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State of India's Digital Economy

2026

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Glossary

AI	Artificial Intelligence
AIPI	AI Preparedness Index
AR	Augmented Reality
BRICS	Brazil, Russia, India, China, and South Africa
CHIPS	Connect-Harness-Innovate-Protect-Sustain
DeFI	Decentralized Finance
DPI	Digital Public Infrastructure
EAP	East Asia and Pacific
ECA	Europe and Central Asia
eCom	eCommerce
EGDI	e-Gov Development Index
EMDEs	Emerging Markets and Developing Economies
EU	European Union
GDP	Gross Domestic Product
GenAI	Generative Artificial Intelligence
G20	Group of Twenty
ICT	Information and Communication Technology
IMF	International Monetary Fund
IoT	Internet of Things
IPCIDE	ICRIER Prosus Centre for Internet and Digital Economy
IT	Information Technology
ITU	International Telecommunication Union
LAC	Latin America and the Caribbean
LLMs	Large Language Models
LTE	Long Term Evolution
Mbps	Megabits per second
MENA	Middle East and North Africa
Mn	Million
MoU	Memorandum of Understanding
NAR	North Atlantic Region
NRI	Network Readiness Index
PPP$	Purchasing Power Parity $
R&D	Research and Development
SAR	South Asia Region
SSA	Sub Saharan Africa
UN	United Nations
UPI	Unified Payments Interface
USD	US Dollar
US$	US Dollar
VR	Virtual Reality
WEF	World Economic Forum
4G, 5G, 6G	Fourth Generation, Fifth Generation, Sixth Generation
€	Euro

Acknowledgements

We express our sincere gratitude to our partner, Prosus, for its continued funding of the ICRIER Prosus Centre for Internet and Digital Economy (IPCIDE), and for supporting the fifth edition of our flagship State of India's Digital Economy (SIDE) report.

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All errors remain our own

Executive Summary

Global benchmarking has become a weapon in the AI race

As digitalisation and AI become strategically important, cross-country benchmarking of the digital economy is no longer a purely academic exercise. It is increasingly becoming a tool in the global AI race, where rankings are closely watched, fiercely debated, and frequently challenged. This is why we launched the **State of India's Digital Economy** (**SIDE**) report—an annual publication since 2023—to bring greater clarity, transparency, and methodological rigour to the digital benchmarking landscape.

This edition of SIDE introduces two major improvements. First, it embeds AI-related indicators into the CHIPS—Connect, Harness, Innovate, Protect, and Sustain—framework, thereby updating it for the AI era. Second, we expand the country coverage from 32 to 71 countries, accounting for 96 percent of global GDP, 86 percent of the world's internet users, and 83 percent of the global population.

India is now the fifth most digitalised country in the world

The global digital map is becoming more distributed and tripolar. Digital leadership was historically concentrated in North America and Western Europe, with Japan as the Asian outpost. That order is changing. The rise of the digital economy in China, India, Singapore, South Korea, and other Asian economies is shifting the centre of gravity toward the Indo-Pacific. Among the top five digitalised countries, three—China, Singapore, and India—are from the Indo-Pacific, while the U.S. and the U.K. represent the North Atlantic. Continental Europe remains relevant, with France and Germany in the top 10, but its relative influence appears to be declining.

The U.S. remains the clear digital frontrunner. With a score of 64.4, it is well ahead of China, which ranks second with 51.6. China is now the most connected country in the world and performs strongly on the Harness and Innovate pillars. India's rank has improved from eighth place in 2025 to fifth place in 2026. This reflects both real gains—especially improved connectivity, greater harnessing of digital technologies, and a strong AI talent pool—and some methodological changes, including the expanded sample and the exclusion of some indicators where India performed less well. Even with these caveats, it is clear that India belongs in the top decile of global digital rankings.

At the same time, digital convergence remains limited. While most countries are making progress, the U.S. continues to push the frontier further ahead. The gap between the frontier and many other G20 economies has widened, and country rankings have become more entrenched. Regional spillovers also appear weak. Countries in the same region often show very different levels of digitalisation, suggesting that digital transformation is driven less by geographical proximity—unlike manufacturing—and more by domestic capabilities, institutions, policies, and private sector dynamism.

While digitalisation is spreading rapidly, the production of digital goods and services is becoming increasingly concentrated. Access to digital technologies is spreading much faster than income. Users of internet, smartphone, e-commerce, and AI are distributed far more broadly than GDP. Developing countries now account for the majority of users across most digital technologies. Yet frontier technology production—advanced chips, cloud infrastructure, large language models, AI compute, and digital platforms—remains concentrated in a handful of countries and firms.

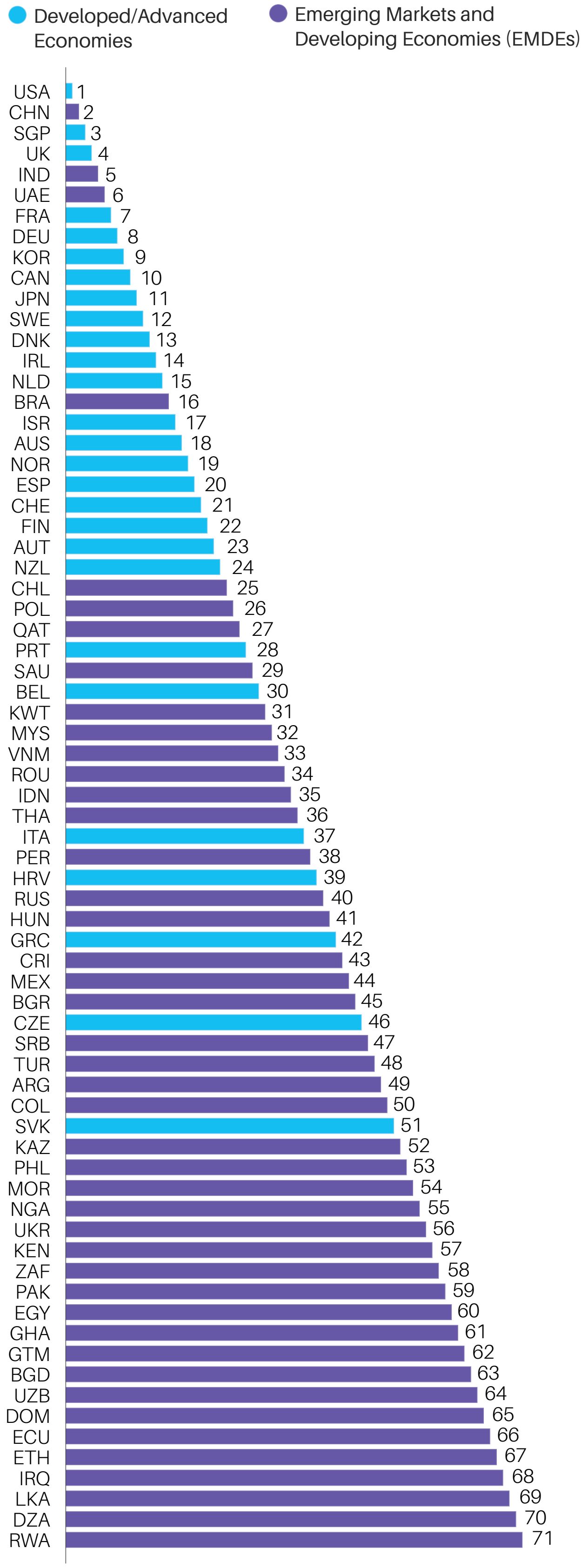
Developing countries are doing better on AI diffusion than on traditional digitalisation

Generative AI is now the fastest-diffusing digital technology in history. It reached mass adoption far faster than the internet, smartphones, e-commerce, or digital payments. Unlike earlier technology waves, AI has become a developing-country phenomenon almost immediately. Developing countries account for 72 percent of global AI users, with China and India alone accounting for nearly two-fifths of global users. This creates a major opportunity for developing countries to shape AI adoption and use cases.

India performs especially well on AI. In the standalone AI index, India ranks fourth, behind only the United States, China, and Singapore, and ahead of Germany, France, Japan, Canada, and Korea. We find that developing countries are, on average, doing better on AI adoption than on traditional digitalisation. However, this finding should be treated with caution, as many AI indicators capture inputs and intermediate capabilities—such as publications, patents, skills, GitHub activity, model development, and startup funding—rather than economy-wide outcomes such as productivity, exports, investment, or growth.

India's AI opportunity lies not in replicating the capital-heavy strategies of the U.S. or China, but in building a talent-led, application-driven AI ecosystem. India has the second-largest concentration of AI talent after the U.S., but lacks comparable levels of patient capital and compute capacity. The next wave of AI—driven by applications, agents, and widespread use—should play to India's strengths. But talent alone will not be enough. India will need more risk capital, affordable

Figure ES1 Country Rankings Based on the CHIPS-Combined Index



compute, stronger links between universities and startups, shared datasets, testing sandboxes and clearer pathways for commercialisation.

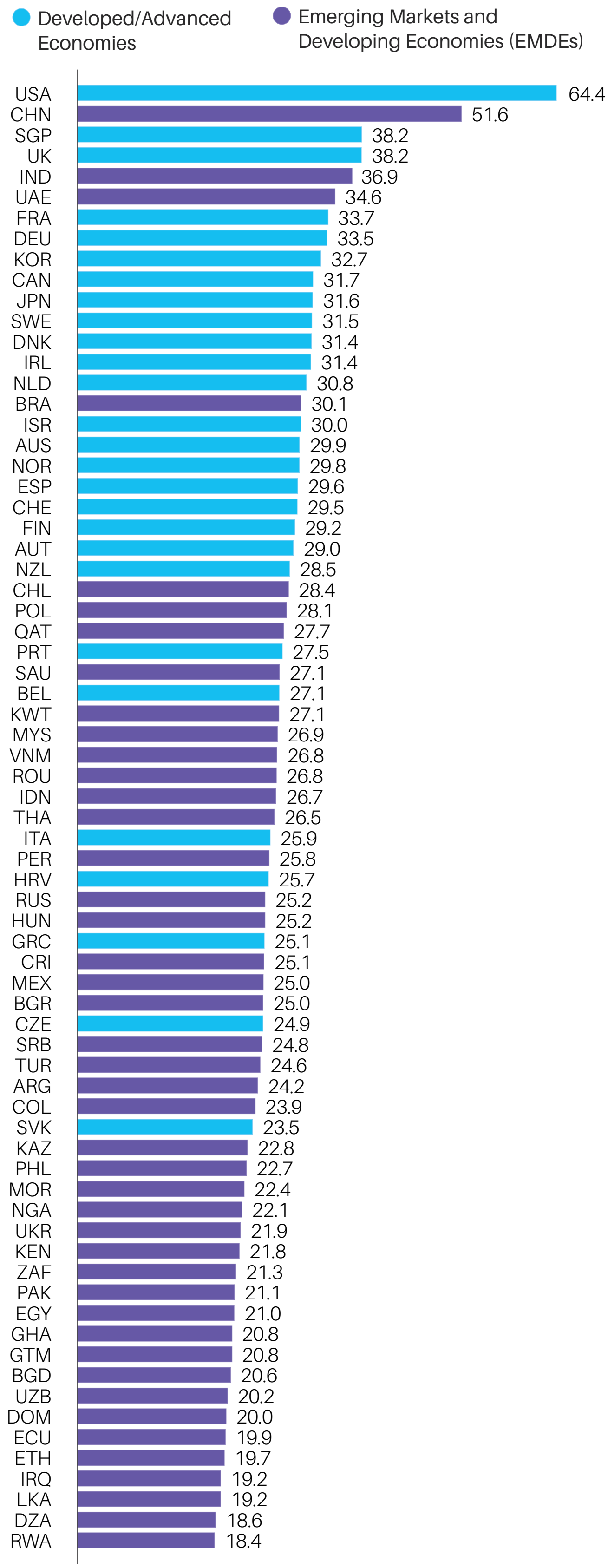
The hidden costs of digitalisation are large and largely ignored

Digital progress has brought growth, jobs, and better service delivery, but it has also created risks: global imbalances in digital trade, rising digital crime, and growing e-waste. Most digital consumers now live in Emerging Markets and Developing Economies (EMDEs), but digitally delivered trade remains dominated by advanced economies. India is a major exception. With around USD 328 billion in digitally delivered trade, it has become a globally significant exporter of digital services despite being a lower-middle-income country.

Cyber risks are rising with digital scale. The U.S. accounts for almost as many reported enterprise ransomware victims as the rest of the world combined. High-income and highly connected economies are especially exposed to ransomware and email leaks. Developing countries are learning that rapid digitalisation without adequate cybersecurity can be costly. India is already among the larger cybersecurity markets, but its spending remains modest relative to the size of its digital economy and user base.

Finally, digitalisation has come with considerable sustainability costs. E-waste per person is rising with income, though India's per capita e-waste remains low. The policy lesson that emerges is that developing countries should not follow the environmentally damaging path taken by advanced economies. They should build e-waste systems early, strengthen producer responsibility, integrate informal recyclers, promote repair and reuse, and recover critical minerals from discarded electronics.

Figure ES2 **Country Scores Based on the CHIPS-Combined Index**



Part I

Mapping the Global Digital and AI Landscape

01

The Global Digital Map

Who Leads and Who Lags in 2026

Digital Benchmarking: A Weapon in the AI Race

If the world is in an AI arms race—as President Putin once suggested—then cross-country benchmarking of the digital economy has become one of its key weapons.[1] In February 2026, during a Davos panel, Kristalina Georgieva, Managing Director of the IMF, presented the IMF's AI Preparedness Index, which placed India in a "second tier" of AI readiness—behind the US and several advanced economies. India's IT minister, Ashwini Vaishnaw, who was also on the panel, publicly challenged this classification, questioning the IMF's methodology and noting that other global benchmarks—such as Stanford's Global AI Vibrancy Index—place India much higher.[2] As digitalisation and AI become strategic domains, disagreements over benchmarking, like the one in Davos, have become more frequent and more visible. Rankings are no longer academic exercises; they are increasingly shaping investment flows, policy narratives, and even geopolitics.

For non-specialists, such stark divergences in digital benchmarking exercises can be confusing. How can India rank 71st in the IMF's AI Preparedness Index and, at the same time, be placed among the top five in Stanford's AI Vibrancy Index? As Table 1 shows, India's position across major digital and AI indices varies widely—from around 134th in the ITU's ICT Development Index to the global top tier in AI-focused rankings. First-generation indices—developed in the early 2000s by institutions such as the ITU, UN, and WEF—focused primarily on a narrow set of digitalisation indicators and largely ignored scale effects, thereby placing India lower. In contrast, more recent indices—such as those by Oxford Insights, Tortoise, and Stanford—place greater emphasis on scale and adopt a broader lens, where India performs much better. The IMF index is an exception: despite being recent, it adopts a methodology similar to that used in first-generation studies from the early 2000s (see Box 1).

The State of India's Digital Economy (SIDE) report—first published in February 2023—is an effort to bring greater clarity and transparency to the benchmarking exercise. Its core objective is to assess India's progress using a framework better suited to its context. It proposes a broader concept of digitalisation through the Connect–Harness–Innovate–Protect–Sustain (CHIPS) framework, capturing both the benefits and risks associated with digital technologies. Second, unlike first-generation global indices that focus primarily on the intensity of digitalisation (i.e., how digitalised the average user is), SIDE assigns equal weight to both the scale (CHIPS-Scale) and the

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1 President Vladimir Putin is often credited with framing AI as a geopolitical contest when, in a speech to Russian students at the Projectory national education forum on September 1, 2017, he remarked: "Whoever becomes the leader in this (artificial intelligence) sphere will become the ruler of the world."

2 Business Standard, January 21, 2026, India is in top tier of AI economies, not second rung: Vaishnaw at Davos

intensity (CHIPS-Intensity) of digitalisation. Finally, while most global indices combine outcomes with inputs (or enablers)—thereby penalising developing countries twice, once for weaker outcomes and again for weaker inputs—the CHIPS framework relies predominantly on outcome indicators.[3]

Table 1: India's Position Across Key Digital & AI Indices

Index	What it measures	Publisher	India's Rank (latest year)	First Published
ICT Development Index (IDI)	ICT access, use, and skills	ITU	~130/176	2009
e-Gov Development Index (EGDI)	Digital government (services, infrastructure, human capital)	United Nations	~97/193	2001
AI Preparedness Index (AIPI)	AI readiness (infra, skills, innovation, regulation)	International Monetary Fund	71/174	2024
Network Readiness Index (NRI)	Digital readiness across tech, people, governance & impact	World Economic Forum → Portulans Institute	~45/127	2001
Government AI Readiness Index	Government capacity to adopt and govern AI	oxford insights	~46/193	2017
Global AI Index	AI capability (talent, infra, investment and research)	Tortoise	Top 10/83	2019
Global AI Vibrancy Index	AI activity (research, patents, investment, talent & adoption)	Stanford University	Top 5/36	2021
State of India's Digital Economy (SIDE)	Connect - Harness - Innovate - Protect - Sustain (CHIPS)	ICRIER Prosus Centre for Internet and Digital Economy	8/33	2023

Note: In the ranks indicated, the numerator is India's approximate rank and the denominator is the total number of countries in the ranking exercise.

[3] As discussed later, we had to somewhat relax this assumption after deciding to incorporate AI into the CHIPS framework for this edition of the SIDE report. This is because, in the AI domain, there are still very few observable outcomes; most of the indicators we use capture inputs or outputs, but rarely outcomes.

Box 1

Limitations of the IMF's AI Preparedness Index (AIPI)[4]

A key pillar of the international financial architecture, the IMF is mandated to promote exchange-rate stability and extend balance-of-payments assistance to member countries. In recent years, however, it has faced criticism for "mission creep" – venturing into areas beyond its core mandate, with the construction of cross-country indices on AI being one such example. While the Fund deserves credit for being among the first multilateral institutions to publish such an index, its limited domain expertise lends credence to these concerns. The AIPI suffers from several limitations:

Limited relevance
Despite its title, the AIPI captures little that is specific to AI. For example, it measures connectivity using indicators such as fixed broadband, mobile broadband, internet users and international bandwidth, while overlooking more direct measures such as the number of AI users. More critically, the index does not include indicators that capture core AI capabilities – such as compute infrastructure, model development or AI applications.

Neglect of scale effects
While the index claims to assess country-level preparedness, it effectively measures the readiness of the average user, as most indicators are expressed in per capita terms. This approach ignores the powerful role of scale in the AI economy. By contrast, indices such as Stanford's Global AI Vibrancy Index explicitly incorporate scale dynamics and consequently identify large developing economies, including China and India, as emerging leaders in AI.

Questionable rankings
The IMF's rankings raise concerns when benchmarked against real-world developments. Seven of the top ten countries are European economies, while large emerging markets appear far down the list – China (30th), Indonesia (60th), Brazil (65th), and India (71st). Notably, only two countries in the IMF's top ten also feature among the top ten in Stanford's Global AI Vibrancy Index, which is widely regarded as a more credible and comprehensive measure of national AI capabilities.

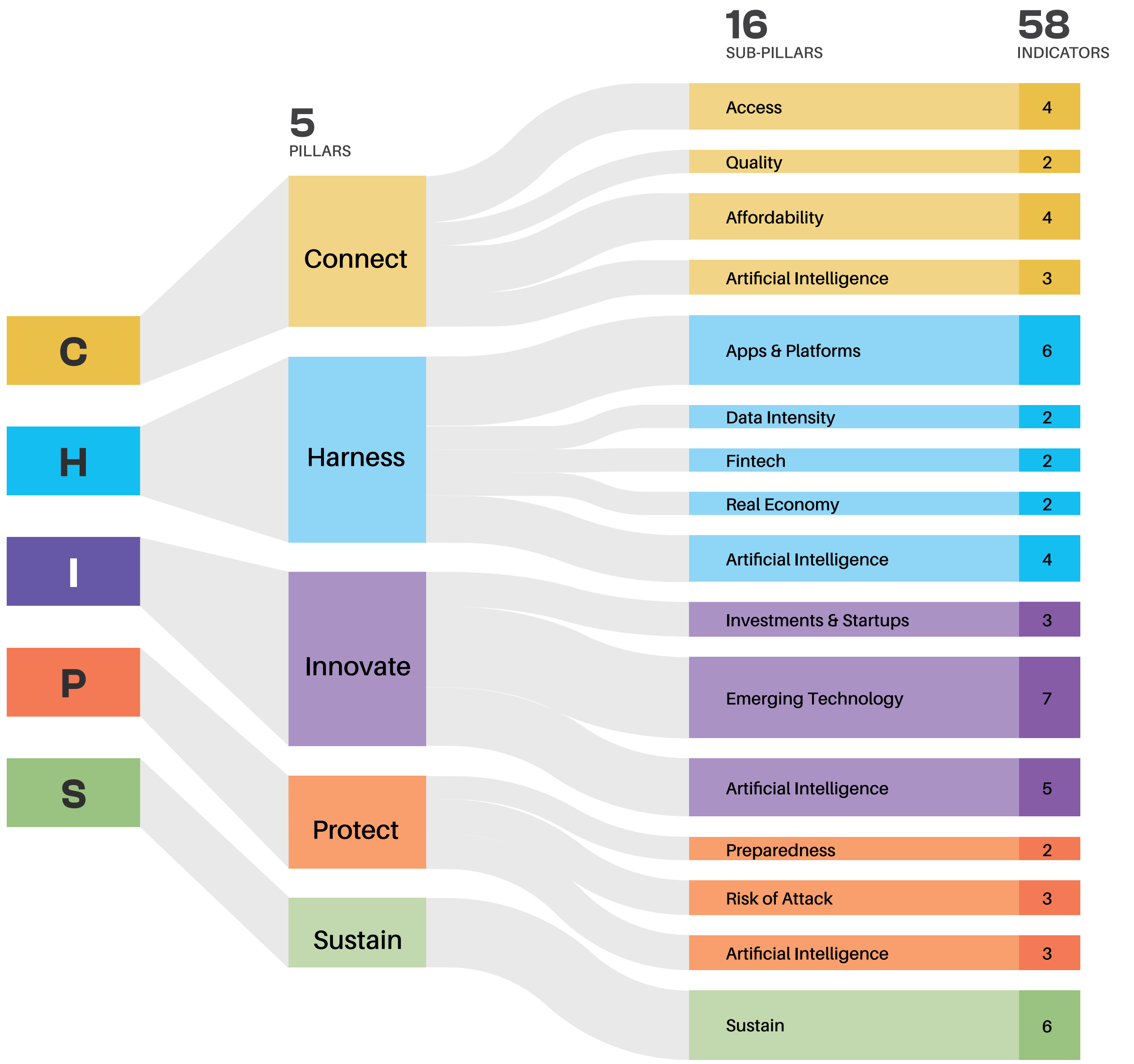
Source: Mishra (2026). Harnessing Digitalization and Artificial Intelligence for Development. Book edited by Homi Kharas, Amar Bhattacharya, and Iyabo Masha. Washington, DC: Brookings Institution. Forthcoming.

CHIPS get an AI upgrade

In this edition of SIDE, we introduce two important improvements. First, we embed several AI-related indicators into the CHIPS framework, thereby updating it for the AI era (see Figure 1). Specifically, we add an AI sub-pillar to each of the four pillars – Connect, Harness, Innovate, and Protect – enabling the construction of a pure AI index, which forms the basis of discussion in Chapter 2. Second, we expand the country coverage from 32 to 71. The expanded set of countries account for 96 percent of global GDP, 86 percent of the world's internet users, and 83 percent of the global population. As before, we estimate CHIPS-Scale (previously referred to as CHIPS-Economy) and CHIPS-Intensity (earlier referred to as CHIPS-User) for all 71 countries, and then combine them to produce CHIPS-Combined –a single measure of a country's level of digitalisation (See Annex 3).

[4] The limitations highlighted here are not specific to the IMF index alone. Many also apply to the first generation of digital indices produced by the ITU, UN, and WEF, as discussed in previous editions of the SIDE Report.

Figure 1 Extending CHIPS to Capture the AI Economy



Source: IPCIDE Team

The 2026 edition of the CHIPS framework is structured across three tiers: five pillars, 16 sub-pillars, and 58 indicators. The five pillars – Connect, Harness, Innovate, Protect, and Sustain – capture the full spectrum of digital transformation (see Figure 1). These are further organised into 16 sub-pillars, including four new ones introduced to better reflect the AI economy (See Annex 4). The number of indicators has also increased from 47 in 2025 to 58 in 2026, with four indicators dropped due to data constraints and 15 indicators added to capture the AI economy. As in previous editions, due to concerns about data quality for the Protect and Sustain pillars, their indicators are assigned half the weight of those in the other three pillars (see Chapter 3 for a more in-depth discussion of these two pillars).

