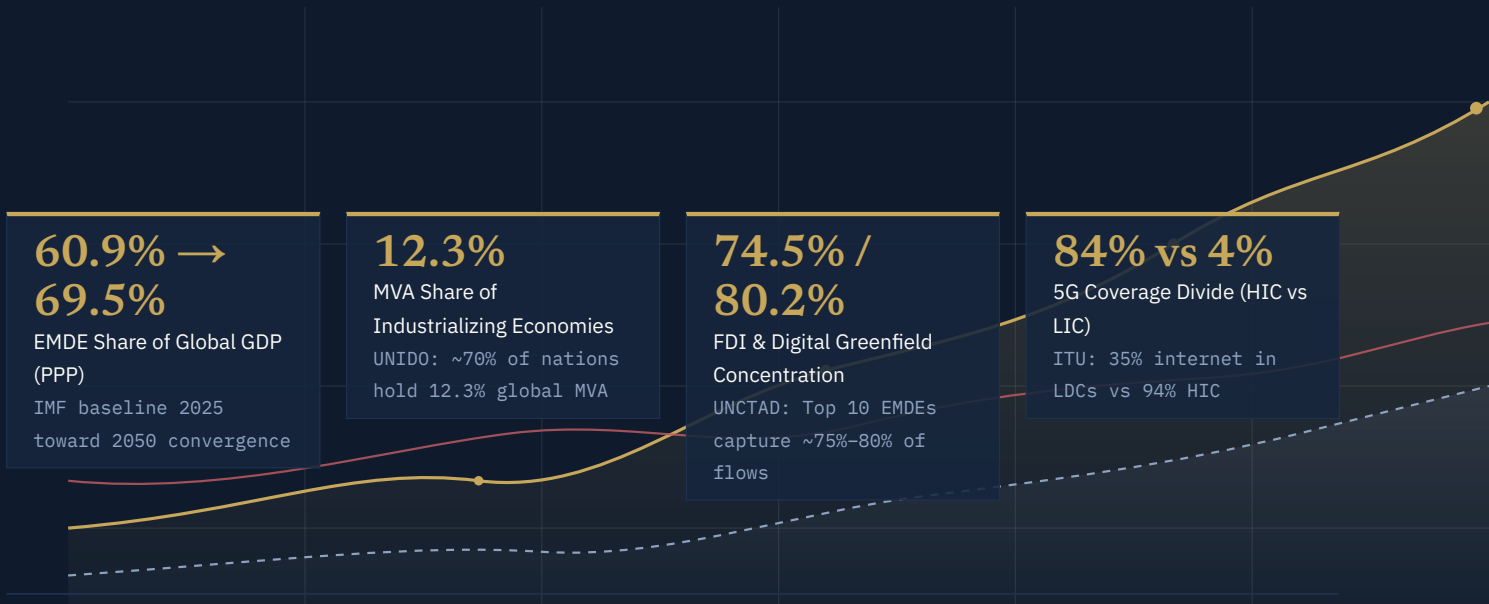
GLOBAL DEVELOPMENT & INDUSTRIAL STRATEGY

The Future of Emerging Economies

Industrialization, Technological Upgrading and the Transformation of the Global South

A 2026–2050 structural synthesis showing how next-generation industrialization, AI and digital infrastructure, clean energy abundance, and human capital investment can elevate emerging economies into higher-value activity and narrow global development disparities.



Hunter Hughes · H Heuristics Research
November 2026 · Independent Research & Advisory · hheuristics.com

Series: H Heuristics Research Report
128 Sunset Blvd #1126, New Castle, DE

EXECUTIVE DOSSIER

Report Overview, Key Findings & Methodology

PUBLICATION METADATA

Series	H Heuristics Research Report
Identifier	HH-2026-34
Published	November 2026
Authors	Hunter Hughes, H Heuristics Research
Domain	Global Development & Industrial Strategy
License	CC BY 4.0
DOI	10.5281/zenodo.24225110

EVIDENCE & CLAIM GRADING

Established: Replicated empirical datasets, audited filings, or mathematical identities.
Substantiated: Strong multi-source convergence with bounded model sensitivity.
Emerging: Early-stage industrial evidence or structural inference with wider variance.
Scenario / Speculative: Long-horizon modeling contingent on policy or capex regimes.

About This Report

This monograph develops the **H Heuristics Framework for the Transformation of Emerging Economies**—synthesizing UNIDO industrial upgrading benchmarks, UNCTAD global FDI and digital greenfield tracking, IMF purchasing-power macroeconomic baselines, ITU broadband and 5G connectivity datasets, WIPO Global Innovation Index trajectories, and UN DESA demographic projections into an operational blueprint for 2026–2050.

Principal Findings

01. **Emerging markets already drive 60.9% of global PPP output, yet structural catch-up remains deeply uneven.** While China, ASEAN hubs, and India expanded rapidly, nearly 70% of industrializing countries hold just 12.3% of global manufacturing value added and Sub-Saharan Africa captures only 1.4%.

02. **Medium- and high-technology (MHT) upgrading determines who escapes the middle-income plateau.** MHT industries account for over half of global manufacturing output and outpace low-tech sectors, rewarding economies that build supplier ecosystems, vocational engineering, and clean industrial corridors.

03. **Digital public infrastructure (DPI) and enterprise AI convert connectivity into formal-sector productivity.** Bridging the 5G (84% vs. 4%), affordability, and skills divides unlocks 11%–19% sector-level productivity gains across fintech, logistics, agriculture, healthcare, and light manufacturing.

04. **Demographic momentum across South Asia and Sub-Saharan Africa demands proactive industrial absorption.** Sub-Saharan Africa's share of the global working-age workforce rises from 12.8% in 2025 to 20.6% by 2050, making reliable low-cost power, multimodal trade corridors, and foundational schooling macro-critical.

05. **De-concentrating global investment transforms growth into shared convergence.** Nearly 75% of EMDE FDI and 80% of digital greenfield inflows go to just ten countries; pairing single-window governance with multilateral credit guarantees can lift EMDE per-capita income from 24.2% to 56.4% of the advanced frontier by 2050.

Analytical Methodology & Source Architecture

Empirical figures integrate IMF World Economic Outlook (PPP shares), UNIDO Industrial Development Report MVA & MHT series, UNCTAD World Investment Report (2024–2025) greenfield capital flows, ITU Facts and Figures connectivity indicators, WIPO Global Innovation Index scores, UN DESA working-age cohorts, and H Heuristics structural simulation runs (v3.4).

KEYWORDS: emerging economies · structural industrialization · technological upgrading · Global South transformation · digital public infrastructure · artificial intelligence adoption · demographic dividend · foreign direct investment

Institutional Notice: This report is published by H Heuristics for informational and strategic planning purposes. Quantitative projections reflect scenario modeling under stated assumptions and do not constitute investment, legal, or regulatory advice.

NAVIGATION

Table of Contents

Executive Summary & Core Thesis 4
0.1 Core Thesis: Why Emerging Economies Define Twenty-First Century Growth 4
0.2 Shifting Weight Without Automatic Catch-Up 4
0.3 Five Interlocking Drivers of Emerging Economy Transformation 4
0.4 Architecture of This Volume 5
1. Global Macroeconomic Rebalancing & Demographic Transitions 6
1.1 Beyond Aggregate Size: Measuring Real Income Convergence 6
1.2 The Great Demographic Redistribution Toward the Global South 6
1.3 Structural Reallocation & Escaping the Low-Productivity Equilibrium 7
1.4 Mobilizing Domestic Savings & Preserving Fiscal Space for Capital Formation 8
2. Next-Generation Industrialization & Value-Chain Upgrading 9
2.1 Medium- and High-Tech Manufacturing as the Engine of Catch-Up 9
2.2 Productive Capabilities & The Complexity-Growth Frontier 9
2.3 "China+N" Supply Chain Diversification & Modular Industrial Parks 10
2.4 Servicification of Manufacturing & High-Value Tradable Services 11
2.5 Export-Disciplined Industrial Policy & Quality Infrastructure 11
3. Digital Infrastructure, Artificial Intelligence & Technological Leapfrogging 12
3.1 Bridging the Multi-Tier Connectivity & 5G Readiness Gap 12
3.2 Enterprise Artificial Intelligence: Complementarity Over Displacement 12
3.3 Digital Public Infrastructure (DPI) as a Formalization Engine 13
3.4 Fast-Climbing Innovators & Localized Capabilities (WIPO Insights) 13
3.5 Spectrum Economics, Regional Cloud Sovereignty & Digital Trust 14
4. Clean Energy Abundance, Power Reliability & Resource Value Capture 15
4.1 Energy Abundance & Reliability as Industrial Gatekeepers 15
4.2 Green Industrialization & Border-Carbon Trade Readiness 15
4.3 Critical Minerals: Moving From Ore Extraction to Downstream Processing 16
4.4 Utility Solvency Reform & Distributed Productive-Use Mini-Grids 17
5. Urbanization, Multimodal Corridors & Regional Trade Integration 18
5.1 Secondary Cities & Agglomeration Economies Without Mega-City Congestion 18
5.2 Multimodal Logistics, Ports & Compressing Border Friction 18
5.3 Continental Trade Integration: AfCFTA, ASEAN & South-South Supply Chains 19
5.4 Municipal Fiscal Capacity & Land-Value Capture for Urban Corridors 19
5.5 Inland Dry Ports, Cold-Chain Logistics & Secondary City Polycentricity 20
6. Human Capital, Workforce Skills & Demographic Absorption 21
6.1 Human Capital as the Binding Constraint on Technological Absorption 21
6.2 Halving Learning Poverty & Scaling Dual-Track Technical Training 21
6.3 Unlocking the Female Labor Force & MSME Entrepreneurship Dividend 22
6.4 Preventive Health Capacity, Micronutrient Catch-Up & Formal Social Insurance 23
7. International Investment, Capital Allocation & Institutional Capacity 24
7.1 Overcoming the Severe Geographic Skew in Global Capital Flows 24
7.2 Compressing Sovereign Risk Spreads & Scaling MDB Guarantee Architecture 24
7.3 State Capacity, Regulatory Credibility & Transformational FDI Policy 25
7.4 Diaspora Capital, Sovereign Co-Investment & Regional Capital Markets 25
8. Integrated 2026–2050 Scenarios & Transformation Roadmap 26
8.1 Modeling Three Structural Regimes for the Global South (2026–2050) 26
8.2 Quantifying Structural Benchmarks Across Global Output, Industry & Workforce 26
8.3 High-Leverage Operational Priorities for the 2026–2035 Window 27
8.4 Five Operational Imperatives for Emerging Economy Leadership 27
8.5 Institutionalizing Adaptive Governance Through 2050 28
8.6 The Compounding Return to Coordinated Emerging-Market Leadership 28
Methodological Appendix: Structural Accounting & Data Notes 29
A.1 Integrated Structural Transformation Modeling Methodology 29
A.2 Dataset Coverage & Cross-Report Synthesis Notes 29
References & Primary Sources 30

Index of Data Visuals & Figures

FIG. 1 The Shifting Center of Gravity: EMDE vs. Advanced Share of Global GDP (PPP) p.4
FIG. 2 Divergent Catch-Up: Real Per-Capita Output Relative to Advanced Frontier p.6
FIG. 3 Global Working-Age Workforce Redistribution Across Regions, 2025 vs. 2050 p.6
FIG. 4 Industrial Upgrading Gap: Medium- & High-Tech Share of Manufacturing Value Added p.9
FIG. 5 Productive Capability Score vs. Long-Run Real Per-Capita Income Growth p.10
FIG. 6 The Multi-Tier Connectivity Divide: Internet Use, 5G Access & Affordability p.12
FIG. 7 Sectoral Productivity Gains From Enterprise AI & Digital Public Infrastructure p.12
FIG. 8 The Energy-Competitiveness Penalty: Industrial Tariffs vs. Grid Outage Losses p.15
FIG. 9 Resource-Rich, Value-Poor? Global Share Across Clean-Tech Supply Chain Stages p.16
FIG. 10 Productivity Bridge From Unplanned Sprawl to Connected Industrial City p.18
FIG. 11 Deepening South-South & Intra-Regional Value-Chain Trade Shares, 2025–2040 p.19
FIG. 12 Human Capital & Technological Absorption Matrix Across EMDE Regions p.21
FIG. 13 Long-Run Per-Capita GDP Lift From Closing Three Human-Capital Bottlenecks p.22
FIG. 14 The Global Capital Concentration Skew: Top 10 EMDEs vs. Rest of Developing World p.24
FIG. 15 EMDE Per-Capita Income Relative to Advanced Economy Frontier, 2026–2050 p.26
FIG. 16 2050 Global South Transformation Benchmarks: Fragmented vs. Coordinated Path p.27

EXECUTIVE SUMMARY

Executive Summary & Core Thesis

0.1 Core Thesis: Why Emerging Economies Define Twenty-First Century Growth

The trajectory of the twenty-first-century global economy will be decided primarily within emerging market and developing economies (EMDEs). Collectively generating **60.9% of world output on a purchasing-power-parity (PPP) basis** in 2025 and home to over **84% of the global population**, developing nations are no longer peripheral suppliers of primary commodities or low-cost assembly labor. **The central thesis of this report** is that accelerating industrialization, technological upgrading, infrastructure buildout, and human capital investment across the Global South can shift emerging economies into higher-value economic activities—raising real incomes, eliminating extreme poverty, and narrowing persistent international development disparities.

