A Report on Cross-Border Digital Infrastructure Development

The Data Centre Boom in Growth Triangle



SINGAPORE, JOHOR & BATAM/RIAU

OCTOBER 2026

This report was prepared by Effective Thoughts, in collaboration with SMCSE Solutions and Wisdom Inn for Skill Enhancement (WISE), to examine how cross-border digital infrastructure is reshaping the Singapore-Johor-Riau (SIJORI) Growth Triangle, and what the data centre boom means for the corridor.

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A growth triangle is an economic, rather than political, concept that links neighbouring areas of different countries – each bringing its own mix of land, labour and capital, and its own competitive strengths – to form a subregion of economic growth.

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Introduction

The Singapore-Johor-Riau corridor is emerging as one of the world's most dynamic locations for digital infrastructure. The clearest sign of this transformation is in Johor, where operational data centre capacity grew by **124%** in a single year, from 401MW to 897MW in 2025.[1] This pace of expansion has propelled Johor into the ranks of the world's leading data centre markets. Johor now stands as the **fifth-largest** primary data centre market globally and, together with Sydney, is one of only two Asia-Pacific markets to feature in the global top ten.[2]

The boom reflects a straightforward geographical and economic logic. Singapore is Southeast Asia's premier digital and financial hub, but the city-state faces binding constraints on land availability and electricity supply. Following the government's 2019 moratorium on new data centre developments – and even after a limited reopening in 2022 – developers have sought locations that can accommodate land and power requirements of hyperscale facilities. Johor, and increasingly Batam in Indonesia's Riau Islands, offer these advantages: abundant land, comparatively lower costs, expanding power infrastructure and close physical proximity to Singapore. At the same time, Singapore continues to host the region's concentration of cloud providers, financial institutions, enterprise customers and digital services.

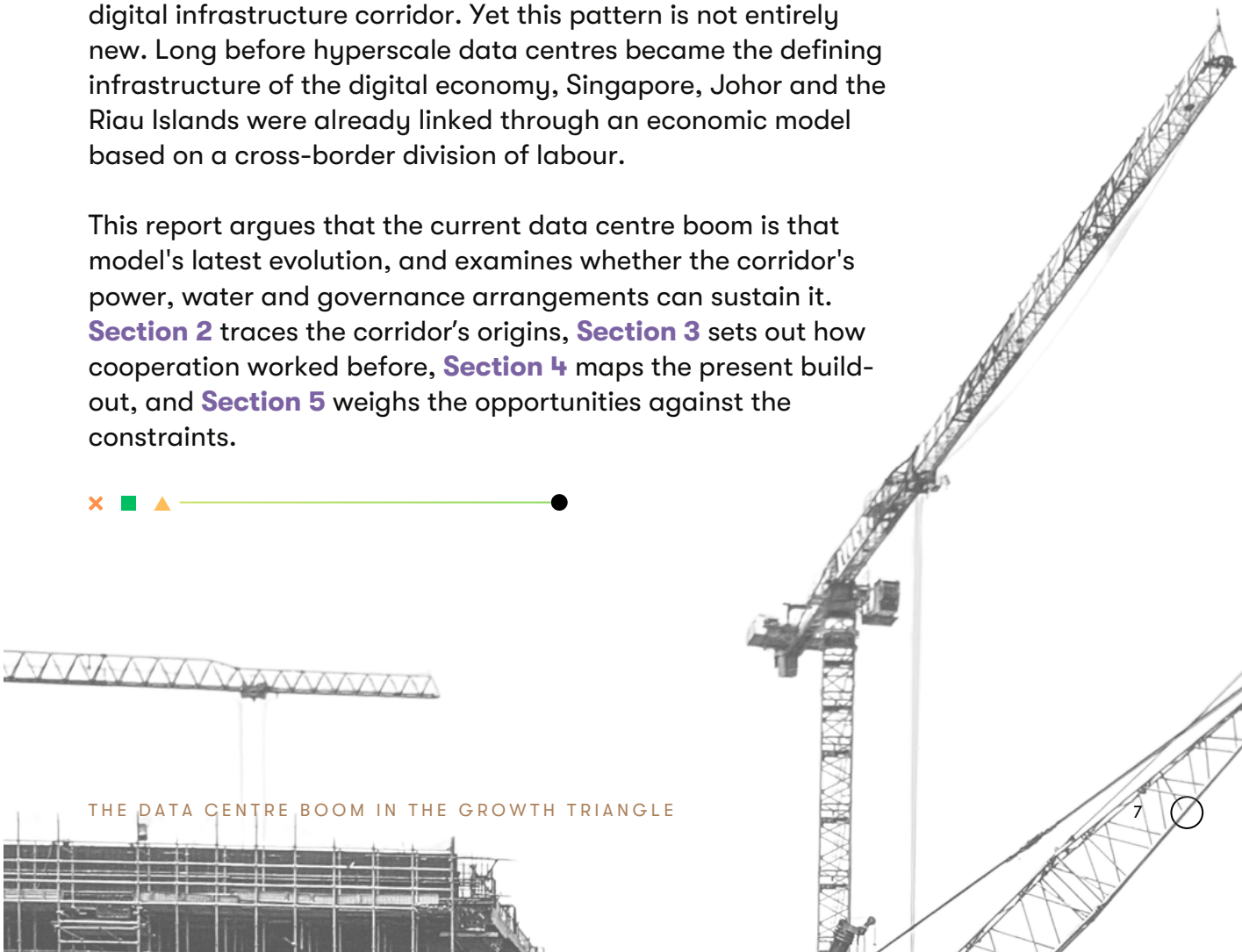
Together, they can be imagined as a single cross-border system with the work split three ways: *Singapore holds the customers and the connectivity, while Johor and Batam supply the land and the power.*

Industries and governments are beginning to recognise this emerging geography as more than a group of adjacent markets. In 2026, data centre developer DayOne formally introduced its proprietary "SIJORI" (Singapore-Johor-Riau Islands) model, explicitly presenting the three national markets as a single regional digital infrastructure platform.[3] While the branding is corporate, it represents how hyperscale operators increasingly view the region: as an interconnected ecosystem in which computing infrastructure, connectivity and investment span national boundaries.

Governments are also moving, albeit more cautiously, in the same direction. At the 16th *Singapore-Indonesia Six Bilateral Economic Working Groups Ministerial Meeting* in June 2026, Singapore's Deputy Prime Minister Gan Kim Yong and Indonesia's Coordinating Minister for Economic Affairs Airlangga Hartarto agreed to undertake a joint study on the technology sector across Batam, Bintan and Karimun, with the objective of developing the islands into a "vibrant digital hub."[4] The announcement did not describe the area as a single data centre hub, but it does show that governments increasingly treat digital infrastructure as a regional rather than a purely national matter.

Taken together, these developments point to a cross-border digital infrastructure corridor. Yet this pattern is not entirely new. Long before hyperscale data centres became the defining infrastructure of the digital economy, Singapore, Johor and the Riau Islands were already linked through an economic model based on a cross-border division of labour.

This report argues that the current data centre boom is that model's latest evolution, and examines whether the corridor's power, water and governance arrangements can sustain it. **Section 2** traces the corridor's origins, **Section 3** sets out how cooperation worked before, **Section 4** maps the present build-out, and **Section 5** weighs the opportunities against the constraints.



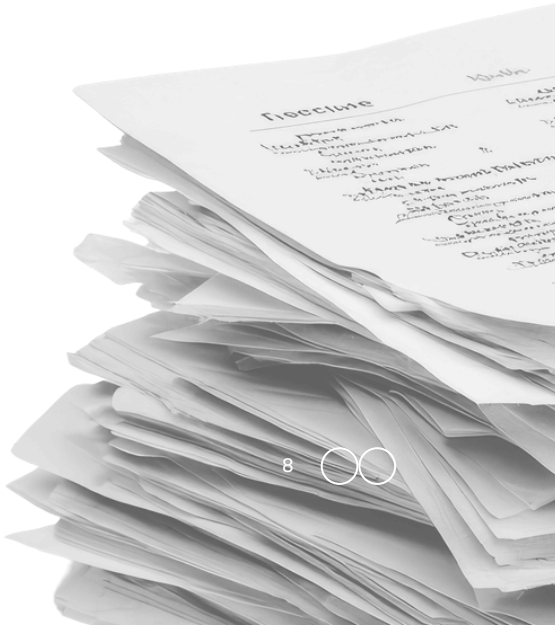


From SIJORI to IMS-GT: A corridor built on complementarity

The geography of today's data centre boom is rooted in a much older pattern of cross-border economic organisation. Long before hyperscale data centres arrived, Singapore, Johor and Batam were already part of a shared production network, in which each contributed what the others lacked. Understanding this history helps explain why the current wave of investment is concentrated in these locations rather than elsewhere in Southeast Asia.