The global digital landscape is becoming increasingly tripolar

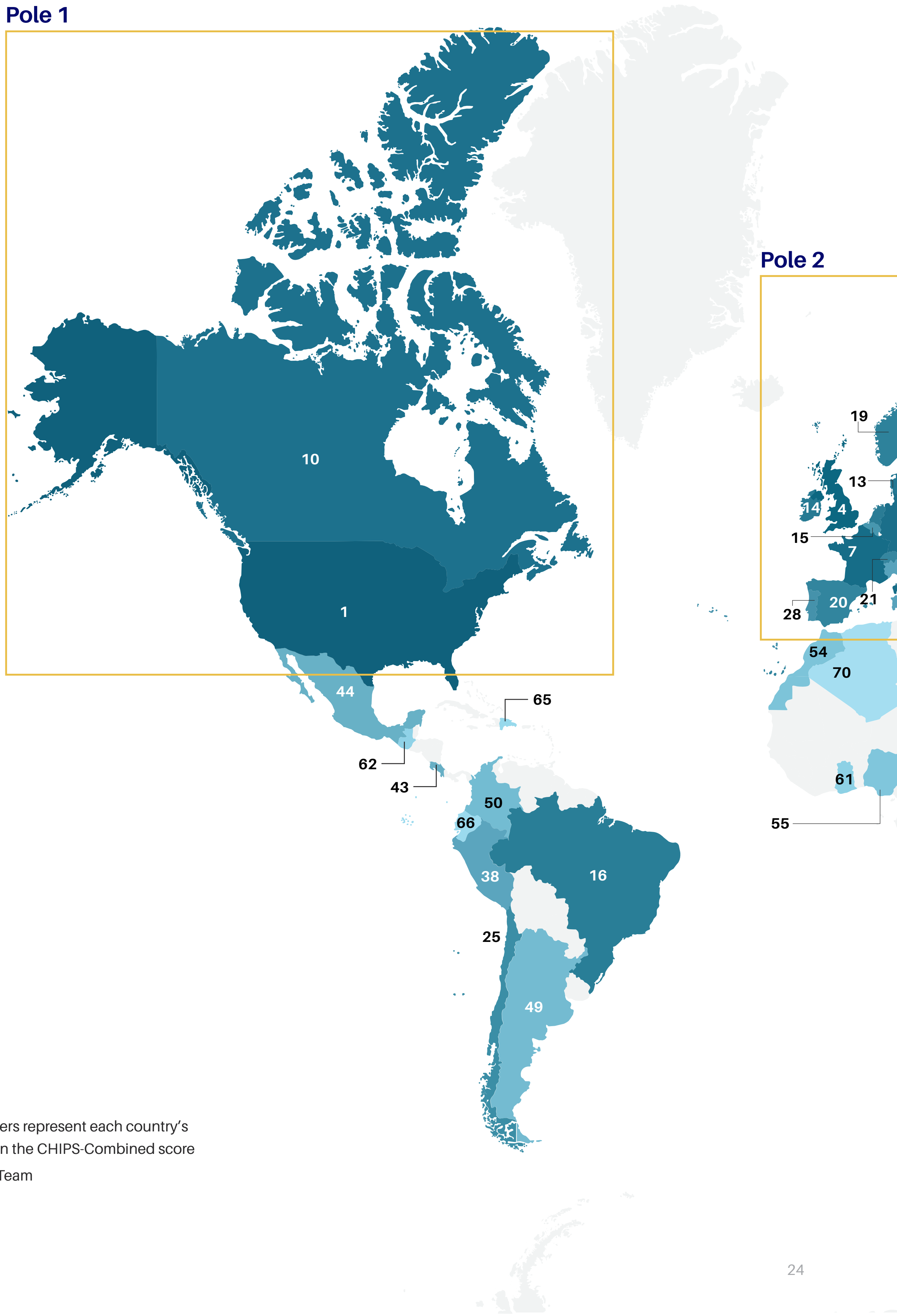
The global digital map for 2026 points to a more distributed, tripolar world, with the Indo-Pacific increasingly challenging the traditional bipolar order. Historically, global digital leadership was anchored in North America and Western Europe, with some spillover to Japan. But the rise of China and India, along with other East Asian economies such as Indonesia, Singapore, and South Korea, is steadily shifting the centre of gravity from the North Atlantic to the Indo-Pacific. As Map 1 shows, three of the top five digitalised countries are now from the Indo-Pacific – China, Singapore, and India – while only two are from the North Atlantic: the United States and the United Kingdom.[5] Continental Europe remains relevant, with France and Germany ranked seventh and eighth respectively, but its relative influence appears to be waning. Together, these patterns point to a more distributed global digital landscape, where leadership is no longer concentrated in a single country or region.

If digital leaders are becoming more geographically dispersed, so too are digital laggards. A broad set of countries across Sub-Saharan Africa, South Asia, the Middle East, Latin America and Central Asia continues to trail behind, underscoring that the digital divide is not confined to any single region but is widely spread. Among the bottom 10 countries in our ranking, two are from Sub-Saharan Africa (Ethiopia and Rwanda), two from South Asia (Bangladesh and Sri Lanka), two from the Middle East (Iraq and Algeria), three from Latin America (Dominican Republic, Ecuador and Guatemala) and one from Central Asia (Uzbekistan). Most of these countries are either low-income or sparsely populated, or both, limiting their ability to achieve the scale and intensity of digitalisation that larger and more prosperous emerging economies have been able to attain.

Sandwiched between the leaders and laggards is a group of large emerging markets and developing economies (EMDEs) that appear to underperform relative to their economic size and demographic weight. Among the original BRIC countries, China and India and, to some extent, Brazil, moved closer to the top tier of digitalisation, while Russia and South Africa lag significantly behind. A similar pattern is evident among G20 EMDEs more broadly: countries such as Argentina, Indonesia, Mexico and Türkiye are positioned in the middle of the distribution (around 30–50 out of 71 countries), despite their large domestic markets. This suggests that scale alone does not guarantee digital leadership; it must be complemented by investment in infrastructure, sound policies and strong institutions and regulation that together support a robust digital ecosystem (see Part II for a more detailed discussion of digital economy performance across regions and country groupings).

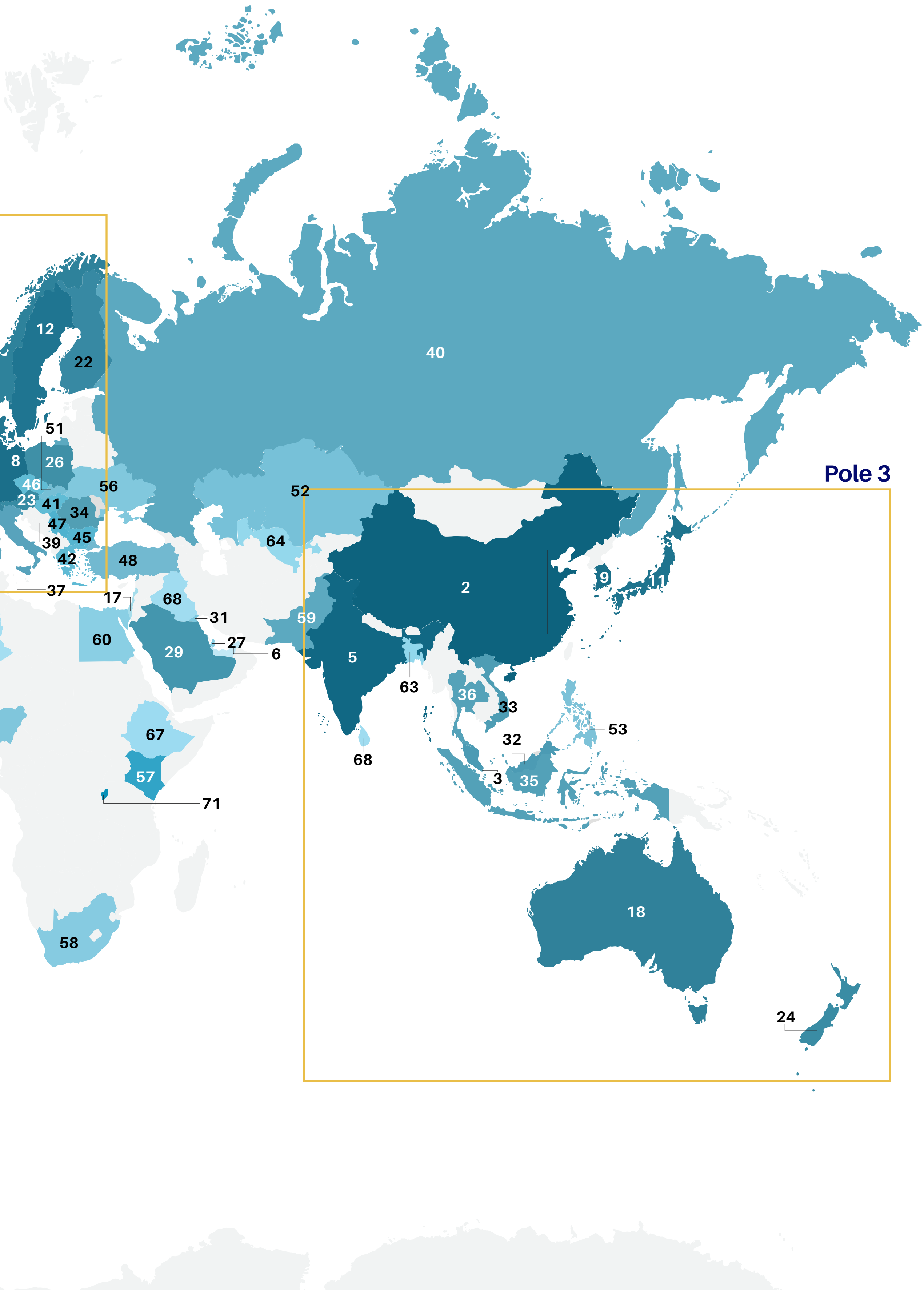
5 The United States straddles both the North Atlantic and the Indo-Pacific. In that sense, four of the top five global digital leaders are from Indo-Pacific region

Map 1 Global Digital Map 2026—An Increasingly Tripolar World



Note: The numbers represent each country's ranking based on the CHIPS-Combined score

Source: IPCIDE Team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The World's Top 10 Digitalisers

The hierarchy in global digitalisation has remained largely unchanged over the past year. The United States continues to stand out as the clear leader, with China a distant second, followed by a tightly clustered group of countries—including India—competing for the remaining top positions. With a CHIPS-Combined score of 64.4, the United States is well ahead of all others, reflecting strong and robust performance across pillars, particularly in innovation (20.6). China ranks second (51.6), driven by strengths in connectivity (17.0)—now the most connected country in the world—along with strong performance in the Harness (13.0) and Innovate (10.1) pillars. Beyond the top two, there is a marked drop, with Singapore, the UK, and India forming the next tier, all clustered in the high 30s, indicating a more competitive and compressed race among the rest (see Figure 2). See Annex 1 and 2 for detailed rankings and CHIPS-Combined scores for all 71 countries.

India has improved its ranking by three places, rising from eighth in 2025 to fifth in 2026. Its performance is driven by relatively strong contributions from connectivity (11.9), usage (9.2), and protection and sustainability (10.5), although it continues to lag in innovation (5.3) compared with the top performers. As discussed in Box 2, the inclusion of AI indicators has contributed to this improvement, with India emerging as the fourth-largest AI performer in the sample, after the United States, China and Singapore. India's overall fifth position is particularly notable, as it now ranks alongside advanced economies despite its lower per capita income levels. Overall, India appears as a well-rounded but still evolving digital economy, with significant scope to strengthen its innovation pillar and close the gap with frontier countries.

Figure 2 Global Digital Rankings—Top 10 Countries

Pillar Contribution to CHIPS Score

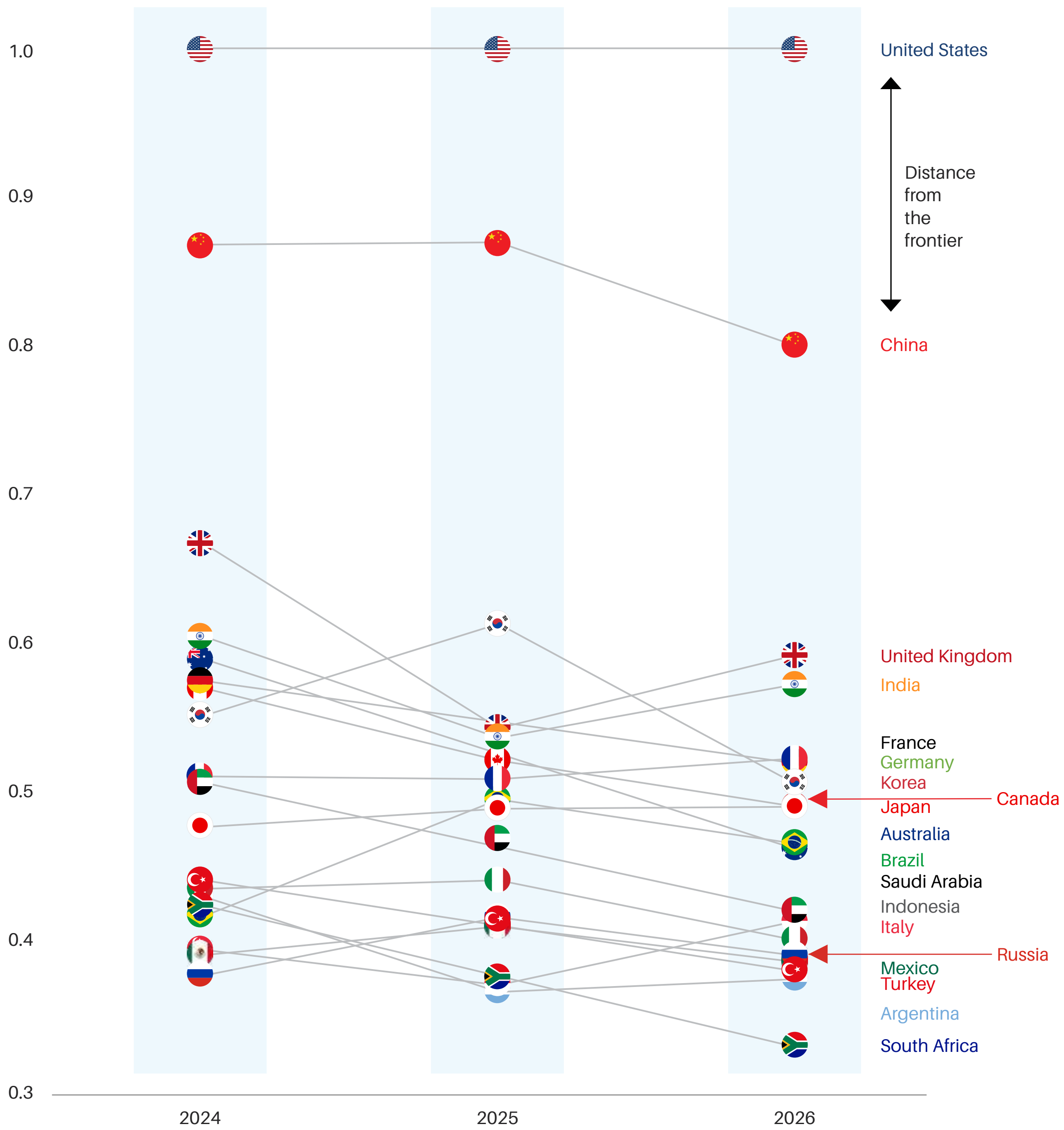
Country	Connect	Harness	Innovate	Protect + Sustain	CHIPS score
#1 USA	15.3	14.2	20.6	14.3	64.38
#2 CHN	17.0	13.0	10.1	11.5	51.59
#3 SGP	14.5	7.6	6.3	9.9	38.21
#4 UK	12.4	7.8	5.8	12.2	38.16
#5 IND	**11.9**	**9.2**	**5.3**	**10.5**	**36.90**
#6 UAE	16.8	5.7	2.6	9.5	34.63
#7 FRA	14.5	6.1	4.2	9.0	33.71
#8 DEU	11.0	6.3	6.2	9.9	33.54
#9 KOR	11.9	6.5	3.6	10.6	32.68
#10 CAN	11.8	6.2	4.0	9.8	31.67

Source: IPCIDE Team

Cross-Country Digital Disparities are Widening

While country rankings have become more entrenched over time, the distance from the digital frontier appears to have widened. Based on the CHIPS-Combined score, the United States remains firmly at the frontier, with little evidence of meaningful convergence from other countries (see Fig. 3). China,

Figure 3 Cross-Country Digital Disparities are Widening Over Time



Source: IPCIDE Team

though still the closest competitor, has seen its relative position weaken over the past 12 months. This runs counter to the widespread view that China, particularly after its "DeepSeek moment", would rapidly close the gap with the United States.[6]

However, as discussed in Chapter 2, the United States continues to maintain a substantial lead over China in the AI domain. Most other countries, including the UK, India, France, Germany, and Korea, remain clustered in the middle, with only modest shifts over time, suggesting limited upward mobility.

While most countries are making progress, the United States has been pushing the frontier even further, leaving little scope for sustained convergence across countries. As shown in Figure 3, which plots CHIPS-Combined scores (indexed to the frontier) for G20 countries over 2024–2026, most countries exhibit only modest and inconsistent movements relative to the frontier.[7] Over this period, a number of countries, including Australia, Canada, Germany, Saudi Arabia, and South Africa, have seen their distance from the frontier increase, indicating a steady widening of the gap. By contrast, only France and Japan have managed to either narrow or maintain their relative position. The remaining countries show a mixed pattern, improving in one year but slipping in the next. All these suggest that sustained convergence with the frontier remains elusive, leading to widening cross-country digital disparities over time.

Box 2

What Explains India's Improved Ranking in 2026?

Against a backdrop in which country rankings have become increasingly entrenched, India's improvement is notable. Its rank rose from 8th in 2025, in a sample of 32 countries, to 5th in 2026, in a much larger sample of 71 countries. This improvement reflects two factors.

First, India remains less digitally saturated than most advanced digital economies, which allows faster year-on-year gains in several indicators. For example, internet users in India increased by 8.8 percent, compared with average growth rate of 2.1 percent among the other nine countries in the top 10.* A similar pattern is visible in several Harness indicators, including digital payments and technology use, where India continues to grow faster than many top-ranked countries. The introduction of AI-related indicators has also contributed to India's improved ranking, given its large AI user base and large pool of AI skilled workers.

Second, part of India's improvement reflects methodological changes between the 2025 and 2026 editions. The expanded country sample has improved India's scores on some indicators where it was previously not performing as well, such as download speeds. This is because the new scores are calculated using a wider range, with a lower minimum value. Further, due to data availability constraints, the 2026 index excludes some indicators related to the gender divide and fintech, areas where India has traditionally not performed as well as its top-ranked peers. For this reason, year-to-year comparisons of rankings should be interpreted with some caution. That said, the broader conclusion remains unchanged: India clearly belongs in the top decile of global digital rankings.

* Between 2023 and 2024, based on harmonised time series data from World Bank estimates for % of population using the internet and population

[6] As others have pointed out, e.g., see Oxford Insights (2025), it is likely that China's position in the AI Index understates its true capabilities. This is often attributed to the country's limited transparency around government initiatives, restricted access to deployment data, and a domestic technology ecosystem that operates largely independently of Western platforms and standards.

[7] While the scores are not strictly comparable across years due to changes in indicators, they remain comparable within each year and clearly illustrate divergence patterns.

Limited Regional Spillover from Digitalisation

There is substantial dispersion in digitalisation not only between regions but also within each region. The two most diverse regions, based on the CHIPS-Combined score, are the North Atlantic Region (NAR) and East Asia and the Pacific (EAP), where scores vary by 2.56x and 2.27x respectively, between the leading and lagging countries (see Figure 4). Central Asia and Western Europe appear less dispersed, possibly reflecting the European Union's cohesion policy, which aims to reduce economic and development disparities across regions through investments in digital infrastructure, skills, and innovation.[8] Countries in the Middle East and North Africa (MENA) also exhibit considerable variation, while Sub-Saharan Africa appears less dispersed, largely because the sample includes relatively few countries from that region.

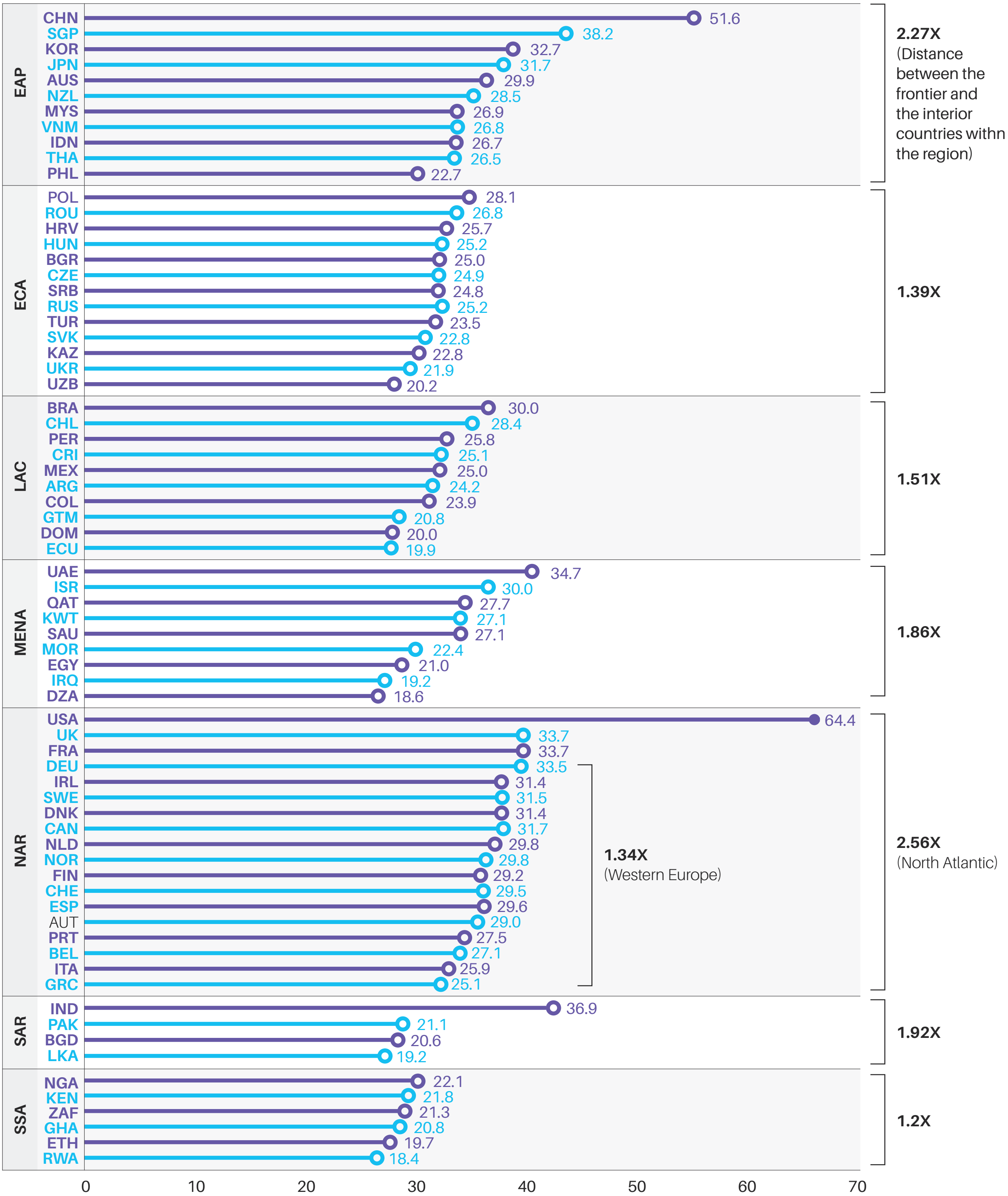
With wide regional disparities in digitalisation, there is little evidence of a consistent "spillover effect" from regional leaders to their neighbours. In the growth literature, particularly for manufacturing-led development, leading economies often pull nearby countries forward through trade and supply-chain linkages. In the digital economy, however, such regional spillovers appear limited. Even in regions with strong digital leaders, such as the North Atlantic or East Asia and the Pacific, the gap between top and bottom performers remains large, suggesting that leadership does not automatically translate into broader regional progress.[9] In South Asia, the disparity is equally pronounced, with India ranked 5th, while Pakistan, Bangladesh, and Sri Lanka are placed 59th, 63rd and 68th, respectively.