Yet macroeconomic weight alone does not guarantee broad-based convergence. Between 2000 and 2025, East Asian and Southeast Asian manufacturing hubs compressed multi-decade technology gaps at unprecedented speed, lifting hundreds of millions into the global middle class. Across much of Sub-Saharan Africa, Latin America, and lower-income South Asia, however, structural transformation stalled or fractured under premature deindustrialization, unreliable power grids, shallow domestic capital markets, and concentrated global investment flows. Closing this divergence between **frontier-catching hubs** and **lagging industrializers** represents the defining economic challenge of the 2026–2050 window.

60.9% → 69.5%
EMDE Share of Global GDP (PPP)
IMF baseline 2025 toward 2050 convergence

12.3%
MVA Share of Industrializing Economies
UNIDO: ~70% of nations hold 12.3% global MVA

74.5% / 80.2%
FDI & Digital Greenfield Concentration
UNCTAD: Top 10 EMDEs capture ~75%–80% of flows

84% vs 4%
5G Coverage Divide (HIC vs LIC)
ITU: 35% internet in LDCs vs 94% HIC

> **H Heuristics Core Proposition: Productive Upgrading Beats Factor Accumulation Alone**
>
> Emerging economies escape low-productivity equilibrium traps not merely by adding cheap labor or extracting raw resources, but by re-allocating capital, skills, and infrastructure into **medium- and high-technology (MHT) manufacturing**, **digitally enabled tradable services**, and **reliable clean energy systems** capable of anchoring regional value chains.

0.2 Shifting Weight Without Automatic Catch-Up

Aggregate purchasing-power trajectories already confirm an irreversible geographic rebalancing of global demand and production (**FIG. 1**). Driven by Asia's ongoing industrial expansion and gradual catch-up across populous lower-middle-income states, emerging and developing economies rose from **43.2% of global PPP output in 2000** to **60.9% in 2025**, and are projected under baseline structural expansion to reach **69.5% by 2050**. Conversely, the advanced-economy share declines steadily from **56.8% to 30.5%** over the same half-century span.

Despite commanding nearly three-fifths of global PPP GDP, developing countries exhibit stark asymmetry in **where complex value is created and captured**. United Nations Industrial Development Organization (UNIDO) tracking indicates that while global manufacturing value added (MVA) expands at roughly **2.8%–2.9% annually**, nearly 70% of countries classified as "industrializing economies" collectively hold only **12.3% of global MVA**, with Sub-Saharan Africa accounting for just **1.4%**. Similarly, UNCTAD's *World Investment Report* demonstrates that while developing nations attract roughly **$867 billion** in annual foreign direct investment (FDI), **74.5% of total EMDE FDI** and **80.2% of digital greenfield project capital** concentrate inside just ten recipient economies.

0.3 Five Interlocking Drivers of Emerging Economy Transformation

Sustained structural upgrading through 2050 depends on synchronizing five reinforcing transformation pillars rather than pursuing isolated sector reforms:

Structural Transformation Pillar	Current Structural Bottleneck	Operational 2026–2050 Pivot	Quantified Development Leverage
1. Industrial & MHT Upgrading	Commodities & basic assembly; 14%–28% MHT share across SSA/South Asia	Regional supplier parks, MHT export corridors & critical-mineral midstream refining	Raises global EMDE MHT share from 39.5% toward **54.8%** by 2050

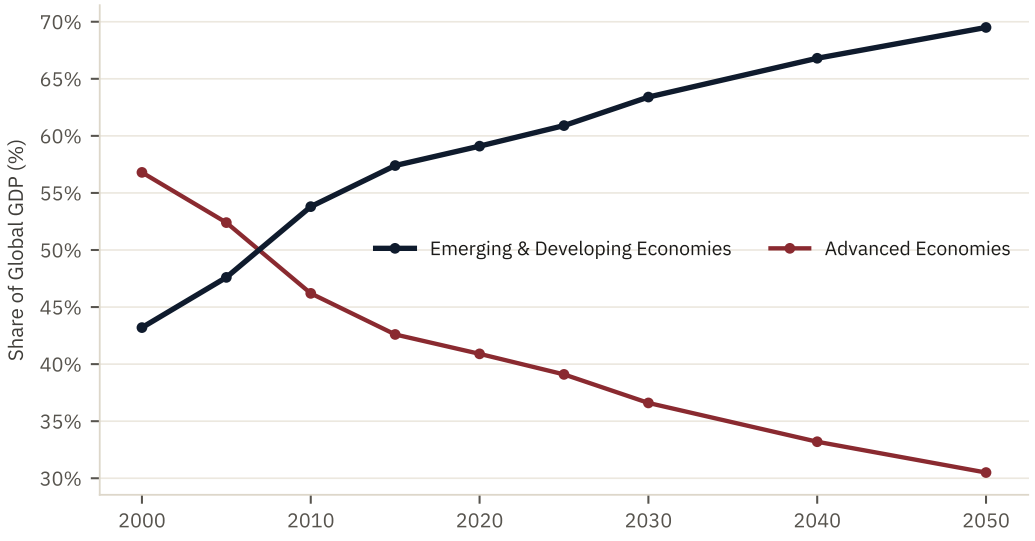
Structural Transformation Pillar	Current Structural Bottleneck	Operational 2026–2050 Pivot	Quantified Development Leverage
2. Digital Public Infrastructure & AI	84% vs 4% 5G coverage gap (HIC vs LIC); 35% internet in LDCs	Open DPI rails (ID, fast payments), spectrum sharing & localized enterprise AI tools	Delivers **11.4%–19.4%** sectoral productivity lift in finance, logistics & agriculture
3. Clean Power & Grid Reliability	Industrial tariffs above $170/MWh & up to 7.6% sales lost to outages	Utility solar-plus-storage, industrial captive clean microgrids & regional interconnectors	Compresses factory power costs below **$55–$65/MWh** with near-zero blackout drag
4. Urban Form & Multimodal Trade	Fragmented secondary cities, border customs friction & port bottlenecks	Transit-oriented secondary industrial cities, single-window customs & rail-port arteries	Boosts urban output-per-worker **+41%** raises AfCFTA intra-trade toward **40.2%**
5. Human Capital & Capital Access	High learning poverty; 75% FDI concentration; expensive EMDE debt	Foundational schooling, STEM/TVET tracks, MDB risk guarantees & digital facilitation	Lifts EMDE per-capita income ratio from **24.2%** to **56.4%** of frontier by 2050

0.4 Architecture of This Volume

To trace how these mechanisms interact over the coming quarter-century, this report progresses systematically from macroeconomic rebalancing and demographic transitions (Section 1) to MHT industrial upgrading and global value chains (Section 2); broadband access, digital public infrastructure, and AI-enabled productivity (Section 3); energy competitiveness and downstream mineral processing (Section 4); secondary urbanization and trade corridor integration (Section 5); human capabilities and youth absorption (Section 6); international investment de-concentration and institutional governance (Section 7); and integrated 2026–2050 scenario modeling with an actionable policy roadmap (Section 8). Together, these chapters establish why coordinated institutional, technological, and capital reforms can convert latent Global South scale into durable prosperity.

FIG. 1 **The Shifting Center of Gravity: EMDE vs. Advanced Share of Global GDP (PPP)**

Percentage of global purchasing-power-adjusted output, 2000–2050 (%)



SOURCE: IMF World Economic Outlook Baselines & H Heuristics Long-Run Growth Panel

SECTION 01

1. Global Macroeconomic Rebalancing & Demographic Transitions

1.1 Beyond Aggregate Size: Measuring Real Income Convergence

Headline shares of global GDP confirm that economic mass has moved decisively south and east, yet aggregate output masks vast gaps in **living standards per worker**. Across the Global South, unweighted average real GDP per capita (PPP) stood at roughly **24.2% of the advanced-economy frontier** in 2025—a gap driven by low agricultural productivity, informal urban services, shallow capital-to-labor ratios, and uneven industrial depth. Historical growth panels (**FIG. 2**) reveal four distinct regional convergence trajectories since 2000 that carry sharply different lessons for the 2026–2050 horizon.

Emerging East Asia achieved the fastest sustained convergence in modern economic history, climbing from **14.5% of advanced-economy per-capita output in 2000** to **45.4% in 2025** and tracking toward **69.2% by 2050** via deep manufacturing ecosystems, rapid capital deepening, and high R&D intensity. **ASEAN manufacturing hubs** (led by Viet Nam, Malaysia, Thailand, and Indonesia) accelerated steadily from **13.8% to 26.8%**, positioned to surpass **53%** by 2050 as supply chains diversify across Southeast Asia. **South Asia** is entering a multi-decade acceleration phase—expanding from **6.4% in 2000 to 16.9% in 2025** with projected momentum past **43% by 2050**—propelled by digital public infrastructure, services-export competitiveness, and urban industrial corridors. Conversely, **Latin America** stagnated near **25%–27%** of the frontier due to low TFP growth and commodity dependence, while **Sub-Saharan Africa** hovered near **7%–8%** without rapid manufacturing and grid breakthroughs.

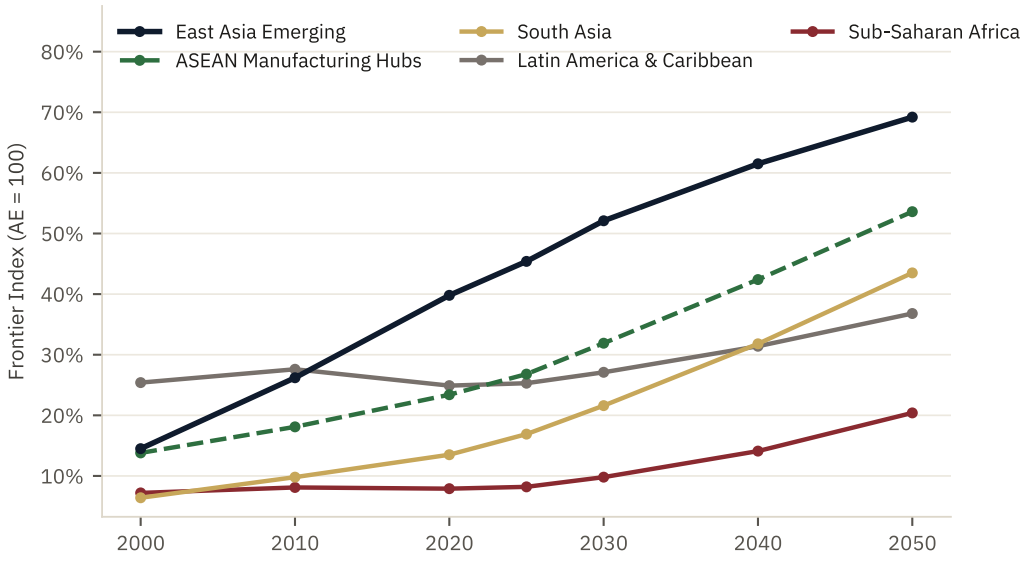
1.2 The Great Demographic Redistribution Toward the Global South

While advanced economies and parts of East Asia face rapid population aging and shrinking prime-age cohorts, global labor-force expansion through mid-century concentrates overwhelmingly in developing regions (**FIG. 3**). According to UN DESA *World Population Prospects* trends, **Sub-Saharan Africa's share of the global working-age population (ages 20–64)** expands from **12.8% in 2025 to 20.6% by 2050**, while **South Asia** grows from **25.4% to 27.1%** and **MENA** climbs from **6.7% to 7.8%**. Over the same period, East Asia's share of world working-age labor contracts from **22.9% to 16.5%**, and High-Income Western economies shrink from **14.7% to 10.8%**.

Demographic momentum operates as a powerful **conditional dividend** rather than an automatic growth engine. Falling fertility ratios temporarily lower youth dependency burdens and expand savings capacity, creating a 20-

FIG. 2 **Divergent Catch-Up: Real Per-Capita Output Relative to Advanced Frontier**

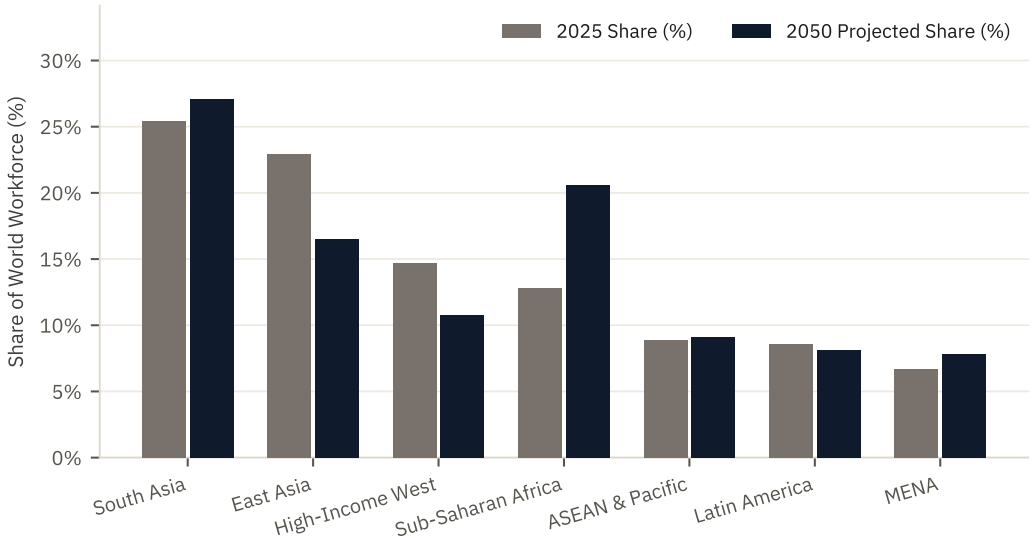
Regional real GDP per capita (PPP) indexed to Advanced Economies = 100, 2000–2050



SOURCE: H Heuristics 184-Economy Structural Observatory & IMF WEO Projections

FIG. 3 **Global Working-Age Workforce Redistribution Across Regions, 2025 vs. 2050**

Regional share of world population aged 20–64 (%); demographic wave shifts south



SOURCE: UN DESA World Population Prospects (2024 Revision)

to-35-year window of favorable workforce-to-dependent ratios. However, capturing this dividend requires generating millions of formal, higher-productivity jobs annually in construction, light and medium manufacturing, logistics, digital trade, and urban services. If job creation lags behind cohort entry, youthful demographics amplify urban informality, underemployment, and social instability rather than per-capita convergence.