The arrangement was first proposed in **December 1989** as the Singapore-Johor-Riau (SIJORI) Growth Triangle by Singapore's then-Deputy Prime Minister, Goh Chok Tong.[5] The concept sought to link Singapore with the Malaysian state of Johor and Indonesia's Riau Islands into a single economic space, enabling firms to allocate different stages of production according to each location's comparative advantages rather than within national borders alone. As the initiative expanded during the 1990s to include additional Malaysian states and Indonesian provinces, it was formalised as the **Indonesia-Malaysia-Singapore Growth Triangle (IMS-GT)**, reflecting a broader geographic scope while retaining the original cross-border logic.[6]

Unlike regional organisations such as ASEAN or the European Union, the IMS-GT was not intended to create a new



supranational governance structure. Instead, it was a market-driven model of regional cooperation, relying on private investment and coordination between governments rather than formal political integration. A growth triangle is an economic concept that links neighbouring areas of different countries, each bringing its own mix of land, labour and capital, and its own competitive strengths, to form a "subregion of economic growth."[7] They are an example of development based on functional economic integration rather than institutional integration.[8]

Across the literature, a consistent division of roles emerges in the IMS-GT. **Singapore supplies capital, advanced infrastructure, technology, managerial expertise and access to international markets, while Johor and the Riau Islands contribute relatively abundant land, labour and lower production costs.**[9] Rather than competing directly, the three territories specialised in different segments of regional value chains, allowing firms to combine Singapore's high-value business environment with the lower-cost production capacity available just across the border. Section 3 sets out the evidence behind this division of roles, together with the uneven reality many scholars find beneath it.

The development of the Growth Triangle is attributed to four recurring factors: economic complementarity, geographic proximity, political commitment and infrastructure connectivity. Later work adds a fifth – sustained private-sector participation – which grew in importance as multinational firms came to drive investment decisions across the corridor.[10] Together, these conditions allow the IMS-GT to evolve as a flexible production network without requiring deep institutional integration.

While the sectors underpinning the corridor have evolved over the past three decades – from export-oriented manufacturing and electronics to increasingly knowledge-intensive industries – the underlying economic logic has remained consistent. The expansion of data centres across Singapore, Johor and Batam is the latest manifestation of the Growth Triangle model. The technologies have changed, but the principle of cross-border functional specialisation that shaped the original SIJORI initiative continues to define the corridor today.



What cooperation looked like before

Before data centres started becoming the corridor's defining industry, the Singapore-Johor-Riau (SIJORI) arrangement was organised around a simpler and more durable logic: each territory contributed what it had in relative abundance. Singapore supplied capital, technology, and international connectivity; Johor absorbed intermediate-tier manufacturing; and Batam/Riau absorbed the most labour-intensive, cost-sensitive production.

This division of labour was, in the language of the literature, "market-driven" – labour, land and utilities were cheaper on one side of the border than the other, and the gaps were wide enough to make moving production across commercially sensible.



3.1 The original three-way division of labour

Table 3.1 shows what the literature tells us about this pattern, and the evidence behind it.

	Literature	Source
01 **Singapore's role in capital, finance, logistics and technology** 	"Singapore contributes capital, technology, infrastructure, management expertise, and international connectivity," while Johor and Riau supply land and labour.	Ooi, 1995
	Rising Singaporean land and labour costs pushed land- and labour-intensive activity outward, while Singapore retained "higher-value activities such as finance, management, logistics, and technology-intensive functions."	Department of Foreign Affairs and Trade, 1995
	Financial and business services accounted for **32.4%** of Singapore's GDP versus manufacturing's **29.1%** in 1990, with the services segment growing **14.9%** that year alone.	Stewart & Png, 1993
02 **Johor as a manufacturing extension at the intermediate tier** 	Johor acts as an "intermediate" industrial tier rather than the lowest rung: "labour-intensive industries in Riau, intermediate industries in Johor, and high-tech in Singapore."	Stewart & Png, 1993
	Johor's 1988 "twinning with Singapore" policy produced a **200%** increase in Singaporean investment into the state in that single year.	Parsonage (1992), as cited in Singh (2020)
	Johor FDI inflows rose from an average of **US$210 million/year** in the 1980s to over **US$800 million/year** in the 1990s – close to a **four-fold** increase (Figure 3.1).	Hutchinson & Chong, 2016
03 **Batam/Riau as a lower-cost production base** 	Production-worker wages in Batam ran **US$80–160/month** versus **US$380–700/month** in Singapore – a **4–6x** differential (Figure 3.2).	Stewart & Png, 1993
	Batam, under Free Trade Zone status since 1971, attracted **700+** foreign companies from **34 countries** and over **US$3 billion** in foreign investment.	Toh, 2021

Table 3.1 — Literature synthesis on the original Singapore-Johor-Batam/Riau division of labour.

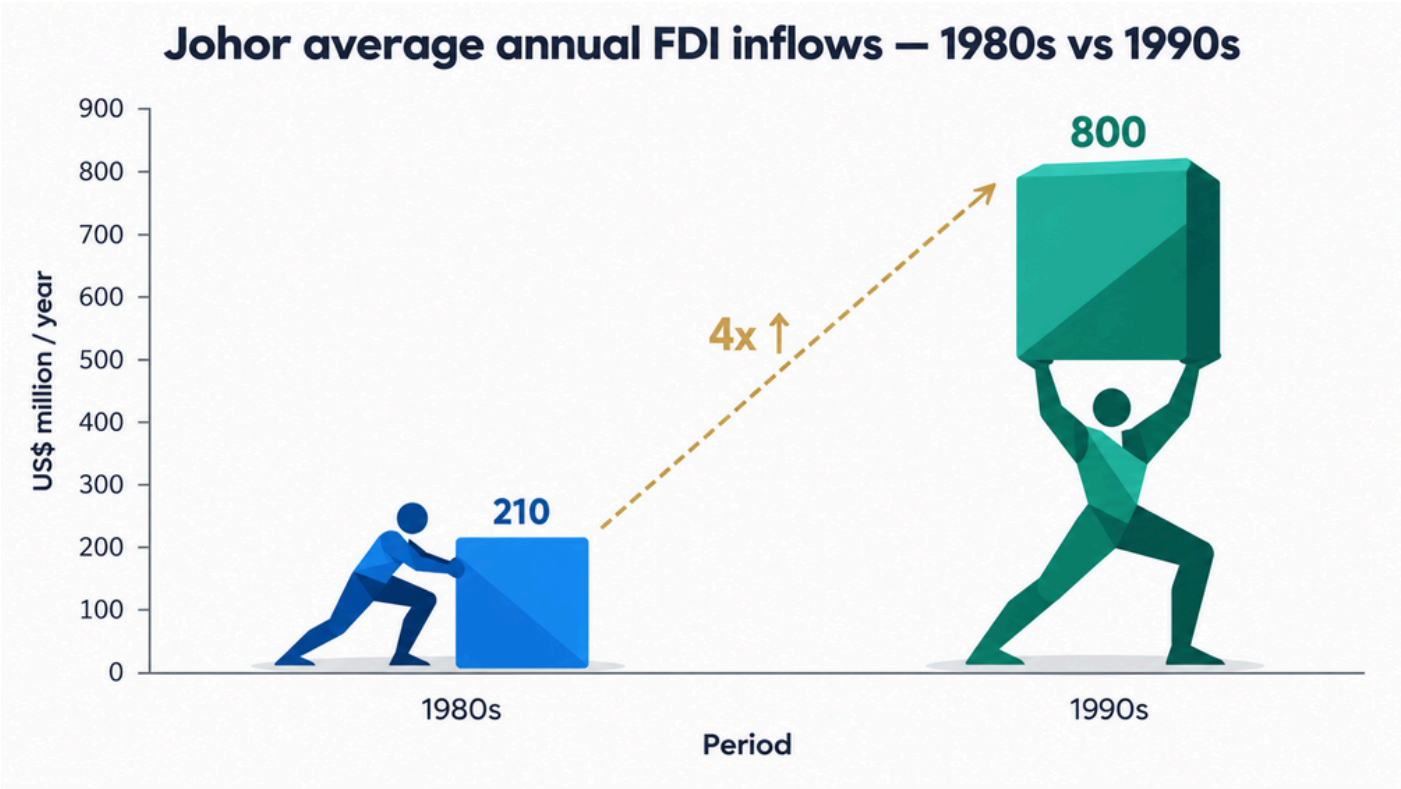


Figure 3.1 — Johor's average annual FDI inflow nearly quadrupled between the 1980s and 1990s, driven substantially by Singaporean, Japanese and Taiwanese investment following the 1988 "twinning" policy. Source: Hutchinson & Chong, 2016.

