loan facility (S03)	Explicit: IFC program debt (S04)	Explicit: platform equity (S08)
Tenor and repayment	Not disclosed	Explicit: 8 years incl. 2-year grace (S06)	Not disclosed	Scope uncertain: "longer tenor", years not stated (S04)	Not applicable
Currency	Explicit: USD or MYR-equivalent option (S01)	Explicit: dollar loan; revenue currency not disclosed (S06)	Not disclosed beyond USD amounts (S03)	Explicit: proposed USD and ZAR-equivalent tranches (S04)	Not disclosed
Energy and operations	Explicit: EDGE support; energy and cooling efficiency (S01)	Explicit: energy management, backup power, fuel storage (S06)	Scope uncertain: power and cooling described, no terms (S03)	Explicit: energy efficiency and EDGE targets; air cooling (S05)	Not disclosed
Demand and counterparties	Scope uncertain: hyperscaler relationships (S01)	Scope uncertain: cloud and telecom clients (S07)	Scope uncertain: enterprises, cloud, hyperscalers (S03)	Scope uncertain: data center customers not described (S04)	Scope uncertain: carrier-neutral colocation (S08)
Development finance	Explicit: IFC anchor; EDGE; later lender (S01, S02)	Explicit: IFC loan; mobilization (S06, S07)	Explicit: DFC facility (S03)	Explicit: longer tenor; standard setting (S04)	Explicit: first institutional investor (S08)

Construction and regulation	Explicit: greenfield; category B (S01)	Explicit: expansion of existing sites; category B (S06)	Scope uncertain: expected capacity over three years (S03)	Explicit: DRC site under construction; category B (S05)	Not disclosed

Note. Labels describe the evidence, not credit quality, and are not combined into a score. No case disclosed customer contract terms. Category B is an environmental and social category, not a financial risk rating. MYR = Malaysian ringgit; ZAR = South African rand; EDGE = IFC Excellence in Design for Greater Efficiencies certification.

The disclosures point to phasing, rather than disclosed contracts, as the visible response to construction risk. Yondr's facility was greenfield, and its later financing covered construction and initial operation; ODATA expanded three existing facilities; ADC's capacity was expected over three years; and WIOCC reported one DRC site under construction and three brownfield sites in Durban and Johannesburg near completion, with an action plan item for the DRC environmental permit (IFC, 2023a). Energy provisions, disclosed in three cases, took the form of efficiency targets, certification support, and backup power; no case disclosed electricity tariffs, supply contracts, or pass-through arrangements. Demand evidence was general in every case, referring to hyperscalers, cloud and telecommunications clients, or carrier-neutral colocation, with no anchor tenants, contract length, pricing, or occupancy. Only Yondr's later announcement linked demand explicitly to AI, through a sponsor statement about the acceleration of AI and digital services (Yondr Group, 2024); this is not evidence that the facility serves AI workloads only.

Country Context

Table 4 reports coverage. Real GDP growth was reported for every country-year, and exchange rates were missing only for the DRC in 2024. Ghana had no lending rate observation in any year, the DRC had inflation data only for 2015 and 2016, and no country had an internet use value for 2025. These gaps limit the comparisons that can be made, especially for Ghana and the DRC.

Table 4 *Country-Data Coverage, 2015 to 2025*

Country	Lending rate	Exchange rate	Inflation	Internet users	GDP growth
Malaysia	11	11	11	10 (2025 missing)	11
Brazil	11	11	11	10 (2025 missing)	11
South Africa	11	11	11	10 (2025 missing)	11
Kenya	10 (2025 missing)	11	11	10 (2025 missing)	11
Nigeria	11	11	11	10 (2025 missing)	11
Ghana	0 (all years missing)	11	11	10 (2025 missing)	11
DRC	11	10 (2024 missing)	2 (2017 to 2025 missing)	9 (2017, 2025 missing)	11
Reported (of 77)	**65**	**76**	**68**	**69**	**77**

Note. Cells give the number of reported annual values out of 11. In total, 355 of 385 values are reported and 30 are missing. Source: World Bank (2026a, 2026b, 2026c, 2026d, 2026e).