The fact that digitalisation takes time to diffuse across borders and remains strongly country-specific has important implications for development policy. Many multilateral institutions, often organised along regional lines, place considerable emphasis on regional initiatives (for example, the World Bank's "Africa Digital Moonshot"), assuming that such efforts will generate strong spillover effects. Similarly, regional trade agreements often presume that countries can rely on regional growth poles to drive digital transformation. However, the evidence presented here suggests otherwise. Countries within the same region, despite their geographic proximity, show widely varying levels of digitalisation. This underscores the primacy of domestic capabilities, policies, institutions and the catalytic role of the private sector over regional dynamics. In short, digital transformation cannot be imported: each country must build its own digital ecosystem rather than rely on neighbouring economies for a lift-off.

8 The EU's Cohesion Policy is its main investment strategy for strengthening economic, social and territorial cohesion by reducing development disparities across regions.

9 This finding, however, should be interpreted with some caution. Cross-country spillovers may take considerable time to materialise. For example, East–West European convergence after the fall of the Berlin Wall took decades. It is possible, therefore, that the available time window is still too short to detect meaningful digital convergence across countries.

Figure 4 Considerable Variation in the Level of Digitalisation Across and Within Regions

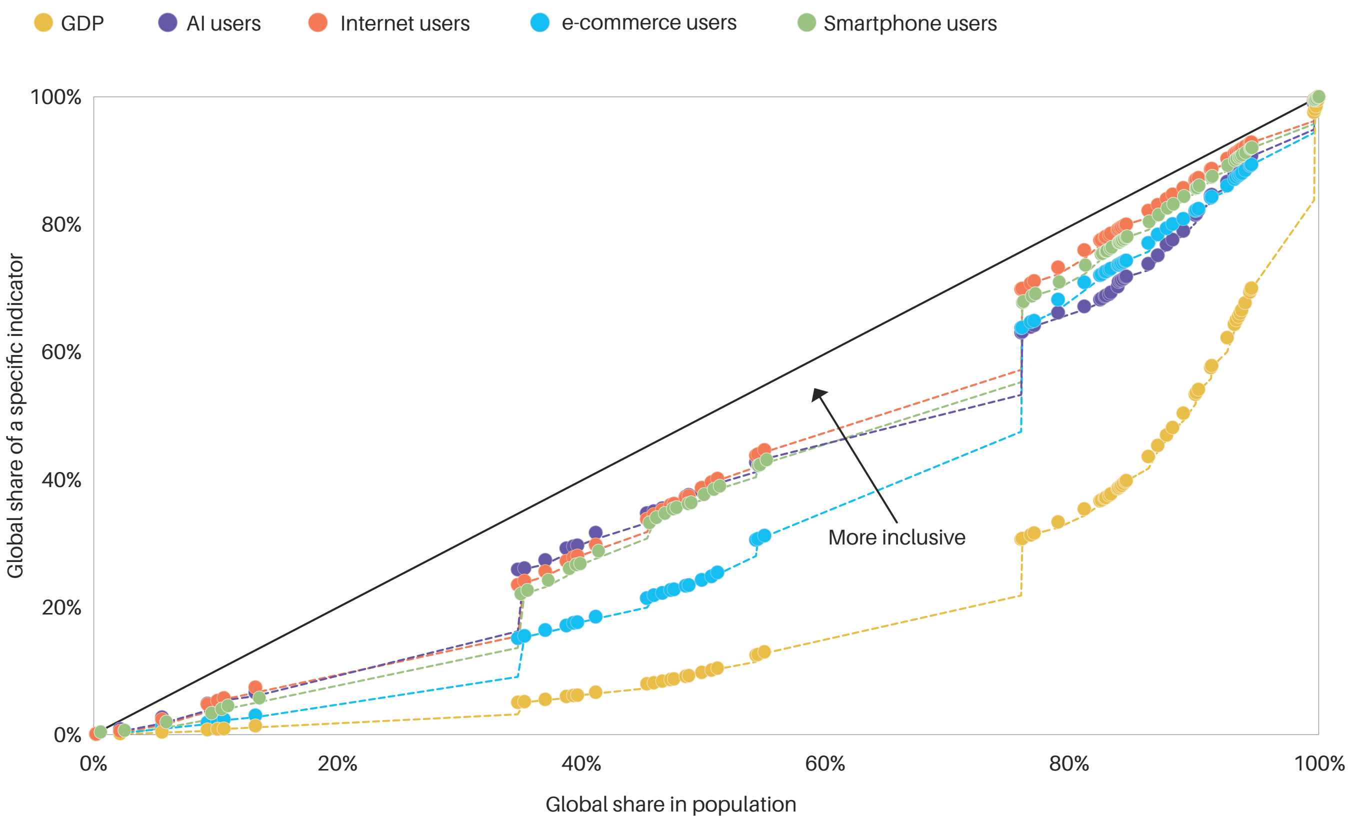


Source: IPCIDE Team

Diffused Users, Concentrated Producers

The fact that digital technologies have diffused faster than income explains much of the optimism surrounding digitalisation. For most digital indicators, such as internet users, smartphone users, e-commerce users and even AI users, the distribution across countries closely mirrors their share in the global population (see Figure 5). This suggests that digital access and usage are relatively inclusive, with large developing countries accounting for a proportionate or even higher, share of global users. In contrast, GDP remains far more concentrated, with a small group of countries accounting for a disproportionately large share of global output.[10] Thus, while prosperity continues to be unevenly distributed, access to digital technologies is spreading much more broadly, offering a potential pathway for more inclusive development even in the absence of rapid income convergence.

Figure 5 Global Diffusion of Digital Technologies and AI Is More Inclusive Than GDP



Note: The dots represent the respective shares for each country, in ascending order of GDP per capita.

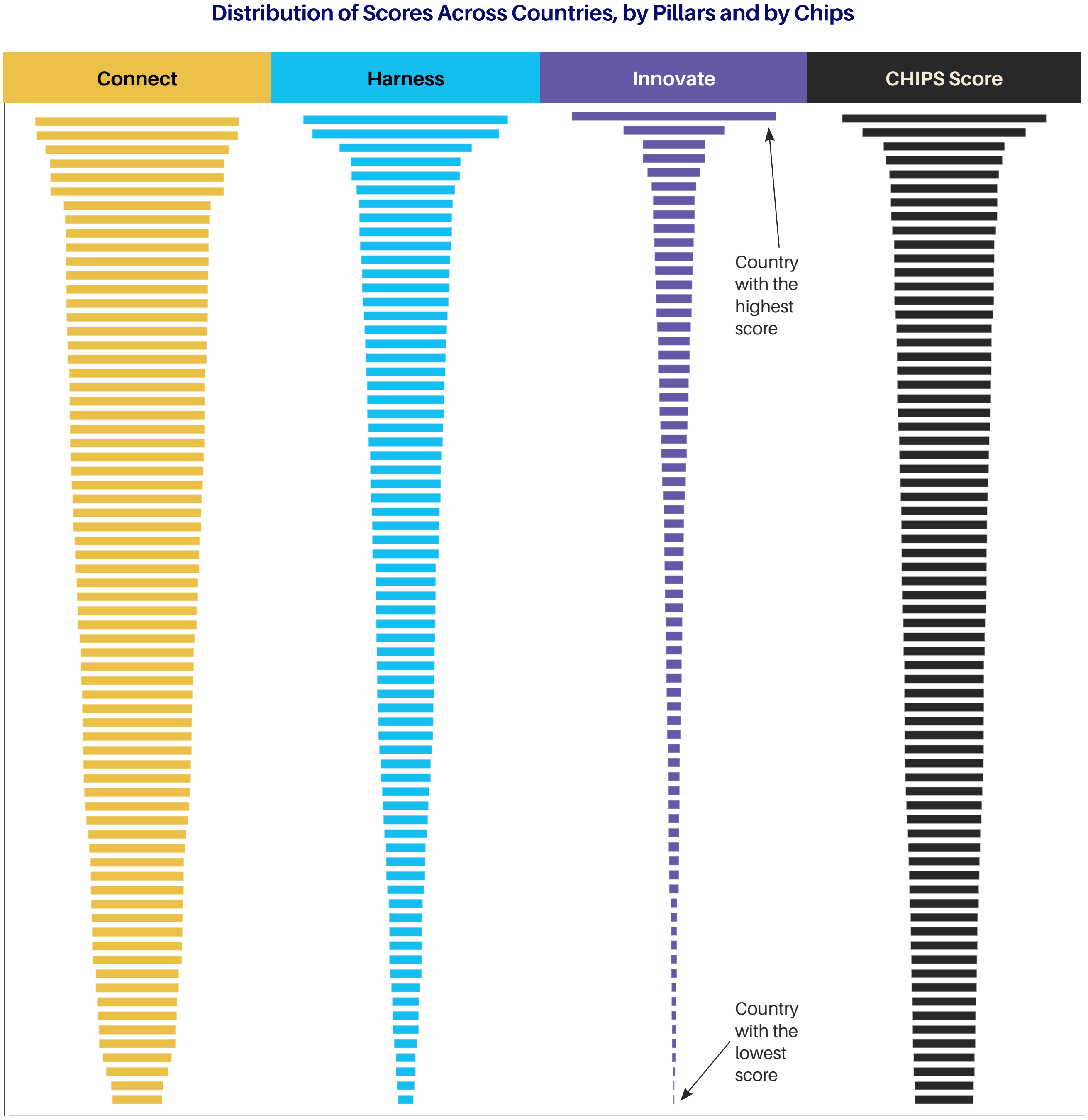
Source: IPCIDE Team

10 One potential implication of this finding is that developing countries have been less successful than their developed counterparts in leveraging digital technologies for growth. The World Development Report, 2016, Digital Dividends, offers several explanations for this pattern, arguing that a successful digital transformation requires strong "analogue" foundations, such as an enabling business environment, skilled workers and accountable governments. In their absence, the rapid diffusion of digital technologies may not translate into robust productivity gains or sustained economic growth.

Thanks to broad-based access, the connectivity gap has narrowed rapidly, but the production of new technologies and innovation remain highly concentrated. Figure 6 highlights stark differences in how digitalisation is distributed across its core pillars.

"Connect" is the most inclusive pillar, with relatively small variation in scores across countries, indicating that basic digital infrastructure, such as internet access and mobile connectivity, has become widely diffused.

Figure 6 Uneven Distribution of Digital Capabilities Across Countries



Source: IPCIDE Team

The "Harness" pillar shows moderate dispersion, suggesting that while access is widespread, countries differ significantly in their ability to use digital technologies productively. In contrast, "Innovate" is the least inclusive pillar, with a sharp drop from the top performers to the rest, underscoring that advanced capabilities, such as innovation, R&D, and frontier technologies, remain concentrated in a small group of countries.[11]

The imbalance in the production of digital technologies has become even more pronounced in the age of AI, where both hardware and software capabilities are concentrated in a handful of countries and firms. On the hardware side, the global supply of advanced chips is dominated by a few companies, such as TSMC (Taiwan), NVIDIA (US), SK Hynix, and Samsung (both South Korea), that control critical parts of the semiconductor value chain. On the software side, the development of frontier large language models (LLMs) is similarly concentrated among a small group of American firms, including Anthropic, Google, Meta OpenAI, X, and China's Alibaba and DeepSeek.[12] This dual concentration of both compute infrastructure and LLMs has created high barriers to entry, making it increasingly difficult for most countries to participate meaningfully in the production side of the AI economy. As a result, while the use of AI may diffuse globally, its production would remain tightly controlled, potentially reinforcing existing digital inequalities and limiting the ability of latecomers to catch up.[13]

Digital Leadership Require Both Scale and Intensity

While all countries have digitalised over time, achieving digital leadership - the ability to shape global rules, norms and standards - requires both scale and intensity. As shown in Figure 7, scale in digitalisation is driven primarily by population, while intensity is shaped more by income; together, they determine whether a country can emerge as a leader. The top panels shows that the CHIPS-Scale is strongly correlated with population ($R^2 \approx 0.49$) but that CHIPS-Intensity has almost no relationship with population, indicating that scale without intensity can lead to underperformance. In contrast, the middle panels shows that CHIPS-Intensity strongly correlated with per capita income ($R^2 \approx 0.65$) but that CHIPS-Scale is largely unrelated to it, suggesting that intensity without scale limits global impact. The bottom panel combines these effects: CHIPS-Combined is influenced by both population and income, with moderate correlations for each, underscoring that true digital leadership comes from combining both.

In the global digital landscape, there seems to be a clear divide between scale and intensity, with high-income countries excelling in intensity and EMDEs deriving strength from scale, but only a few combining both to achieve true leadership.

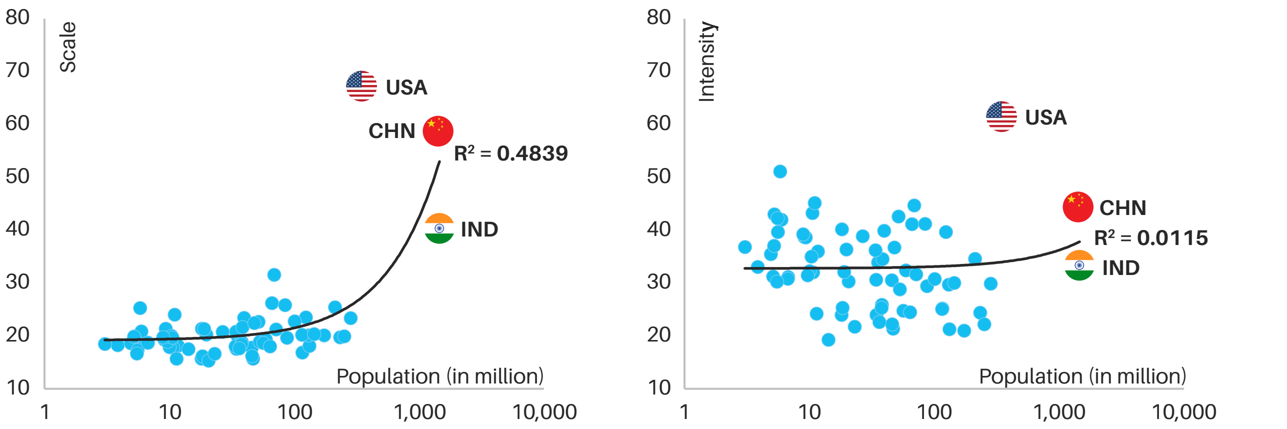
[11] There are several possible reasons why Connect is more inclusive than Harness and Innovate. First, connecting people to digital technologies is often treated as a public good, or even as a basic right. Governments and multilateral organisations, therefore, have made universal connectivity a policy priority, supported by investment, regulation and enabling policies. Comparable programmes to promote digital use and innovation are far more limited. Second, the complementary reforms required for connectivity are less demanding than those needed for harnessing and innovation. Connecting a person or firm requires infrastructure and access. Ensuring that they use digital technologies productively, or innovate with them, requires much stronger analogue foundations—skills, finance, institutions, competition, regulation and managerial capability. In short, the importance of analogue complements increases as we move from Connect to Harness and finally to Innovate.

[12] For a useful discussion of how global AI infrastructure is becoming increasingly concentrated in a few countries, see Lehdonvirta, Wú, and Hawkins (2024).

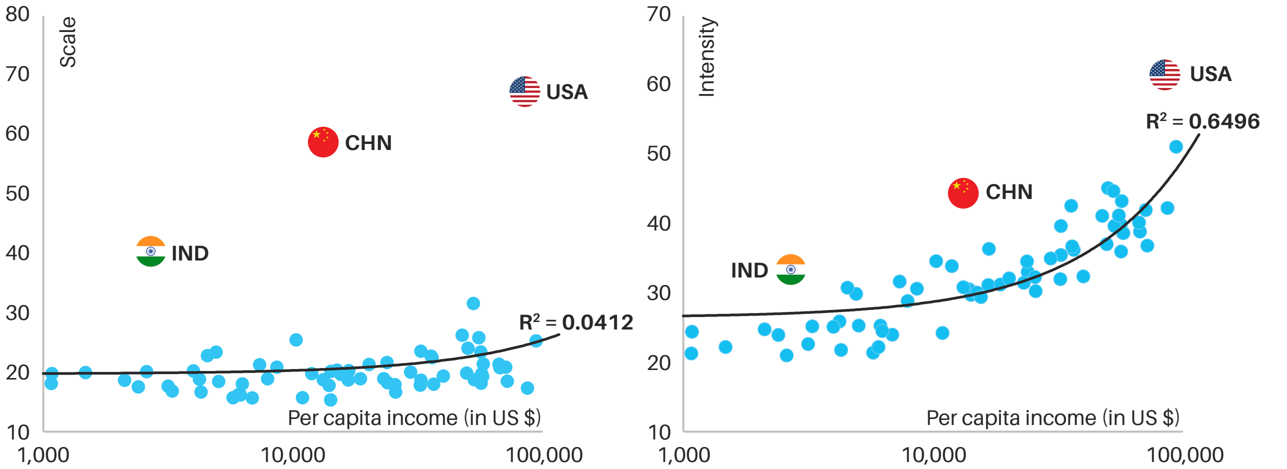
[13] This is precisely why many developing countries are keen to build their own sovereign AI models, even if doing so requires substantial investment and carries a high risk of failure.

Figure 7 Overall Digital Performance must Reflect both Scale and Intensity

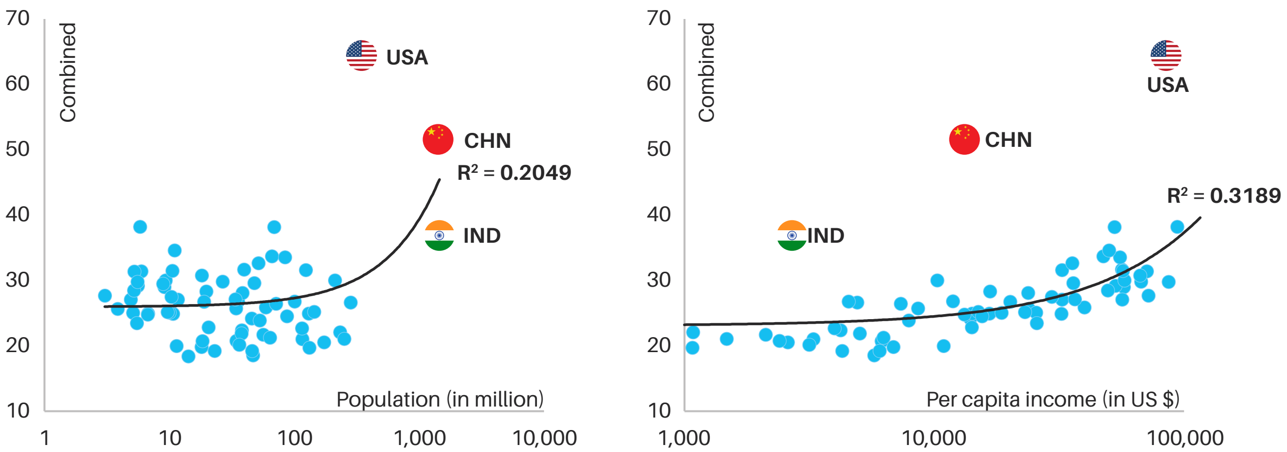
Top Panel: Scale of Digitalisation is Influenced more by Population Size than Per Capita Income



Middle Panel: Income has a Significant Impact on Intensity but not on the Scale of Digitalisation



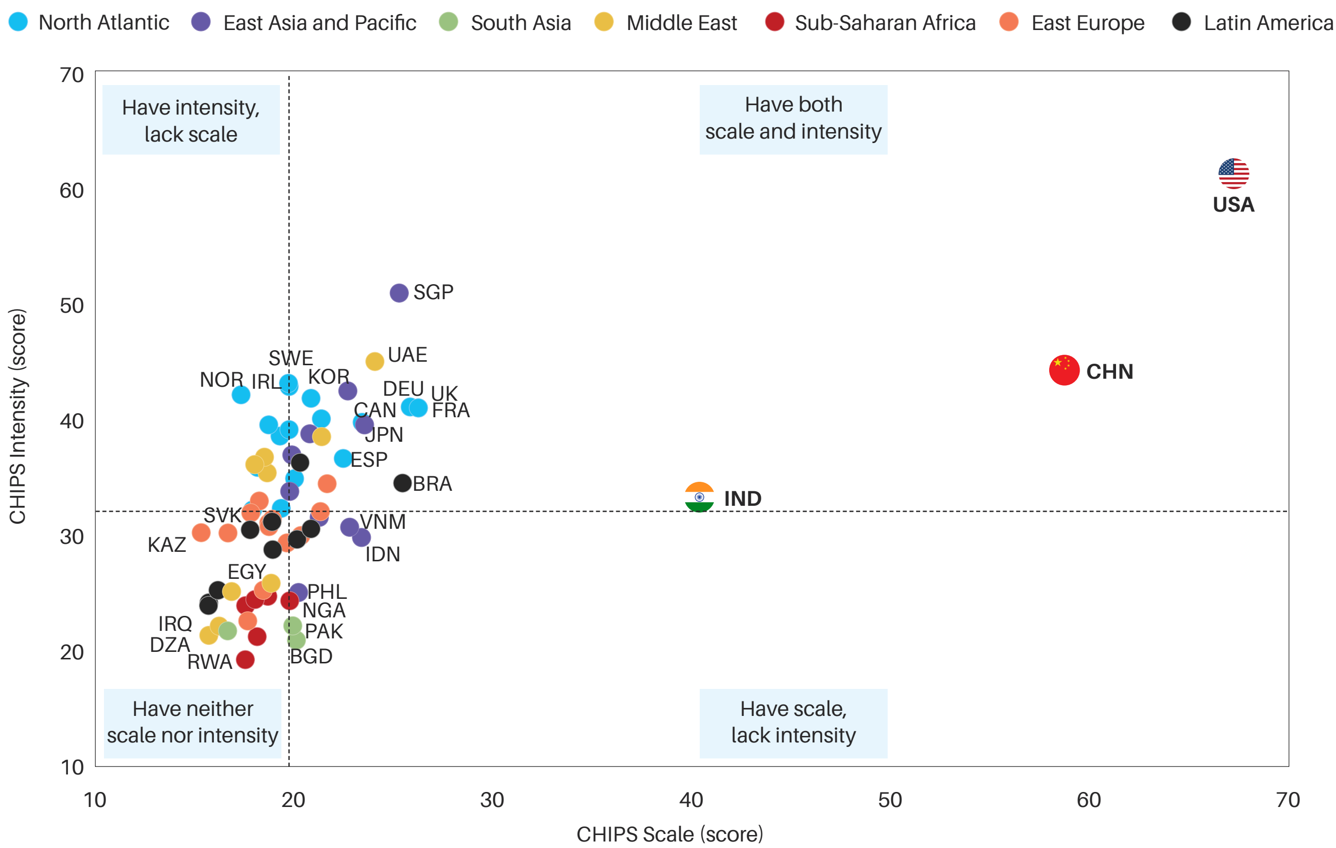
Bottom Panel: Overall Digitalisation is Impacted Equally by Population and Per Capita Income



Source: IPCIDE Team

As shown in Figure 8, high-income countries dominate the top-left quadrant, exhibiting strong digital intensity but often limited scale due to smaller populations.[14] In contrast, large EMDEs such as India, Brazil, Indonesia and Vietnam occupy the bottom-right quadrant, where scale is substantial but intensity remains relatively weak. A small group of countries, including the United States, China, and a few advanced and emerging market economies, occupy the top-right quadrant, combining both scale and intensity and thus emerging as true digital leaders. Finally, a large number of low-income and smaller economies fall into the bottom-left quadrant, lacking both scale and intensity. Overall, the figure underscores that neither scale nor intensity alone is sufficient for digital leadership; countries must combine both.

Figure 8 High-Income Countries Lead in Intensity, while EMDEs Exhibit Greater Scale



Source: IPCIDE Team

Returning to the question with which we started this chapter: which methodology better benchmarks AI progress: the IMF's AIPI or Stanford's Global AI Vibrancy Index. The evidence presented here strongly suggests that the IMF's index captures only a partial picture of digitalisation. Digital leadership depends on both scale and intensity. Large populations create powerful network effects, large user bases and deeper pools of data and talent. Higher incomes enable more intensive and productive use of digital technologies. Ignoring either dimension produces an incomplete assessment of a country's digital progress. Seen in this light, indices such as the IMF's AIPI, which focus mainly on intensity, or the experience of the average user, need methodological updating. They should incorporate scale effects, as is already done in indices produced by Stanford University, Oxford Insights, Tortoise Media and this report.