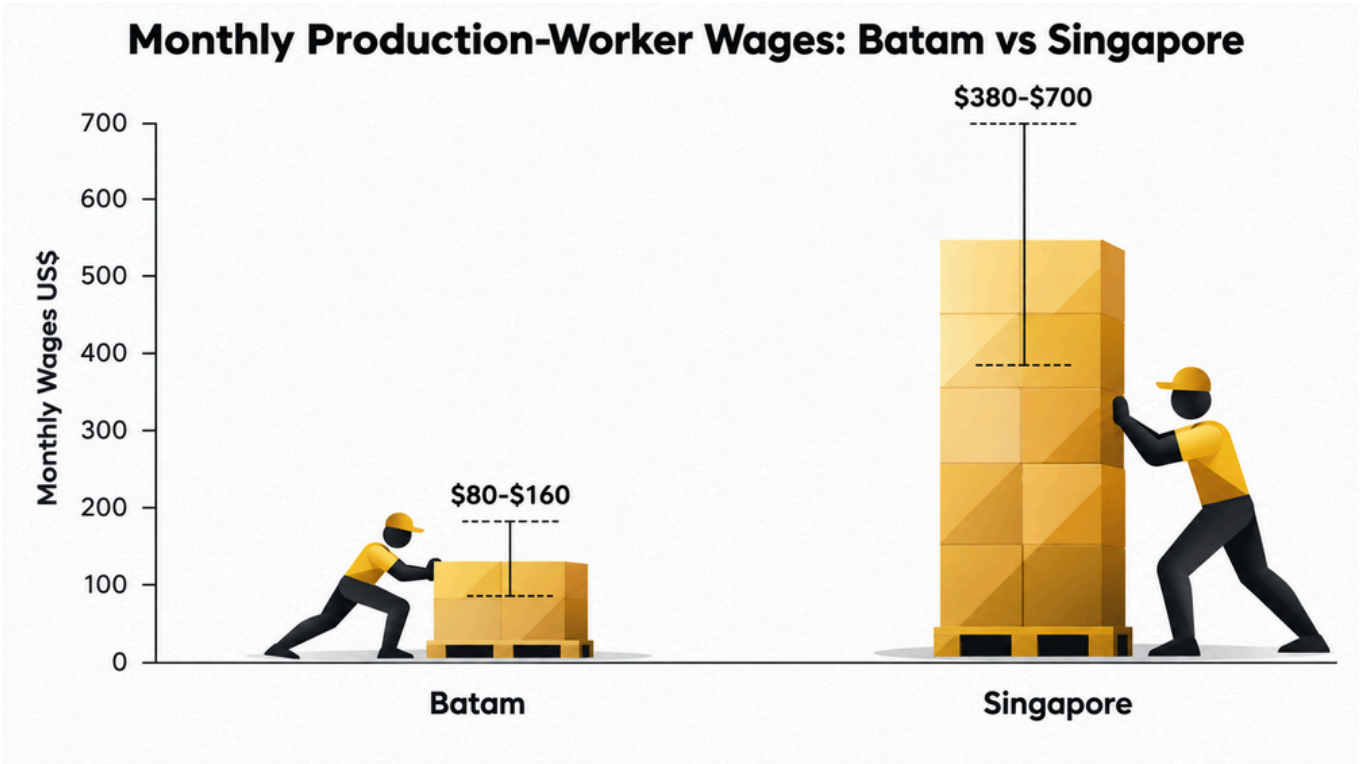


Figure 3.2 — The 4–6x wage differential between Batam and Singapore was the single clearest price signal underpinning the original relocation logic. Source: Stewart & Png, 1993.

3.2 Beyond the three-tier model: A more uneven reality

While the "three-tier" framing captures the basic logic of the IMS-GT, the economic relationships within it were never symmetrical. The literature consistently describes the Growth Triangle as two strong bilateral axes – Singapore-Johor and Singapore-Riau – with a much weaker Johor-Riau relationship. The result is better understood as a Singapore-centred subregional network than as an equilateral triangle (we visualise this in Figure 3.3).

- **The Johor–Riau relationship was structurally weaker because the two economies offered the same things.** Both supplied relatively abundant land and lower-cost labour. Johor and Riau were described as "much more competitive than complementary," leaving their direct economic links underdeveloped.[11]

- **Economic integration consequently developed primarily along two bilateral channels:** Singapore-Johor and Singapore-Riau – rather than three equally dynamic bilateral relationships.[12]

- **The term "triangle" therefore overstates the degree of three-way integration.** A more realistic interpretation is that three territories participated in a common subregional economic zone, with Singapore functioning as the central node connecting the two peripheral economies. The United States International Trade Commission (USITC) reached similar conclusion, describing SIJORI as "mainly bilateral rather than trilateral, with Singapore at the core."[13]

- **The two bilateral axes also emerged through different mechanisms.**

    - *The Singapore-Johor relationship was substantially market-driven and predated the formal announcement of the Growth Triangle.* Johor already had relatively good industrial infrastructure and transparent regulations by the late 1970s, and Singaporean firms began relocating labour-intensive manufacturing there before the Growth Triangle was formally announced. Thomson Consumer Electronics, for example, established a factory in Muar, Johor, in 1974;[14] investment accelerated following Malaysia's liberalization of foreign-investment regulations in 1986.[15]

- *The Singapore-Riau axis was more dependent on government intervention.* Indonesian policy changes in 1989 enabled private-sector infrastructure development on Batam and allowed 100% foreign ownership for the first five years, helping create the conditions for Singapore-linked industrialization on the island.[16]

- **The scale and composition of early investment show the same asymmetry.** By 1990, Batam's exports had reached almost **US$150 million**, roughly three times the 1989 level, while total foreign investment was estimated at approximately **US$1 billion**. Singapore accounted for 45% (US$450 million) of Batam's foreign investment, compared with US$178 million from the United States, US$92 million from Japan, US$89 million from Hong Kong, and US$86 million from Europe.[17]

- **The growth triangle's logic can be understood as a hub-and-spoke structure.** Singapore was the hub, while Johor and Riau developed separate economic linkages with Singapore. This interpretation is consistent across early policy analysis and subsequent academic work.[18]

- **This asymmetry persisted beyond the initial formation of SIJORI.** A later assessment describes the historical economic connection between Singapore and Johor as much stronger than that between Singapore and Riau, while the Johor-Riau economic connection remained negligible – leading it to be characterised as an "hourglass" with Singapore as its neck rather than a complete triangle.[19]

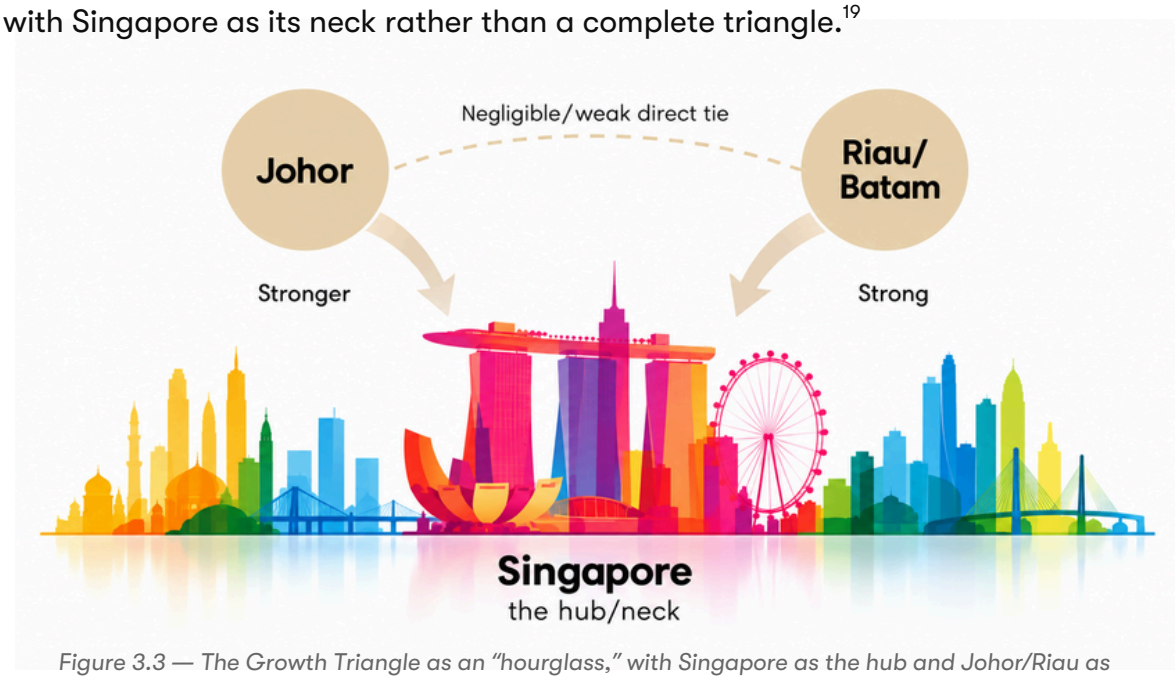


Figure 3.3 — The Growth Triangle as an "hourglass," with Singapore as the hub and Johor/Riau as spokes joined strongly through Singapore, not weakly to each other. Source: Xiaodong, 2019.