1.3 Structural Reallocation & Escaping the Low-Productivity Equilibrium

Macroeconomic catch-up occurs through two complementary engines: **within-sector technological upgrading** (raising output per worker inside firms through machinery, electrification, software, and management) and **between-sector structural reallocation** (moving workers from subsistence farming or petty informal trade into higher-productivity factories and modern services). In an economy with sector shares s_i and sectoral labor productivities y_i, aggregate labor productivity change decomposes into:

$$\Delta Y = \sum_i s_{i,t-1} \Delta y_i + \sum_i y_{i,t} \Delta s_i$$

Crucially, **McMillan and Rodrik's decomposition** of post-2000 growth episodes demonstrates why growth in Latin America and Sub-Saharan Africa lagged East Asia: in several resource-exporting economies, urban migration shifted labor out of low-productivity agriculture not into dynamic manufacturing, but into equally low-productivity informal urban vending—yielding **growth-reducing structural change**. Transforming emerging economies requires reversing this pattern so labor reallocation aligns positively with productivity differentials:

Regional Archetype	Workforce Trend (2025–2050)	Dominant Structural Risk	High-Leverage Productivity Unlock
East Asia & Coastal China	Rapidly aging (-6.4 pts world labor share)	Tightening labor supply & legacy debt overhang	Industrial robotics, AI automation & outbound FDI into ASEAN/Africa
South Asia & ASEAN	Expanding (+1.9 pts combined world share)	Informal SME dominance & secondary-city congestion	MHT supplier clustering, female formal inclusion & clean grid buildout
Sub-Saharan Africa	Booming (+7.8 pts world labor share)	Power outages, trade fragmentation & youth informality	Agro-processing zones, AfCFTA rail/ports & mobile DPI formalization
Latin America & MENA	Moderately aging / stable	Premature deindustrialization & low R&D intensity	Nearshoring electronics/autos, critical-mineral refining & TVET reform

Bridging these regional trajectories requires treating macroeconomic stabilization not merely as inflation containment, but as the platform enabling long-horizon industrial investment, deep domestic savings mobilization, and sustained structural transformation across the Global South.

1.4 Mobilizing Domestic Savings & Preserving Fiscal Space for Capital Formation

Sustaining high physical and digital investment across three decades requires deep **domestic capital mobilization** so emerging economies are not hostage to volatile short-term external bond cycles. Historical fast-converging Asian economies financed **75%–90%** of gross fixed capital formation through domestic household, corporate, and pension savings, reserving foreign capital for technology-transfer FDI rather than routine fiscal consumption. Expanding contributory micro-pensions via mobile money, deepening domestic Treasury yield curves, and widening formal corporate tax bases through digital invoicing enable governments to protect public infrastructure CapEx—grids, ports, schools, and broadband backbones—even during global interest-rate tightening episodes.

> **Macro-Demographic Policy Imperative**
>
> Demographic windows are finite: economies in Sub-Saharan Africa and South Asia maximize per-capita income gains only if formal job absorption, electricity buildout, and female labor participation scale concurrently with youth workforce entry between 2026 and 2040.

SECTION 02

2. Next-Generation Industrialization & Value-Chain Upgrading

2.1 Medium- and High-Tech Manufacturing as the Engine of Catch-Up

Manufacturing has historically functioned as the premier escalator of emerging-economy convergence because industrial tradables exhibit **unconditional labor-productivity convergence**, deep backward and forward supplier linkages, and rapid learning-by-doing across regional supply chains. Yet modern industrialization is increasingly bifurcated by technological intensity. As UNIDO's *Industrial Development Report* highlights, **medium- and high-technology (MHT) industries**—including electrical machinery, precision equipment, industrial automation, pharmaceuticals, chemicals, and transport equipment—now represent **over 50% of global manufacturing value added (MVA)** and consistently outpace low-technology textiles and basic assembly.

Across the Global South, however, MHT industrial depth remains highly skewed (**FIG. 4**). **Industrializing East Asia** already generates **46.8% of domestic MVA** within medium- and high-tech brackets (approaching Advanced OECD levels of **54.2%**), and **ASEAN manufacturing hubs** sit at **39.4%**. By contrast, **Latin America (28.6%)**, **South Asia (27.9%)**, **MENA (22.4%)**, and **Sub-Saharan Africa (14.2%)** remain disproportionately clustered in resource processing or basic low-margin consumer goods—leaving them vulnerable to wage-compression competition and volatile commodity cycles.

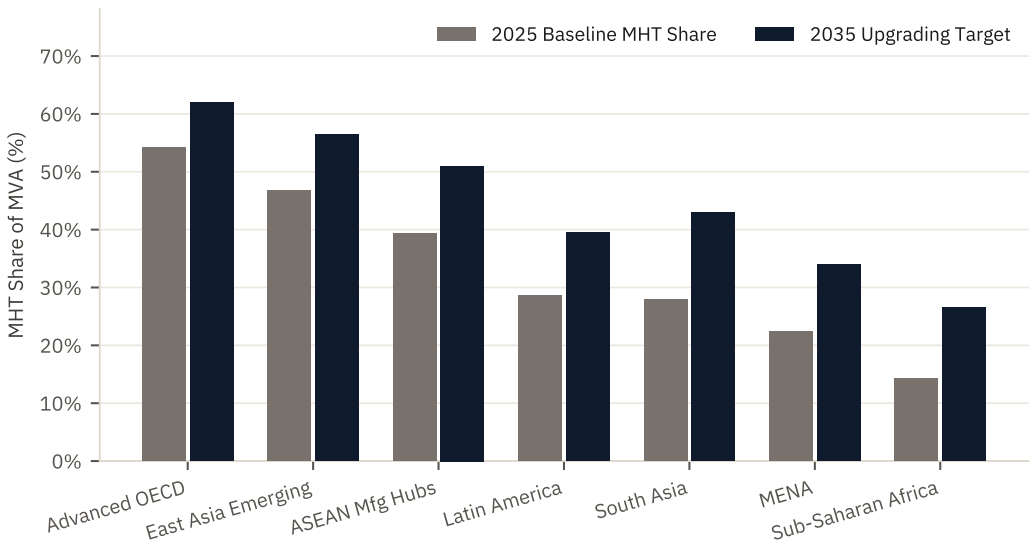
> **Industrial Reality Check: Scale Must Pair With Complexity**
>
> While developing countries classified by UNIDO as "industrializing" comprise nearly 70% of nations worldwide, their combined share of global MVA stands near **12.3%**, with **Sub-Saharan Africa at ~1.4%**. Escaping this structural margin requires explicit progression from raw commodity or basic assembly tiers into intermediate components, capital goods, and green industrial equipment.

2.2 Productive Capabilities & The Complexity-Growth Frontier

Cross-country evidence compiled across industrial competitiveness and innovation indices confirms a tight statistical link between **productive capability depth** (the diversity and technical sophistication of goods and software an economy can reliably produce) and **sustained real per-capita income growth** (**FIG. 5**). Countries such as **Viet Nam**,

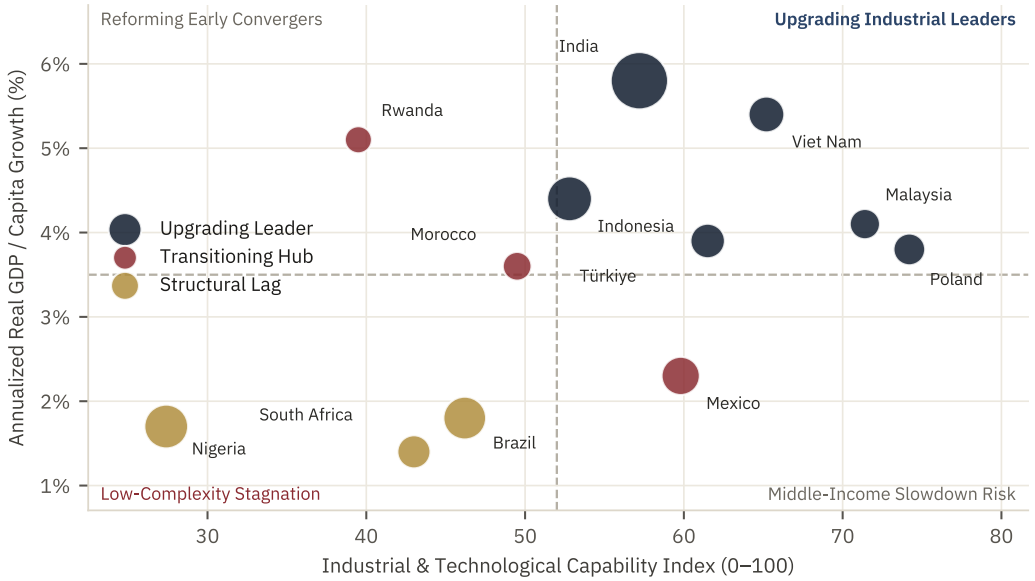
FIG. 4 **Industrial Upgrading Gap: Medium- & High-Tech Share of Manufacturing Value Added**

Current regional MHT share in domestic MVA (%) versus 2035 structural transformation targets



SOURCE: UNIDO Industrial Development Report & International Yearbook of Industrial Statistics

FIG. 5 **Productive Capability Score vs. Long-Run Real Per-Capita Income Growth**
Composite MHT industrial & digital capability index (0–100) vs. annualized real GDP/capita growth (%)



SOURCE: H Heuristics Synthesis of UNIDO CIP, WIPO GII & World Bank Growth Panels

India, **Malaysia**, **Poland**, and **Türkiye** sustain annualized real catch-up rates between **3.8% and 5.7%** precisely because targeted supplier development, export-zone logistics, and engineering talent expanded their MHT export baskets beyond simple resource endowments.

Conversely, economies stalled in the lower-left and lower-right quadrants—where raw extraction, protected domestic monopolies, or low-complexity assembly dominate—experience recurring growth slowdowns whenever commodity super-cycles unwind. Notably, dynamic smaller reformers such as **Rwanda** and **Morocco** demonstrate that early institutional clarity, industrial-park governance, and automotive/aerospace or agro-tech niche specialization can initiate rapid upward velocity even from modest initial capital bases.

2.3 "China+N" Supply Chain Diversification & Modular Industrial Parks

Geopolitical risk diversification, rising coastal wages in mature hubs, and regional free-trade rules are driving the most consequential global reorganization of manufacturing footprints since the early 2000s. Rather than wholesale reshoring to high-wage Western markets, multinational electronics, apparel, renewable hardware, and automotive component producers are executing **"China+N" multi-node strategies**—anchoring upstream chemical and component manufacturing in East Asia while expanding final assembly, battery packing, PCB fabrication, and machinery sub-assemblies across **Viet Nam, India, Indonesia, Mexico, Morocco, Egypt, Türkiye, and East Africa**.

Emerging economies capture enduring value from this relocation wave only when industrial parks move beyond isolated tax holidays toward **plug-and-play productive ecosystems**:

Upgrading Instrument	Legacy Enclave Pitfall	High-Value Ecosystem Design	Expected Structural Spillover
Supplier Localization & Linkage Programs	Duty-free imports crowd out local Tier-2/Tier-3 SMEs	Tiered domestic supplier certification, quality labs & co-investment credit	Raises domestic value-added share of gross exports by **12–20 pts**
Zero-Stoppage Export Infrastructure	Multi-day customs delays & grid blackouts erode JIT margins	Dedicated clean-power feeders, dry-port rail links & automated AEO customs	Compresses factory-to-vessel lead times by **35%–55%**
R&D & Testing Co-Centers	Factories remain pure blueprint-execution branches	Shared metrology, prototyping & robotics training institutes inside parks	Cuts unit defect rates and speeds transition from OEM to **ODM/OBM**
Circular Industrial Symbiosis	High water/waste compliance risk triggers buyer ESG bans	Shared zero-liquid-discharge water & scrap-metal recovery loops	Qualifies exports for **EU CBAM & OEM Scope-3** procurement mandates

2.4 Servicification of Manufacturing & High-Value Tradable Services

Modern industrial upgrading also dissolves the rigid historical boundary between factories and services. High-value manufacturing is increasingly embedded with engineering design, embedded software, supply-chain telemetry, predictive maintenance, and aftermarket logistics—a structural trend termed **servicification**. Simultaneously, cross-border digital delivery enables emerging economies with strong STEM cohorts and multilingual talent—most visibly **India, the Philippines, Brazil, Poland, Kenya, and Colombia**—to export global capability centers (GCCs), cloud engineering, financial analytics, and telemedicine directly to advanced-economy enterprises.