[14] But as Singapore and the UAE demonstrate, countries with small populations are not necessarily destined to score low on scale. Some indicators—particularly those related to quality and affordability—are not inherently dependent on population size.

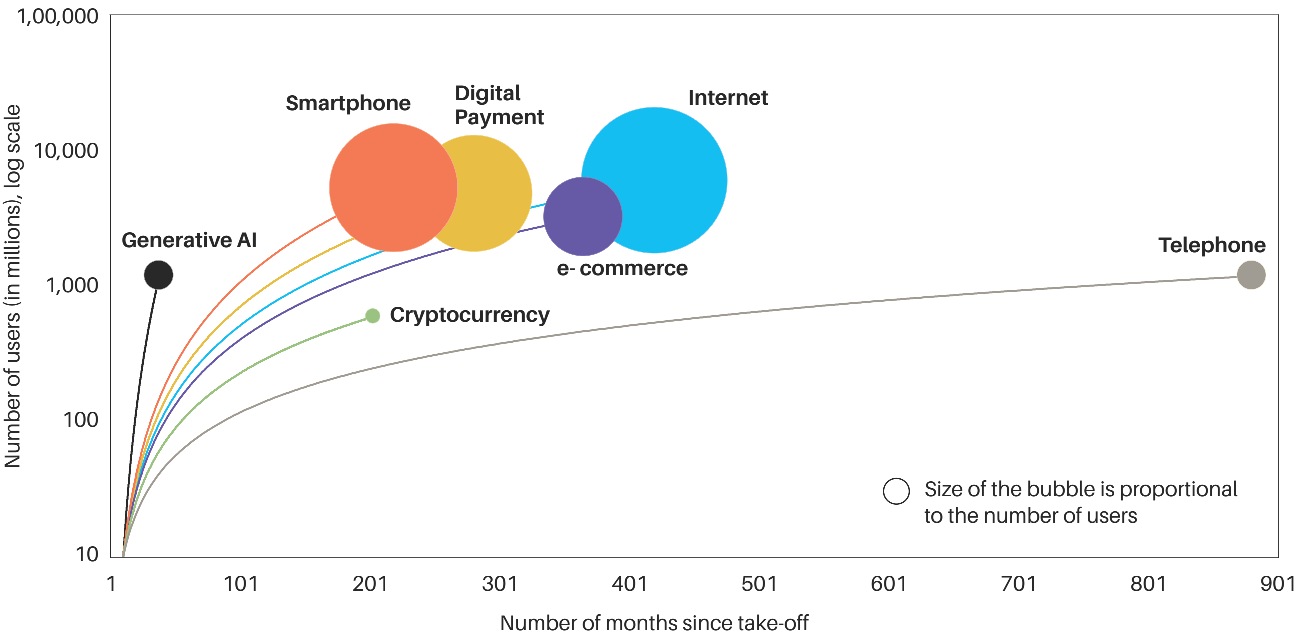
02

The Rise of the Intelligent Digital Economy

Benchmarking the AI Revolution

GenAI is diffusing at a historically unprecedented pace, achieving mass adoption far faster than earlier digital technologies. As Figure 9 shows, Generative AI crossed the billion-user threshold in roughly three years, whereas earlier digital technologies took far longer to reach comparable scale.[15] The internet, e-commerce, digital payments and smartphones each required one to three decades to build large global user bases. With AI now a mass phenomenon, countries increasingly need to assess their progress and benchmark their performance against the rest of the world. This is the objective of this chapter.

Figure 9 GenAI is the Fastest-Diffusing Technology in History



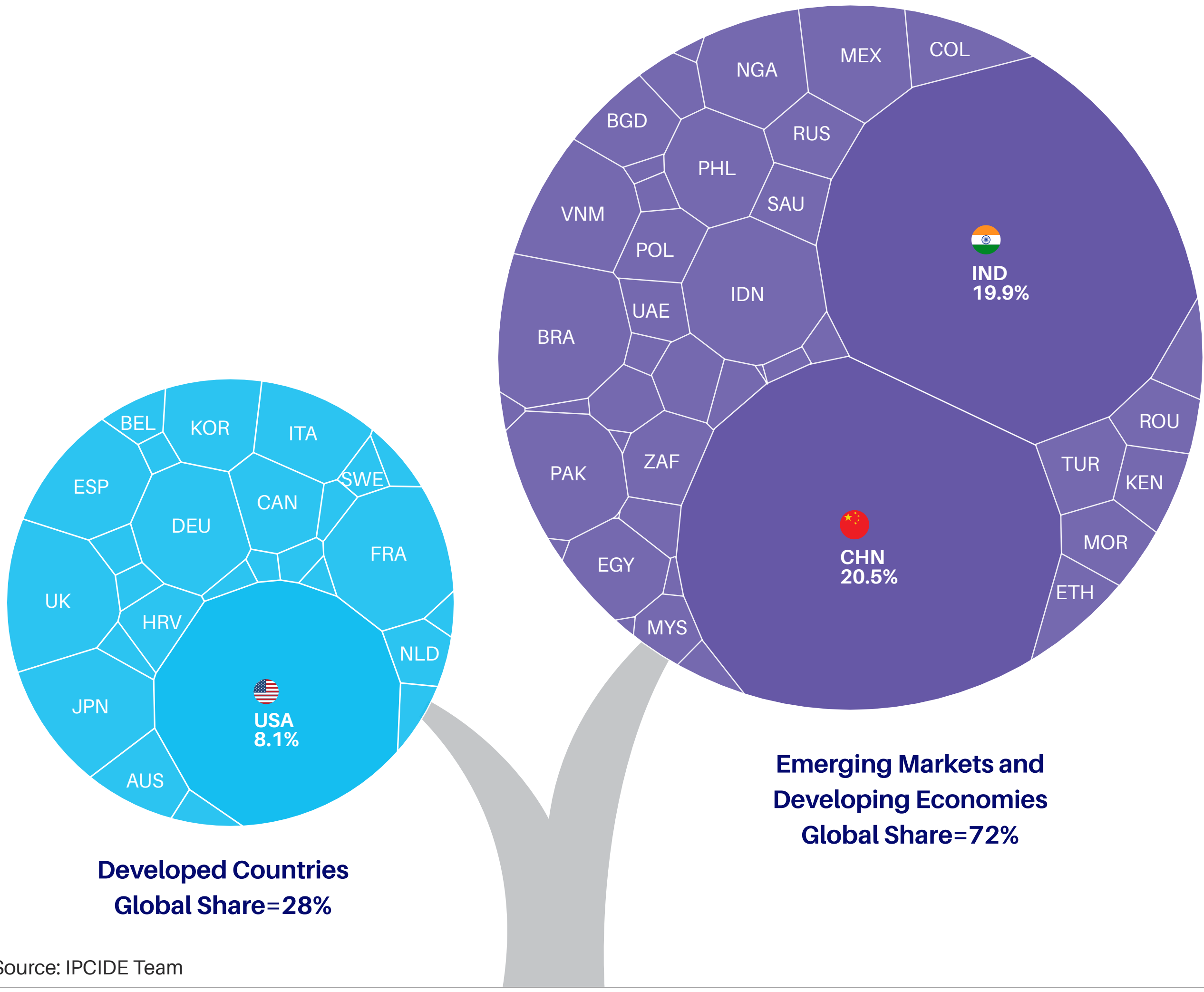
Note: The paths shown here are for illustrative purposes only. We use the following take-off periods: December 1990 for the internet, marked by the launch of the World Wide Web; September 2007 for smartphones, following the launch of the Apple iPhone; July 1995 for e-commerce, around the time Amazon began gaining traction in the United States; November 2022 for GenAI, with the launch of ChatGPT by OpenAI; July 2002 for digital payments, reflecting the growing use of PayPal; January 2009 for cryptocurrency, marked by the launch of Bitcoin; and 1952–2005 for telecom, capturing the period of expansion and subsequent decline of landline telephony in developing countries.

Source: IPCIDE Team

[15] It is worth noting that the figure visually understates the gap between AI and other technologies because the y-axis is on a logarithmic scale.

Not only is GenAI diffusing faster, developing countries now account for nearly three-fourths of its user base. In most previous technological revolutions, diffusion began in developed countries and reached the developing world only after considerable lags. For example, in the first three years after the launch of the World Wide Web, almost 98 percent of internet users were in advanced economies. By contrast, within three years of GenAI's launch, it has already become a developing-country phenomenon, with EMDEs accounting for 72 percent of global AI users, compared with 28 percent in developed countries (see Figure 10). China and India dominate: each has more AI users than all developed countries combined, excluding the United States. This creates a major opportunity for developing countries to shape AI adoption, applications, and use cases, provided they can translate scale into productivity, innovation and development outcomes.[16]

Figure 10 Developing Countries Account for Nearly Three-Fourths of Global AI Users



Source: IPCIDE Team

[16] One often hears the concern that developing countries will remain consumers of AI, while its production will be dominated by Western companies. But it is worth remembering that a similar criticism was made during the early rollout of the internet, when most search engines, platforms and digital firms were Western in origin. Looking back, however, those concerns appear overstated. The experience of large EMDEs such as China, India, Brazil and Indonesia show that they were able to leverage the internet to generate growth, create jobs and improve service delivery. Even today, many of the world's largest internet companies (producers) are American—especially the "Magnificent Seven", while a disproportionate share of internet users (consumers) live in developing countries. Yet few would argue that the spread of the internet has been less beneficial to developing countries than to developed ones.

The modular nature of the CHIPS framework allows us to benchmark India's AI performance both as a continuation of the digital revolution and as a standalone technology. Whether GenAI ultimately marks the beginning of a new industrial revolution or represents the next phase of the ongoing digital revolution is for history to decide. What is already clear, however, is that its unprecedented pace of diffusion makes monitoring and measuring AI progress an urgent priority. Older global digital indices, such as those produced by the IMF, UN, WEF, and ITU, have yet to fully incorporate AI into their frameworks. By contrast, newer indices produced by Oxford Insights, Stanford, and Tortoise focus exclusively on AI. This report takes a slightly different approach: in Chapter 1, we integrate AI into the broader CHIPS framework; in this chapter, we treat AI as a distinct technological breakthrough (see Box 3).

Box 3

An AI Index using the CHIPS Framework

We separate the AI-related indicators from the broader CHIPS framework to construct a standalone AI index. Of the 58 indicators used to estimate the CHIPS scores, 15 are directly related to AI. We use these indicators to build a pure AI index (See Annex 4).

It is important to point out that most of the indicators included here are already used in other AI indices. We, however, limit our choice of indicators to the ones that come closest to capturing outcomes rather than inputs or enabling conditions. Where indicator-level data are not readily available, we rely on publicly available sub-pillar scores.

Given that much of the underlying information is drawn from existing indices, the AI index constructed here should not be interpreted as offering entirely new evidence. Rather, it is best understood as a structured recombination of existing AI indices, using the CHIPS framework to organise and interpret the available evidence.

Developing Countries are Doing Better on AI than on Traditional Digitalization

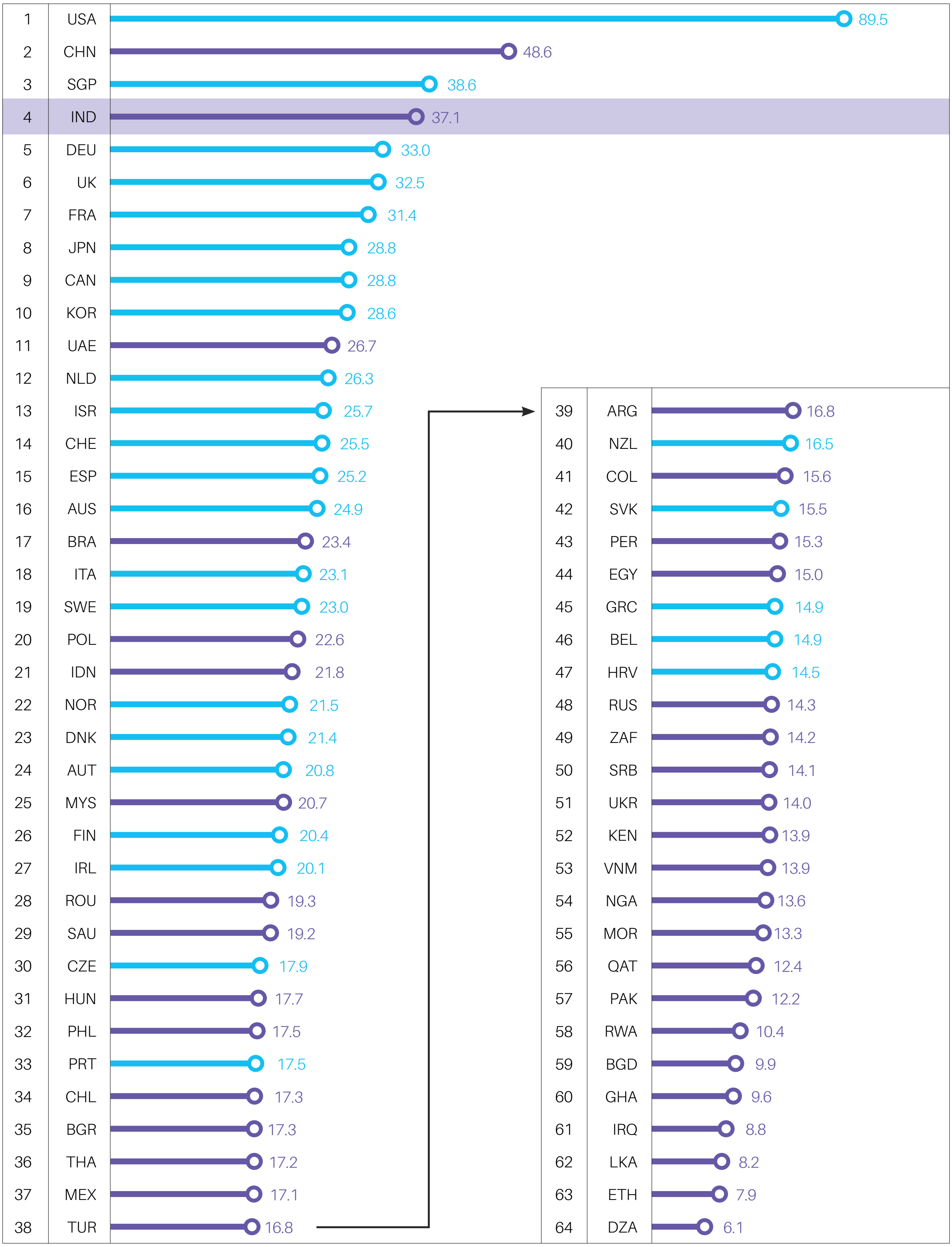
While AI rankings broadly mirror traditional digitalisation rankings, they also reveal several important departures (see Figure -11).

First, the United States remains the clear global outlier, far ahead of every other country. China ranks second but with a much lower score, underscoring the continued concentration of global AI capability at the frontier.

Second, several developing countries perform unexpectedly well. India, for example, ranks fourth, ahead of Germany, France, Japan, Canada, and Korea. Brazil ranks 14th, ahead of several high-income European economies.

Third, several advanced economies, especially in Europe, rank below large emerging economies, suggesting that conventional strengths in connectivity,

Figure 11 Country Rankings by AI Score: India is in the Fourth Position



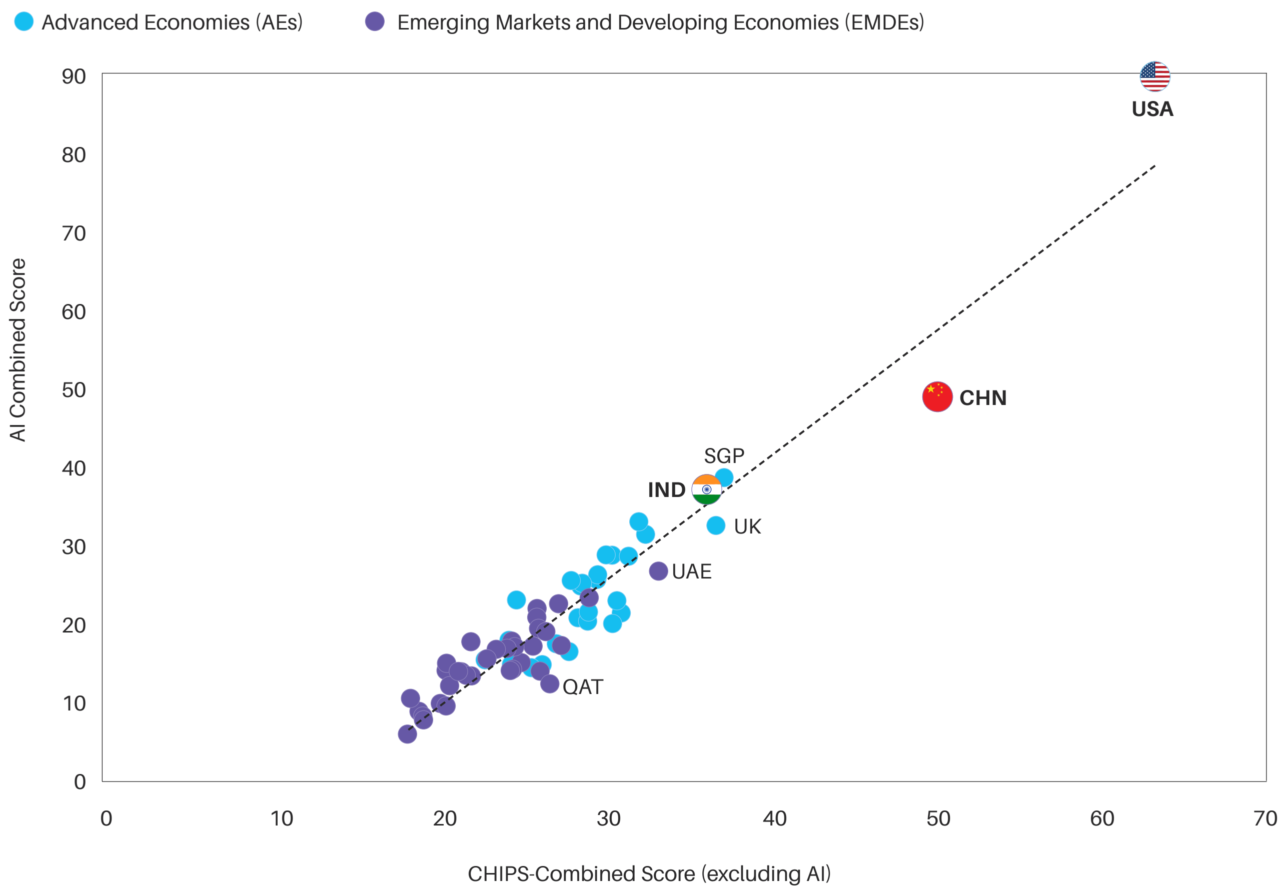
Source: IPCIDE Team

e-government and digital infrastructure do not automatically translate into AI leadership.

Finally, many developing countries that do not usually feature near the top of conventional digital economy rankings perform better on AI-related measures. This may reflect the faster diffusion of AI tools, the importance of scale and the ability of countries with large digital user bases, talent pools and innovation ecosystems to generate AI momentum even before fully closing legacy digital gaps.

There is evidence to believe that disparity in AI between developed and developing countries may be smaller than the traditional digital divide. The upward-sloping trend line in Figure 12 confirms that AI performance is positively associated with broader digitalisation: countries with stronger CHIPS scores (excluding AI) also tend to have higher AI scores. However, several developing countries sit above the trend line, indicating that their AI performance exceeds what would be expected, based on their traditional digitalisation. India is the clearest example. Its AI score is substantially higher than its non-AI CHIPS score would predict, placing it well above the fitted line and close to many much richer economies. Several other EMDEs also cluster around or above the trend line, suggesting that AI capabilities may be diffusing faster than earlier waves of digital technology. By contrast, some richer countries perform closer to, or even below, the level implied by their traditional digital strengths. The main exception to this narrative is the United States, which remains a major frontier outlier, combining very high traditional digitalisation with an exceptionally high AI score.

Figure 12 EMDEs are Performing Better on AI than on Traditional Digitalisation



Source: IPCIDE Team

Figure 13 Countries are Playing to their Strengths in the AI Race

Indicators/ Scores	USA	China	Singapore	India
Safety and security	100	100	100	78.0
AI R&D	100	89.9	7.0	36.8
Compute capacity	100	88.5	44.9	52.3
AI Infrastructure	100	65.8	49.5	14.1
AI Innovation Research	100	54.0	25.0	10.0
AI commercial	100	48.0	27.0	14.0
Responsible AI	100	40.0	5.7	6.1
Open Source Models	100	26.2	18.7	0.7
AI Talent	100	25.3	29.3	41.4
AI Skilled population	94.9	N/A	21.8	100
Open Data score	80.6	17.7	100	41.9
Private Investment	75.7	7.7	10.8	2.7
Newly Funded AI Companies	70.8	21.2	39.3	20.0
Number of AI users	40.1	58.7	47.9	57.5
Public Trust Score	N/A	33.0	55.6	83.4

Source: IPCIDE Team

The finding that developing countries may be performing better on AI than on traditional digitalisation should be treated with caution. Since AI rewards scale, talent and rapid adoption, and many EMDES have large user bases, sizeable pools of technical talent and active startup ecosystems, it is possible that they are indeed doing well on AI. However, some of this optimistic result may also reflect how the AI index is constructed. Many AI indicators capture inputs or intermediate capabilities, such as publications, patents, AI skills, GitHub activity, model development, and startup funding, rather than economy-wide outcomes such as exports, investment, productivity, or growth. Since technology alone cannot deliver development and must be complemented by enterprise restructuring, appropriate worker skills, transparent, accountable governments, etc., the same level of AI diffusion may produce very different outcomes across countries.[17] For this reason, the finding should be interpreted with caution and treated as suggestive rather than conclusive until it is backed by stronger outcome-based evidence.

One way leading AI countries are thriving is not by competing with each other, but by specialising in different parts of the AI supply chain according to their comparative advantage. As shown in Figure 13, the United States performs strongly across compute capacity, AI infrastructure, open-source models, AI talent, private investment, newly funded AI companies, AI commercialisation, AI R&D, responsible AI, and safety and security, confirming its position as the most complete AI ecosystem, with strengths across both the upstream and downstream parts of the AI value chain.[18] China performs particularly well on the number of AI users, compute capacity, AI R&D, safety and security, and, to some extent, AI infrastructure, suggesting a model built around scale, state-backed infrastructure, research capacity and large domestic deployment. India's comparative advantage lies mostly in scale and skills. Singapore has a narrower but distinctive AI profile, focusing on trusted data systems, regulatory quality and enabling infrastructure. Overall, the evidence points to an emerging global AI supply chain in which countries occupy different niches rather than all trying to replicate the same model.

India has the Talent but Lacks Patient Capital

Critics have argued that India has yet to carve out a clear position in the global AI supply chain. This supply chain is often described as a five-layer stack: energy, infrastructure, compute, models and applications.[19] The first four layers are highly capital-intensive and require strong manufacturing capabilities. They, therefore, favour countries such as South Korea, Taiwan, the Netherlands and China, which have strong semiconductor and electronics manufacturing bases, as well as the United States, which combines deep pools of patient capital with strong intellectual property ownership. Given its more limited capital base – as shown in Figure 14, India occupies the quadrant marked "limited start-up capital, but strong talent base". India has been right to avoid entering the most capital-intensive segments of the AI race. Instead, it has focused on building low-cost sovereign AI models and pursuing frugal innovation through small language models.