Table 5 summarizes the series over 2015 to 2024. Among countries with full coverage, average inflation was lowest in Malaysia (1.87%) and highest in Ghana (17.40%) and Nigeria (17.16%), where it peaked at 38.11% in Ghana and 33.24% in Nigeria. Annual exchange rate changes were observed for 62 of 63 possible pairs from 2016 to 2024. Nigeria's currency depreciated by an average of 29.81% a year from 2016 to 2024, including 129.23% in 2024, and Ghana's by 16.79% a year, including 42.49% in 2022. Malaysia's average annual change was 1.85%, with no year above 10%. Brazil's lending rate averaged 40.18%, far above its inflation average of 5.84%; this may partly reflect the definition of the

national series and should not be compared directly with other countries' rates. The DRC's inflation average rests on two observations and is not comparable with the other countries.

Table 5 *Country Indicator Summary, 2015 to 2024*

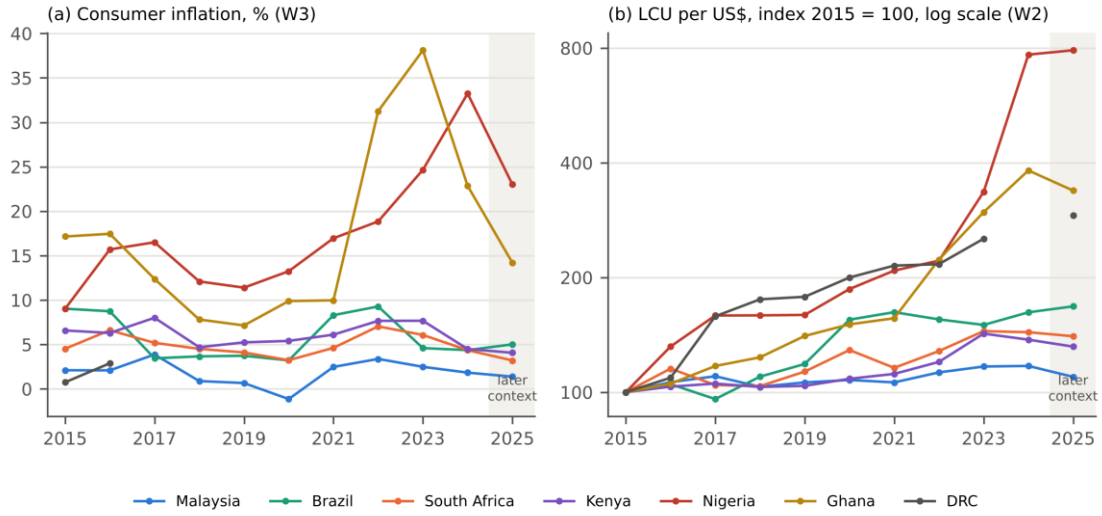
Country	Inflation, % mean (range), n	Lending rate, % mean (range), n	Annual LCU per US$ change, % mean (largest, year), n	Latest reported year: inflation; lending rate
Malaysia	1.87 (−1.14 to 3.87), 10	4.54 (3.44 to 5.32), 10	1.85 (6.22, 2022), 9	2025; 2025
Brazil	5.84 (3.21 to 9.28), 10	40.18 (29.04 to 52.10), 10	6.05 (30.69, 2020), 9	2025; 2025
South Africa	5.02 (3.23 to 7.04), 10	9.71 (7.04 to 11.63), 10	4.54 (15.29, 2016), 9	2025; 2025
Kenya	6.21 (4.49 to 8.01), 10	13.84 (12.00 to 16.59), 10	3.76 (18.65, 2023), 9	2025; 2024
Nigeria	17.16 (9.01 to 33.24), 10	15.13 (11.48 to 17.55), 10	29.81 (129.23, 2024), 9	2025; 2025
Ghana	17.40 (7.14 to 38.11), 10	Not reported, 0	16.79 (42.49, 2022), 9	2025; none
DRC	1.82 (0.74 to 2.89), 2	23.07 (19.05 to 26.74), 10	12.96 (44.95, 2017), 8	2016; 2025

Note. Annual changes are computed only where adjacent years are both observed; a positive change indicates local depreciation. Exchange rates are annual averages and do not measure intra-year volatility. The lending rate is a national benchmark whose definition differs across countries; it is not the borrowers' loan rate. Source: World Bank (2026c, 2026d, 2026e). Values for 2025 are later context.