3.3 Manufacturing, electronics and the "overflow" tourism economy

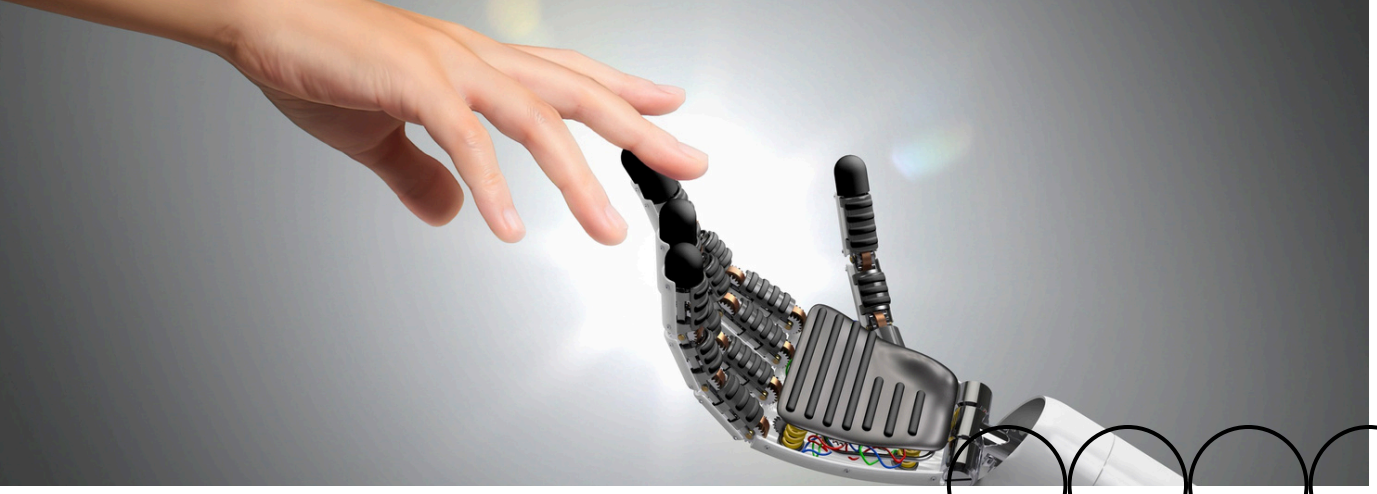
Manufacturing and industrial relocation are the dominant historical drivers cited across nearly every source in the literature.[20] Electronics and semiconductors were the sector most closely associated with the boom. Malaysia's manufactured-export share rose from **20%** of total exports in 1976 to **60%** by 1991, alongside a **1,100%** increase in industrial output over the same period. Singapore's planned technology park in Skudai, Johor – covering 600 hectares – was explicitly framed at the time as a high-tech counterpart to, and larger than, Taiwan's Kaohsiung technology park (500 hectares).[21]

Batam's industrial base took a heavier, more capital-intensive form: the island came to host approximately 40 shipyard and heavy-fabrication industries,[22] alongside the lighter assembly and processing activity typical of its Free Trade Zone status.

Tourism operated as a secondary but structurally revealing sector throughout this period. Singapore functioned as the dominant international gateway, capturing most long-haul arrivals, while Johor and Batam captured largely secondary or "overflow" tourism – day-trippers and short-stay visitors whose journeys originated in Singapore.[23]

This asymmetric, core-periphery tourism pattern is a useful parallel for the data-centre boom examined in Section 4.





The rise of data centres

The underlying logic that shaped the manufacturing-era Growth Triangle (Singapore retaining scarce yet high-value capacity while land- and resource-intensive activity moves outward) is repeating itself in a new industry. Singapore's physical limits on land and electricity grid capacity have constrained new data centre construction since 2019; Johor has absorbed the resulting demand at a pace with few parallels in the world; and Batam/Riau, while lacking a comparable market-wide aggregate, has begun attracting individually large hyperscale commitments. This section sets out what is known, quantitatively, about each leg of that shift.

4.1 Why now: Singapore's land scarcity and grid constraints

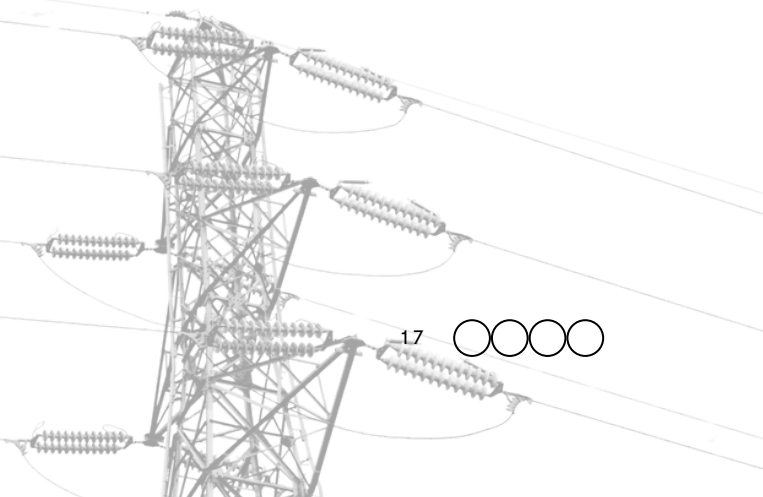
Singapore's data centre sector had grown to more than 70 operational facilities and roughly **1,000–1,070MW** of capacity by 2021, at which point the government had a moratorium on new builds to manage land use and electricity-grid strain. That moratorium was lifted in January 2022, but with a series of discrete, policy-gated allocation rounds.

Milestones		Detail
01	**Pre-moratorium baseline** (2021)	Singapore hosted 70+ operational data centres totalling approximately 1,000MW of capacity before a moratorium on new builds took effect. [24]
02	**Moratorium lifted** (Jan 2022)	Government lifted the moratorium in January 2022; the first pilot Call-for-Application (DC-CFA1) opened in Q2 2022. [25]
03	**DC-CFA1 allocation** (2023)	The first pilot allocation made approximately 60MW available. The initial framework envisaged up to three applications, with individual projects of 10-30MW. The eventual allocation was 80MW across four operators. [26]
04	**DC-CFA2** (2025-2026)	The second call, launched in December 2025, made at least 200MW available, with additional capacity potentially available through innovative green-energy pathways. The application process had stricter sustainability requirements, including PUE ⩽ 1.25, Green Mark Platinum certification, and at least 50% green-energy sourcing. [27]
05	**Jurong Island** (2025-2026)	Singapore has reserved **~20 hectares** on Jurong Island for a low-carbon data-centre park capable of supporting up to 700MW. The development is intended to leverage Jurong Island's existing energy, utilities, storage and industrial infrastructure alongside emerging low-carbon energy sources. [28]

Table 4.1 — Singapore's data-centre moratorium and managed-allocation timeline, 2021–2026.

4.2 Johor: A market in rapid build-out

Where Singapore's growth is administered in discrete tranches, Johor's has been organic and market wide. Johor's operational capacity rose from 401MW in H2 2024 to 897MW in H2 2025 – a **124%** increase,[29] one of the fastest growth rates recorded in any data-centre market globally. A further 315MW is currently under construction; if that near-term pipeline completes on schedule, operational capacity will reach approximately **1,212MW** by end-2026.[30]