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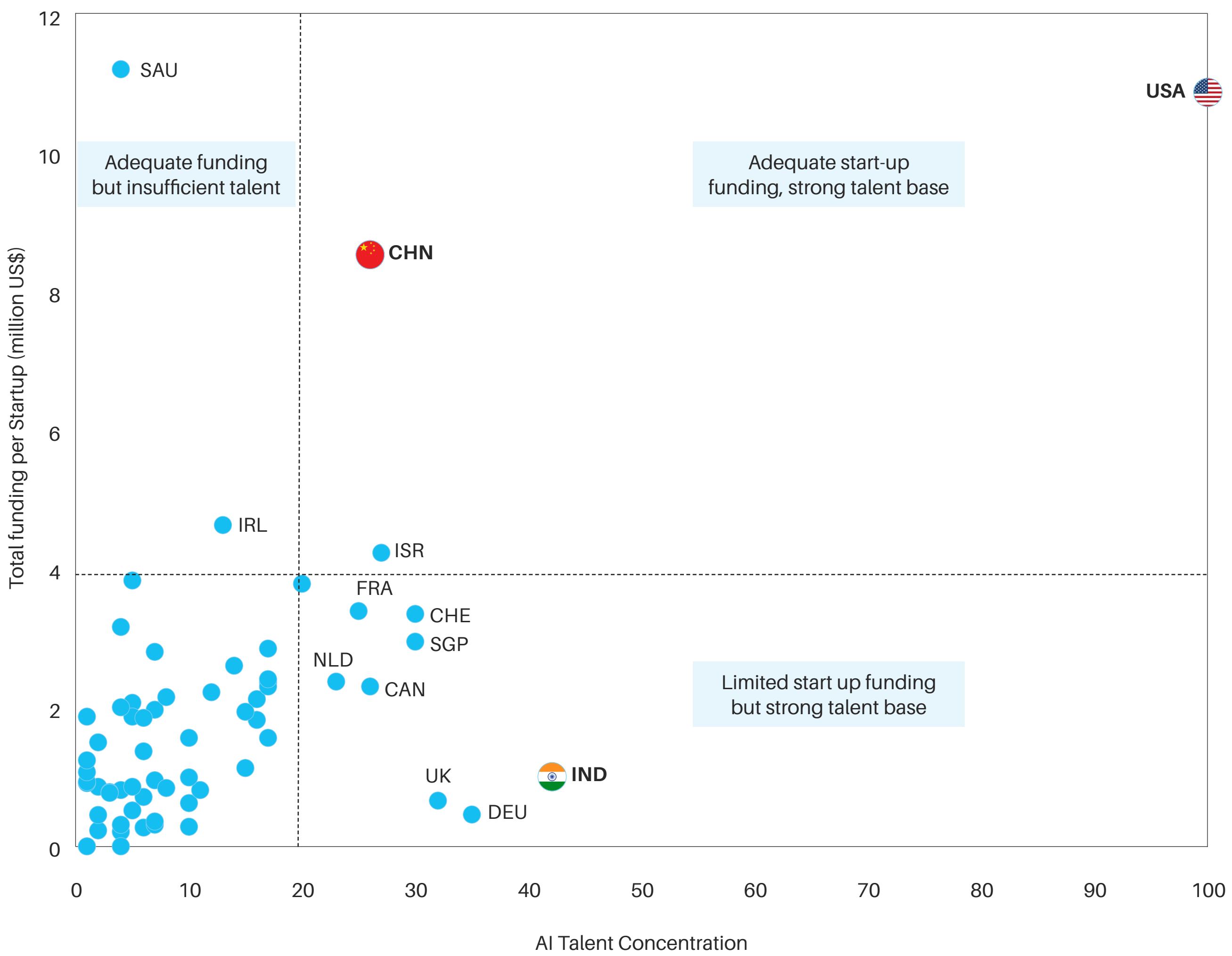
[17] See World Development Report (2016) and Brynjolfsson and Autor (2015) for a fuller discussion of this argument.

[18] The US scores high on open-source models not because its leading frontier LLMs are open, but because it still has the world's deepest ecosystem for producing, publishing and scaling open AI models. However, this is a fast-changing area, and China's open-model ecosystem has grown rapidly since the Tortoise 2025 index was published, which is one of the sources used in preparing Figure 13.

[19] The formulation of this stack is often credited to Jensen Huang, Founder and CEO, NVIDIA.

Figure 14 India's AI Advantage Lies in its Talent Pool



Source: IPCIDE Team

The second wave of AI adoption, marked by the rapid spread of applications and agents, will require more intensive use of AI skills. This should play to India's advantage. Applications are talent-intensive, and India has the second-largest concentration of AI talent after the United States (see Figure 14). The United States remains the clear outlier, combining very high AI talent concentration with very high funding per startup. China also performs well on capital, with high funding per startup, but its AI talent concentration is much lower than that of the United States and India. India will also have to compete with several European economies that combine moderate levels of talent with moderate levels of funding.

There are good reasons to believe that India has not missed the AI train. Its opportunity lies not in replicating the capital-heavy AI strategies of the United States or China, but in building a talent-led, application-driven AI ecosystem that reflects its own comparative advantage. As the second wave of AI, driven by applications, agents, and widespread use, takes off, India is well placed to emerge as one of the world's leading user capitals of AI.

But this transition will not happen on talent alone. India will need more risk capital for AI startups, easier access to affordable compute and stronger links between universities, research labs, startups and industry. The government can play an enabling role by providing shared datasets, testing sandboxes, public digital infrastructure and early demand through public procurement. It can also help retain and attract high-end AI talent by expanding research opportunities, improving funding channels and creating clearer pathways for commercialisation.

03

Digitalisation's Hidden Costs

Global Imbalance, Digital Crime, and E-Waste

Digitalisation is not an Unqualified Good

Many advocates of digitalisation, including the authors of this report, may have, at times, portrayed it as an unqualified good. Much of this optimism is justified. Computers, the internet, the World Wide Web, smartphones, cloud computing, 5G, apps, platforms, software, digital public infrastructure and, now, artificial intelligence (AI) have transformed economies and societies by boosting growth, supporting livelihoods and improving service delivery. But this positive story is incomplete. Digital technologies also create new risks and hidden costs, which receive far less attention in the literature than they deserve. A balanced assessment of digitalisation, therefore, must look not only at its benefits, but also at its risks.

The SIDE Report and its CHIPS framework were designed to provide a more balanced account of digitalisation. The first three pillars – Connect, Harness, and Innovate – capture the opportunities created by digital technologies, while the last two – Protect and Sustain –focus on managing risks. In practice, however, the discussion has been less balanced than the framework. The main reason is data-related. Reliable, annually updated and publicly available data on the downsides of digitalisation are far less available than data on its dividends. Despite these limitations, and partly to highlight the underlying data gaps, this chapter examines three important downsides of digitalisation.

Most of the downside risks discussed here are already visible in India. Online financial crime and digital fraud have grown rapidly and are now among the most commonly reported forms of crime in the country. Data breaches, email leaks, phishing, identity theft and ransomware attacks have also increased, exposing households, firms and public institutions to new forms of digital vulnerability. At the same time, the risks of digital exclusion have become harder to ignore, with reports of people being denied access to services because of failures in digital authentication. India also faces a growing environmental challenge as it is the world's largest generators of electronic waste after China and the United States.[20] But these problems are solvable and, based on lessons learnt from other countries, we offer several policy ideas.

Global Imbalance: Trade in Digitally Delivered Services

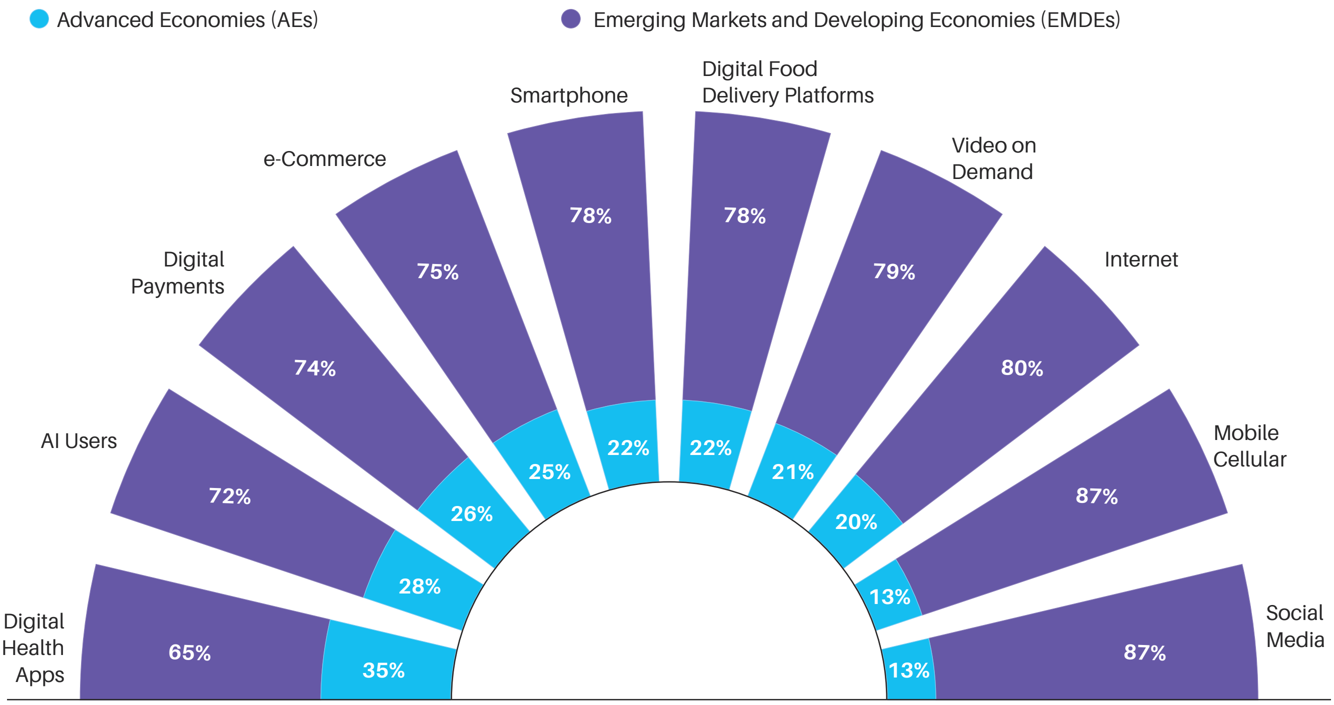
Global trade in digital services is highly skewed. The majority of consumers of digital technologies reside in emerging markets and developing economies (EMDEs), while the production and ownership of these services remain concentrated in advanced economies (AEs). Figure 15 shows that the share of EMDEs ranges from 65 percent for digital health apps to 87 percent for mobile cellular and social media users.

[20] However, in per capita terms, India's e-waste generation is among the lowest in our sample. At 2.9 kg per person, it ranks eighth lowest, compared with Norway, which records the highest level at 26.8 kg per person.

Several factors explain this shift. EMDEs have larger populations, often with younger demographics that adopt new technologies quickly. Digital technologies have also become more accessible and affordable, especially through smartphones and low-cost mobile internet. In addition, weak physical delivery systems in many developing countries have increased demand for digital alternatives in payments, commerce, health, entertainment and communication.

Figure 15 **Most Digital Technology Users Live Outside Advanced Economies**

(User share across various technologies)

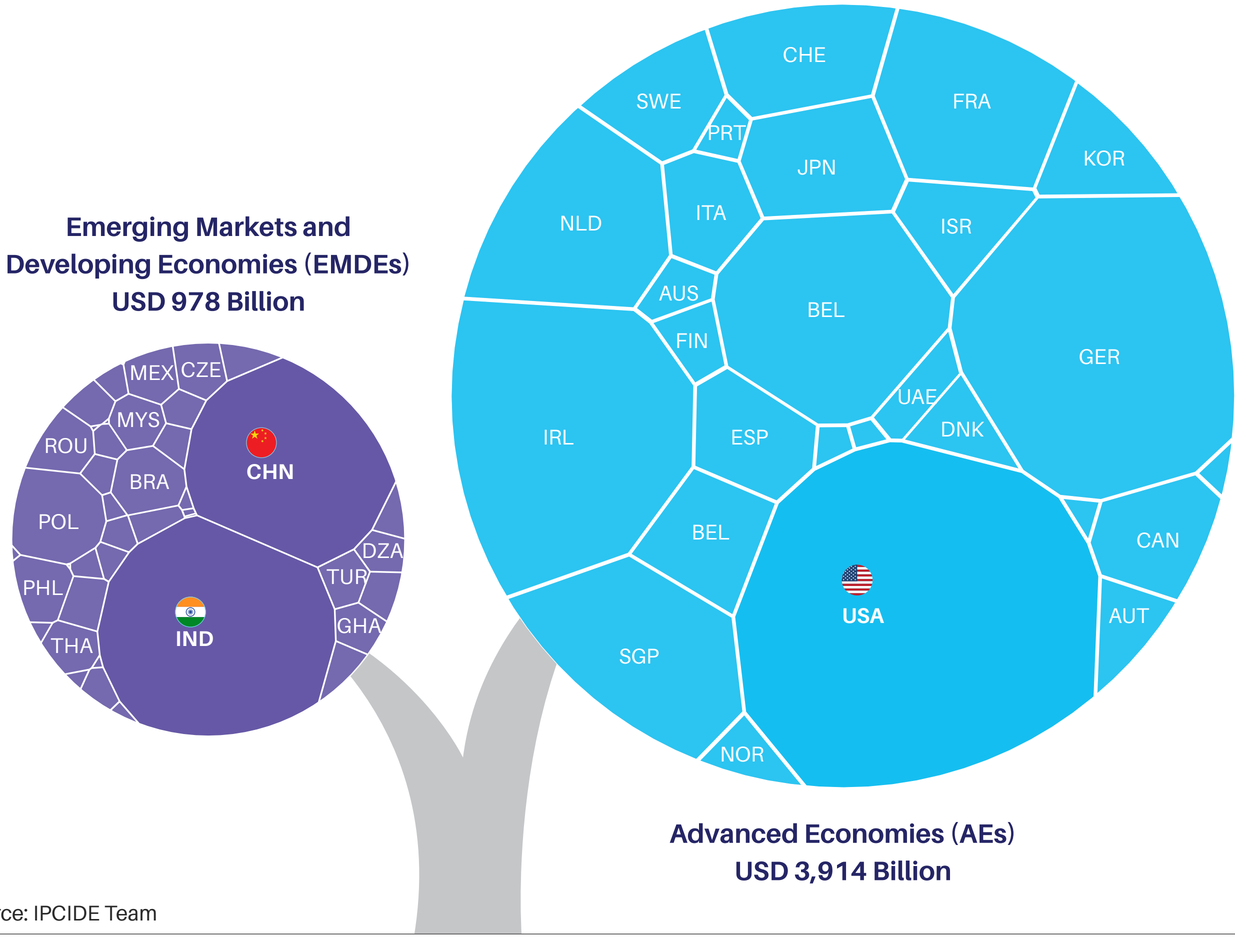


Source: IPCIDE Team

Yet the production and trade sides tell a different story. Most Big Tech firms and AI hyperscalers that provide these services are headquartered in advanced economies. As Figure 16 shows, the imbalance in global trade in digitally delivered services is large. EMDEs account for less than one-fifth of digitally delivered trade, and AEs account for more than four-fifths. The United States alone records USD 815 billion, almost as much as all EMDEs combined. The United Kingdom, Ireland, and Germany are also major exporters.[21] Thus, while the users of digital technologies increasingly live in the developing world, the value from digitally delivered trade is still captured mainly by advanced economies.

[21] Not all exports are organically driven. Some smaller advanced economies, such as Ireland and Singapore, record high levels of digitally delivered exports because many multinational firms book digital revenues through these jurisdictions.

Figure 16 EMDES Account for Less than One-fifth of Digitally Delivered Exports



Source: IPCIDE Team

Box 4

India's Exceptionalism in Digitally Delivered Services

India stands out as a major exception in the global trade in digitally delivered services. It has managed to emerge as a globally significant exporter despite being a lower middle-income country. At around USD 328 billion in digitally delivered trade, India outperforms almost all EMDEs and rivals several advanced economies. In fact, India's digitally delivered exports exceed those of many high-income countries with much higher levels of income, capital availability and digital infrastructure.

This exceptionalism reflects the distinctive structure of India's digital economy. Unlike many EMDEs that mainly consume imported digital services, India built a globally competitive IT and business services sector over several decades. The country developed a large pool of English-speaking engineers, programmers and digital professionals. Its firms gained early access to global markets through outsourcing, software exports, business process management and IT-enabled services. Over time, this created deep organisational capabilities, export relationships, managerial expertise and reputational capital, making India the fourth largest exporter of digital services in the world after the USA, UK and Ireland.

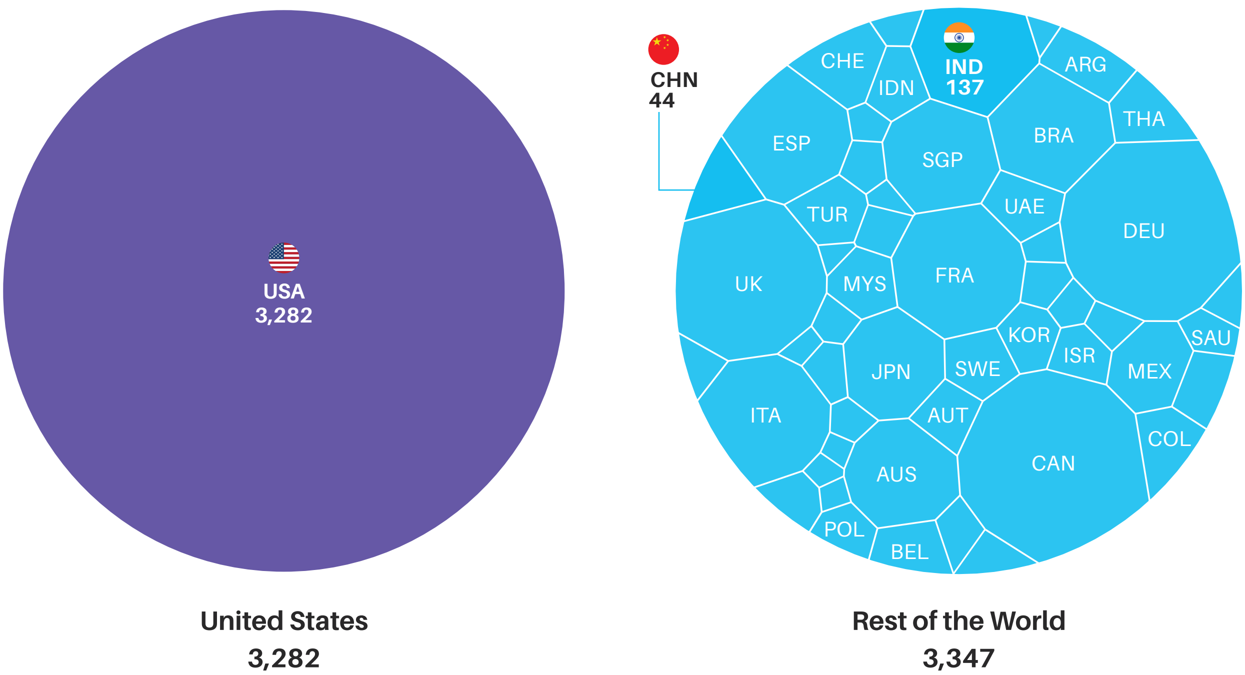
This transformation is so dramatic that it has not yet been fully recognised in India's policy stance. A case in point is India's position at the WTO on the moratorium on customs duties on electronic transmissions, introduced in 1998 and commonly referred to as the e-commerce moratorium. India opposed the moratorium then and continues to oppose it in 2026, often aligning itself with other developing countries such as Brazil and South Africa. Yet this position does not fully reflect how much India's own digital economy has changed. India is no longer simply a net importer of digital products and services; it has become a major exporter of digitally delivered services. Its trade policy stance, therefore, needs to better reflect this new reality.

Digital Crime: The Growing Pains of Connectivity

Large, highly connected economies are also among the biggest victims of digital crime. As Figure 17 shows, enterprises in the United States alone account for almost as many reported ransomware victims as the rest of the world combined: 3,282 victims in the United States, compared with 3,347 victims in all other countries. This is not surprising. The United States is the world's largest and most digitally intensive economy. It has a large number of firms, cloud users, data centres, digital platforms and digitally connected supply chains. US firms are also attractive targets because they often hold valuable data and have a greater ability

Figure 17 Every Second Enterprise Ransomware Victim was in the United States

(Number of ransomware victims in 2025)

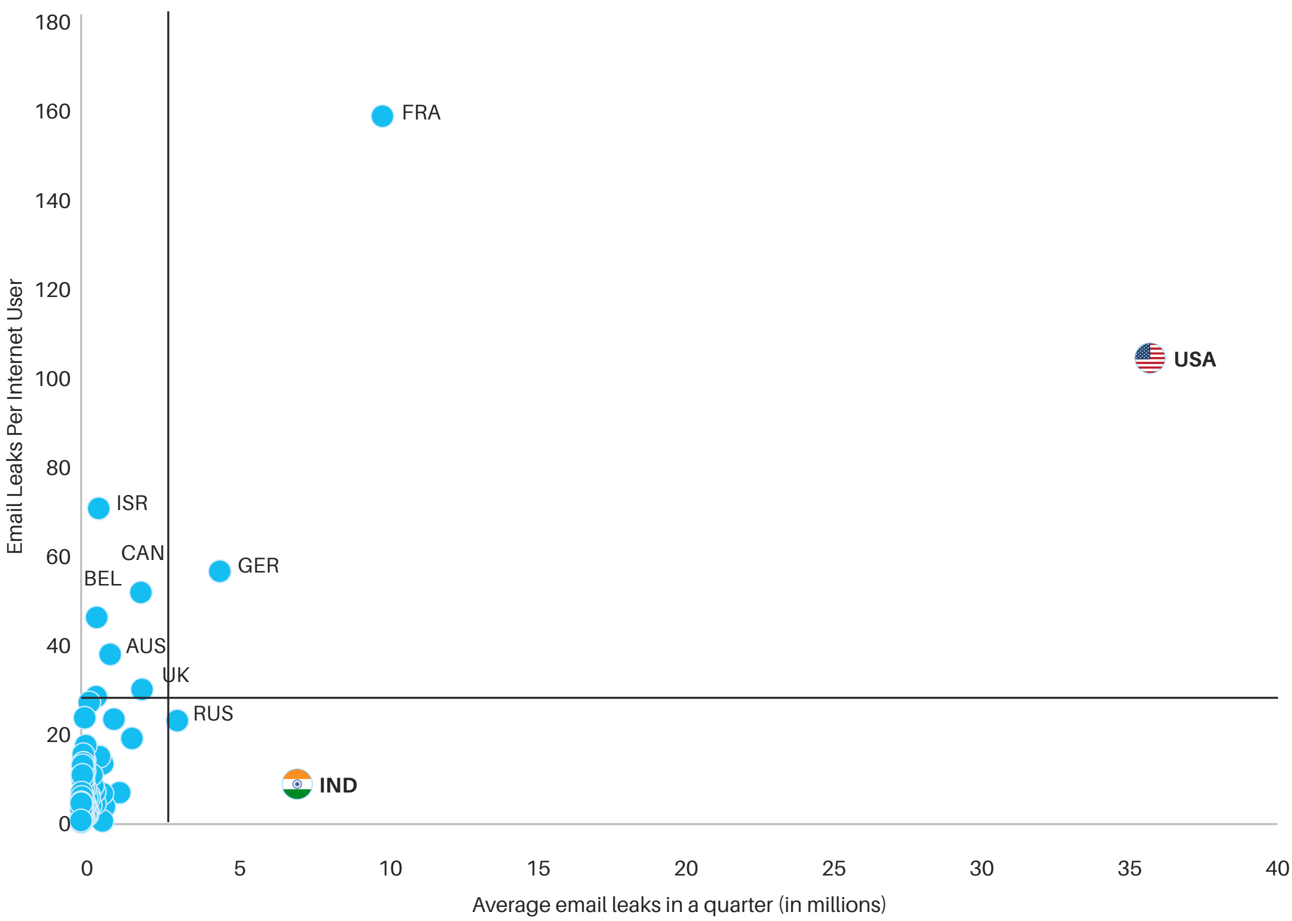


Source: IPCIDE Team

to pay. The US also has strict disclosure requirements, possibly resulting in more comprehensive reporting of incidents than in the rest of the world. Enterprises in other highly connected, high-income countries, such as Canada, Germany, the United Kingdom, and France, are also more exposed to ransomware attacks. Among EMDEs, only Brazil and India appear in the top 10. China is conspicuously absent, despite being one of the world's most connected economies.[22]

Individuals, like enterprises, are more exposed to email leaks in highly connected economies. The United States records the highest average number of leaked emails in a quarter, at around 35 million, and also has the second-highest number of leaks per internet user (see Figure 18). Several other high-income countries also show high levels of exposure. These include France, Canada, Germany, Israel, Belgium, Australia, and the United Kingdom. India also records a relatively high number of total email leaks, reflecting its very large internet user base. However, its leaks per internet user remain low. China is a notable exception to this pattern. Despite having around five times as many internet users as the United States, it reports less than 2 percent of the email leaks recorded in the United States. One possible explanation has to do with China's large spending on cybersecurity, an issue we turn to next.