Figure 2 shows inflation and the cumulative exchange rate path. The financing events occurred in different conditions. The initial ODATA financing was disclosed in 2020, when Brazil's GDP contracted by 3.28% and its currency depreciated by 30.69% against the dollar, consistent with IFC's reference to scarce long-term dollar financing. WIOCC's program was disclosed in 2023, when the

naira depreciated by 51.46%, the Congolese franc by 16.61%, and the rand by 12.81%. PAIX's equity was announced in 2022, when inflation in Ghana reached 31.26% and the cedi depreciated by 42.49% (in Kenya, 7.66% and 7.50%). By contrast, Malaysia's inflation was 2.49% in 2023 and 1.83% in 2024, with depreciation of 3.63% and 0.35%. Appendix B lists the event-year values for each named country. These are calendar-year averages that would not all have been known on the disclosure dates.

Figure 2 *Consumer Inflation and Exchange Rates in the Seven Countries, 2015 to 2025*



Note. Panel (a) shows annual consumer price inflation (W3, World Bank, 2026c). Panel (b) shows the official exchange rate in local currency units per U.S. dollar, indexed to 2015 = 100 on a log scale (W2, World Bank, 2026e); a rise indicates depreciation. Gaps are missing observations, not zeros. The shaded 2025 values are later context.

Illustrative Model Results

Table 6 lists the hypothetical inputs. With debt of US$65 million at 8% over 10 years, annual debt service is US$9.69 million; CFADS is US$14.50 million and the base DSCR is 1.50. Table 7 and Figure 3 report the scenarios.

Table 6 *Illustrative Model Assumptions*

Input	Value	Basis
Debt principal	US$65 million	Analyst assumption
Annual interest rate; amortization term	8%; 10 years	Level annual payment; no construction or grace period
Annual collected revenue	US$30 million	Local currency receipts at base exchange rate
Annual electricity cost	US$8 million	No tariff pass-through
Other cash operating costs; cash taxes	US$5 million; US$1 million	Assumed constant
Maintenance capital expenditure; increase in working capital	US$1 million; US$0.5 million	Assumed constant
Foreign currency share of debt service	70%	Unhedged; remainder in local currency
Illustrative DSCR threshold	1.20 times	Analyst choice; not an observed covenant

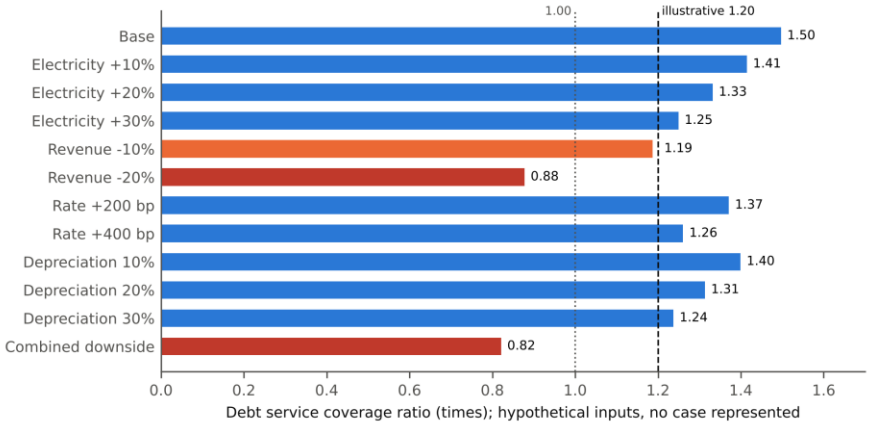
Note. All values are hypothetical, expressed in US$ million base-date equivalents, and represent no selected case.