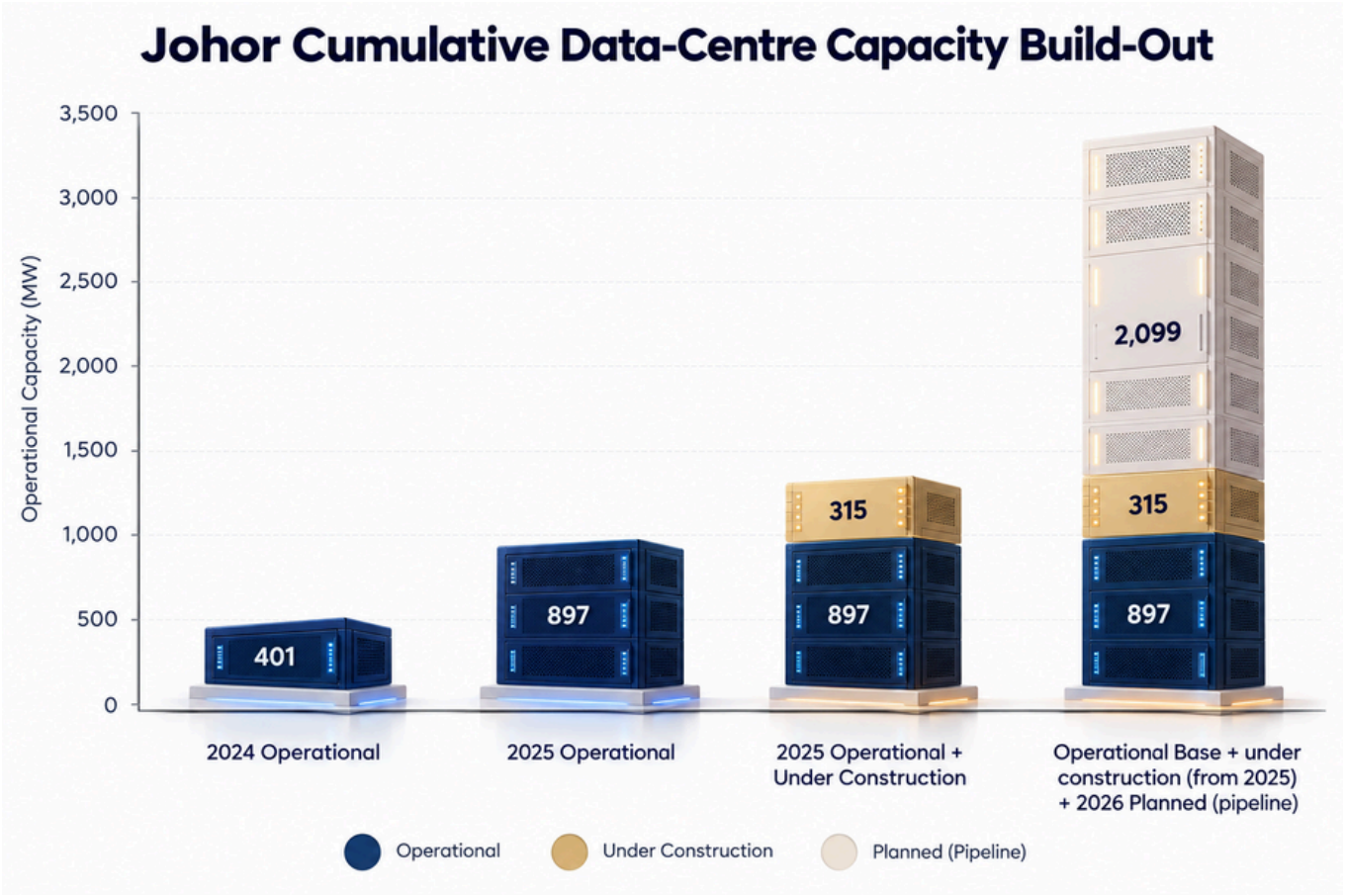


Figure 4.1 — Johor's cumulative build-out profile, from 2024 operational capacity through the full disclosed pipeline. Johor's operational capacity nearly doubled within a single year and is on track to exceed 1,200MW by end-2026 as near-term construction completes. Data source: Phua, 2026.

4.3 Batam/Riau: Anchor projects

No market-level capacity aggregate exists for Batam/Riau yet. The region is currently legible through individual anchor-project disclosures, the two largest of which are:

01	DayOne second Batam facility	450MW power purchase agreement (~511MVA) – Indonesia's largest PPA to date, to be delivered in phases across 2026–27. [31]
02	Equator Gate System, Nongsa	US$5 billion (~Rp88 trillion) project on approximately 30 hectares – the second-largest disclosed commitment in Batam. [32]

Table 4.2 — Largest disclosed data-centre commitments in Batam.

4.4 Pressure on the power grid

The scale of this build-out is beginning to register at the level of national power systems, particularly in Malaysia. If every Malaysian data centre with an executed energy-supply agreement builds out to full capacity, committed demand will exceed 7GW – about a quarter of current Peninsular Malaysia generation capacity – with data centres already accounting for **4%** of total power consumption in 2025.[33]

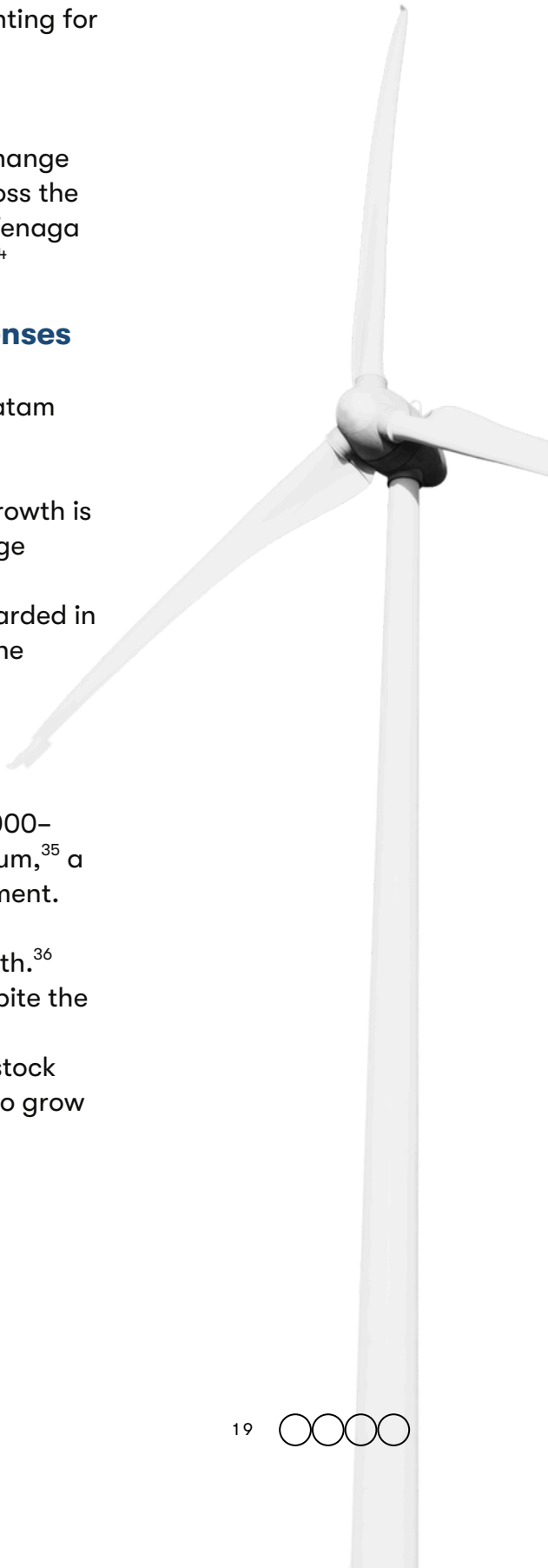
Cross-border electricity trade gives Singapore a limited alternative to building at home: Malaysia's Enegem exchange allows up to 300MW of renewable power to be sold across the border, though the first auction cleared only 50MW, a Tenaga Nasional–Sembcorp Power solar and hydropower deal.[34]

4.5 Reading the numbers: Three analytical lenses

Three comparative lenses make the Singapore-Johor-Batam contrast legible beyond raw megawatt figures.

1. **Rate-of-change vs. rate-of-permission:** Johor's growth is measured as a market-wide year-on-year percentage change (+124%); Singapore's growth is measured in discrete, policy-gated allocation rounds (80MW awarded in 2023; a 200MW-minimum round closing in 2026). The contrast is one of organic market growth versus administered allocation.

2. **Stock vs. flow:** Singapore had built more than 70 operational data centres totalling approximately 1,000–1,070MW by 2021, prior to its construction moratorium,[35] a base accumulated over several decades of development. Johor, by contrast, reached 897MW of operational capacity in roughly five years of concentrated growth.[36] The near-parity in absolute installed capacity – despite the difference in build timeline – is the single clearest illustration of how quickly the corridor's balance of stock has shifted, even though the two markets continue to grow through very different mechanisms.



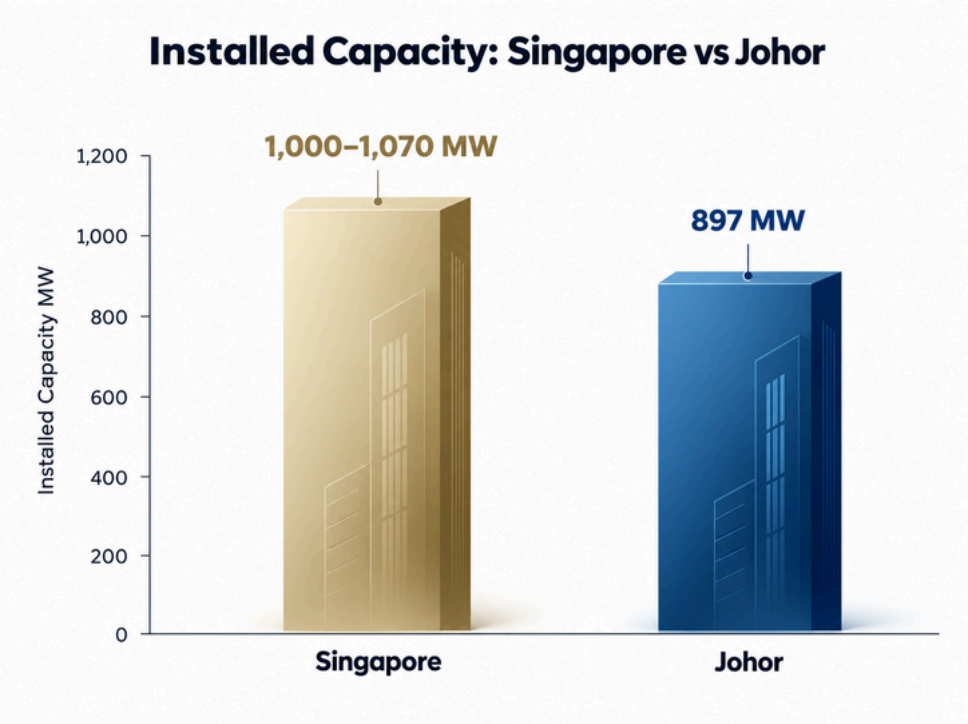


Figure 4.2 — Installed capacity is now nearly at parity, despite vastly different build timelines Source: w.media; Phua, 2026.