Crucially, services-led export growth complements rather than replaces physical industrialization. Modern services employ concentrated college-educated urban cohorts, whereas diversified MHT manufacturing, agro-processing, and construction generate the high-multiplier middle-skill jobs essential for absorbing fast-growing working-age populations across South Asia and Sub-Saharan Africa. Anchoring both engines concurrently insulates emerging economies from both commodity price whipsaws and premature deindustrialization.

2.5 Export-Disciplined Industrial Policy & Quality Infrastructure

Successful twenty-first-century industrializers—from East Asia to rising clusters in Morocco, Viet Nam, and India—distinguish sharply between **rent-seeking infant-industry protection** and **export-disciplined capability policy**. Rather than insulating non-competitive domestic incumbents behind permanent tariff walls, credible governments tie public infrastructure subsidies, tax credits, and R&D grants directly to **time-bound export performance, supplier localization milestones, and international quality-certification adoption** (ISO, CE, UL, and sanitary/phytosanitary testing). Investing early in **national metrology and conformity-assessment laboratories** prevents developing-country producers from suffering costly export rejections at European, North American, and Asian customs borders.

> **Avoiding Premature Deindustrialization**
>
> Even modest upgrades in engineering standards, factory electrification, and port customs speed allow mid-sized emerging economies to enter electronics sub-assembly, medical consumables, modular construction materials, and agricultural machinery—sectors where rising labor productivity compounds steadily over decades.

SECTION 03

3. Digital Infrastructure, Artificial Intelligence & Technological Leapfrogging

3.1 Bridging the Multi-Tier Connectivity & 5G Readiness Gap

Digital infrastructure functions today much as railways and alternating-current grids functioned during earlier industrial revolutions: as a **general-purpose platform** determining who can participate in high-productivity commerce. International Telecommunication Union (ITU) tracking confirms steady progress in headline global connectivity—reaching roughly **6 billion internet users (~74% of humanity)** by 2025—yet exposes a stark **multi-tiered quality divide** across country income groups (**FIG. 6**).

While high-income economies sit near universal saturation (**94% internet penetration**, **89% affordable broadband**, and **84% 5G coverage**), **Least Developed Countries (LDCs)** record only **35% active internet usage** and **14% 5G coverage**, and **Low-Income Countries (LICs)** trail at **27% internet use**, **12% affordable broadband**, and just **4% 5G reach**. Moreover, hundreds of millions across developing regions reside within mobile signal footprints yet remain offline—an **affordability and digital-skills usage gap** driven by entry-level smartphone costs, regressive spectrum taxation, and scarce local-language content. Closing this physical and financial divide is a prerequisite before enterprise software or AI workflows can scale beyond narrow metropolitan enclaves.

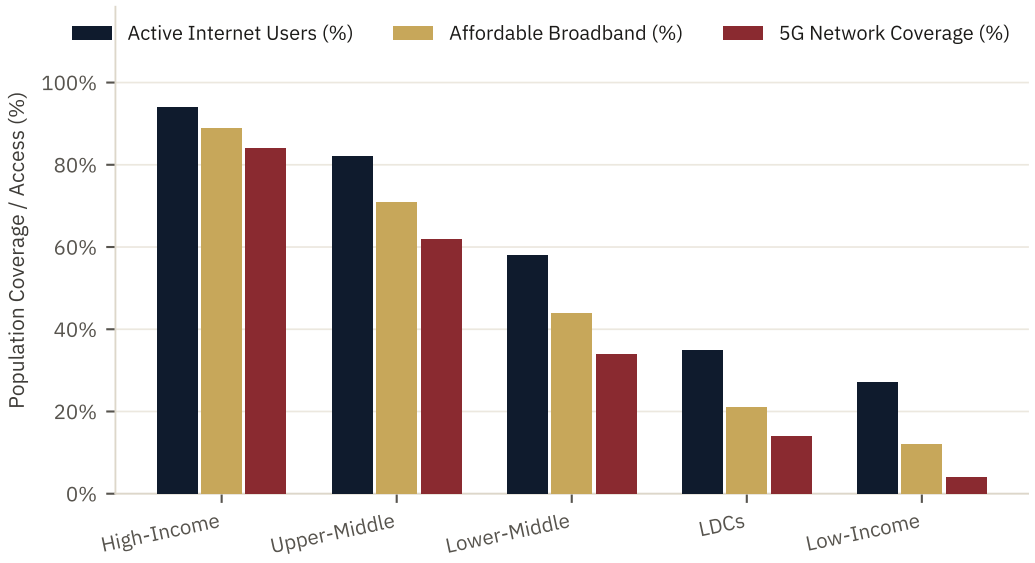
3.2 Enterprise Artificial Intelligence: Complementarity Over Displacement

The rapid emergence of cloud-hosted foundation models and domain-specific AI applications introduces both **acute convergence risks** and **historic leapfrogging opportunities** for developing markets. On the risk side, IMF *Artificial Intelligence Preparedness* analyses show high-income economies possess denser cloud compute clusters, venture capital, and digital skills, threatening a renewed divergence where AI accelerates frontier productivity faster than emerging firms can adapt. Because emerging-market labor forces contain larger shares of agricultural and manual-craft workers and smaller shares of routine clerical office jobs, however, near-term AI deployment exhibits far higher potential for **labor complementarity** than wholesale displacement across the Global South (**FIG. 7**).

When tailored to local languages, low-bandwidth mobile interfaces, and domain bottlenecks, practical AI deployment acts as a **force multiplier for scarce technical expertise**: enabling nurses and community health workers to run diagnostic screening (+14.9% triage productivity), smallholders to access hyper-local agronomy and pest alerts (+13.6%), automated customs risk-engines to clear cargo (+17.8%), and micro-lenders to underwrite informal

FIG. 6 **The Multi-Tier Connectivity Divide: Internet Use, 5G Access & Affordability**

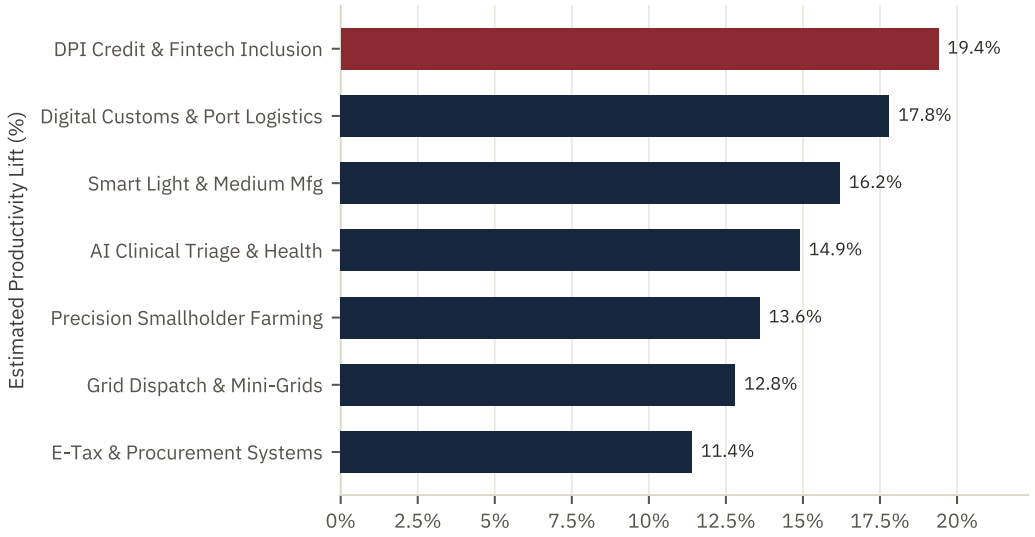
Share of population with internet use, 5G mobile coverage & affordable broadband access (%, 2025)



SOURCE: International Telecommunication Union (ITU) Facts and Figures 2024–2025

FIG. 7 **Sectoral Productivity Gains From Enterprise AI & Digital Public Infrastructure**

Estimated medium-term sectoral TFP/output lift (%) once cloud, broadband & DPI rails are active



SOURCE: H Heuristics Synthesis of IMF AI Preparedness, WIPO GII & DPI Case Studies

merchants via verified cash-flow telemetry (+19.4%). Rather than chasing frontier model pre-training at prohibitive capital cost, emerging economies generate highest returns by focusing public R&D and cloud procurement on **applied, multilingual AI adaptation** layered onto domestic sector datasets.

3.3 Digital Public Infrastructure (DPI) as a Formalization Engine

Among the most transformative institutional innovations originating directly in the Global South over the past fifteen years is **Digital Public Infrastructure (DPI)**—interoperable, open-standard public rails for verifiable digital identity, instant low-cost retail payments, and consent-based data exchange. Pioneered at continental scale in India (Aadhaar + UPI + Account Aggregator) and replicated in tailored forms across **Brazil (Pix), Indonesia (QRIS), Singapore, Kenya, and Rwanda**, open DPI collapses transaction costs that historically excluded hundreds of millions of informal firms and households from formal markets.

DPI Layer	Legacy Exclusion Barrier	Operational Digital Mechanism	Measurable Economic & Inclusion Impact
Verifiable Digital Identity	Missing birth/land records block bank KYC & welfare	Biometric / cryptographic ID linked to mobile open APIs	Slashes KYC onboarding costs from $15–$25 to **under $0.50**
Instant Interoperable Payments	Cash friction & 2%–3% card merchant fees deter SMEs	Zero/low-fee peer-to-merchant QR & real-time bank switches	Rapidly digitizes micro-retail cash flows, building **verifiable credit history**
Consent Data Exchanges	Collateral-poor MSMEs face predatory informal lenders	Portable encrypted invoice, tax & utility payment verification	Expands formal working-capital access for MSMEs & **women-owned enterprises**
Digital Trade Single Windows	Paper customs invite delays & border rent-seeking	Unified electronic manifest, phytosanitary & tariff clearance	Compresses border clearance times by **40%–65%**, boosting SME exporting

3.4 Fast-Climbing Innovators & Localized Capabilities (WIPO Insights)

WIPO's *Global Innovation Index (GII)* reinforces that technological upgrading does not wait for advanced-economy income status. Alongside **China's entry into the global Top 10**, an expanding cohort of middle-income economies—including **India, Viet Nam, Indonesia, the Philippines, Malaysia, Türkiye, and Morocco**—consistently outperform GDP-per-capita peers in innovation output, while lower-income reformers such as **Rwanda, Senegal, Tunisia, and Uzbekistan** demonstrate how deliberate digital regulation, STEM university links, and startup facilitation cultivate vibrant domestic ecosystems. Emphasizing **"innovation without heavy frontier research"**—process adaptation,

fintech UX, frugal engineering, and cloud SaaS localization—allows capital-constrained EMDEs to harvest frontier breakthroughs rapidly while steadily growing domestic R&D capacity.

3.5 Spectrum Economics, Regional Cloud Sovereignty & Digital Trust

Reaching universal broadband parity requires dismantling **short-sighted telecom fiscal extraction**. In several lower-income countries, upfront spectrum auctions, turnover levies on mobile data, and excise duties on low-cost smartphones raise end-user connectivity costs above **5%–8% of monthly GNI per capita**—choking off precisely the MSMEs, students, and rural farmers who stand to gain most from digital tools. Shifting toward **coverage-linked spectrum pricing** (waiving upfront license fees in exchange for binding rural 4G/5G rollout milestones), mandating passive fiber and tower infrastructure sharing along roads and railways, and enacting **data-protection and cyber-resilience standards** builds the institutional trust necessary to attract regional Tier-3/Tier-4 cloud data centers and fintech investment across the Global South.

> **Closing the Affordability Usage Gap**
>
> Connectivity hardware without digital literacy or affordable devices leaves rural populations offline despite cellular coverage; combining open DPI rails with zero-rated educational and public-service portals turns mobile broadband into immediate household income.

SECTION 04

4. Clean Energy Abundance, Power Reliability & Resource Value Capture

4.1 Energy Abundance & Reliability as Industrial Gatekeepers

No economy has ever industrialized—or sustained modern digital compute and urban logistics—without abundant, predictable, and cost-competitive electricity. Across manufacturing corridors in South Asia, Sub-Saharan Africa, and parts of Latin America, however, **chronic grid unreliability and elevated industrial power tariffs** act as an implicit tax on factories and data centers alike (**FIG. 8**). World Bank Enterprise Surveys and regional grid audits illustrate the dual bind: whereas well-integrated **clean grid hubs** deliver reliable power near **$54/MWh** with negligible outage interruptions (**0.4% sales loss**), manufacturers in diesel-backed **Sub-Saharan African corridors** face effective power costs reaching **$174/MWh** alongside **7.6% of annual firm output lost** to voltage drops, blackouts, and backup fuel rationing.