Table 7 *Illustrative Model Results by Scenario*

Scenario	CFADS	Debt service	DSCR	CFADS shortfall to 1.20
Base	14.50	9.69	1.50	0.00
Electricity +10% / +20% / +30%	13.70 / 12.90 / 12.10	9.69	1.41 / 1.33 / 1.25	0.00
Revenue −10% / −20%	11.50 / 8.50	9.69	1.19 / 0.88	0.12 / 3.12
Rate +200 / +400 basis points	14.50	10.58 / 11.50	1.37 / 1.26	0.00
Depreciation 10% / 20% / 30%	14.50	10.37 / 11.04 / 11.72	1.40 / 1.31 / 1.24	0.00
Combined: rate +200 bp, electricity +20%, revenue −10%, depreciation 20%	9.90	12.06	0.82	4.57

Note. US$ million base-date equivalents. Shocks are applied one at a time, then jointly. The rate shock represents floating-rate exposure or refinancing. Depreciation applies only to the 70% foreign currency share of debt service. Results are illustrations of the model, not estimates for any case.

Figure 3 *Illustrative Debt Service Coverage Ratio by Scenario*



Note. Hypothetical inputs from Table 6; no selected case is represented. The dashed line marks the illustrative 1.20 threshold and the dotted line marks 1.00, the point at which CFADS equals debt service.

Every single electricity, interest rate, and depreciation shock left the DSCR above 1.20, the lowest being 1.24 at 30% depreciation. A 10% revenue reduction lowered the DSCR to 1.19, just below the threshold, and a 20% reduction lowered it to 0.88, below the point at which CFADS covers debt service. The combined scenario produced 0.82, with a CFADS shortfall of US$4.57 million relative to the illustrative threshold. Holding other inputs at base values, the DSCR reaches 1.20 at a revenue reduction of 9.6%, an electricity cost increase of 35.9%, depreciation of 35.3%, or a rate increase of about 520 basis points. Revenue is the most sensitive input because it is the largest cash flow, whereas the effect of depreciation is scaled by the foreign currency share. These rankings follow from the chosen inputs and would change with a different cost structure, currency share, or hedging arrangement.

Discussion

How Financing Conditions Were Assembled

In two case groups, financing was disclosed in successive events, and a third reported a first draw on a larger facility. Yondr's initial structure combined an anchor development finance loan, parallel loans, and equity; a larger multi-lender facility with a different scope was announced a year later, and its relation to the initial structure is not disclosed. ODATA moved from an IFC loan on its own account to a tranche with mobilized commercial banks. This pattern is consistent with the view that development banks can reduce perceived risk for other lenders (Hainz & Kleimeier, 2012) and that their lending is associated with later private lending (Broccolini et al., 2021). ODATA's follow-on tranche also brought in a domestic bank, Itaú BBA; evidence that domestic arrangers lower spreads on emerging market loans (Ahiabor & James, 2019) suggests one possible benefit, although Itaú BBA's role and the loan pricing are not disclosed. The cases cannot show that commercial participation depended on IFC or DFC, because no counterfactual is observed.

The disclosed mechanisms correspond to the risks emphasized in the literature, but only partly. Tenor, a distinguishing feature of project finance loans (Kleimeier & Megginson, 2000), was quantified in one event. Local currency financing, a response to the currency mismatch documented by Eichengreen et al. (2023), appeared in one program loan and as an option in one project loan. Energy risk was

addressed through efficiency targets, certification, and sustainability-linked terms rather than disclosed power contracts. The contracts that the project finance literature identifies as central to risk allocation (Corielli et al., 2010), such as offtake and construction agreements, and their data center analogue, tenant leases, were not disclosed in any case. The disclosures therefore document access to capital and selected mitigants, but they do not reveal the full allocation of risk among sponsors, lenders, tenants, and contractors.

The mechanisms also differed in who bore risk. Yondr's lenders lent to a single-asset project company, although nonrecourse status is not established; ODATA's lender relied on the operator's wider balance sheet; and Africa50 took equity risk across PAIX's platform. Treating these as one type of project finance would obscure the differences.

The model helps to interpret these mechanisms, although it represents no case. A local currency tranche, such as WIOCC's proposed rand-equivalent loan, lowers the foreign currency share of debt service to the extent that receipts are in rand, which is the parameter that scales the depreciation effect in the model; in the base inputs, depreciation of 35.3% was needed to reach the illustrative threshold with a 70% foreign currency share. A grace period, such as the two years in ODATA's loan, is omitted from the model, but it is designed to delay principal repayment until capacity is built and leased, the period in which revenue is least certain. Sustainability-linked energy targets address electricity use; in the model, the electricity increase needed to reach 1.20 (35.9%) was similar to the depreciation needed (35.3%), a result that depends on electricity being assumed at about a quarter of revenue. The input to which the model was most sensitive, revenue, corresponds to the dimension the disclosures described least. Under the chosen illustrative inputs, therefore, risk is concentrated where disclosure is thinnest; this is an illustration, not an estimate for any case.

