
The Infrastructure Loop

*Digital Asset Ownership, Distributed Infrastructure Participation,
and Economic Resilience*

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Country Coverage: United States · China · India · United Kingdom · Germany · France · Brazil · South Korea · Singapore · United Arab Emirates · Sub-Saharan Africa (representative economy)

Primary Sources: Stanford HAI · CNAS · Federal Reserve · US Census Bureau · OECD · World Bank · SBA · Synergy Research · Oxford Insights GAIRI · Lawfare · UK DSIT · Barclays Private Bank · AVCA · GSMA

Builds on: Agarwal, S. (2026). External AI dependence and startup financial survivability. *triNetra Research Working Paper EAD-2026-01*.

Agarwal, S. (2026). The infrastructure loop: Digital asset ownership, distributed infrastructure participation, and economic resilience. *triNetra Research Working Paper EAD-2026-03*.

Overview

Working Paper EAD-2026-01 identified External AI Dependence as a structural economic variable and documented its association with independent business survivability across ten economies. It introduced the Specialised Digital Asset hierarchy as the practical response: use general-purpose AI as productive infrastructure to build owned domain assets that compound in value and remain under the builder's control.

This paper addresses the question that follows: if Specialised Digital Asset development generates revenue, and some portion of that revenue is directed back into the infrastructure layer through ownership participation, community education, and cooperative infrastructure development, what changes in the structure of the AI economy? That is the Infrastructure Loop.

EADI STARTING POSITIONS

Country	EADI Score	EAD Level	Primary Structural Characteristic
United States	92	None (Source)	Owns dominant position at all three infrastructure layers.
China	64	Low	Domestic stack extensive. Intentional decoupling underway. USD 47.5 billion semiconductor fund active.
South Korea	45	Moderate	Samsung and SK Hynix HBM supply creates genuine upstream hardware leverage. Naver HyperCLOVA X is a functional domestic LLM.
France	32	High	Mistral AI is the only credible non-US, non-China foundation model at commercial scale globally. EUR pricing removes currency risk.
Germany	28	High	Industrial AI capability through SAP and Mittelstand sector knowledge. EU AI Act compliance creates domestic alternative demand.
Singapore	26	High	Regional AI hub. National AI Strategy 2.0 active. SGD/USD relatively stable.
United Arab Emirates	24	High	Falcon model demonstrates sovereign ambition. AED/USD peg eliminates currency risk for US infrastructure investment.
United Kingdom	17	Critical	Third-largest AI market globally (approximately USD 92 billion) on entirely foreign infrastructure. Nscale is the first significant domestic challenger.
India	12	Critical	Near-total USD dependency. IT services sector faces structural automation risk from the same platforms it pays to use.
Brazil	7	Critical	Lowest EADI in the group. Zero domestic AI infrastructure at commercial scale. BRL/USD volatility 20 to 40 percent annually.
Sub-Saharan Africa	5	Critical	Mobile-first unique advantage. Infrastructure participation near-zero. Highest latent community knowledge transfer potential of any region assessed.

Table 1-1. EADI Version 1.0 Scores. Source: Author's derivation; EAD-2026-01 framework. All scores Category B (Derived).

2. Cross-Country Patterns

Eleven economies are assessed using a consistent Economic Participation Framework covering four primary categories: Infrastructure, Digital Assets, Capital Participation, and Competence. Each sub-category is measured against three metrics: Established Ecosystem percentage, Small Business Participation percentage, and External Dependency percentage.

Five patterns emerge consistently across all eleven economies when the framework is applied identically.

Pattern 1: Foundation model access is the most concentrated sub-category globally

No sub-category across all four primary categories shows higher established ecosystem concentration than foundation model access. The United States scores approximately 95 percent established ecosystem concentration. China scores approximately 90 percent, though concentration is domestic rather than foreign-sourced. Every other economy assessed shows external dependency of 60 percent or higher, with India, Brazil, and Sub-Saharan Africa at 90 to 97 percent. This is the empirical expression of the CNAS finding that the United States and China own all 50 top-ranked foundation models.

Pattern 2: Infrastructure IPO access is the binding constraint for the capital participation loop

Infrastructure IPO access shows the lowest small business participation percentage of any capital participation sub-category across all eleven economies. Even in the United States, where retail investors receive approximately 32 percent of IPO allocations, meaningful pre-IPO access remains restricted to accredited investors. In India, Brazil, and Sub-Saharan Africa, meaningful retail access to US infrastructure company IPOs is estimated at 5 to 8 percent. This is the structural barrier most directly preventing the capital participation loop from closing.