Figure 18 Email Leaks Reflect the Risks of Digital Scale

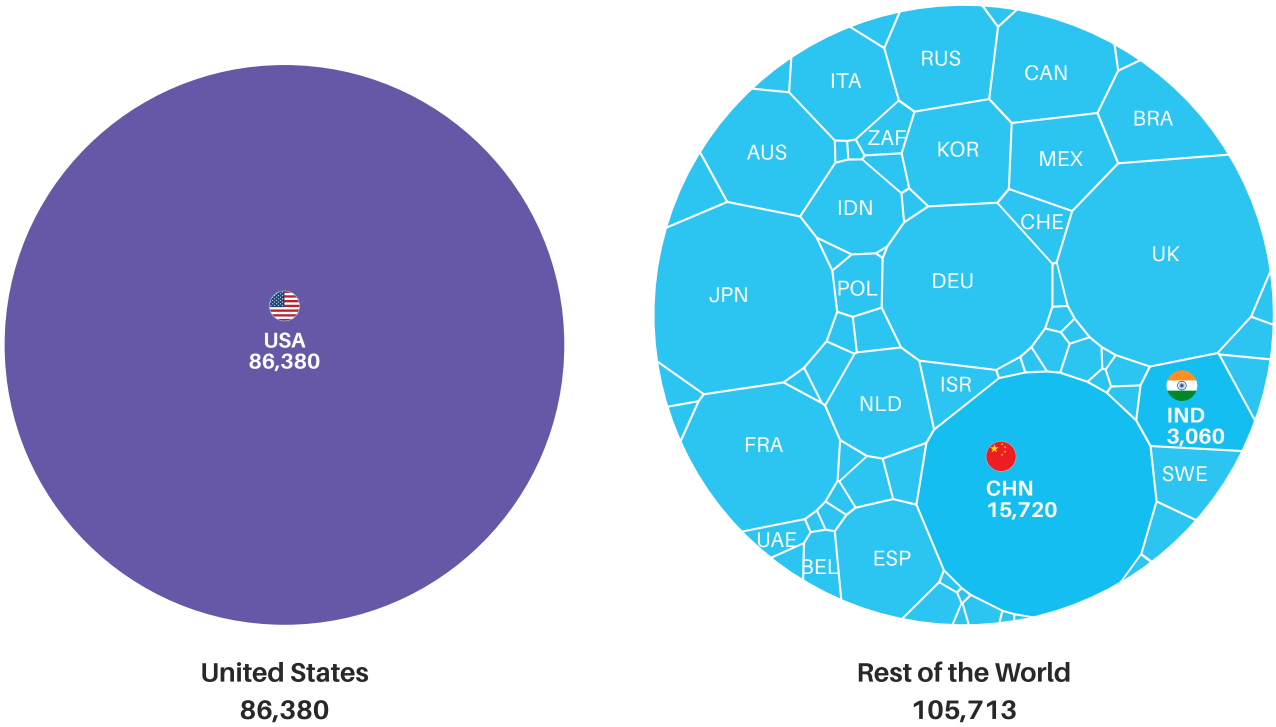


Source: IPCIDE Team

22 This may reflect differences in reporting, disclosure requirements, data availability, or the way ransomware incidents are tracked in China compared to other countries.

As digital vulnerabilities rise, countries are also increasing their protection efforts. The United States, which appears to face the highest exposure to digital crime, accounts for US$ 86.4 billion in cybersecurity revenue, almost equal to the US$105.7 billion spent by the rest of the world combined. China is the second-largest cybersecurity market, even though it appears considerably less vulnerable. This suggests that China's spending may be aimed more at preventing cybercrime than responding to it after incidents occur. Other major cybersecurity markets include the United Kingdom, Japan, Germany, France, Australia, Canada, Brazil, South Korea, Spain, India and Italy.

Figure 19 Revenue from Cybersecurity Spending (in million US$)

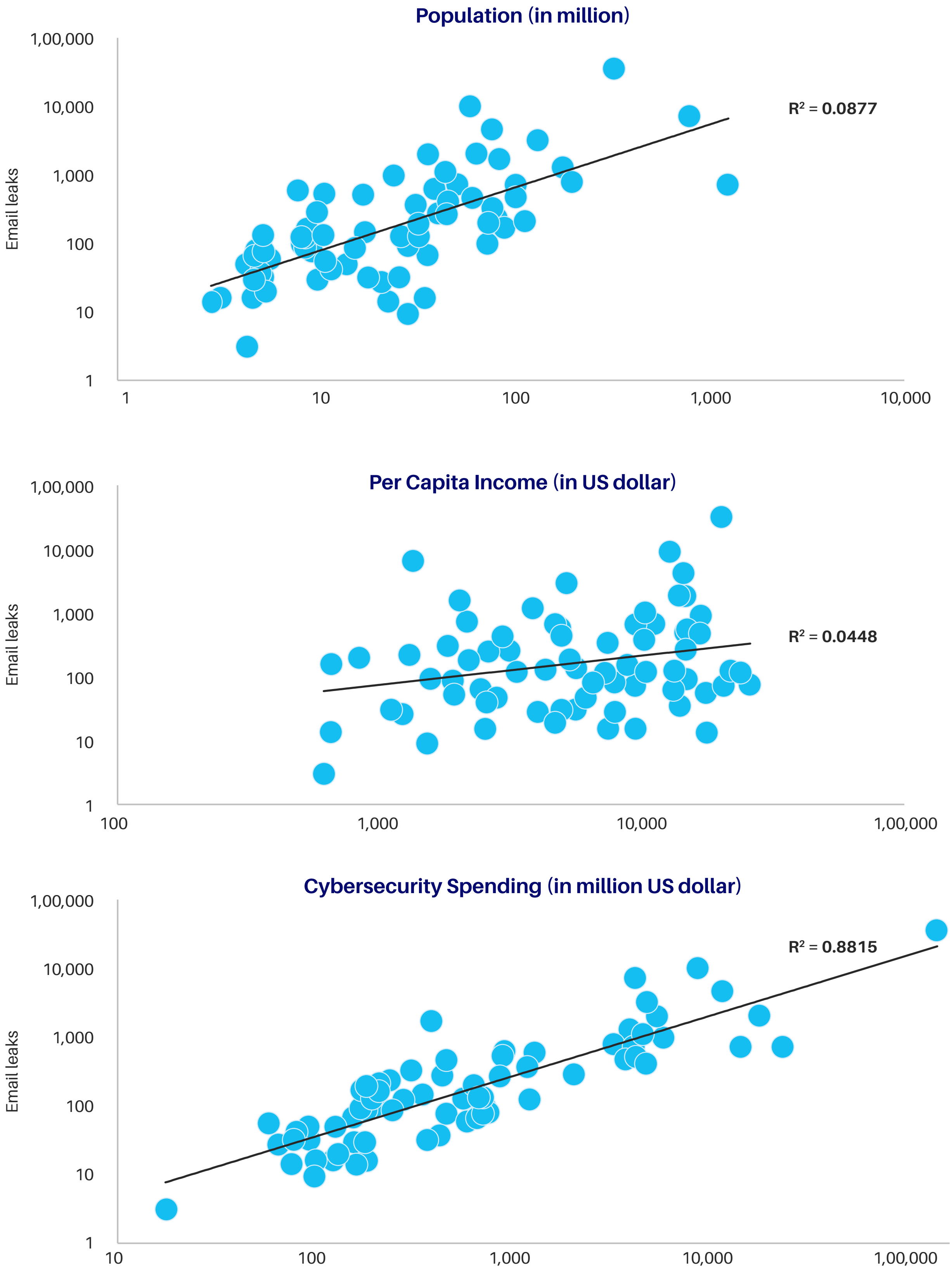


Source: IPCIDE Team

It appears that the focus on prevention does not come early enough in the digitalisation process. Among population, per capita income and overall digital spending, the strongest correlation with email leaks is with cybersecurity spending (see Figure 20). This suggests that countries tend to invest more in protection only after their digital economies become larger and more vulnerable.[23] The logic is straightforward. More digitalisation creates more value, but it also creates more targets. Cybersecurity spending, therefore, is becoming an unavoidable cost of digital deepening. Countries expanding digital activity, therefore, should consider investing in protection early, before cyber risks proliferate and the cost of responding to them becomes much higher.

[23] If prevention were the dominant strategy, one would expect a negative relationship between the two.

Figure 20 Countries that Expand more Digital Crime also Invest more on Cyber Protection



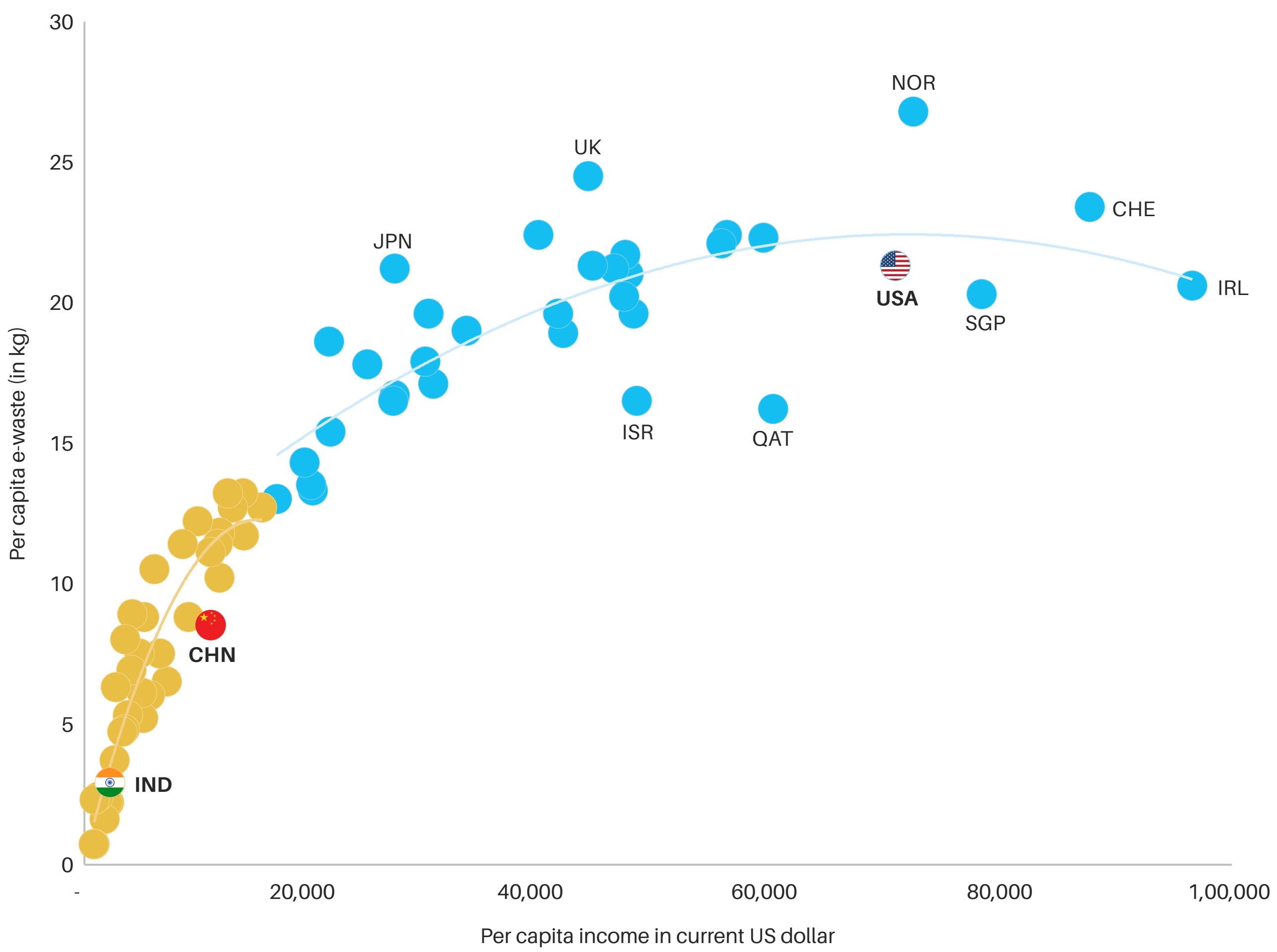
Source: IPCIDE Team

Developing countries are realising that rapid digitalisation must be accompanied by adequate investment to prevent cybercrime. Their digital use is expanding rapidly, but cybersecurity markets remain relatively small, widening the protection gap. India illustrates this challenge. It is already among the larger cybersecurity markets, yet its spending remains modest relative to the size of its digital economy and user base. This points to the need for stronger investment in cyber protection, greater emphasis on basic cyber hygiene, more secure digital public infrastructure, better incident reporting and faster threat sharing. The broader lesson is clear: countries that expand digital services must also build the systems needed to protect them.

Digitalisation and Sustainability

In our sample, digitally advanced countries, most of them high-income economies, also tend to face greater sustainability costs. As Figure 21 shows, e-waste per person rises with income, though the relationship flattens at very high-income levels. Poorer countries generate very little e-waste per person. India is near the bottom, at around 2.9 kg per person. China is higher, but still below most advanced economies.

Figure 21 As Incomes Rise, e-waste Rises Sharply



Source: IPCIDE Team

This reflects lower levels of device ownership, slower replacement cycles and lower consumption of high-end electronics.

As incomes rise, e-waste rises sharply. Middle- and high-income countries consume more smartphones, laptops, appliances, smart devices and other electronic goods. They also replace them more frequently. This creates more electronic waste. Most advanced economies have much higher per capita e-waste. The United Kingdom, the United States, Switzerland, Norway, Singapore and Ireland all generate far more e-waste per person than India or China. Norway is the highest in the chart, at around 26.8 kg per person. However, the e-waste growth flattens after a point. At very high-income levels, per capita e-waste does not keep rising indefinitely. This may reflect better recycling systems, longer product lifespans, stronger regulation and more efficient consumption patterns. But the level still remains high. This suggests that income matters, but so do consumption habits, regulation, repair culture, recycling systems and measurement quality.

Developing countries do not have to follow the same environmentally damaging path that advanced economies took while digitalising. Their per capita e-waste is low today, but this will change as incomes rise and digital adoption expands. They should, therefore, build e-waste management systems early. India illustrates both the opportunity and the challenge. Its per capita e-waste remains low, but its total e-waste is already large because of its population size. India, therefore, faces a dual task: managing today's large aggregate volume of e-waste while preparing for much higher per capita e-waste in the future. Policy should focus on repair, reuse, recycling and safe disposal, as India has already begun to do. Producer responsibility rules should be strengthened. Informal recyclers should be integrated into formal systems. Critical minerals should be recovered from discarded electronics. Done well, this can reduce environmental damage while supporting future digital and clean-energy supply chains.

Part II

India's Digitalisation in a Comparative Perspective

04

India in the G20

An Emerging Digital Power with Significant Room to Grow

Digitalisation is not only widespread within the G20 but also more intensive relative to its demographic weight. While the G20 accounts for 70 percent of the global population, it consistently exceeds this share across most digital indicators—particularly in "harness" metrics such as social media use (83 percent), e-commerce (83 percent), and digital payments (84 percent) (see Table 2). Developed G20 countries are, on average, more digitally advanced than their developing counterparts, although the latter perform strongly in connectivity and usage—especially in social media (87 percent) and mobile subscriptions (81 percent). While basic connectivity is relatively evenly distributed between G20 and non-G20 countries, higher-order digital usage remains significantly more concentrated within the G20.

India stands out as a key contributor to this scale-driven digital ecosystem within the G20. It accounts for 31 percent of the G20 population, and roughly 22 percent of users across core connectivity indicators (internet, mobile, smartphones), reflecting its large digital base. However, its lower shares in e-commerce (15 percent) and digital payments (14 percent) suggest that there remains significant scope to deepen participation in more advanced digital applications. Against this backdrop, India's high share of AI users (26 percent) is particularly striking and holds significant promise – suggesting that India appears to be transitioning from a scale-driven digital economy to one with growing depth in the AI era.

Table 2 The G20's Digital Footprint Significantly Outpaces its Demographic Weight

Pillars	Indicators	G20 share in total (71 countries)	G20 Developing share in G20	Non-G20 share in total	India's share in G20
Connect	Internet users	**74%**	78%	26%	22%
	Mobile cellular subscribers	**70%**	81%	**30%**	22%
	Smartphone users	**75%**	76%	25%	22%
Harness	Users of social media for work	**83%**	**87%**	17%	23%
	Digital food delivery platform users	**82%**	78%	18%	18%
	Digital health application users	**76%**	63%	24%	19%
	E-commerce users	**83%**	74%	17%	15%
	Digital payments users	**84%**	74%	16%	14%
AI	AI users	**74%**	70%	26%	26%
Memo item	**Population**	**70%**	**82%**	**30%**	**31%**
	GDP per capita (in US$)	$31,830	$13,255	-	$ 2,695
	GDP share (in US$)	82%	39%	18%	4%

Note: Indicators with shares exceeding the population share are highlighted in red—these indicate areas where the group is more digitalised than its relevant comparator.

Source: IPCIDE Team

The G20's large digital footprint - far exceeding its economic footprint - comes not only from scale but also the high intensity of digital use. The G20 accounts for 82% of global GDP, but its share is even higher across most digital indicators: 90 percent of digital payment transactions, 93 percent of unicorn valuations, 91 percent of drone revenues, and 92% of all private investment in AI. This pattern indicates that digitalisation at the frontier—spanning AI, immersive technologies (AR/VR, metaverse), and advanced hardware—is heavily concentrated within the G20. Interestingly, digitally delivered services exports (61 percent) are somewhat more distributed, largely because the world's largest exporter (Ireland) is not a G20 country.

India's performance, when benchmarked against its economic weight, reveals a mixed but generally positive picture. It significantly outperforms its GDP share in areas such as digitally delivered services exports (11 percent) and DeFi revenues (18 percent), indicating emerging strengths in software-led and decentralised domains. Leveraging its highly acclaimed digital public infrastructure (DPI), India also performs broadly in line or slightly above its economic weight in digital payments (8 percent). However, India lags behind in more capital- and technology-intensive segments—such as robotics (2 percent), drones (1 percent), and AR/VR and metaverse revenues (2–3 percent), and accounts for only 1 percent of private investment in AI. Overall, India appears to be punching above its economic weight in select digital services and platforms, while remaining underrepresented in frontier, capital-intensive digital technologies.

Table 3 India Outperforms its Economic Weight in Several Digital Indicators

Pillars	Indicators	G20 share in total (71 countries)	G20 Developing share in G20	Non-G20 share in total	India's share in G20
Harness	Digital payment transactions	**90%**	**63%**	10%	**8%**
	Digitally delivered services (exports)	61%	23%	**39%**	**11%**
Innovate	Valuation of Unicorns	**93%**	21%	7%	**4%**
	Consumer IoT revenues	**88%**	**40%**	12%	3%
	AR/ VR revenues	**86%**	36%	14%	2%
	Metaverse revenue	**87%**	37%	13%	3%
	DeFi revenue	69%	**48%**	**31%**	**18%**
	Robotics revenue	78%	32%	**22%**	2%
	Drones revenue	**91%**	**46%**	9%	1%
	Private Investment in AI	**92%**	9%	8%	1%
Memo item:	**GDP (in US$)**	**82%**	**39%**	**18%**	**4%**
	GDP per capita (in US$)	$31,830	$13,255	-	$ 2,695
	Population	70%	82%	30%	31%

Note: Indicators with shares exceeding the GDP share are highlighted in red—these indicate areas where the group is more digitalised than its relevant comparator.

Source: IPCIDE Team

Greater digitalisation in the G20 has been accompanied by higher exposure to risks and externalities. The G20 accounts for a disproportionately large share of adverse digital indicators—82 percent of ransomware victims, 88 percent of email leaks, and 78 percent of e-waste generated—well above its 82 percent share of global GDP (see Table 4). Much of this reflects higher levels of prosperity in several G20 economies, which make them attractive targets for hackers and fraudsters. Within the G20, developing countries contribute significantly to e-waste (60 percent), though this remains well below their demographic share (82 percent). India appears to be relatively insulated from these risks, accounting for 3 percent of ransomware victims, 10 percent of email leaks, and 9 percent of e-waste within the G20 – significantly below its 31 percent population share. This suggests that while India is not yet a major contributor to global digital risks, these pressures are likely to rise alongside its expanding digital ecosystem.

Table 4 India's Digital Risks Remain Contained Relative to the G20

Pillars	Indicators	G20 share in total (71 countries)	G20 Developing share in G20	Non-G20 share in total	India's share in G20
Protect	Ransomware victims	**82%**	11%	18%	3%
	Email leaks	**88%**	21%	12%	10%
Sustain	E-waste generated	**78%**	60%	22%	9%
Memo item:	**Population**	**70%**	**82%**	**30%**	**31%**
	GDP per capita (in US$)	$31,830	$13,255	-	$ 2,695
	GDP (in US$)	82%	39%	18%	4%

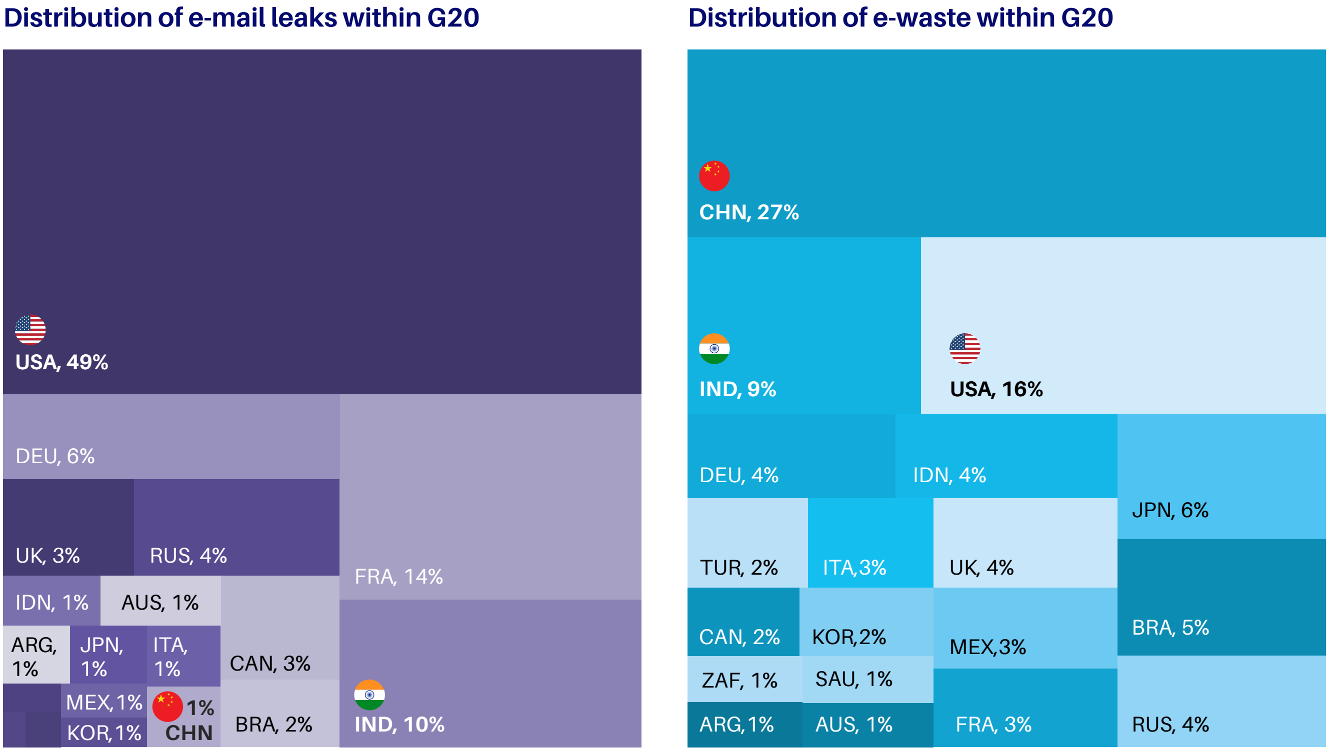
Note: Indicators with shares exceeding the population share are highlighted in red—these indicate areas where the group is more digitalised than its relevant comparator.