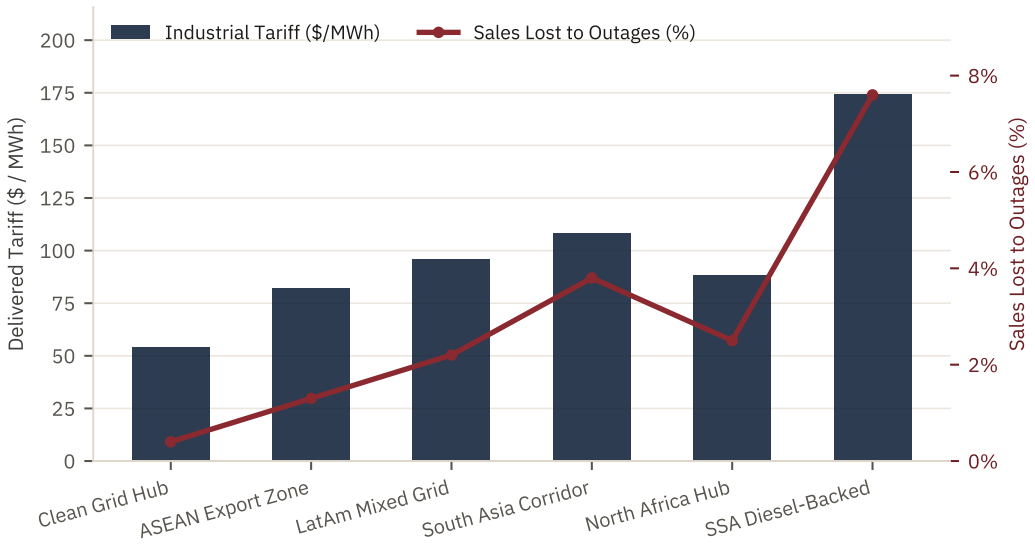
Breaking this competitiveness penalty is the fastest lever available to unlock factory formation. Utility-scale solar PV, onshore wind, and 4-to-8-hour battery storage (BESS) now undercut imported coal and LNG baseload across the Sunbelt, allowing emerging industrial parks to procure dedicated firm clean power via **direct corporate PPAs**, **private-wire captive clean microgrids**, and **grid-forming battery inverters** that stabilize local industrial voltage without waiting ten years for slow national utility turnarounds.

4.2 Green Industrialization & Border-Carbon Trade Readiness

Beyond direct cost savings, **clean electrification is rapidly becoming a non-negotiable condition of market access**. Under the European Union's **Carbon Border Adjustment Mechanism (CBAM)** and rising Scope-3 decarbonization mandates across global automotive, electronics, footwear, and cloud buyers, emerging exporters operating coal-heavy grids face rising border tariffs and supplier deselection risks. Conversely, countries with high solar, wind, hydro, or geothermal endowments—such as **Morocco, Chile, Kenya, Brazil, Namibia, Viet Nam, and Egypt**—can convert abundant renewable electrons into a structural export advantage across **green steel (DRI-EAF), green ammonia fertilizers, aluminum smelting, and low-carbon data-center hosting**.

FIG. 8 **The Energy-Competitiveness Penalty: Industrial Tariffs vs. Grid Outage Losses**

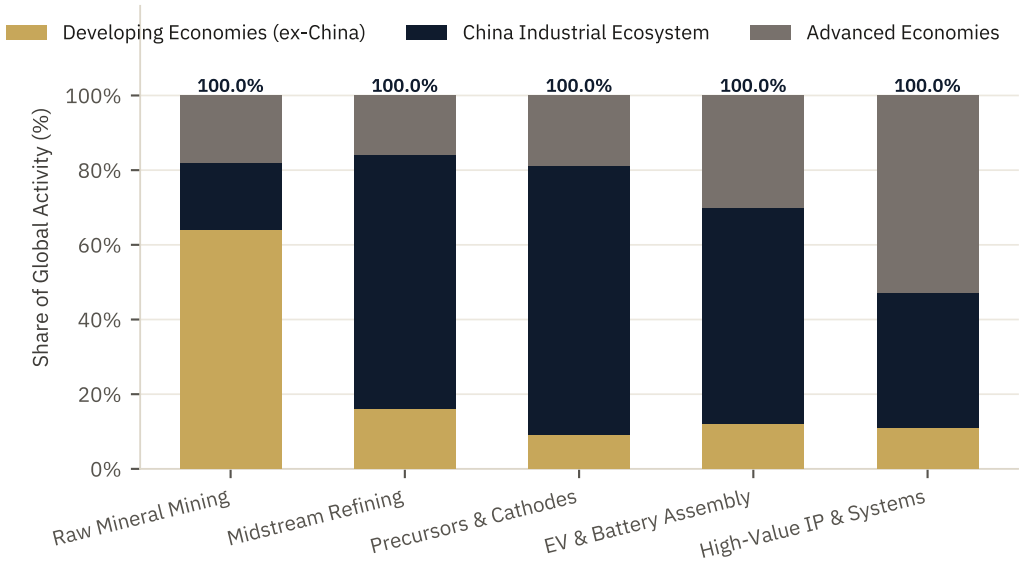
Delivered industrial power tariff ($/MWh, bars) vs. annual manufacturing sales lost to outages (%, line)



SOURCE: World Bank Enterprise Surveys, IRENA & H Heuristics Industrial Benchmarks

FIG. 9 **Resource-Rich, Value-Poor? Global Share Across Clean-Tech Supply Chain Stages**

Distribution of mining vs. refining, cathode precursors, hardware assembly & IP capture (%)



SOURCE: IEA Critical Minerals Outlook & UNIDO Clean Manufacturing Value-Chain Estimates

4.3 Critical Minerals: Moving From Ore Extraction to Downstream Processing

Demand for lithium, cobalt, nickel, copper, graphite, and rare earth elements is transforming resource endowments across **Latin America (the Lithium Triangle, Chile, Peru, Brazil)**, **Sub-Saharan Africa (DRC, Zambia, South Africa, Zimbabwe, Madagascar)**, and **Southeast Asia (Indonesia, the Philippines)**. Historically, resource-rich developing nations captured only a sliver of commodity value chains because raw ores were exported with minimal domestic processing, exposing public budgets to cyclical boom-bust swings while leaving high-margin refining, precursor synthesis, and manufacturing offshore (**FIG. 9**).

As IEA and UNIDO value-chain decompositions illustrate, developing economies outside China account for **64% of global primary mineral extraction**, yet hold only **16% of midstream refining**, **9% of precursor/cathode manufacturing**, and **12% of EV and battery hardware assembly**. Escaping raw-material dependence requires shifting policy from blunt export bans—which often deter capital when domestic power and skills are missing—toward **co-invested regional beneficiation corridors**:

Value-Chain Step	Legacy Extraction Model	Upgraded Domestic Value-Capture Policy	Realistic EMDE Anchor Economics
Upstream Extraction	Unprocessed ore exports; enclave royalties	Transparent mineral cadastres, geological mapping & clean tailings water loops	Stable long-term fiscal revenue & ESG-compliant mine certification
Midstream Refining	Raw concentrates shipped abroad for smelting	Co-located renewable hydro/ solar power, shared acid/ chemical plants & export zones	Captures **2.5x–4x value-added** over raw concentrate shipments
Cathode & Precursor Mfg.	Zero local supplier base or testing standards	Joint-venture technology licensing, regional free-trade input sourcing & TVET engineers	Anchors recurring chemical/ metallurgical export revenues
Regional Battery & Motor Packs	Imported finished EVs, grid BESS & motors	Regional demand pooling (e-buses, grid BESS, 2- & 3-wheelers) for scale assembly	Creates skilled factory jobs insulated from raw spot-price volatility

Indonesia's nickel downstreaming trajectory demonstrates the immense employment and export scale achievable when mineral leverage pairs with industrial park infrastructure, while also underscoring why **environmental standards, clean-power integration, and local skills training** are vital to ensure downstream processing translates into high-margin, sustainable domestic wealth rather than coal-intensive lock-in.

4.4 Utility Solvency Reform & Distributed Productive-Use Mini-Grids

Solving industrial power unreliability also demands confronting the **financial insolvency of state-owned distribution utilities** that plagues dozens of developing countries. Below-cost politically frozen tariffs for select consumer blocks, high technical transmission losses, and non-collection arrears leave national utilities unable to honor power-purchase obligations—driving up perceived off-taker risk premiums across the entire energy sector. Restoring utility creditworthiness requires three parallel reforms: installing **smart industrial and feeder metering** to slash commercial losses; carving out **financially ring-fenced transmission corridors** backed by multilateral liquidity guarantees; and unbundling commercial/industrial (C&I) wheeling so factories can contract **utility-scale clean IPPs directly**.

Outside major industrial zones, distributed solar-plus-storage mini-grids and solar irrigation hubs transform rural agricultural productivity. Replacing volatile, expensive diesel pumps and post-harvest crop spoilage with electrified **cold-chain storage, grain milling, and milk chilling facilities** boosts smallholder net farm incomes by **25%–45%** while establishing predictable anchor electricity demand that stabilizes village mini-grid economics.

> **Energy Access Must Serve Productive Loads, Not Lighting Alone**
>
> Basic household solar lanterns improve evening study and safety, but rural income convergence accelerates only when electrification reaches three-phase motors, cold storage, agro-processing workshops, and telecom towers—raising daytime load factors and making rural power investments commercially self-sustaining.

SECTION 05

5. Urbanization, Multimodal Corridors & Regional Trade Integration

5.1 Secondary Cities & Agglomeration Economies Without Mega-City Congestion

Historically, industrialization across emerging markets relied heavily on a handful of congested coastal megacities. Over the next quarter-century, however, the sharpest urban population growth will unfold across **secondary and intermediate cities of 500,000 to 5 million inhabitants** across South Asia, Southeast Asia, and Sub-Saharan Africa. When planned coherently, urban density generates powerful **agglomeration economies**—thick specialized labor pools, shared industrial suppliers, rapid managerial knowledge diffusion, and lower per-unit grid and fiber deployment costs.

Yet across unplanned rapid-growth cities, **infrastructure deficits and fragmented land cadastres flip agglomeration benefits into congestion drag**. Multi-hour commuter gridlock, informal settlements detached from piped water and mass transit, and insecure industrial land titles push up urban wages without raising worker output—pricing emerging-market manufacturers out of export competition. Decomposing the productivity gap between an unplanned rapid-growth municipality and a **connected industrial city hub** illustrates where public capital creates decisive leverage (**FIG. 10**).

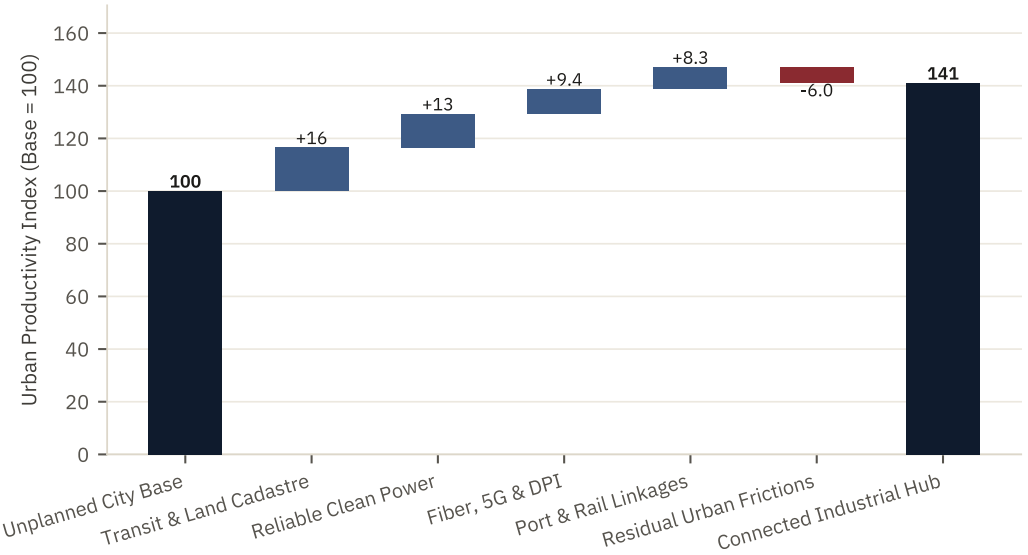
Pre-planned transit corridors and secure digital land cadastres contribute **+16.5 index points** by uniting metropolitan labor markets, while reliable industrial clean power (**+12.8**), high-speed broadband and DPI access (**+9.4**), and unimpeded port-rail linkages (**+8.3**) combine to raise connected output-per-worker from a **100.0 baseline to 141.0** even after residual urban frictions. Crucially, executing land-use zoning and arterial right-of-way reservation *ahead* of dense settlement expansion costs a fraction of retrofitting choked megacity cores decades later.

5.2 Multimodal Logistics, Ports & Compressing Border Friction

For emerging economies seeking integration into regional and global production networks, **border dwell times and inland transport costs** frequently matter more than nominal tariff rates. While ocean container shipping costs declined historically, inland trucking across poorly paved secondary highways, fragmented gauge rail systems, and paper-bound border posts can add **15%–30% to landed unit costs** in landlocked and coastal developing regions alike. Automated port cranes, digital customs single windows, standardized axle weights, and electrified standard-gauge freight rail convert isolated national markets into investable regional production platforms.