3. **Pipeline-to-installed ratio as a maturity signal:** Johor's under-construction and planned pipeline (315MW + 2,099MW = 2,414MW) is approximately **2.7 times** its installed base of 897MW,[37] indicating a market still firmly in its build-out phase. Singapore's disclosed pipeline – a 200MW minimum under the second Call-for-Application round, plus a potential 700MW low-carbon park at Jurong Island – is smaller relative to its installed base, at approximately **0.87 times**.[38] This is consistent with a mature market whose growth is managed through periodic, capped allocation rounds rather than open construction.

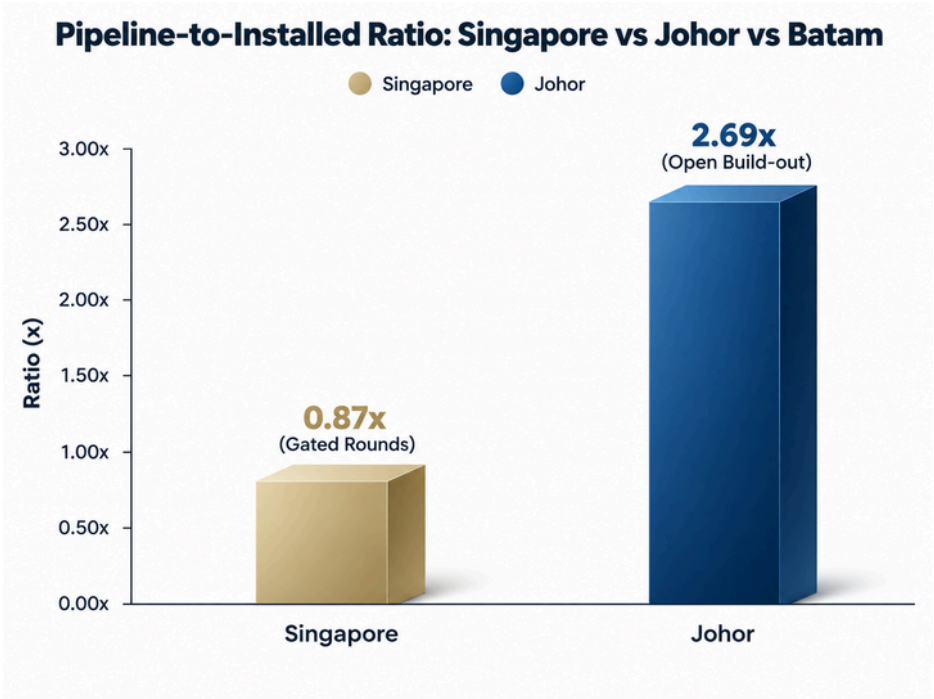


Figure 4.3 — Johor's pipeline is 2.7x its installed base, consistent with an early-stage, still-expanding market; Singapore's is smaller relative to its base, consistent with a mature, gated market. No equivalent ratio can be computed for Batam. Source: Phua, 2026; Lui et al., 2026; Tan, 2025.

Taken together, these three lenses point to the same underlying story as Section 3's manufacturing-era data:

Singapore retains a mature, high-value, tightly administered core, while capacity expansion happens at the periphery, organically in Johor's case, and through concentrated anchor projects in Batam's. The industry is new; the spatial logic is not.





Opportunities and challenges

The scale of activity documented in Section 4 does not come free of friction. The same build-out that is being celebrated as the corridor's "second life" is simultaneously straining power grids, water resources, and the regulatory machinery of three separate jurisdictions. This section sets out two sides: the institutional and energy foundations that make continued growth plausible, and the resource and governance constraints that could slow or reshape it.

5.1 Opportunities: Institutional and energy foundations

Three developments anchor the opportunity case. The first is the emergence of cross-border renewable electricity trade as a partial answer to the region's power constraints: Malaysia's Enegem programme supports trade of up to **300MW** of renewable power to Singapore[39] – evidence that the grid constraints described in Section 4.4 are already being met with a cross-border commercial response.

The second, and most consequential, is the Johor-Singapore Special Economic Zone (JS-SEZ), which now functions as the clearest institutional vehicle for the corridor's next phase. Unlike the informal, market-driven cooperation described in Section 3, the JS-SEZ is a signed bilateral agreement with defined geographic and sectoral scope.

JS-SEZ as institutional vehicle

Singapore and Malaysia signed the JS-SEZ Agreement on 6 January 2025; the zone spans over 3,500 square km — more than four times Singapore's land area — across 9 zones and 11 sectors. Data centres and electronics are explicitly named as key sectors expected to benefit from SEZ-linked policy support.[40]

The investment data available so far suggest the SEZ is already the dominant channel for capital entering Johor.

Investment scale via SEZ (January–September 2025)

Johor drew RM91.1 billion in approved investment in the first nine months of 2025; 74.6% (RM68 billion) came via the JS-SEZ specifically. Singapore was the largest single-country investor, at RM28.5 billion.[41]

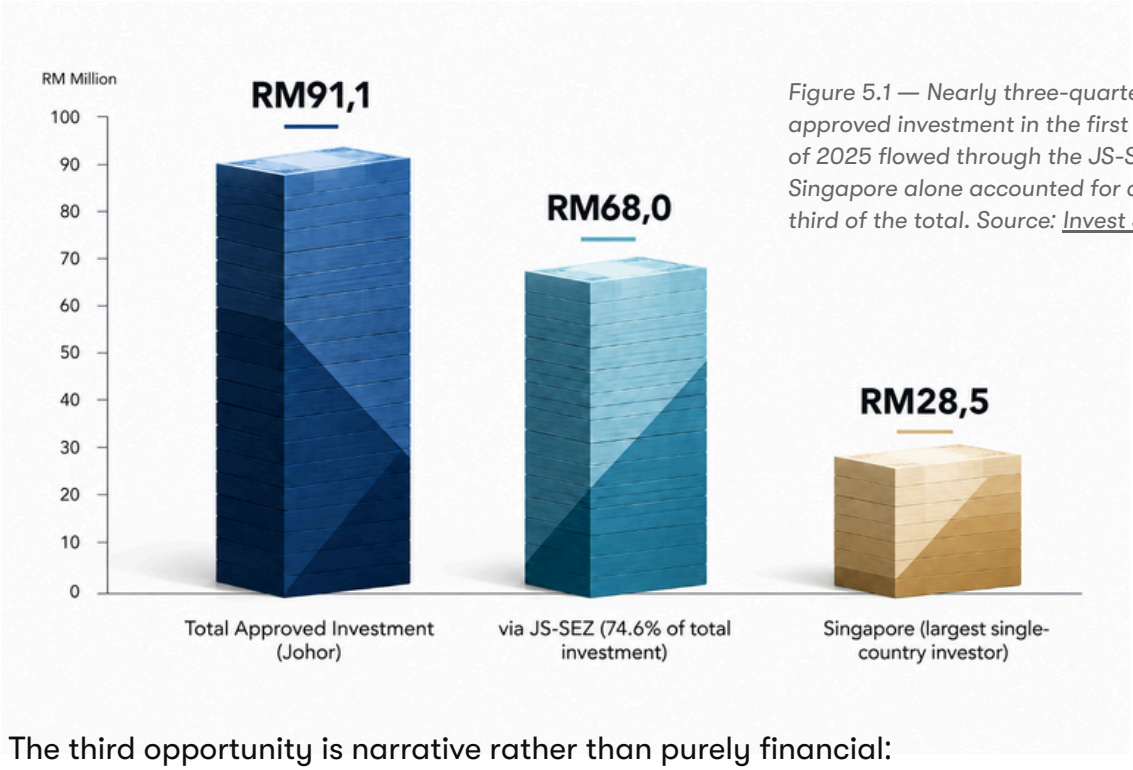


Figure 5.1 — Nearly three-quarters of Johor's approved investment in the first nine months of 2025 flowed through the JS-SEZ; Singapore alone accounted for close to a third of the total. Source: Invest Johor, 2026.

The third opportunity is narrative rather than purely financial: the corridor's "second life" framing, in which a region once defined by manufacturing overflow and tourism spillover (Section 3.3) is being recast as a digital-infrastructure hub. That reframing matters commercially as well as rhetorically; it is the framing used by regional governments and industry bodies to justify continued SEZ-linked policy support for data centres and electronics.