Source: IPCIDE Team

Digital risks within the G20 are highly concentrated, with a few countries accounting for a disproportionate share of global exposure. In the case of email leaks, the concentration is particularly stark: the United States alone accounts for nearly half (49 percent), followed by France (14 percent) and India (10 percent). Despite being the most connected G20 country, China accounts for only 1 percent of email leaks, likely reflecting a mix of measurement issues, institutional differences, and user behaviour, rather than inherently lower cyber risk.[24] A similar, though slightly more distributed, pattern emerges for e-waste. China leads with 27 percent, followed by the United States (16 percent) and India (9 percent), with several other G20 countries contributing moderate shares. Unlike email leaks, e-waste is more closely linked to scale—population size, consumption, and manufacturing—resulting in a broader distribution across countries.

[24] Chinese users and firms rely more on integrated "super-apps" rather than email for communication, resulting in a smaller attack surface for email-related breaches. Also, reporting on cyber breaches are perhaps more controlled or less transparent in China, which can lead to underreporting. China's more centralised digital infrastructure and tighter control over platforms may reduce certain types of vulnerabilities (especially large-scale leaks from fragmented systems), even if risks exist in other forms.

Figure 22 Risks are Concentrated in G20 Countries that are also its most Digitalised



Source: IPCIDE Team

Digital Ranking of G20 Countries

Within G20, there is a clear digital hierarchy, with the US firmly leading and China close behind. The United States dominates across pillars, ranking first overall and leading in harness, innovation, and protection, despite not being the top performer in connectivity. China holds a strong second position, with consistently high rankings across connect, harness, and innovate, though it lags significantly in protection and sustainability. The United Kingdom rounds out the top three, followed by India in fourth place, ahead of several advanced European economies—an outcome that underscores India's strong overall digital performance.

A key pattern is the divergence across pillars, even among top performers. Countries like France and Germany rank highly overall but show weaknesses in specific areas—particularly protection and connectivity. Similarly, Japan and Canada perform strongly in some pillars but lag in others, highlighting the uneven nature of digitalisation. The protect and sustain pillar emerges as the weakest link globally, with even advanced economies showing relatively poor rankings, suggesting that governance, security, and sustainability frameworks are lagging behind adoption and innovation.

India stands out as a high-performing emerging economy with a distinctive profile. It ranks fourth overall, driven by exceptional performance in harness (3rd) and innovate (6th), indicating strong adoption and growing innovation capabilities. However, it lags in connect (11th) and especially in protect and sustain (32nd), pointing to gaps in infrastructure depth and regulatory frameworks. Overall, India's position reflects a model of digitalisation led by usage and innovation rather than universal access or strong safeguard systems, distinguishing it from both advanced economies and its emerging market peers.

Table 5 Global Digitalisation Rankings: US Leads, China, India, and Brazil Among the Top 20

Country	CHIPS (Combined)		Pillar ranking (full sample)			
	G20 ranking	Full Sample ranking	Connect	Harness	Innovate	Protect + Sustain
USA	1	1	3	1	1	1
CHN	2	2	1	2	2	12
UK	3	4	6	4	5	5
IND	4	5	11	3	6	32
FRA	5	7	5	13	8	69
DEU	6	8	26	11	4	50
KOR	7	9	9	8	14	27
CAN	8	10	15	12	10	55
JPN	9	11	10	7	11	68
BRA	10	16	8	22	31	22
AUS	11	18	30	18	13	47
SAU	12	29	34	23	21	70
IDN	13	35	50	33	27	11
ITA	14	37	43	29	26	58
RUS	15	40	38	41	29	61
MEX	16	44	47	31	39	54
TUR	17	48	48	46	43	29
ARG	18	49	53	48	37	17
ZAF	19	58	52	61	46	57

Source: IPCIDE Team

05

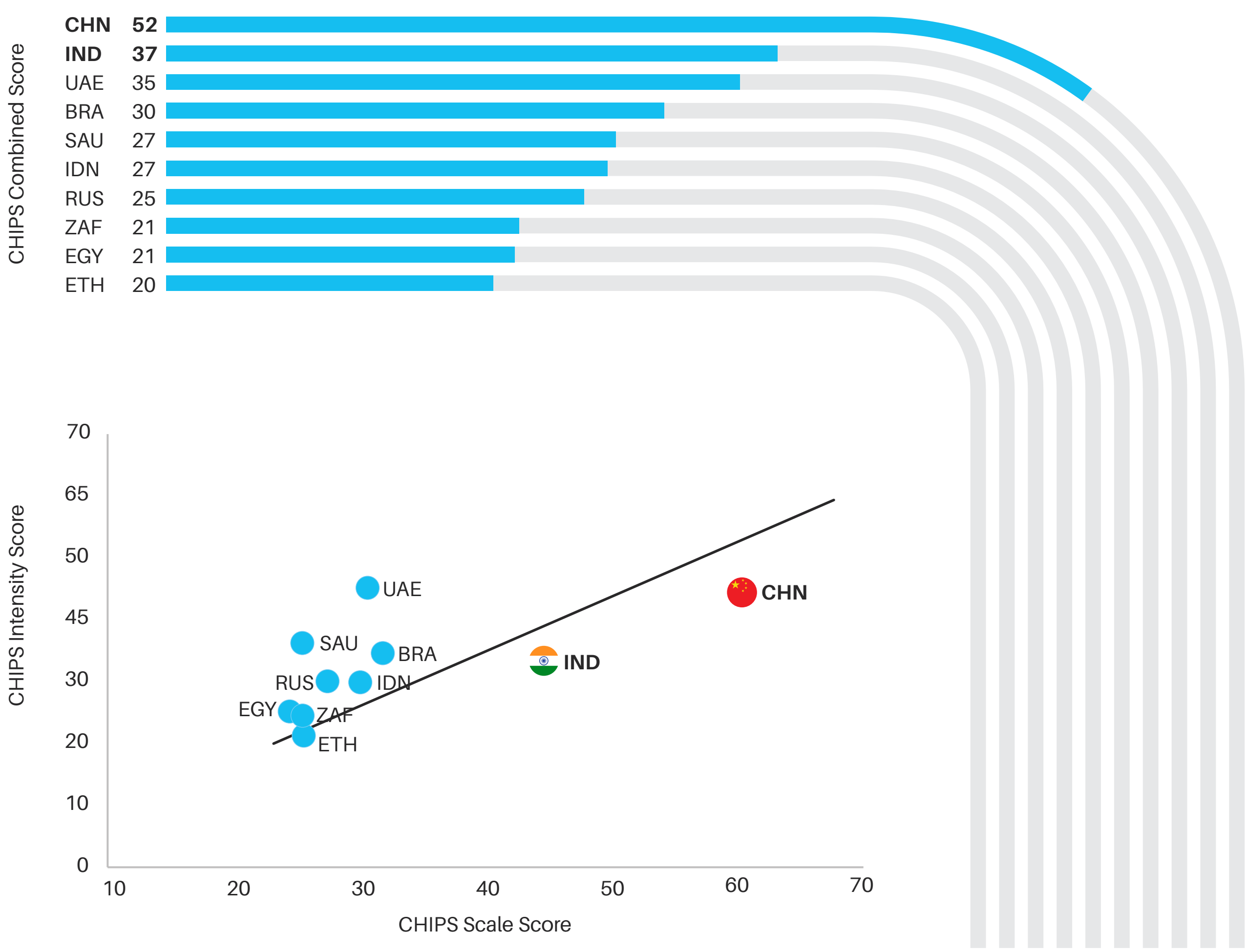
India and BRICS

Competing with Emerging Giants[25]

[25] The BRICS consists of 11 major emerging economies (Brazil, China, Egypt, Ethiopia, India, Indonesia, Iran, Russia, Saudi Arabia, South Africa and United Arab Emirates) aiming to strengthen economic, political and social cooperation, and the influence of the global south in international governance. The 2025 declaration reaffirmed BRICS' commitment to comprehensive UN reform, multilateral trade reform, and inclusive governance and the 2026 summit hosted in India has identified four areas of focus: resilience, innovation, cooperation and sustainability.

Expectedly, India and China, due to their scale, are significant drivers of overall digitalisation in the BRICS (including the set of five new countries added recently). As discussed in Part I of the report, China has the highest CHIPS-Scale score across all pillars, followed by India with the second highest across all pillars. However, UAE leads in terms of the intensity, followed by China, Saudi Arabia, Brazil and then India. (See Figure 23 for the ranking of countries in the BRICS bloc and the sharp divergences for a few countries, benefitting from Scale (India and China) and Intensity (UAE and Saudi Arabia)).

Figure 23 Scale and Intensity of Digitalisation within the BRICS



Note: The diagonal line spans the minimum value of both indices and the maximum value of both indices, thus indicating the points at which the relative position of the intensity value is equivalent to relative position of the scale value.

The BRICS countries represent 57% of the population of the countries in the full sample, reiterating its crucial role in determining outcomes for a large portion of the global population.[26] While the BRICS countries access digital technologies at a similar rate to the rest of the world, their use of social media and applications like digital food delivery platforms is much higher (Table 6). The use of digital health applications and AI, however, appear to be lagging.

26 The sample is made up of all BRICS countries except Iran.

India's contribution to the BRICS in terms of internet users or smartphones is much lower than its contribution in terms of population. Those connected are also less likely to use applications such as food delivery, e-commerce and digital payments. The gap is lower for the use of digital health applications partly due to the India's reliance on DPIs with public access pathways, particularly during the COVID-19 pandemic (Das & Khan, 2026). While DPIs have been part of the BRICS agenda and joint initiatives for some time now, deeper collaboration on finetuning these systems that are now at a more advanced stage could catalyse their potential impacts on various sustainable development goals (Pigatto et al., 2025; Chadha & Jaiswal, 2026).

Table 6 BRICS Country Residents are more likely to use Social Media and Food Delivery Platforms

Pillars	Indicators	BRICS share in total (11 countries)	Non-BRICS share in total	India's share in BRICS
Connect	Internet users	56%	**44%**	29%
	Mobile cellular subscribers	56%	**44%**	27%
	Smartphone users	55%	**45%**	30%
Harness	Users of social media for work	**69%**	31%	27%
	Digital food delivery platform users	**61%**	39%	24%
	Digital health application users	45%	**55%**	31%
	E-commerce users	**58%**	42%	21%
	Digital payments users	**59%**	41%	20%
AI	AI users	51%	**49%**	38%
Memo item	**Population**	**57%**	**43%**	**38%**
	GDP per capita (in US$)	$14,334	-	$ 2,695
	GDP share (in US$)	29%	71%	13%

Note: Indicators with shares exceeding the population share are highlighted in red—these indicate areas where the group is more digitalised than its relevant comparator. For Ethiopia, the missing value for use of social media was calculated using the average percentage for BRICS (42.34%) and multiplied with Ethiopia's number of internet users.

Source: IPCIDE Team

Challenging the Global Payment System through Greater BRICS Cooperation

Although the BRICS countries constitute 29% of GDP of the full sample, they contribute 56% of the value of digital payment transactions (Table 7). Having such a high share of activity and users of digital payments within the bloc presents an opportunity to challenge existing global systems and leverage the countries' emerging digital financial networks to process transactions and foster trade. The BRICS Pay, is a planned decentralised and independent payment system for BRICS nations, with the goal of building a fair and polycentric financial ecosystem that promotes stronger business ties and integration within the bloc by reducing transaction costs and enabling inclusion (Freidin, 2024; BRICS, 2026). Given the re-emergence of trade wars and global instability, one of the goals is also to promote sovereignty and reduce dependence on the US dollar and institutions influenced by it, such as SWIFT (Barbosa, 2020; Lyu, 2026).

While the system is currently set to be linked through credit or debit cards, further integration with the BRICS countries' DPI and DPI-like payment systems (such as India's UPI, Brazil's Pix, Russia's FPS, Indonesia's BI-FAST, UAE's Aani and South Africa's PayShap) will help leverage their widespread proliferation to strengthen e-commerce and trade between the countries, and the inclusion of smaller businesses in global value chains.

Collaboration between countries to strengthen their own digital payments and financial systems can also prove impactful. Ethiopia recently launched EthioPay-IPS, the national instant payment system in early 2026. It has been collaborating with and drawing on some of India's learnings and successful initiatives like establishing a development fund to help spur deployment of low-cost acceptance devices in smaller towns and rural areas, and developing a digital payments index to help track key metrics and understand the relationship between infrastructure development, consumer adoption, and market health.

Strong financial networks can help countries within the bloc expand access to other aspects of the digital economy and augment the use of new technologies. While India has been leading on the export of digitally delivered services and use of DPIs to improve access to public services, most indicators relating to the adoption of emerging technologies are low across countries in the bloc.

Table 7 **The BRICS' Opportunity to Leverage its Strong Digital Financial Networks and Strengthen Digital Delivered Services**

Pillars	Indicators	BRICS share in total (11 countries)	Non-BRICS share in total	India's share in BRICS
Harness	Digital payment transactions	**56%**	44%	13%
	Digitally delivered services (exports)	14%	**86%**	**48%**
Innovate	Consumer IoT revenues	**33%**	67%	8%
	AR/ VR revenues	**29%**	**71%**	7%
	Metaverse revenue	**30%**	70%	10%
	Robotics revenue	24%	**76%**	5%
	Drones revenue	**40%**	60%	2%
Memo item:	**GDP (in US$)**	**29%**	**71%**	**13%**
	GDP per capita (in US$)	$14,334	-	$ 2,695
	Population	57%	43%	38%

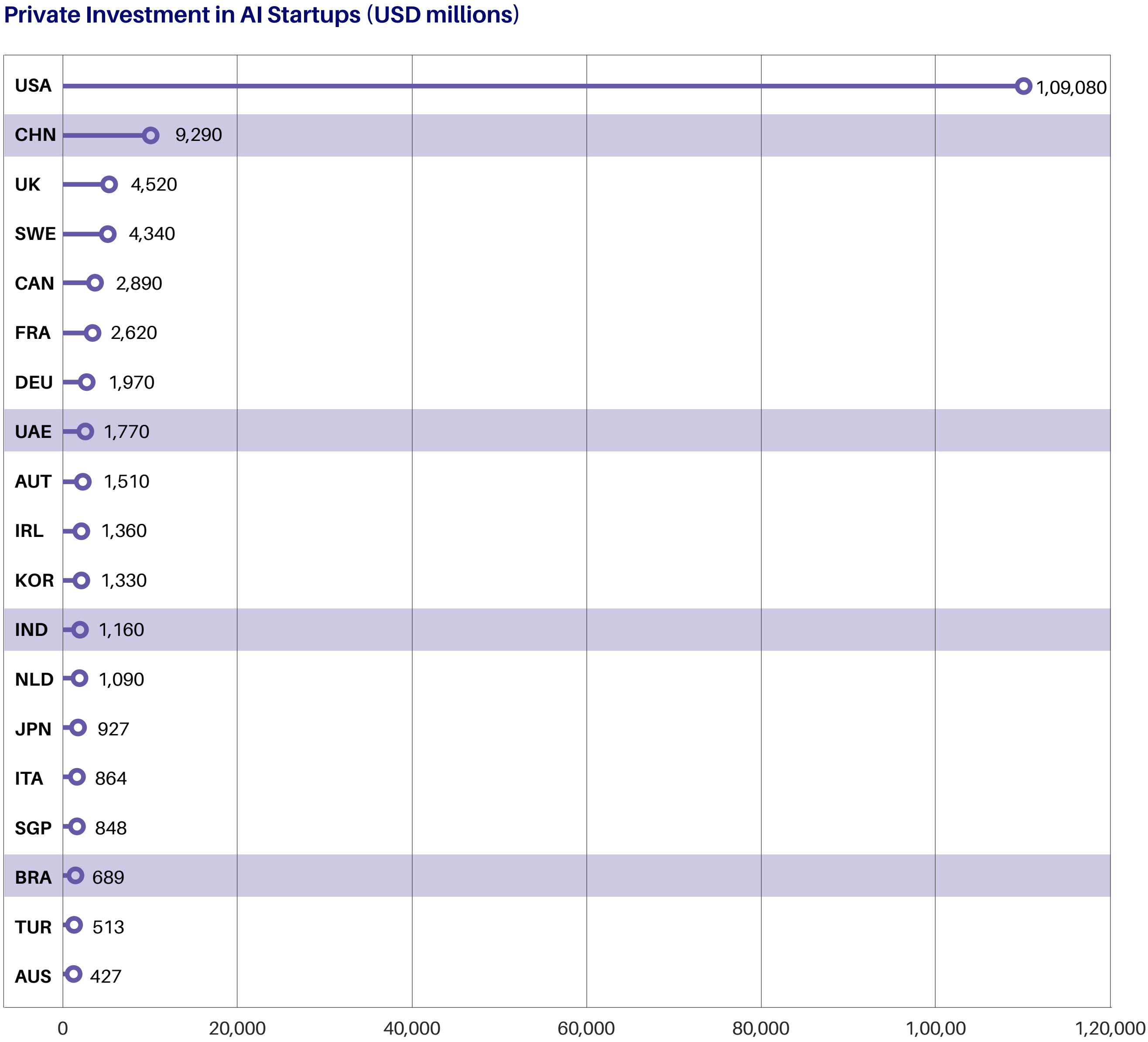
Note: Indicators with shares exceeding the GDP share are highlighted in red—these indicate areas where the group is more digitalised than its relevant comparator. For AR/VR revenues and Metaverse revenues, missing values for Ethiopia were extrapolated using the BRICS average revenue per smartphone user multiplied by number of smartphone users.

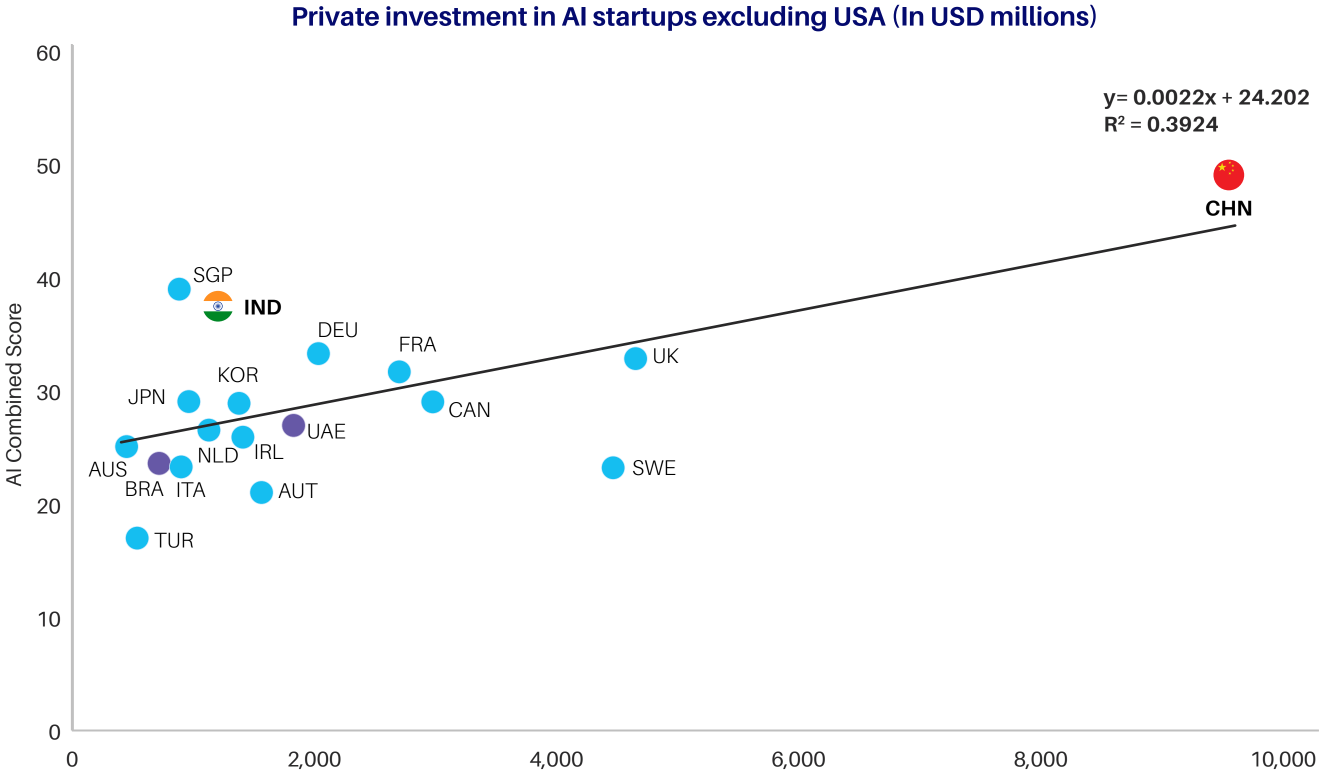
Source: IPCIDE Team

Strengthening Cooperation on AI

The AI-based global transformation is also an opportunity for both India and the BRICS to boost their role in the digital economy. According to a recent report, the four foundational Cs, driving the adoption of AI are Connectivity – reliable digital infrastructure, Compute – AI chips, data centres, etc, Context – availability of locally relevant content and data and Competency – availability of robust digital skills (World Bank, 2025). BRICS countries have seen large public investments, particularly in compute capacity, skilling, research, cybersecurity and sectoral applications such as health, education and governance (MeitY, 2026; Beraja et al., 2024; UNCTAD, 2024; CSET. 2021). There is, however, significant scope to boost private investment (see Figure 24). Of the BRICS countries, China has the highest private investment in AI startups.

Figure 24 Private Investment in AI Startups



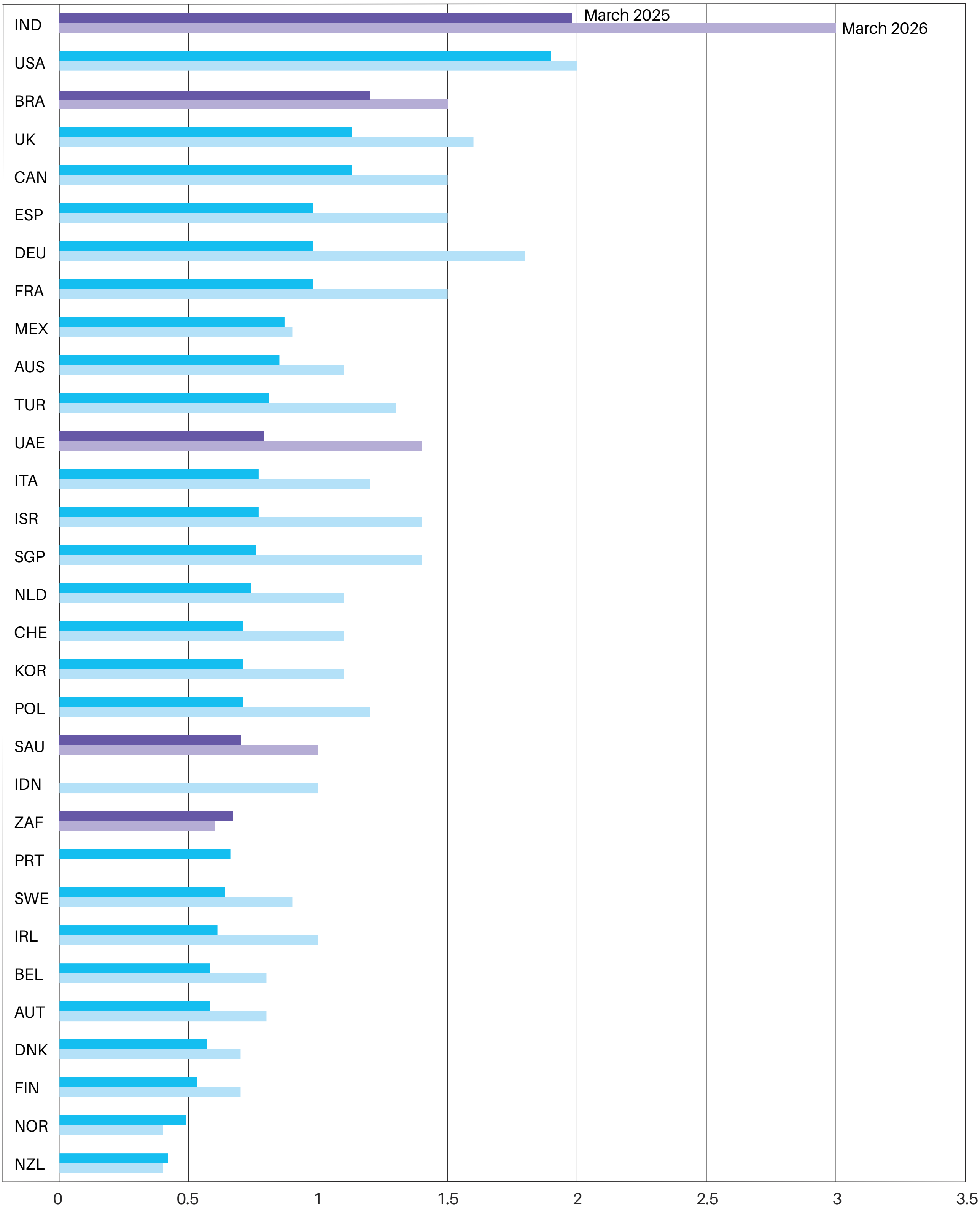


Note: Total AI Private Investment measures the total amount of private investment received for AI startups (in nominal USD). The bottom panel is plotted without values for U.S., an outlier in private investments in AI startups. Source: AI Vibrancy Index, originally from Quid, 2024. Data last updated in March 2025.