Pattern 3: Community knowledge transfer scores are inversely correlated with EADI scores

Sub-Saharan Africa, Brazil, and India, the three economies with the lowest EADI scores, show the highest community knowledge transfer distribution percentages at approximately 72, 68, and 65 percent respectively. Group A2 (Connector) activity, which requires the least infrastructure to initiate, has its most natural conditions in the economies where the Infrastructure Loop is most needed. The knowledge transfer loop does not require capital markets access or regulatory reform to begin.

Pattern 4: The AED/USD peg creates a unique structural advantage in the UAE

Of all Critical and High-EAD economies, only the United Arab Emirates faces zero currency risk when investing in US-denominated infrastructure company IPOs. The AED/USD currency peg is fixed, meaning UAE-based independent builders are structurally better positioned for Group B (Circulator) participation than their EADI score suggests. This is the most underappreciated structural feature in the comparative analysis.

Pattern 5: Data gaps are findings

Sub-categories with the most data gaps across all eleven countries are those measuring small business participation in AI infrastructure construction, fine-tuning activity, and cooperative capital structures. Primary statistical agencies have not previously asked these questions. The framework in this paper defines a measurement agenda for future research.

India: The Most Analytically Significant Case

Four conditions converge simultaneously in India: near-total external infrastructure dependency of 90 percent or higher across foundation models, chips, and cloud compute; high AI adoption in the IT services sector at 75 to 85 percent; the world's second-largest national AI company count at approximately 8,178; and the structural trap in which IT firms pay US platforms to automate their own labour. Every EAD financial mechanism documented in Paper 1 operates in full at this intersection.

Capital participation pathways carry the highest barriers of any economy in the study: INR/USD volatility makes USD-denominated infrastructure investment high-risk, and meaningful retail access to US infrastructure company IPOs is estimated at approximately 8 percent. Against this, India's community knowledge transfer score is one of the strongest at approximately 65 percent, providing a natural foundation for Group A2 (Connector) activity.

3. The Proposed Loop

Specialised Digital Assets generate revenue. Some portion of that revenue, directed toward infrastructure company ownership through accessible public market participation, converts independent builders from permanent renters into partial owners of the infrastructure they depend on. Builder-owners have an aligned financial interest in the platform's health rather than solely in its pricing. At sufficient scale, their participation opens the circular investment pattern that currently excludes them.

THE INFRASTRUCTURE LOOP: CAUSAL CHAIN

Stage	What Occurs	Mechanism
1	Specialised Digital Asset Development (Levels 1 to 5)	Domain knowledge encoded into owned, compounding, revenue-generating assets (as defined in EAD-2026-01)
2	Revenue Surplus Generated	Asset revenue exceeds operating costs; surplus becomes available for redirection
3	Infrastructure Ownership Participation	Surplus directed toward infrastructure company equity through accessible public markets
4	Distributed Ownership and Aligned Interest	Builder-owners hold a financial stake in infrastructure health; more stable than price-dependent renters
5	Circular Investment Pattern Opens	Capital from outside the existing venture and hyperscaler circle enters the infrastructure investment loop
6	Infrastructure Quality and Access Improve	Better-capitalised, more broadly governed infrastructure reduces EAD burden for all builders

Figure 1. The Infrastructure Loop: Proposed Causal Chain. Source: Agarwal, S. triNetra Research, 2026.

3.1 The Live Infrastructure IPO Pipeline

The Infrastructure Loop is not a future proposition. The infrastructure IPO wave is occurring now. CoreWeave (Nasdaq: CRWV) went public in March 2025. Cerebras Systems (Nasdaq: CBRS) listed in May 2026. Lambda has engaged Morgan Stanley, JPMorgan, and Citi for an anticipated second-half 2026 offering. Databricks targets Q4 2026. The window in which independent builders can participate in the early public-market phase of these companies is currently open.