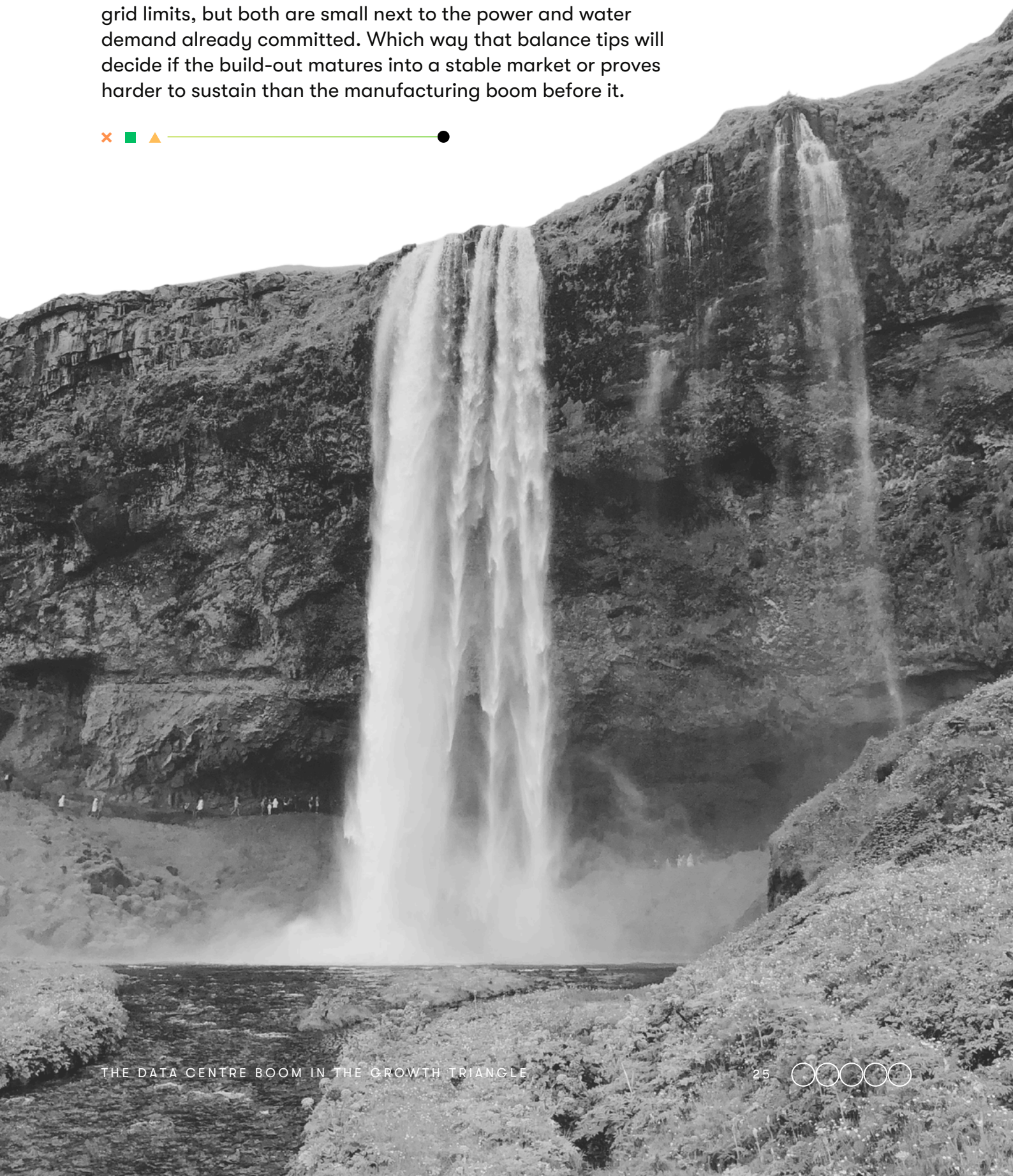
5.2 Challenges: Resource, grid and governance strain

Set against these foundations are four recurring sources of strain, each of which scales directly with the build-out documented in Section 4.

1. **Power and water demand.**
    - Malaysia's committed data centre power demand is expected to exceed **7GW**, about a quarter of Peninsular Malaysia's generation capacity, if every executed energy-supply agreement is built out in full.[42]
    - Water is a parallel, less-visible constraint: According to an estimate, a single megawatt of data centre capacity requires roughly **25.5 million** litres of water per year for cooling alone.[43]
    - Batam has a planned development of up to **200MWp** of solar capacity – the renewable-supply counterweight worth naming alongside the water-demand challenge.[44]
2. **Grid and renewable supply.** The same cross-border electricity trade that represents an opportunity in Section 5.1 is also, from another angle, evidence of a constraint: Malaysia and Singapore need mechanisms like Enegem precisely because neither grid can absorb the corridor's data-centre demand unassisted, and the scale of renewable supply currently traded (tens of MW) remains small next to gigawatt-scale committed demand.
3. **Regulatory coordination across three jurisdictions.** Singapore, Malaysia and Indonesia each retain distinct energy, land-use, environmental and investment-approval regimes. The JS-SEZ addresses this bilaterally for Singapore and Malaysia, but no equivalent instrument yet binds Batam/Riau into the same institutional framework, a structural gap that echoes the historically weaker Johor-Riau leg of the original Growth Triangle described in Section 3.2.
4. **Sustainability of concentration.** The speed and geographic concentration of the build-out raises a further question that is more structural than technical: whether the corridor has the power, water and land to sustain this pace, or whether the pace itself is temporary.

5.3 Balancing opportunity and constraint

None of the four challenges above is disqualifying on its own, and none of the three opportunities is unconditional. The JS-SEZ is the corridor's most concrete institutional step so far, and cross-border renewable trade is an early market response to grid limits, but both are small next to the power and water demand already committed. Which way that balance tips will decide if the build-out matures into a stable market or proves harder to sustain than the manufacturing boom before it.





Conclusion

The throughline connecting Sections 3 through 5 is a recurring mechanism across the growth triangle: cross-border functional specialisation. In the manufacturing era, Singapore retained capital, finance and high-value management functions while Johor absorbed intermediate-tier industry and Batam/Riau absorbed the most labour-intensive production, a division of labour driven by nothing more formal than relative factor costs.

That same mechanism is now visible again in data centre infrastructure: Singapore retains a mature, administratively gated core; Johor has absorbed the bulk of new capacity through open market growth; and Batam/Riau is attracting individually massive anchor investments.

New industry, old geometry. The corridor's history of growing by dividing the work is now playing out in a new technology.

Territory	Manufacturing-era role (from the 1980s)	Data centre-era role (today)
01 Singapore	Capital, finance, logistics, technology-intensive functions; retained highest-value activity	Mature, high-value core; growth managed through gated allocation rounds (DC-CFA1/2) rather than open build-out
02 Johor	Intermediate-tier manufacturing; absorbed Singaporean FDI via the 1988 twinning policy	Open-market capacity growth (+124% YoY); now near parity with Singapore in installed MW; JS-SEZ as institutional anchor
03 Batam/Riau	Lowest-cost production base under FTZ status; wage-driven relocation destination	Individually large anchor projects (DayOne, Equator Gate)

Table 6.1 — The Growth Triangle's functional specialisation, then and now.



Endnotes

Introduction

1. Phua, 2026
2. Cushman & Wakefield, 2026
3. DayOne, 2026
4. Asia News Network, June 2026

From SIJORI to IMS-GT

5. Toh, Mun Heng, 2006; Toh, Mun Heng, 2021; Smith, 1997
6. Hutchinson & Chong, 2016; Ooi, 1995
7. Department of Foreign Affairs and Trade, 1995
8. Thant et al., 1994
9. Ooi, 1995; Toh, Mun Heng, 2006; Department of Foreign Affairs and Trade, 1995; Hutchinson & Chong, 2016
10. Department of Foreign Affairs and Trade, 1995; Thant et al., 1994; Hutchinson & Chong, 2016

What cooperation looked like before

11. Department of Foreign Affairs and Trade, 1995
12. McGee et al., 1995
13. U.S. International Trade Commission, 1993
14. New Straits Times, 2021
15. Invest Malaysia, 2022
16. McGee et al., 1995
17. U.S. International Trade Commission, 1993
18. Nation Brand Research, 2026
19. Xiaodong, 2019
20. Ooi, 1995; Department of Foreign Affairs and Trade, 1995; Stewart & Png, 1993
21. Stewart & Png, 1993
22. Toh, 2021
23. Henderson, 2001

The rise of data centres

24. Ganesh, June 2022
25. Ganesh, January 2022
26. EDB, 2022
27. Infocomm Media Development Authority, 2025
28. EDB, 2025
29. Phua, 2026
30. Phua, 2026. It reports 315MW under construction and 2,099MW planned in Johor as of H2 2025; the end-2026 figure reflects operational capacity plus near-term under-construction completions and is an estimate.
31. Yong, 2026
32. Fahmi & Shobirin, 2026
33. Moody's Ratings, 2026
34. Enerdata, 2025
35. Ganesh, June 2022 (70+ facilities, ~1,000MW as of 2021); EDB, 2022 (80MW awarded under DC-CFA1). The ~1,080MW figure combines the 2021 operational base with the DC-CFA1 award.
36. Phua, 2026. For an alternative higher tracker, see Ong, 2026, citing JLL (850MW completed, 1,800MW under construction, 2,700MW pipeline).
37. Phua, 2026. Johor's pipeline-to-installed ratio is calculated as (315MW under construction + 2,099MW planned) ÷ 897MW installed ≈ 2.69x.
38. Lui et al., 2026; Tan, 2025; Purush et al., 2025. Singapore's ratio is calculated using the disclosed DC-CFA2 minimum (200MW) plus the potential 700MW Jurong Island low-carbon park, divided by an installed base of ~1,035MW ≈ 0.87x. Figures are illustrative given Singapore's allocation-based (rather than open market) growth model.