FIG. 10 **Productivity Bridge From Unplanned Sprawl to Connected Industrial City**

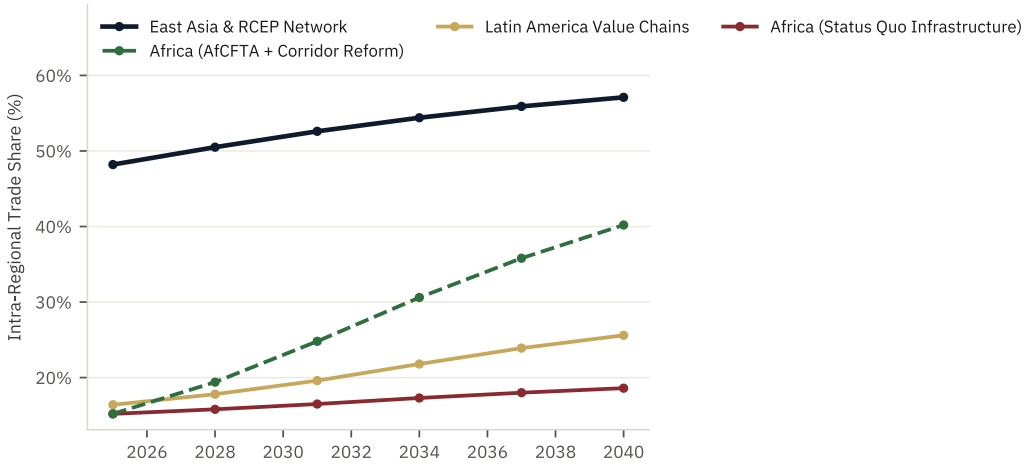
Output-per-worker index decomposition across urban transit, power, digital & logistics upgrades



SOURCE: H Heuristics Urban Productivity Decomposition Model

FIG. 11 **Deepening South-South & Intra-Regional Value-Chain Trade Shares, 2025–2040**

Intra-regional share of total merchandise & intermediate goods trade (%) under corridor reforms



SOURCE: UNCTAD Trade Corridors Database, AfCFTA Secretariat & H Heuristics Projections

5.3 Continental Trade Integration: AfCFTA, ASEAN & South-South Supply Chains

Because small fragmented domestic markets struggle to support scale-intensive MHT factories, **deep regional trade integration** acts as the vital spatial multiplier for emerging economies (**FIG. 11**). Across East and Southeast Asia, RCEP and ASEAN trade-in-parts ecosystems already channel **48.2% of total merchandise trade intra-regionally** in 2025—heading toward **57.1% by 2040**—allowing factories in Viet Nam, Malaysia, Thailand, and Indonesia to import intermediate electronics and machinery inputs rapidly without punitive border delays.

By contrast, intra-African merchandise trade sits near **15.2%** under status quo border and rail bottlenecks. Under coordinated **African Continental Free Trade Area (AfCFTA)** rules-of-origin harmonization paired with priority cross-border corridor modernization (such as the Abidjan–Lagos, Northern Mombasa–Kampala–Kigali, Lobito, and Cairo–Cape links), modeled intra-continental value-chain trade accelerates to **40.2% by 2040**—unlocking viable continental scale for African pharmaceutical, food-processing, construction-material, automotive, and clean-tech assembly industries.

Regional Corridor Lever	Bottleneck Eliminated	Target Operational Metric	Industrial Value-Chain Payoff
One-Stop Digital Border Posts	Duplicate manual customs checks & truck queues	Cut cross-border truck dwell from 48h to **under 4h**	Enables cross-border just-in-time components sourcing
Port-to-Inland Rail Arteries	Heavy diesel trucking wear & port yard gridlock	Shift 35%–50% of bulk & container freight onto rail	Reduces inland logistics cost per tonne-km by **30%–45%**
Harmonized Standards & Mutual Recognition	Redundant national safety & phytosanitary labs	Continent-wide conformity certification acceptance	Allows local agribusinesses & SMEs to scale regionally
Transit-Oriented Workforce Housing	Distant peri-urban slums & >15% wage spent commuting	Mixed-income high-density housing along BRT/rail stops	Expands effective firm labor-shed radius by **2x–3x**

Integrating municipal urban planning directly with national industrial and trade policy transforms demographic urbanization from an infrastructure liability into the physical backbone of rising Global South productivity.

5.4 Municipal Fiscal Capacity & Land-Value Capture for Urban Corridors

Rapidly growing secondary cities across Africa, South Asia, and Latin America routinely lack the **sub-national balance sheets** needed to finance mass transit, piped water, flood drainage, and industrial-park utilities on time. Because municipal property registries cover only small fractions of urban land, local authorities lose their natural tax base precisely when urbanization lifts commercial real-estate values exponentially.

Deploying **drone- and satellite-assisted digital land cadastres**, simple area-based property tax assessments, and **transit-oriented land-value capture instruments**—selling development-rights bonuses or auctioning publicly serviced commercial plots along newly built BRT and metro stations—can self-finance **30%–55% of capital outlays** for core urban transport arteries. When paired with transparent audited municipal accounts, sovereign guarantee

pools enable creditworthy secondary cities to issue **long-dated local-currency infrastructure bonds**, decoupling productive city expansion from stretched central-government budgets.

> **Cities Convert Demographic Scale Into Industrial Cost Advantage**
>
> Pre-securing arterial transit corridors, serviced industrial zones, and property tax registries in secondary cities today prevents multi-decade congestion drag and keeps urban manufacturing wages globally competitive.

5.5 Inland Dry Ports, Cold-Chain Logistics & Secondary City Polycentricity

Beyond coastal gateway modernization, unlocking agricultural and industrial exports from interior regions requires building **inland container depots (dry ports)** and temperature-controlled cold-chain networks integrated directly into standard-gauge rail corridors. Across much of Africa, South Asia, and Andean Latin America, perishable horticultural, dairy, and marine exports suffer **20%–35% post-harvest losses** before reaching urban buyers or export terminals. Co-locating solar-powered cold storage warehouses alongside automated rail-loading bays cuts spoilage dramatically while allowing interior provinces to export high-value processed food and pharmaceuticals directly under bonded customs seal.

Equally critical is **polycentric metropolitan planning**: linking secondary manufacturing towns to tier-one financial capitals via fast intercity rail rather than allowing a single congested primate city to absorb all formal capital investment. Multi-node urban corridors balance housing affordability, keep industrial land costs low, and diffuse managerial know-how across wider national geographies.

SECTION 06

6. Human Capital, Workforce Skills & Demographic Absorption

6.1 Human Capital as the Binding Constraint on Technological Absorption

Capital equipment, 5G fiber networks, and green industrial zones yield sub-par returns unless accompanied by a workforce capable of operating, maintaining, and adapting modern technologies. Across much of the developing world, however, formal schooling expansion over recent decades masked a severe **learning-quality crisis** alongside sharp mismatches between university curricula and practical industrial engineering needs. Disaggregating human capital and technological absorption scores across five workforce dimensions reveals distinct regional readiness profiles (**FIG. 12**).

Emerging East Asia scores consistently high across foundational learning (**84**), STEM and TVET pipelines (**79**), digital access (**86**), enterprise R&D participation (**78**), and female formal participation (**72**), creating dense absorptive capacity for robotics, electronics, and clean manufacturing. **ASEAN manufacturing hubs** maintain solid momentum (**54–74**), whereas **Latin America** suffers from comparatively weak enterprise R&D (**41**) and STEM-TVET depth (**52**) relative to broader connectivity (**68**). Meanwhile, **South Asia** exhibits an acute gender-inclusion gap (Female LFP index **38** despite rising STEM cohorts of **59**), and **Sub-Saharan Africa** faces severe structural deficits across foundational learning (**39**), R&D (**28**), and TVET pipelines (**41**) that restrict industrial absorption if left unaddressed.

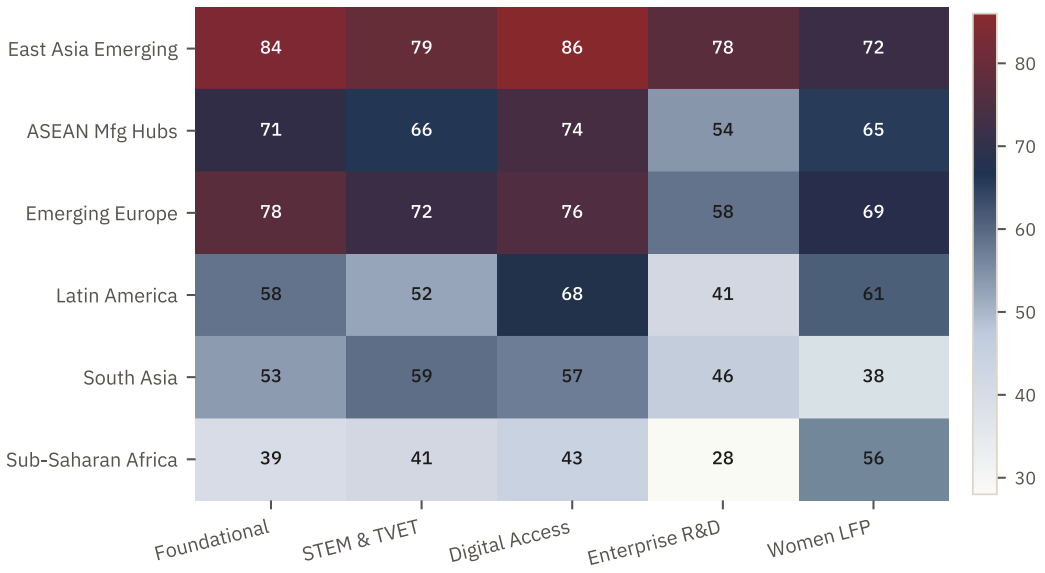
6.2 Halving Learning Poverty & Scaling Dual-Track Technical Training

Economic catch-up requires synchronized investment across two time horizons: **foundational literacy, numeracy, and early-childhood health/nutrition** for cohorts entering schools today, and **rapid demand-driven technical and vocational upgrading (TVET)** for the hundreds of millions of young adults already entering developing-economy labor markets over the next decade.

> **Workforce Upgrading Principle: Employer-Co-Designed Dual Apprenticeship Systems**
>
> Public vocational colleges isolated from private industry routinely train youth on obsolete curricula. Replacing classroom-only training with **dual-track employer-anchored apprenticeships** across solar installation, EV maintenance, CNC

FIG. 12 **Human Capital & Technological Absorption Matrix Across EMDE Regions**

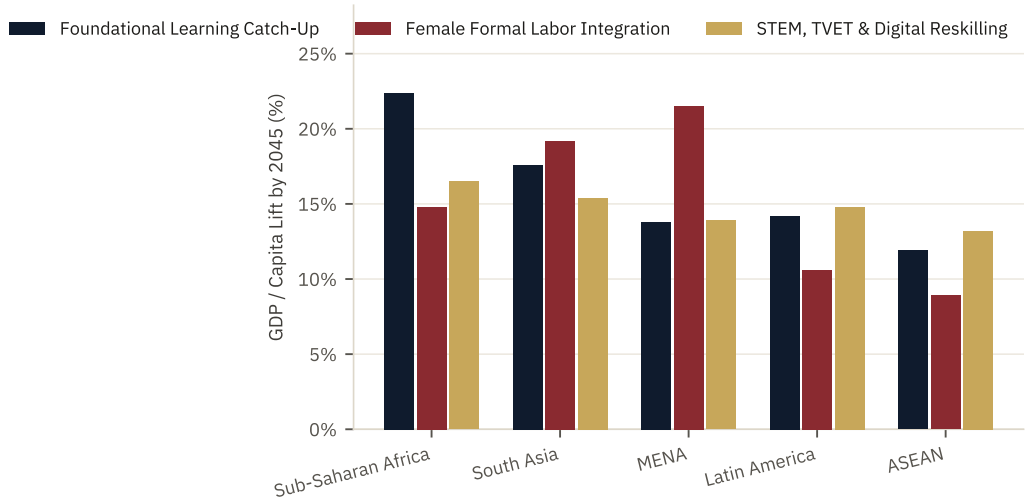
Normalized readiness score (0–100) across learning, STEM/TVET, digital access, R&D & women's LFP



SOURCE: H Heuristics Workforce Observatory (UNESCO, ILO, WIPO & World Bank HCI)

FIG. 13 **Long-Run Per-Capita GDP Lift From Closing Three Human-Capital Bottlenecks**

Projected steady-state GDP/capita gain (%) by 2045 from learning, female inclusion & TVET reform



SOURCE: H Heuristics Macro-Demographic Simulation calibrated to World Bank & ILO Studies

machining, cloud operations, cold-chain logistics, and nursing raises graduate placement rates above **75%–85%** while shrinking factory onboarding costs.

In parallel, modern AI tutoring tools delivered via low-cost tablets and localized mobile software offer proven **4x–6x cost-efficiency** in closing foundational math and reading gaps across crowded primary classrooms when paired with structured teacher coaching and basic school electrification.

6.3 Unlocking the Female Labor Force & MSME Entrepreneurship Dividend

No emerging region can reach upper-income productivity while systematically under-utilizing half its adult talent. Modeling the long-run steady-state GDP-per-capita gains from simultaneously addressing **foundational learning catch-up**, **female formal labor-force integration**, and **digital-TVET reskilling** by 2045 illustrates striking regional priorities (**FIG. 13**).

In **Sub-Saharan Africa**, foundational schooling catch-up delivers the largest single lift (**+22.4% GDP/capita**), reinforced strongly by digital/TVET reskilling (**+16.5%**) and formal female inclusion (**+14.8%**). Across **South Asia** and **MENA**, however, closing barriers to **women's formal employment**—through safe affordable public transit, childcare infrastructure, legal equal-pay/inheritance parity, and digital remote work platforms—yields the single largest macroeconomic expansion (**+19.2% and +21.5% GDP/capita**, respectively).