Alternative Explanations and Disconfirming Evidence

Several alternative explanations limit interpretation. First, selection and disclosure bias are substantial. Most sources are development finance disclosures, so financings with development finance participation are overrepresented, and failed applications, purely commercial loans, and covenants are largely absent. The prominence of development finance in the case set is partly a consequence of where public information exists. Second, sponsor quality may explain financing access better than

project features: an operator with relationships with hyperscalers or an existing portfolio may obtain finance on the strength of the sponsor rather than the asset. Third, the timing and macroeconomic conditions differ. ODATA's initial loan was disclosed during the COVID-19 shock in 2020, before the current AI investment wave, and the African financings occurred during large depreciations in several countries. Fourth, the AI boom is not the evident driver in most cases. Only one case group linked demand explicitly to AI, and the other financings supported cloud, colocation, connectivity, and general digital expansion. This is disconfirming evidence for any claim that the financings observed here were primarily AI-driven.

Later events outside the extraction window show why financing announcements should not be read as project outcomes. Yondr reported handing over the first 25 MW of IT capacity in Johor in June 2025, six months ahead of schedule (Yondr Group, 2025a), and in November 2025 it completed the sale of its 300 MW Johor campus to Vantage Data Centers (Yondr Group, 2025b). These events were not coded, because they fall after the 2020 to 2024 window, but they show that ownership and operating status can change soon after financing is arranged.

Practical Implications

For lenders and investors, under the chosen illustrative inputs, revenue shortfalls from lower occupancy, slower lease-up, or weaker collections eroded coverage faster than moderate electricity, interest rate, or currency shocks taken one at a time. This makes the undisclosed demand terms, such as anchor tenancy, contract length, and pricing, central to any assessment of these assets. Combined shocks matter more than single shocks, so stress testing should consider correlated downside conditions. For development finance institutions, the cases show tools that can be used together: anchor and parallel lending, mobilization of commercial banks, local currency tranches, and sustainability-linked conditions. Because such de-risking can shift risk to public balance sheets, a concern raised by Gabor (2021), its use should be weighed against its public cost. More consistent disclosure of tenor, currency, hedging, and the reasons for differences between proposed and approved amounts would make these interventions easier to evaluate. For policymakers, stable access to electricity and local currency long-term funding are relevant conditions, given the energy intensity of data centers and the depreciation recorded in several of the countries.

Limitations

The study has several limitations. The five case groups were selected purposively, are not representative of data center investment in emerging markets, and cannot support statistical generalization. The evidence consists of disclosures and announcements, which may report proposed rather than executed terms; event dates are disclosure dates, not necessarily financial close. Key inputs are missing: project cash flows, loan pricing, amortization schedules, security packages, customer contracts, and hedging. The country indicators are national averages with notable gaps, and the lending rate is not comparable across countries. The model is hypothetical and omits construction-period financing, grace periods, indexation, and hedging, so its results illustrate mechanisms and do not estimate any project's risk.

Conclusion

This study examined how five data center case groups in emerging markets were financed between 2020 and 2024. On RQ1, the operators combined development finance with commercial debt, equity, and internal funding in different ways: project-level loans with parallel lenders, corporate loans that later mobilized commercial banks, a development finance facility with a first disbursement, a program loan, and platform equity. On RQ2, the disclosures addressed tenor in one event, currency through local currency options or tranches in two case groups, construction through phasing, and energy through efficiency targets, certification, and backup power, while demand was described only in general terms. No case disclosed loan pricing, hedging, or customer contract terms. On RQ3, the illustrative model remained above an illustrative coverage threshold of 1.20 under each single electricity, interest rate, and currency shock, but fell below it with a 10% revenue reduction and below 1.00 with a 20% reduction or a combined downside scenario.