Company	Status	Key Metric	Relevance to the Loop
CoreWeave (CRWV)	Public, March 2025	USD 50 billion-plus market cap; USD 99 billion revenue backlog Q1 2026	Already accessible to retail investors at approximately 32% of IPO allocations.
Cerebras Systems (CBRS)	Public, May 2026	USD 48.8 billion valuation; approximately USD 510 million 2025 revenue	Wafer-scale AI accelerator chips. Alternative to Nvidia architecture. Publicly accessible.

Company	Status	Key Metric	Relevance to the Loop
Lambda Labs	IPO targeted H2 2026	USD 9 billion-plus valuation; USD 520 million-plus annualised revenue	Developer-focused GPU cloud. Morgan Stanley, JPMorgan, and Citi engaged.
Databricks	IPO targeted Q4 2026	USD 62 billion-plus valuation; USD 5 billion-plus ARR	Data and AI platform critical for Level 3 Specialised Digital Asset development.
Nscale	IPO preparation; Goldman Sachs and JPMorgan engaged	USD 14.6 billion valuation; USD 2 billion raised March 2026	UK-based. First significant European-domiciled infrastructure company at this valuation scale. EUR and GBP accessible.

Table 3-1. AI Infrastructure IPO Pipeline: Current Status (July 2026). Sources: CoreWeave company filings; Sacra Q1 2026; Cerebras IPO filing May 2026; Lambda: The Information; Databricks: EquityZen 2026; Nscale: company announcement March 2026.

3.2 The Retail Investor Parallel

Post-2020 retail investor participation demonstrated that a previously excluded population, given accessible tools and a compelling reason to act, can materially change the capital composition of public markets. Retail investors now account for approximately 20 percent of daily US equity trading volume.

Two aspects of the parallel hold for the Infrastructure Loop: accessible platforms now exist for small-scale equity participation, and builders have use-aligned reasons to invest in infrastructure companies they depend on. One aspect does not hold. Of SPACs completed between 2020 and 2021, over 90 percent now trade below their offering price, with a median return of negative 87 percent. Participation without competence transferred wealth from those who did not understand what they owned to those who did. Use-aligned ownership, grounded in direct operational knowledge of the infrastructure, is the critical differentiator from speculative participation.

4. Three Groups, Not One

Not all builders who develop Specialised Digital Assets will participate in infrastructure ownership. Most will not. This is a documented feature of human economic behaviour, not a gap in the framework. Kahneman and Tversky's Prospect Theory (1979) established that losses feel approximately twice as painful as equivalent gains feel pleasurable. Simon's satisficing principle (1955) established that people search for solutions that are good enough and stop when they find one. These mechanisms interact to produce a three-group distribution.

Group	Behaviour	System Role	Primary Enabling Condition	Primary Barrier
A1: Settlers	Build Specialised Digital Assets; achieve financial resilience; consolidate	Demonstrate that the pathway is real. Passive market signal for new entrants.	Sufficient asset revenue to reduce EAD burden materially	None. This is a complete and legitimate economic outcome.
A2: Connectors	Build assets; achieve resilience; enter the knowledge transfer loop; mentor, teach, connect	Primary system multiplier. Converts tacit expertise into explicit, transferable knowledge.	Willingness to share; community infrastructure for sharing	Tacit-to-explicit knowledge conversion. Teaching is a distinct skill from doing (Polanyi, 1958).
B: Circulators	Build assets; generate surplus; direct some toward infrastructure company equity	Systemic structural change. Circular investment pattern opens to new capital.	Financial literacy; regulatory access; sufficient surplus; acceptable currency risk	Loss aversion (Kahneman and Tversky, 1979); satisficing (Simon, 1955); regulatory barriers; currency risk in Critical-EAD economies
C: Involuntary Consolidators	Would circulate but are structurally prevented	Latent Group B. Addressable through policy reform.	Policy reform removing structural barriers	Accredited investor definition; currency barriers; regulatory exclusion; information asymmetry

Table 4-1. Three-Group Ecosystem: Summary. Source: Author's framework. Behavioural grounding: Kahneman and Tversky (1979); Simon (1955); Hirschman (1970).

5. The Competence Requirement

Structural access distributed without competence provision does not produce the outcomes it appears to promise. Three historical cases establish the pattern. In Andhra Pradesh in 2010, microcredit extended to borrowers without financial literacy produced over-indebtedness and crisis. In the post-Soviet economies of the 1990s, privatisation vouchers distributed broadly to populations without capital markets knowledge were sold immediately to the small number of people who understood their value. In US capital markets between 2020 and 2021, retail investors with accessible trading platforms but insufficient understanding of SPAC structures lost heavily: over 90 percent of completed SPACs now trade below their offering price, with a median return of negative 87 percent.