Human Capability Bottleneck	Primary Transmission Channel	Targeted Institutional Reform	2035 Workforce Absorption Target
Foundational Learning Poverty	Limits lifetime trainability & firm adoption of digital SOPs	Structured pedagogy, early-grade mastery checks & AI-assisted catch-up	Halve late-primary reading & numeracy shortfalls by 2035
TVET-Industry Skills Mismatch	Factories import expatriate technicians despite high youth unemployment	Industry sector skill councils, competency certs & tax-credited apprenticeships	Double certified technician output in power, manufacturing & ICT
Female Formal Exclusion	Depresses household savings & wastes educated STEM/ medical talent	Safe urban transit corridors, public childcare & mobile DPI micro-credit	Lift formal non-agricultural female LFP by **12–18 percentage points**
Low Enterprise R&D Absorption	Firms remain captive subcontractors unable to upgrade product lines	Matching grants for process engineering, ISO/quality labs & diaspora brain-circulation	Raise business R&D intensity past **0.8%–1.2% of GDP** in middle-income hubs

When youth demographic waves across Africa, South Asia, and ASEAN are paired with healthier, better-educated, formally integrated workers, human capital ceases to be a bottleneck and becomes the compounding engine of emerging-market structural transformation.

6.4 Preventive Health Capacity, Micronutrient Catch-Up & Formal Social Insurance

Cognitive capacity, adult labor attendance, and workforce longevity are shaped long before individuals enter formal factories or digital offices. Across lower-income regions, early childhood stunting, anemia, clean-water deficits, and particulate air pollution silently erode **8%–14% of potential adult earnings** across entire cohorts. Scaling low-cost community health clinics, **fortified school-feeding programs**, and urban clean-air standards represents one of the highest-benefit development investments available, strengthening physical endurance and foundational classroom attention simultaneously.

Furthermore, expanding **portable, mobile-linked social insurance accounts** tailored to gig, agricultural, and micro-enterprise workers lowers household vulnerability to illness or seasonal income shocks without imposing punitive payroll wedges on small formal employers—removing a major barrier to labor mobility and formalization.

> **Human Capability Competes as a Dynamic Ecosystem**
>
> Nutrition, basic schooling, employer-linked technical apprenticeships, and women's formal labor access reinforce one another across a worker's life cycle—multiplying the economic returns on every dollar spent on power, fiber, or machinery.

SECTION 07

7. International Investment, Capital Allocation & Institutional Capacity

7.1 Overcoming the Severe Geographic Skew in Global Capital Flows

Structural transformation across infrastructure, manufacturing, and digital compute requires massive sustained fixed-capital formation—typically **28%–35% of GDP** across fast-converging historical episodes—backed by patient long-term equity and affordable cross-border project finance. Yet UNCTAD's *World Investment Report (2024–2025)* reveals an acute structural obstacle: while developing nations receive over half of global FDI (**~$867 billion**), capital is overwhelmingly concentrated inside a narrow tier of major emerging markets (**FIG. 14**).

Roughly **74.5% of total EMDE FDI inflows**, **77.4% of medium- and high-technology industrial greenfield announcements**, and **80.2% of digital economy greenfield capital** go to just **ten developing countries**, leaving the remaining **~120 emerging and frontier nations** competing for barely **20%–28%** of global private investment capital. Worse still, tighter global monetary conditions and elevated sovereign risk premiums since 2022 have driven steep contractions in **international project finance (IPF)**—precisely the long-dated syndicated financing structure needed for ports, transmission grids, renewable parks, and broadband backbones.

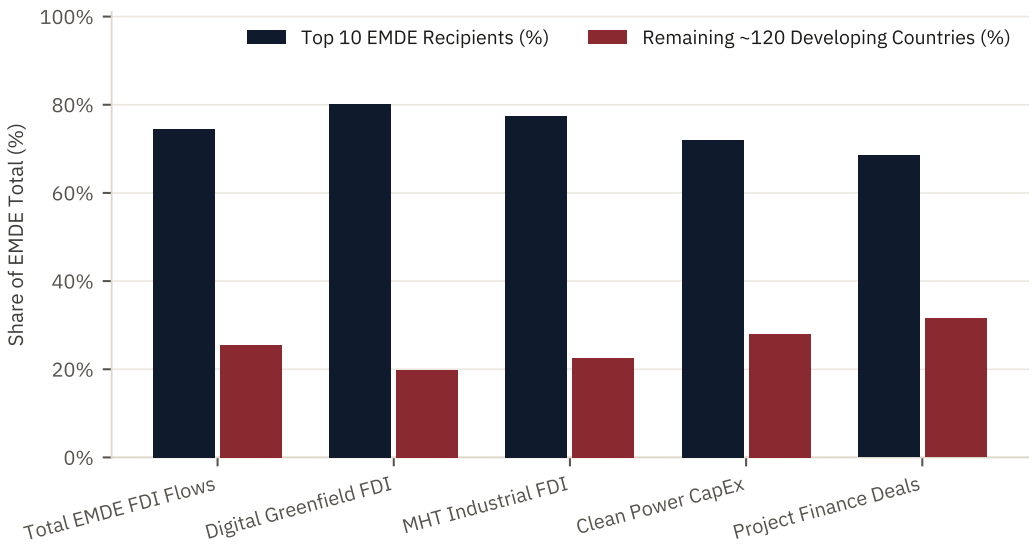
7.2 Compressing Sovereign Risk Spreads & Scaling MDB Guarantee Architecture

Private institutional investors routinely price perceived political, currency, and off-taker risks across frontier emerging economies at **600–1,100 basis points above advanced benchmarks**—making otherwise profitable solar farms, cold-chain hubs, and light-manufacturing zones unbankable at local interest rates. Reversing this capital drought requires reforming international development finance from **slow project-by-project sovereign lending** toward **industrial-scale credit enhancement and local-currency risk pooling**.

Expanding **first-loss guarantees**, **political-risk insurance (MIGA-style)**, and **standardized multilateral FX hedging facilities** enables pension funds and sovereign wealth capital to co-invest into diversified baskets of emerging-market infrastructure assets at compressed weighted-average cost of capital (WACC). Even a **250–350 basis-point reduction in WACC** reduces delivered clean electricity and port infrastructure tariffs by **20%–30%**, turning marginal greenfield corridors into high-return global production nodes.

FIG. 14 **The Global Capital Concentration Skew: Top 10 EMDEs vs. Rest of Developing World**

Share of cross-border inflows captured by the top 10 recipients vs. remaining ~120 developing nations (%)



SOURCE: UNCTAD World Investment Report 2024–2025 ($867B EMDE FDI Benchmark)

7.3 State Capacity, Regulatory Credibility & Transformational FDI Policy

Capital-cost compression works sustainably only when matched by credible domestic governance across developing nations. Modern institutional economics increasingly shifts away from unrealistic "best-practice institutional mimicry" toward **targeted state capability building inside high-impact economic agencies**—central banks, investment facilitation single windows, customs authorities, grid regulators, and industrial-park corporations.

Institutional Anchor	High-Friction Status Quo	Credible Transformation Architecture	Investor & Domestic Firm Outcome
Digital Investment Single Window	12–24 months fragmented land, tax & permit approvals	Unified online portal with binding SLA timelines & land-bank GIS	Compresses greenfield factory setup to **<90 days**, drawing diversified FDI
Currency & Domestic Bond Markets	Short-term FX mismatch triggers crises during US rate hikes	Deep local-currency pension/ insurance markets & MDB FX liquidity lines	Shields domestic firms & infrastructure utilities from sudden-stop shocks
Performance-Linked Industrial Support	Perpetual open-ended protection creates stagnant rents	Sunset clauses, export/value-added milestones & transparent competitive bidding	Disciplines conglomerates and accelerates productivity learning curves
Transformational FDI Linkages	Enclave assembly with minimal domestic tech transfer	Co-funded Tier-2 supplier upgrading, local engineering quotas & IP licensing	Embeds foreign MNEs deeply into local innovation & export ecosystems

Ultimately, resilient domestic institutions transform international capital from volatile short-term portfolio flows into patient, productivity-enhancing partnerships across the Global South.

7.4 Diaspora Capital, Sovereign Co-Investment & Regional Capital Markets

Beyond foreign multinational equity and concessional multilateral debt, emerging economies hold under-tapped domestic and **diaspora capital pools**. Global diaspora remittances now exceed official bilateral aid several-fold across Sub-Saharan Africa, South Asia, and Central America, yet most flows finance short-term consumption rather than long-dated infrastructure or productive SMEs. Issuing structured **local-currency or hedged diaspora infrastructure bonds** backed by ring-fenced port, clean-power, or toll-corridor cash flows channels loyal, patient capital directly into domestic asset formation.

Concurrently, regional securities-exchange harmonization—linking bond clearing and pension fund mandates across regional economic communities—aggregates fragmented national savings pools into **sub-regional institutional liquidity**, financing mid-cap MHT manufacturers and regional grid interconnectors that are too large for domestic commercial banks yet overlooked by global Wall Street syndicates.

> **From Enclave Extraction to Deep Domestic Capital Markets**
>
> When credible digital investment single windows pair with multilateral FX risk hedging and deep local pension markets, emerging economies permanently lower their cost of industrial capital and retain far larger shares of compounding asset wealth domestically.

SECTION 08

8. Integrated 2026–2050 Scenarios & Transformation Roadmap

8.1 Modeling Three Structural Regimes for the Global South (2026–2050)

To integrate industrialization, digital/AI adoption, clean power reliability, human capabilities, and capital-allocation reforms into a consistent macroeconomic horizon, H Heuristics simulates **three 2026–2050 trajectories** for developing-world per-capita GDP relative to the advanced-economy frontier (**2026 baseline = 24.2%**, **FIG. 15**):

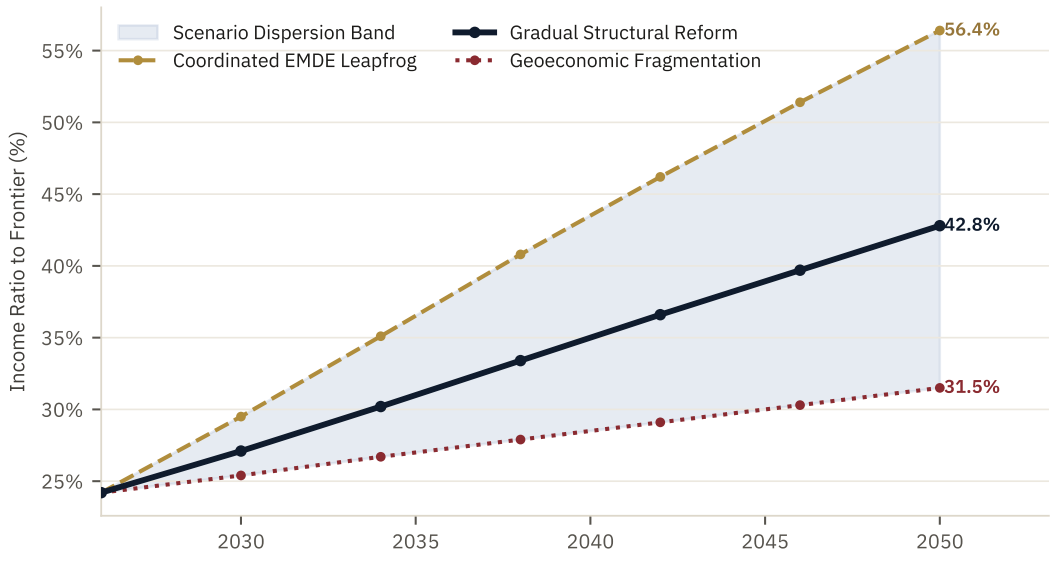
1. **Geoeconomic Fragmentation Regime:** Rising trade barriers, persistent frontier-EMDE compute and capital exclusion, slow grid modernization, and stalling MHT upgrading leave much of Africa, Latin America, and lower-income Asia trapped in low-value domestic services and raw commodity swings. Relative EMDE per-capita income creeps slowly from **24.2% to 31.5% by 2050**.
2. **Gradual Structural Reform Baseline:** Ongoing renewable cost deflation, incremental ASEAN/South Asia value-chain shifts, and selective DPI rollout lift convergence steadily to **42.8% of the frontier by 2050**, though regional disparities widen sharply for capital-starved LDCs.
3. **Coordinated EMDE Leapfrog:** Synchronized execution across MHT industrial parks, universal broadband + open DPI + localized enterprise AI, reliable clean industrial grids, AfCFTA/regional rail-port corridors, foundational learning + female formalization, and de-concentrated blended finance propels broad-based convergence to **40.8% by 2038**, **46.2% by 2042**, and **56.4% of the advanced frontier by 2050**.

8.2 Quantifying Structural Benchmarks Across Global Output, Industry & Workforce

By mid-century, the divergence between a fragmented path and a coordinated transformation reshapes virtually every dimension of the global economy (**FIG. 16**). Under **Coordinated EMDE Upgrading**, developing economies expand their share of global PPP output to **71.4%** (versus **63.1%** under fragmentation), command **54.8% of global medium- and high-technology manufacturing** (up from **39.5%**), power **78.5%** of electricity demand from clean grids (**48.0%** baseline), absorb **64.0%** of the expanding working-age workforce into formal higher-productivity employment (**41.2%** fragmented), and achieve **84.2%** enterprise AI and 5G broadband readiness across industrial and urban centers.