Opportunities and challenges

39. Enerdata, 2025
40. Tan, 2025; EDB, 2026
41. Invest Johor, 2026. Figures cover approved investment, January–September 2025.
42. Phua, 2026; Moody's Ratings, 2026 (on committed Malaysian power demand exceeding 7GW).
43. Mytton, 2021
44. The Jakarta Post, 2026



References

Asia News Network. (9 June 2026). "Singapore and Indonesia to Conduct Joint Study on Batam, Bintan and Karimun Technology Sector."

Cushman & Wakefield. (2026). 2026 Global Data Center Market Comparison.

DayOne. (accessed 2026) "SIJORI Digital Infrastructure Platform."

Department of Foreign Affairs and Trade, East Asia Analytical Unit (1995), "Growth Triangles of South East Asia," Australian Government Publishing Service.

EDB. (accessed 2026). Johor–Singapore Special Economic Zone. Singapore Economic Development Board
EDB. (2022). Singapore pilots sustainable way to grow data centre capacity. Singapore Economic Development Board.

EDB. (2025). Jurong Island to host Singapore's largest green data centre park; 10 per cent of land set aside for new energies. Singapore Economic Development Board.

Enerdata. (2025). Malaysia launches auction to increase power trading with Singapore.

Fahmi, A. N. & Shobirin, R. (2026). BP Batam Oversees Rp88 Trillion AI Data Centre Investment for Batam's Digital Transformation. TIMES Indonesia.

Ganesh, V. (January 2022). New Conditions for Data Centres in Singapore to kick in from Q2-2022. w.media.

Ganesh, V. (June 2022). Singapore Data Centre Moratorium Lifted; What next?w.media.

Henderson, J.C. (2001). Regionalisation and Tourism: The Indonesia–Malaysia–Singapore Growth Triangle. Current Issues in Tourism, Vol. 4, No. 2–4, pp. 78–93.

Hutchinson, F.E., & Chong, T. (eds.) (2016). The SIJORI Cross-Border Region: Transnational Politics, Economics, and Culture. Singapore: ISEAS–Yusof Ishak Institute.

Infocomm Media Development Authority. (2025). Launch of second data centre – Call for application. Government of Singapore.

Invest Johor / Malaysian Investment Development Authority (MIDA). Approved investment data, January–September 2025.

Invest Malaysia. (2022). Laws of Malaysia: Promotion of Investments Act 1986 (Act 327).

Lui B., Cyriac, G., Kuek, C. & Rianita, W. (2026). Singapore Announces Data Center Capacity Allocation Call. Morgan Lewis.

McGee, Terence Gary, and Ira M. Robinson, eds. (1995). The mega-urban regions of Southeast Asia. Vol. 1. UBC Press.

Moody's Ratings, via MCI Group. (2026). Johor Emerges as Cost-Efficient Data Centre Alternative to Singapore – Moody's.

Mytton, D. (2021). Data centre water consumption. npj Clean Water, 4(1), 11.

Nation Brand Research. (2026). The Anchor Brand.

New Straits Times. (2021). STMicroelectronics Putting Knowledge into Practice.

Ong, J. (2026). Malaysia's data centre capacity to double to 2,055MW by 2026 — JLL. The Edge Malaysia.

Ooi, G.L. (1995). The Indonesia–Malaysia–Singapore Growth Triangle: Sub-regional economic cooperation and integration. GeoJournal, 36(4), 337–344.

Parsonage, J. (1992). Southeast Asia's 'Growth Triangle': A Subregional Response to Global Transformation, International Journal of Urban and Regional Research 16, no. 2: 307, quoted in Singh, M. (2020). Economic Developments in the Sub-regional Growth Zones in ASEAN: A Case Study of SIJORI-Growth Triangle, SSRG International Journal of Humanities and Social Science 7, no. 5: 88–97.

Phua, A. (2026). Asia Pacific's Data Centre Development Pipeline Hits Record 19.4GW in 2025. Cushman & Wakefield.

Purush, M., Ping, T. T., Tan, S. (2025). Singapore's Data Centre Expansion: Jurong Island and the Next Phase of Sustainable Growth. ReedSmith.

Smith, Shannon LD. (1997). The Indonesia-Malaysia-Singapore growth triangle: A political and economic equation. Australian Journal of International Affairs 51, no. 3: 369-382.

Stewart, T.P., & Png, M.L.H. (1993). The Growth Triangle of Singapore, Malaysia and Indonesia. Georgia Journal of International & Comparative Law, 23(1), 1–33.

Tan. S. (2025). Johor-Singapore Special Economic Zone: A rising cross-border hub for data centers. ReedSmith.

Thant, M., Tang, M., & Kakazu, H. (eds.) (1994). Growth Triangles in Asia: A New Approach to Regional Economic Cooperation. Manila/Oxford: Asian Development Bank / Oxford University Press.

McGee, Terence Gary, and Ira M. Robinson, eds. The Jakarta Post. (2026). Batam Powers Ahead as Southeast Asia's Emerging Hyperscale Data Center Hub.

Toh, Mun Heng (2006). Development in the Indonesia–Malaysia–Singapore Growth Triangle. East Asian Bureau of Economic Research Development Economics Working Paper 21818 / NUS SCAPE Policy Research Working Paper 0606.

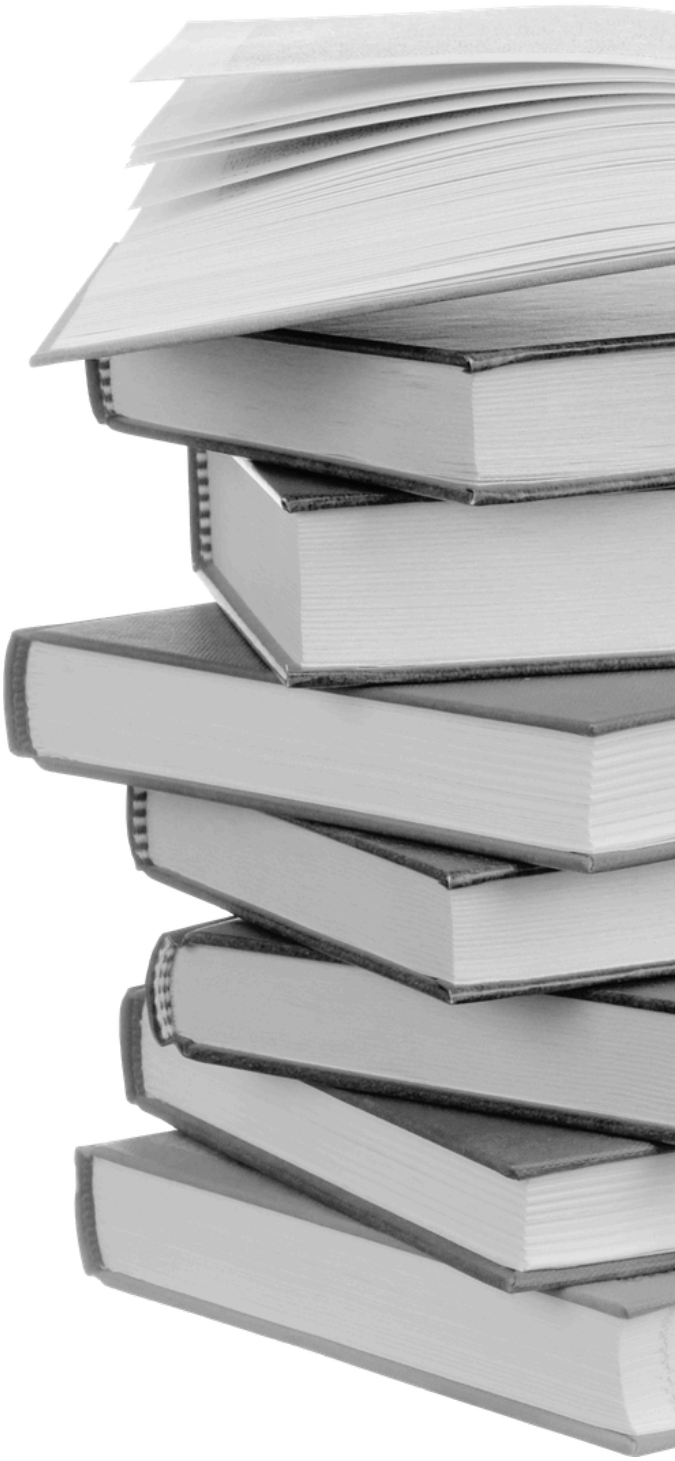
Toh, Mun Heng (2021). The SIJORI Cross-Border Region as an Economic Entity in 1990 and 2012, and Perspectives for 2030, in Hutchinson & Chong (eds.), The SIJORI Cross-Border Region. Singapore: ISEAS–Yusof Ishak Institute / EABER.

U.S. International Trade Commission. (1993). East Asia: Regional Economic Integration and Implications for the United States. USITC Publication 2621, Investigation No. 332-326, 45.

w.media. (2026). DayOne inks Indonesia's largest power deal for its Batam data center.

Xiaodong, X. (2019). The SIJORI Growth Triangle: Progress, Problems and Prospect. Journal of Maritime Studies and National Integration, 3(1), 1-13.

Yong, J. (2026). DayOne inks Indonesia's largest power deal for its Batam data center. w.media.



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