Four specific competences are required to operate the Infrastructure Loop: **asset-building competence** (identifying proprietary knowledge, structuring it into compounding assets); **knowledge transfer competence** (converting tacit expertise into explicit, teachable form); **capital markets literacy** (understanding IPO mechanics, infrastructure company financials, currency risk, and portfolio concentration); and **commons governance capacity** (applying Ostrom's institutional design principles to knowledge communities that sustain Group A2 activity).

6. The 1% Education Mechanism

Builders who generate surplus from Specialised Digital Assets contribute 1 percent of revenue to education within their community. Recipients develop the competence to enter the pathway, build assets, generate surplus, and contribute their own 1 percent. The cycle continues without external injection.

The 1 percent figure sits below the threshold of financial pain: a builder generating meaningful revenue will not feel 1 percent as a sacrifice. It exceeds the threshold of collective impact: aggregated across a community of builders, 1 percent is significant by volume even when small by individual contribution. It calibrates automatically to capacity without requiring assessment.

Accumulated funds may take four institutional forms: new builder support funds providing compute access or dataset labelling costs; community-specific time-bounded programmes; non-profit organisations where the identified need is sustained; or direct individual support for individuals with exceptional potential and exceptional barriers. One governance principle holds across all four forms: the contributing community controls the fund, no external actor captures governance, and the form is revisable as needs change.

7. Governance: Three Levels

Governance should operate at the lowest level capable of handling the problem, escalating upward only when the scale or risk genuinely requires it. Applying this subsidiarity principle to the AI builder ecosystem produces three distinct governance tiers with different actors, different instruments, and different escalation conditions.

Level	Coverage	Government Role	Escalation Trigger
Level 1: Local	Interactions between independent builders; knowledge transfer; 1% fund governance; community quality standards	None required. Reputational mechanisms and community norms govern interactions between roughly equal parties.	Power differentials too large for reputational mechanisms; collective action problems requiring binding commitments
Level 2: National	Builder-national economy relationships; tax treatment; capital market access; competition enforcement backstop	Available but not mandatory. Remove structural barriers. Provide infrastructure that markets underprovide. Available for dispute resolution without being required for routine operation.	Market failure consequences extending across regions within the national jurisdiction; power differentials requiring binding enforcement
Level 3: International	High-risk sector AI governance; infrastructure company conduct across jurisdictions; preventing regulatory arbitrage	Required for sectors where AI failure produces transnational consequences. Targets infrastructure companies and large market participants, not independent builders. Coordinated competition enforcement; mandatory access in high-risk sectors.	Transnational consequences of AI failure; total non-substitutable infrastructure dependency across multiple jurisdictions

Table 7-1. Three-Level Governance Framework. Source: Author's framework.

Conclusion

One pattern runs consistently across all eleven economies assessed: small business participation is lowest and external dependency is highest in the sub-categories most critical to the Infrastructure Loop, specifically foundation model access, infrastructure IPO access, and venture capital access. That pattern holds regardless of whether the economy is a source economy or a critical-EAD economy. It is the empirical foundation for the Loop's relevance.

Barriers to Group B (Circulator) participation are structural rather than personal. Regulatory frameworks, accredited investor definitions, and currency risk management tools are institutional choices. They can be changed. Whether they change in time to allow meaningful independent builder participation in the current infrastructure IPO wave is an open question this research raises, not one it resolves.

At the competence layer, the most encouraging finding is an inversion. Economies with the lowest EADI scores show the highest community knowledge transfer distribution percentages. Group A2 (Connector) activity, which requires the least infrastructure to initiate, has its most natural conditions where the Loop is most needed. Knowledge transfer requires no regulatory reform to begin.

Modern economies have historically accumulated wealth through the ownership of productive assets. Specialised Digital Assets provide an increasingly accessible path for people with domain knowledge and no prior capital to participate in that accumulation, using infrastructure they do not own to build something that is entirely theirs.

Use general-purpose AI as productive infrastructure. Build and own the Specialised Digital Assets that encode what is uniquely yours. Contribute to the infrastructure that makes building possible. Teach the next person to do the same.

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