FIG. 15 **EMDE Per-Capita Income Relative to Advanced Economy Frontier, 2026–2050**

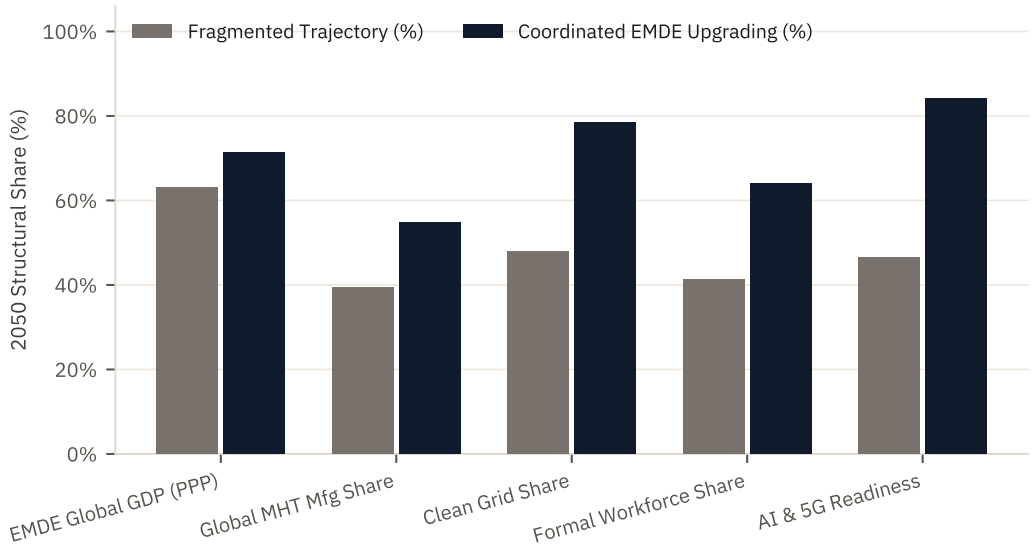
PPP-adjusted real income convergence trajectory across three global structural scenarios (AE Frontier = 100%)



SOURCE: H Heuristics Global South Transformation Model (v3.4)

FIG. 16 **2050 Global South Transformation Benchmarks: Fragmented vs. Coordinated Path**

Projected share of world output, MHT manufacturing, clean grids, formal jobs & AI readiness (%)



SOURCE: H Heuristics Global South Transformation Model (v3.4)

8.3 High-Leverage Operational Priorities for the 2026–2035 Window

Capturing the **56.4% frontier income path** requires locking in foundational institutional and physical infrastructure during the decisive **2026–2035 execution window** before demographic windows peak and rapid secondary urbanization solidifies:

Strategic Domain	2026–2030 Immediate Catalysts	2031–2035 Scaling Milestones	Primary Execution Coalition
Industrial & Value Chains	Plug-and-play MHT export parks; supplier linkage programs; CBAM compliance labs	Transition from OEM assembly into ODM engineering & midstream critical minerals	Industry Ministries, SEZ Authorities & Anchor MNEs
Digital & Enterprise AI	Open DPI (ID + instant payments); spectrum sharing & fiber backbones	Multilingual AI advisory in ag, health, customs & SMEs; regional cloud data hubs	ICT Regulators, Central Banks & Local Tech Ecosystems
Power & Trade Corridors	Industrial solar+BESS PPAs; one-stop digital border customs posts	Cross-border HV interconnectors & electrified port-to-inland rail arteries	Energy/Transport Ministries, AfCFTA/RCEP & MDBs
Human Capital & Finance	Learning-poverty foundational sprints; MDB guarantee facilities scaling FX hedging	Dual employer-led STEM/TVET tracks; deep local-currency sovereign bond markets	Education/Finance Ministries, Private Pension Pools & DFIs

8.4 Five Operational Imperatives for Emerging Economy Leadership

Strategic Blueprint: Transforming Global Scale Into Shared Prosperity

1. **Pair Macroeconomic Stability With Active Capability Policy:** Use fiscal credibility as the foundation for long-horizon public investment in power, logistics, and supplier ecosystems rather than austerity cuts to productive capital.
2. **Embed Open Digital Public Infrastructure Before Fragmented Monopolies Harden:** Interoperable public digital identity, instant payments, and data rails compress SME transaction costs economy-wide and accelerate formalization.
3. **Treat Cheap Clean Power as Core Industrial Policy:** Dedicated solar-plus-storage feeders for manufacturing parks solve outage drag immediately while future-proofing exports against green trade borders.
4. **Pre-Plan Secondary Cities & Continental Corridors for the Demographic Wave:** Synchronize transit rights-of-way, housing, and one-stop customs before rapid population inflows lock in urban congestion.
5. **De-Concentrate Global Capital via Standardized Credit Guarantees:** Convert high-risk-perception sovereign pipelines into bankable asset classes capable of crowding in patient institutional capital across all developing regions—not merely the top ten incumbents.

8.5 Institutionalizing Adaptive Governance Through 2050

Sustaining multi-decade transformation requires institutional mechanisms that continuously measure execution against frontier benchmarks and reallocate capital rapidly when bottlenecks emerge. Across successful late-industrializing states, high-level **Economic Transformation Delivery Units**—reporting directly to heads of government and publishing transparent quarterly metrics on grid outages, border dwell times, MHT export sophistication, secondary-city transit completion, broadband affordability, and foundational learning proficiency—keep infrastructure ministries and regulators aligned across electoral cycles.

Over the next twenty-five years, the economies of the Global South will shape global inflation, clean-technology supply chains, digital service markets, and shared human prosperity. By treating industrialization, technological upgrading, clean energy abundance, urban form, and human capability development as one integrated agenda—rather than disconnected policy silos—emerging economies can move decisively into higher-value activity, lift hundreds of millions permanently out of poverty, and close historic global development divides.

8.6 The Compounding Return to Coordinated Emerging-Market Leadership

Ultimately, the transformation of the Global South is neither automatic nor purely exogenous. While advanced-economy trade policy, global interest-rate cycles, and multinational capital flows shape the external environment, **domestic institutional execution remains the decisive multiplier**. Countries that synchronize cheap clean industrial power, transparent digital public infrastructure, export-oriented supplier ecosystems, and relentless human-capital upgrading steadily lower their own cost of capital—converting external volatility into durable domestic resilience.

> *When emerging economies pair demographic vitality with reliable grids, interoperable digital rails, connected secondary cities, and competitive manufacturing capabilities, catch-up accelerates from an isolated East Asian exception into the central stabilizing engine of twenty-first-century global prosperity.*

TECHNICAL APPENDIX

Methodological Appendix: Structural Accounting & Data Notes

A.1 Integrated Structural Transformation Modeling Methodology

Quantitative projections in *The Future of Emerging Economies* (HH-2026-34) synthesize international macro-structural panels across **184 economies** (H Heuristics Global South Transformation Model v3.4) calibrated to official 2024–2026 baseline releases from the **IMF World Economic Outlook**, **UNIDO Industrial Statistics**, **UNCTAD World Investment Report**, **ITU Measuring Digital Development**, **WIPO Global Innovation Index**, **UN DESA World Population Prospects**, **IEA Critical Minerals Outlook**, and **World Bank Enterprise Surveys**.

Real per-capita income convergence ($y_{r,t}$) for each developing region r relative to the advanced-economy frontier ($y_{F,t}$) evolves via dual decomposition of total factor productivity upgrading, physical/digital infrastructure deepening, MHT manufacturing share reallocation, and demographic dependency absorption:

$$g^{y}_{r,t} = \alpha_0 + \beta_1 \ln\left(\frac{y_{F,t-1}}{y_{r,t-1}}\right) \cdot \Phi\big(\mathrm{Cap}_{r,t}\big) + \beta_2 \Delta s^{\mathrm{MHT}}_{r,t} + \beta_3 \Delta \mathrm{DPI}_{r,t} + \beta_4 \Delta h_{r,t} - \gamma \mathrm{Friction}_{r,t}$$

Here $\Phi\big(\mathrm{Cap}_{r,t}\big) \in (0,1]$ measures absorptive capability across grid reliability, broadband affordability, and state facilitation capacity; Δs^{MHT} tracks within-industry upgrading toward medium- and high-technology manufacturing and value-added mineral refining; Δ DPI captures digital formalization and enterprise AI complementarity multipliers; Δh measures learning-adjusted schooling, female labor integration, and TVET alignment; and Friction penalizes delivered tariff excess, outage sales losses, border dwell times, and sovereign WACC spreads.

A.2 Dataset Coverage & Cross-Report Synthesis Notes

All 16 data figures balance official empirical cross-sections (2000–2025 historical series and 2024–2025 UNIDO/UNCTAD/ITU/WIPO benchmarks) with forward 2026–2050 scenario calibration. Because emerging-market data quality varies across informal agricultural and urban micro-enterprises, figures combining enterprise surveys, satellite urban footprint data, and balance-of-payments project flows carry explicit model bounds illustrated through **Figure 15's** three-regime scenario fan (31.5%, 42.8%, and 56.4% frontier ratios by 2050).

Module / Figure Series	Primary Anchoring Institutional Source	Analytical Horizon	Primary Policy Sensitivity
Macro & Demographics (FIG. 1–3)	IMF WEO (PPP GDP), UN DESA Population Prospects	2000–2050	Workforce absorption rate & total factor productivity growth
Industrial & Complexity (FIG. 4–5)	UNIDO IDR / MVA Yearbook, WIPO GII, World Bank	2025–2035	Supplier ecosystem depth & MHT capital allocation
Digital & Enterprise AI (FIG. 6–7)	ITU Facts & Figures (2024–2025), IMF AI Index	2025 Baseline	Spectrum affordability, DPI openness & cloud access
Clean Power & Minerals (FIG. 8–9)	World Bank Enterprise Surveys, IRENA, IEA	2025–2035	Captive industrial clean PPAs & midstream processing
Cities & Trade Corridors (FIG. 10–11)	UN-Habitat, AfCFTA / RCEP Trade Databases	2025–2040	Secondary-city zoning & one-stop digital customs
Human Capital & FDI (FIG. 12–14)	UNESCO/World Bank HCI, ILO, UNCTAD WIR 2025	2025–2045	Learning catch-up, female formal LFP & MDB guarantees
Integrated Scenarios (FIG. 15–16)	H Heuristics Transformation Model v3.4	2026–2050	Coordinated multi-pillar execution vs. fragmentation

All underlying visualization datasets, parameter configurations, and Typst layout templates are version-controlled cleanly for full empirical reproducibility across future annual H Heuristics Global South outlook updates.

BIBLIOGRAPHY

References & Primary Sources

[1] International Monetary Fund (2025–2026). World Economic Outlook Database & Artificial Intelligence Preparedness Index. Washington, DC: IMF.

[2] United Nations Industrial Development Organization (2024–2025). Industrial Development Report & International Yearbook of Industrial Statistics. Vienna: UNIDO.

[3] United Nations Conference on Trade and Development (2024–2025). World Investment Report: Investment Facilitation & International Investment in the Digital Economy. Geneva: UNCTAD.

[4] International Telecommunication Union (2024–2025). Measuring Digital Development: Facts and Figures. Geneva: ITU.

[5] World Intellectual Property Organization (2024–2025). Global Innovation Index: Innovation at a Crossroads. Geneva: WIPO.

[6] United Nations Department of Economic and Social Affairs (2024). World Population Prospects & World Urbanization Prospects (2024 Revision). New York: UN DESA.

[7] World Bank (2024–2025). Enterprise Surveys, Logistics Performance Index & Global Economic Prospects. Washington, DC: World Bank.

[8] Rodrik, D. (2016–2024). Premature Deindustrialization, Industrial Policy & Job Creation Strategies for Developing Economies. NBER / Harvard Kennedy School.

[9] Hausmann, R., Hidalgo, C., Bustos, S., Coscia, M., & Simoes, A. (2014–2024). The Atlas of Economic Complexity: Productive Capabilities and Structural Upgrading. Cambridge, MA: MIT Press.

[10] International Energy Agency (2025). World Energy Investment & Global Critical Minerals Outlook. Paris: IEA.

[11] International Renewable Energy Agency (2025). Renewable Power Generation Costs in 2024 & Clean Industrial Electrification. Abu Dhabi: IRENA.

[12] International Labour Organization (2024–2025). World Employment and Social Outlook: Youth Absorption & Formalization Trends. Geneva: ILO.

[13] UNESCO & World Bank (2023–2025). Global Learning Poverty Assessment & Human Capital Index Updates. Paris / Washington, DC.

[14] AfCFTA Secretariat & World Bank (2024). Deepening African Intra-Continental Supply Chains and Trade Facilitation. Accra / Washington, DC.

[15] Asian Development Bank & ASEAN Secretariat (2025). Asian Economic Integration Report: Global Value Chains & Regional Connectivity. Manila.

[16] McMillan, M., Rodrik, D., & Sepúlveda, C. (2017–2023). Structural Change, Fundamentals, and Growth Across Developing Regions. IFPRI / World Bank.

[17] Hughes, H. (2025–2026). Green Economic Convergence, The Economics of Global Convergence & Sustainable Global Economic Convergence. H Heuristics Research.

[18] Acemoglu, D., & Restrepo, P. (2022–2025). Tasks, Automation, AI Complementarity & Labor-Share Dynamics Across Emerging Markets. MIT.

[19] UN-Habitat (2024–2025). World Cities Report: Secondary Urban Corridors & Productive Agglomeration. Nairobi: UN-Habitat.

[20] Stern, N., Songwe, V., & Bhattacharya, A. (2024). Finance for Climate Action and Multilateral Development Bank Guarantee Architecture. LSE / Brookings IHLEG.

[21] H Heuristics Research (2026). Global South Structural Transformation Simulation Model (v3.4) & 184-Economy Observatory. New Castle, DE.