These answers stay within the evidence. The study does not show that development finance caused the commercial participation observed, that any structure was optimal, or that the financed facilities are profitable. It shows which financing conditions were disclosed, how they differed across five mechanisms, and where an illustrative cash flow structure is most exposed. Under the illustrative inputs, the terms most relevant to coverage, those governing revenue, were also the terms least visible in the disclosures.

Bankability in these cases is best understood as a set of observable financing conditions, of which public disclosures capture only part. AI demand motivates current interest in data centers, but only one case explicitly linked demand to AI. Future research needs contract-level data on tenant agreements, power supply, loan pricing, and hedging; information on applications that did not reach financing; and larger samples that include purely commercial transactions. With such data, researchers could test whether the mechanisms described here are associated with financing terms and later project performance.

Declarations

Data availability. The transaction facts, country data, coding matrix, workbook, and analysis scripts are compiled in Supplementary Material S1. The original financing disclosures are available from IFC, DFC, Africa50, and Yondr Group, and the country indicators are available from the World Bank World Development Indicators. Original source links are provided in the references and the supplementary source register. Reuse is subject to the terms of each source.

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Appendix A. Event Reconciliation

Table A1 records how overlapping or differing figures were handled. No figure was replaced, summed across events, or reallocated across countries.

Table A1 *Reconciliation of Figures Across Events and Sources*

Case group	Issue	Handling in this study
Yondr	The initial disclosure covers a 96 MW facility (S01); the later announcement covers a 98 MW development (S02) within a planned 300 MW campus.	Kept as separate events and scopes; 300 MW is campus scope only.
Yondr	The later facility is "more than" US$900 million and includes IFC among seven lenders.	Recorded as a lower bound; not added to the initial IFC loan or the parallel loans.
ODATA	A new US$30 million tranche was announced in 2022 after the initial US$30 million loan (S06, S07).	Kept as a separate event; the initial program cost is not assumed unchanged, and no updated ratio is computed.
ADC	Capacity of approximately 31.3 MW is expected over three years, and the facility is regional (S03).	Not treated as completed capacity; no cost per MW or national allocation is computed.
WIOCC and OADC	The proposal gives up to US$20 million; the board table gives US$20.67 million, labeled indicative (S04). The source does not explain the difference.	Both figures retained and reported separately; no explanation assumed.
WIOCC and OADC	The US$379 million program includes connectivity as well as data centers (S04).	Not treated as data center construction cost; program ratios labeled accordingly.
PAIX	The event is the first US$20 million Series B tranche (S08).	Later cumulative investment reports are not added; ownership share is not inferred.

Note. Source identifiers refer to the source register in Supplementary Material S1.

Appendix B. Event-Year Country Context

Table B1 lists calendar-year indicator values for each country named in an event disclosure, in the year of the disclosure or announcement. Regional events are listed by country and are not aggregated. Annual averages for the event year would not all have been available to lenders on the disclosure date.

Table B1 *Indicator Values in the Event Year for Each Named Country*

Event	Year	Country	Lending rate, %	Inflation, %	LCU per US$ change, %	Real GDP growth, %
ODATA initial	2020	Brazil	29.04	3.21	30.69	−3.28
ODATA follow-on	2022	Brazil	39.40	9.28	−4.27	3.02
PAIX equity	2022	Ghana	Not reported	31.26	42.49	3.80
PAIX equity	2022	Kenya	12.34	7.66	7.50	4.86
ADC first draw	2022	South Africa	8.79	7.04	10.67	2.06
ADC first draw	2022	Kenya	12.34	7.66	7.50	4.86
WIOCC program loan	2023	South Africa	11.50	6.08	12.81	0.81
WIOCC program loan	2023	Nigeria	14.01	24.66	51.46	3.32
WIOCC program loan	2023	DRC	23.52	Not reported	16.61	8.53
Yondr initial	2023	Malaysia	5.32	2.49	3.63	3.54
Yondr later	2024	Malaysia	5.28	1.83	0.35	5.11

Note. Positive exchange rate changes indicate local depreciation relative to the previous year. "Not reported" marks a missing World Bank value, not zero. Source: World Bank (2026a, 2026c, 2026d, 2026e).