However, it is about 11 times smaller than that of the US. The UAE is the second highest in the bloc, and India is third highest. Private investments are essential to boost the start-up economy and drive the wider diffusion of the technology among economic agents. The combined AI score is positively correlated with private investment in AI startups, reiterating the strong linkage in private investments driving the successful scaling of AI in a country.

The BRICS countries have relatively high penetration of AI skills (Figure 25). India is leading and Brazil is in the top five for relative AI skills penetration measured across occupations based on Linkedin data. India's lead seems to be increasing, while Brazil maintains its relative position, and UAE which was in the top ten improves its relative position. While skilling for AI intense roles is high in BRICS countries, continued and dynamic skilling is necessary to keep up with the evolving market. The workforce also needs to be upskilled in the broader use of AI in roles beyond just AI production, such as specialised roles within other sectors that can benefit from the integration of AI. For example, it is estimated that Brazil will need to upskill or reskill over 14 million workers between 2025 and 2027 to meet demands (ANI, 2024). The World Economic Forum's Future of Jobs Report 2025 estimated that over 60% of the Indian workforce with need to upskill by 2030 (WEF, 2025). There is a need for greater strategic coordination in the rollout of training programs and modification of existing higher education curriculum to keep up with the rapidly evolving AI landscape. This will require identifying skills and sectoral applications of skills that are in demand, but lacking in the countries' labour markets. For example, cybersecurity within AI ecosystems, is one area that requires greater skilling in most BRICS countries. Collaborations between technical and vocational education institutions, governments and businesses are important to ensure this. A recent BRICS white paper proposed frameworks

Figure 25 Relative AI Skills Penetration



Note: Relative AI Skill Penetration measures the intensity of AI skills by identifying the top 50 representative skills amongst LinkedIn members (2015-2024 or 2015-2025) and calculating the proportion of AI skills among these top skills. A ratio is then constructed between a country's AI skills penetration and the benchmark (e.g., global average), controlling for occupations. A relative AI skills penetration of 1.5 indicates that AI skills are 1.5 times more frequent than in the benchmark for similar occupations. Data as of March 2025 and March 2026, and was missing for China, Ethiopia, Russia and Egypt.

Source: Linkedin data from Stanford Global AI Vibrancy Tool and from OECD.ai.

to leverage the bloc's complementary strengths such as shared staffing initiatives, unified credential recognition, and cross-border remote employment platforms (BRICS, 2025). There is also an urgent need for better AI awareness and literacy amongst the general population, not just as users of the technology but as consumers of content produced using AI.

Finally, the BRICS also has an important role to play in shaping global AI governance. In 2025, the bloc released a "Statement on Global Governance of Artificial Intelligence, calling for inclusive, responsible, human-centric AI regulation" recognising it as an opportunity to boost more equitable development, foster innovation and advance sustainability. Haryono (2024) identifies the need for BRICS countries to boost investment and bridge disparities in legal and regulatory frameworks particularly in intellectual property rights, data governance, digital infrastructure and cybersecurity. Pantserev (2025) highlights the need for establishing common standards and regulatory frameworks within the BRICS, and conducting comprehensive large-scale joint scientific research in order to promote resilience and sustained innovation. The bloc's ability to shape AI governance is not only important in determining the trajectory of how AI is developed and used globally, but also the position of global south countries and the distribution of gains from AI.

06

India and EU

A Partnership of Complementary Strengths

The India–EU digital partnership is powerful precisely because it brings together two very different digital models. India brings scale, a large talent base, greater reliance on digital public infrastructure, and rapid adoption. The EU brings universal connectivity, regulatory capacity, institutional depth, privacy protections, and standards-setting power. On their own, each faces clear limitations. India still needs to achieve universal connectivity and stronger safeguards around trust, privacy, and accountability. The EU, despite its regulatory leadership, has struggled to achieve population-level scale and become a hotbed of digital innovation.

Together, however, India and the EU could help shape a third path for digitalisation. This path would be more democratic and rights-based than China's state-led model, and less dominated by Big Tech than the U.S. platform model. India's DPI experience offers lessons in building digital systems at population scale. The EU's regulatory experience offers lessons in embedding trust, safety, and accountability into digital markets. Both also have a shared interest in reducing dependence on U.S. and Chinese technology ecosystems.

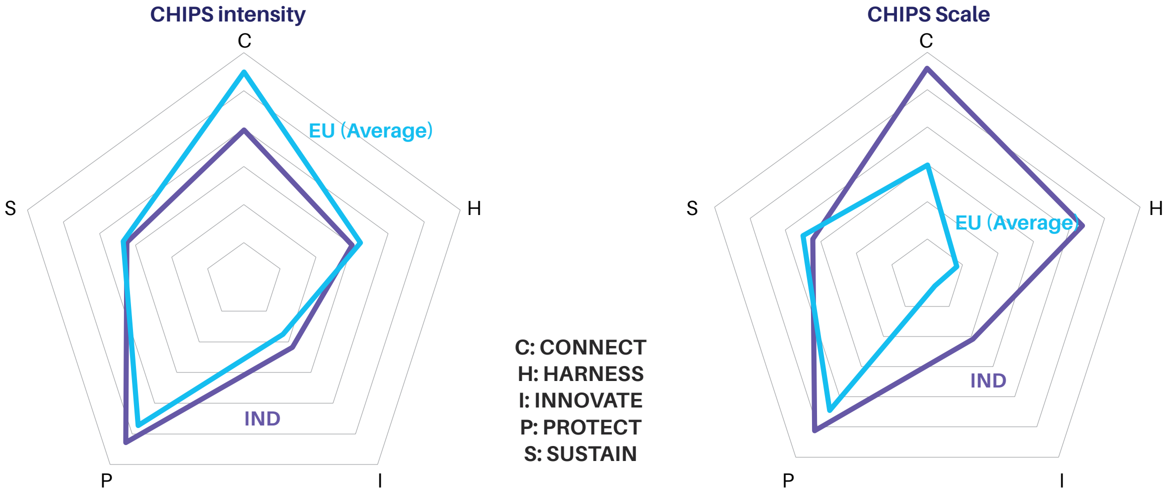
While their partnership has become more institutionalised through the India–EU Trade and Technology Council, the promise remains only modestly realised. Differences over data governance, cross-border data flows, platform regulation, market access, and standards continue to create friction. The partnership has strong strategic logic, but it now needs concrete programs, institutional mechanisms, and commercial partnerships to convert convergence into impact. In this chapter, we explore areas of common interest and the scope for partnership between India and the EU in the current global digital ecosystem.

Scale Meets Intensity

Given their different economic, political, and technological backgrounds, it is not surprising that India and the EU represent two distinct models of digital development. On CHIPS-Scale, India performs strongly, reflecting the sheer size of its digital ecosystem—large numbers of users, transactions, platforms, and adoption of digital public infrastructure. EU countries, by contrast, perform better on CHIPS-Intensity, which measures the depth and quality of digitalisation for the average user. Their stronger performance reflects higher broadband penetration, better infrastructure quality, and greater convergence on connectivity between and within countries. This is supported by policy frameworks such as the EU's Convergence Policy, which seeks to reduce regional disparities and promote more balanced connectivity outcomes across member states—offering important policy lessons for addressing persistent digital disparities across Indian states.[27]

[27] Digitalisation in India has expanded rapidly, but it remains uneven across states and social groups. As we show in the "State of India's Digital Economy: A Subnational Perspective (2025)" (https://icrier.org/pdf/ISIDE_A-Subnational-Perspective_2025.pdf) report, digital access is concentrated in more advanced states such as Delhi, Kerala, Maharashtra and Haryana, while several aspirational states continue to lag behind. Programmes such as BharatNet have expanded middle-mile fibre connectivity, but last-mile access, device affordability, and digital inclusion remain continuing challenges (https://icrier.org/pdf/pb-BharatNet.pdf).

Figure 26 India Brings Scale, Europe has Depth

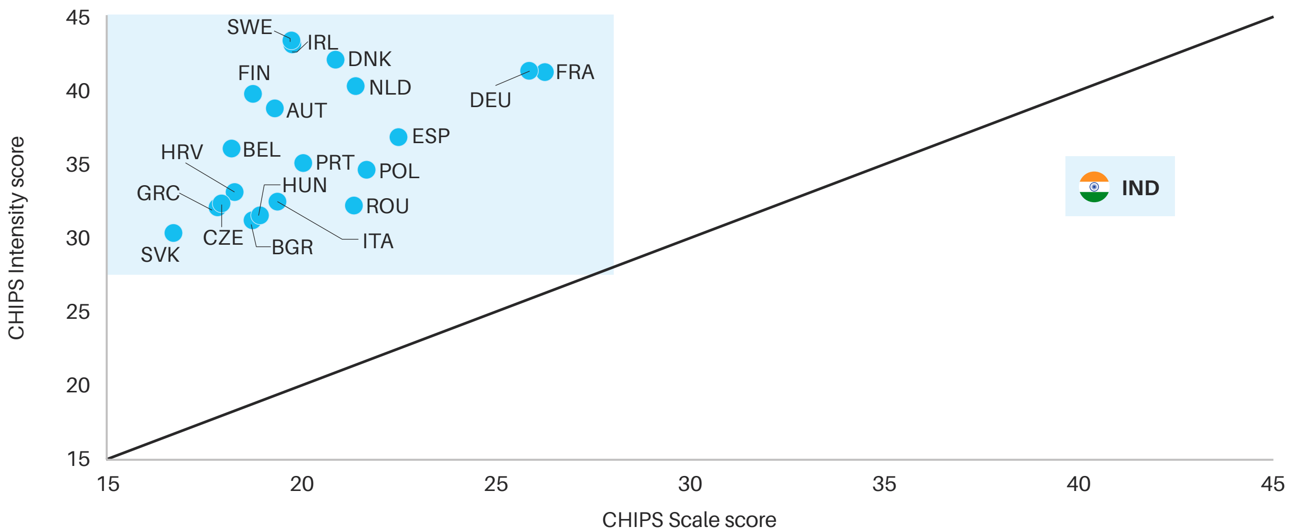


Note: The comparison here is between the average EU country and India. If the EU is treated as a single entity, with numbers cumulated across member states, the picture would change considerably, with the EU far exceeding India on both scale and intensity.

Source: IPCIDE Team

The complementarity is clearer at the country level. As Figure 27 shows, EU economies cluster in the upper-left corner: they have smaller scale but much higher intensity. Countries such as Sweden, Ireland, Denmark, Germany, France, the Netherlands, and Austria demonstrate considerable digital depth. India lies at the opposite end, with far greater digital scale than any EU economy, driven by its large population, vast user base, and rapid diffusion of platforms and digital public infrastructure. However, its lower intensity suggests that the depth and quality of digitalisation for the average user remain weaker than in most EU countries. This contrast creates strong scope for mutual learning: India offers lessons in population-scale digital systems, while the EU offers lessons in deepening access, quality, trust, and usage.

Figure 27 India's Digital Model is Scale-driven, while the EU's is Intensity-driven



Source: IPCIDE Team

Two Pathways to Digital Harnessing

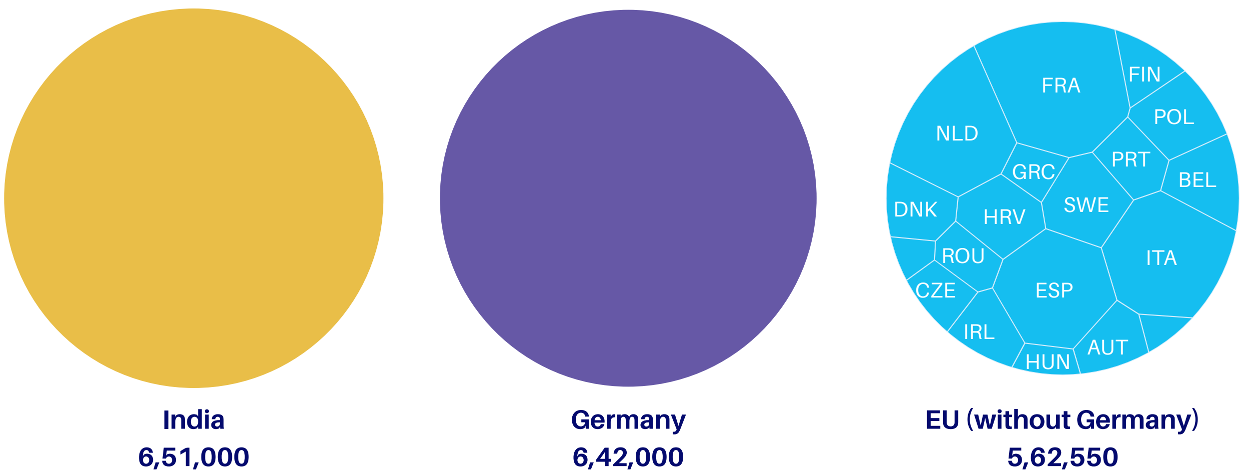
India and the EU have also taken two contrasting paths to harnessing digital technologies: India's advantage lies in breadth, while Europe's lies in depth. India ranks third globally on the Harness pillar, largely because even moderate levels of adoption translate into very large numbers when applied to its population. With nearly 16 percent of the world's internet users, India generates an exceptionally large digital user base and high transaction volumes. This scale advantage is reinforced by several factors: a young and growing population, expanding mobile internet access, the rapid deployment of digital public infrastructure such as Aadhaar, UPI, and DigiLocker, and a mature IT services sector. Together, these strengths have also helped India become the world's fourth-largest exporter of digitally delivered services.

EU economies have followed a different approach. Individually, they are much smaller in scale, but they show greater depth of digital adoption. A higher share of internet users engages in digital payments, and ICT employment is more deeply embedded across the economy. Their strength lies less in the number of users and more in the quality, maturity, and integration of digital use. This reflects higher levels of digital literacy, deeper digital integration, vibrant ecosystems, and more intensive use by firms and individuals.

Scale and Depth of Innovation

India and the EU have large but structurally different startup ecosystems. India hosts about 6,51,000 startups, slightly more than Germany's 6,42,000 and the combined startup base of the rest of the EU excluding Germany, which stands at around 5,62,550 (Figure 28). This points to the sheer scale of India's entrepreneurial ecosystem. The EU, by contrast, does not have an integrated startup ecosystem of similar scale outside Germany. This fragmentation is a weakness as startups often face different regulations, markets, financing systems, and business cultures across member states, limiting the speed at which they can scale. India's startup ecosystem benefits from a large domestic market and population-scale digital public infrastructure such as Aadhaar, UPI, and DigiLocker, which may hold interesting policy lessons for EU countries.

Figure 28 India has more Startups than all EU Countries Combined Excluding Germany



Source: IPCIDE Team

The EU's innovation strength lies less in startup scale and more in industrial depth and export competitiveness. Although accounting for roughly 18 percent of global GDP, the EU countries contribute approximately 38 percent of global digitally delivered services exports, significantly outperforming its economic weight. It also maintains strong positions in capital-intensive emerging technology sectors such as robotics (30 percent) and AR/VR (18 percent), reflecting advanced industrial ecosystems, deep enterprise capabilities, and sustained innovation investment (Table 8). This suggests that while India's innovation model is driven by entrepreneurial scale and ecosystem dynamism, the EU's advantage lies in higher-value digital production and industrial sophistication.

Table 8 Digital Economy Performance Relative to GDP Weight

Pillars	Indicators	EU's share	India's share
Harness	Digital payment transactions	9%	**7%**
	Digitally delivered services (exports)	**38%**	**7%**
	Value of digital payment transactions	9%	**7%**
Innovate	Valuation of unicorns	6%	**4%**
	Consumer IoT revenues	13%	3%
	AR/VR revenues	**18%**	2%
	DeFi revenues	17%	**12%**
	Robotics revenue	**30%**	1%
Memo Item	**GDP (in US$)**	**18%**	**4%**
	GDP per capita (US$)	$43,860	$2,695

Note: Red values indicate shares exceeding the group's GDP weight — areas of digital outperformance relative to economic size.

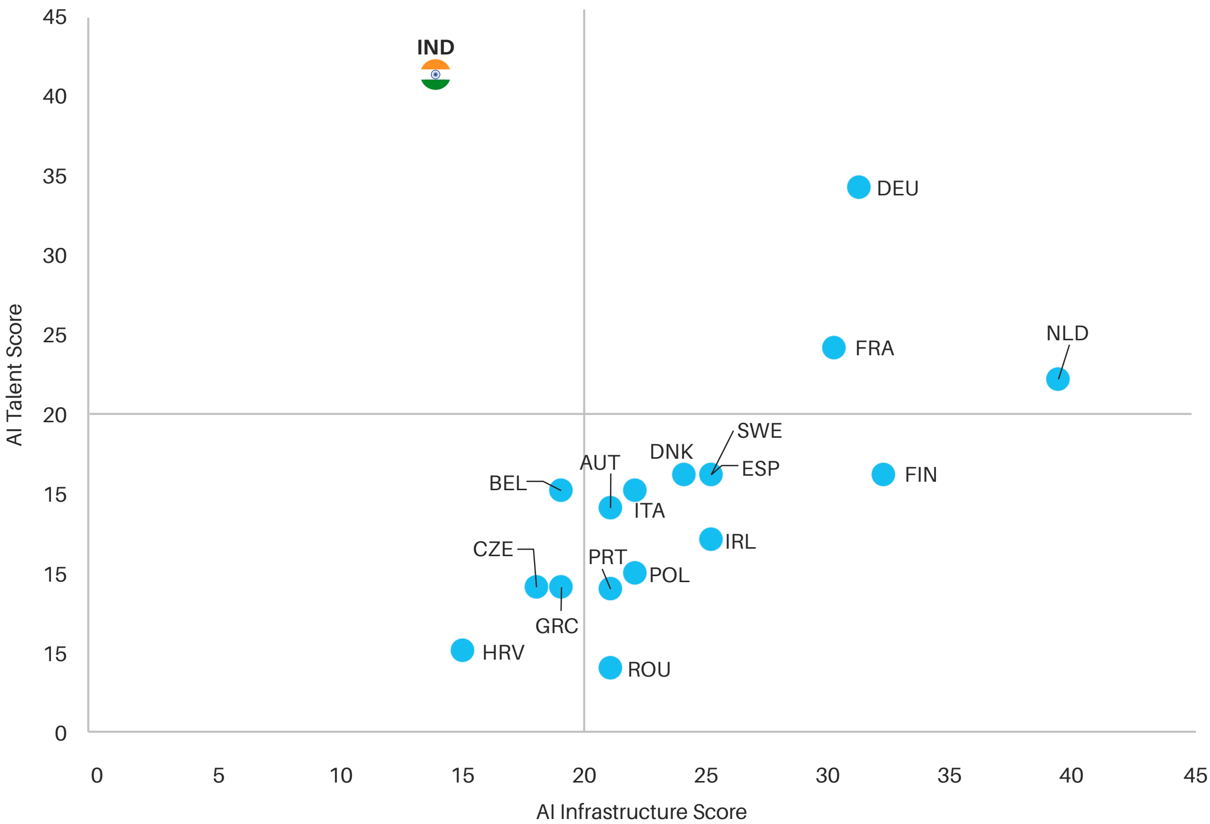
Source: IPCIDE Team

Two Strengths, One AI Frontier

The EU leads on AI infrastructure, while India performs more strongly on AI talent and workforce diffusion. As Figure 29 shows, EU economies generally outperform India on AI infrastructure, reflecting stronger research ecosystems, greater compute capacity, and higher institutional readiness for AI deployment. However, stronger infrastructure does not automatically translate into better AI outcomes in the absence of other complements. Several advanced European economies, for example, record lower AI talent scores than India despite higher levels of digital readiness, suggesting that conventional strengths in connectivity, e-government, and infrastructure do not necessarily ensure AI leadership.

India's relative strength lies in its vast pool of AI talent. In per capita terms, India records lower AI adoption among firms and the general population than the EU, suggesting weaker downstream diffusion. Yet the country stands out for its AI talent and relative skill penetration. Its higher AI skill intensity suggests that AI-related capabilities are more widely distributed across the workforce rather than narrowly concentrated in specialised segments. By contrast, while AI talent in Europe has more than doubled since 2016, it still accounts for only around 0.41 percent of total EU employment, with persistent AI literacy gaps and skill shortages across countries and sectors.[28]

Figure 29 Complementary AI Strengths in India and the EU



Source: IPCIDE Team

India and the EU bring complementary strengths to the AI value chain. The EU has stronger AI infrastructure, well-developed governance frameworks, and mature research ecosystems. India brings scale, a deep technical workforce, and large pools of cost-effective talent. Together, these strengths create significant scope for collaboration in AI skilling, compute access, responsible deployment, and applied innovation.

[28] European Commission, 2025 https://digital-strategy.ec.europa.eu/en/library/shaping-and-strengthening-european-ai-talent?utm_source

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Annexures

Annex 1: Global CHIPS Rankings

Table A1 Global Digitalisation Rankings— US Leads; China, India, and Brazil Among the Top 20

Overall Ranking			Pillar Ranking			
Country	Acronym	CHIPS	Connect	Harness	Innovate	Protect + Sustain
USA	USA	1	3	1	1	1
China	CHN	2	1	2	2	12
Singapore	SGP	3	4	6	3	52
United Kingdom	UK	4	6	4	5	5
India	IND	5	11	3	6	32
United Arab Emirates	UAE	6	2	16	25	62
France	FRA	7	5	13	8	69
Germany	DEU	8	26	11	4	50
Republic of Korea	KOR	9	9	8	14	27
Canada	CAN	10	15	12	10	55
Japan	JPN	11	10	7	11	68
Sweden	SWE	12	23	10	9	56
Denmark	DNK	13	16	14	17	30
Ireland	IRL	14	21	5	19	63
Netherlands	NLD	15	12	17	16	48
Brazil	BRA	16	8	22	31	22
Israel	ISR	17	13	24	12	64
Australia	AUS	18	30	18	13	47
Norway	NOR	19	28	15	17	45
Spain	ESP	20	14	20	28	37
Switzerland	CHE	21	17	21	7	71
Finland	FIN	22	29	9	20	66
Austria	AUT	23	31	28	15	41
New Zealand	NZL	24	20	42	36	12
Chile	CHL	25	21	25	35	36
Poland	POL	26	19	27	40	35

Overall Ranking			Pillar Ranking			
Country	Acronym	CHIPS	Connect	Harness	Innovate	Protect + Sustain
Qatar	QAT	27	7	45	24	67
Portugal	PRT	28	25	34	41	22
Saudi Arabia	SAU	29	34	23	21	70
Belgium	BEL	30	35	32	22	60
Kuwait	KWT	31	18	26	70	31
Malaysia	MYS	32	32	19	48	51
Viet Nam	VNM	33	23	50	38	21
Romania	ROU	34	27	39	51	20
Indonesia	IDN	35	50	33	27	11
Thailand	THA	36	32	37	54	18
Italy	ITA	37	43	29	26	58
Peru	PER	38	39	47	52	6
Croatia	HRV	39	36	34	31	59
Russian Federation	RUS	40	38	41	29	61
Hungary	HUN	41	37	43	42	49
Greece	GRC	42	45	38	33	44
Costa Rica	CRI	43	44	54	62	3
Mexico	MEX	44	47	31	39	54
Bulgaria	BGR	45	41	44	56	19
Czechia	CZE	46	46	39	34	46
Serbia	SRB	47	40	30	58	43
Türkiye	TUR	48	48	46	43	29
Argentina	ARG	49	53	48	37	17
Colombia	COL	50	42	52	46	28
Slovakia	SVK	51	49	36	44	65
Kazakhstan	KAZ	52	54	64	30	15
Philippines	PHL	53	55	49	53	26
Morocco	MOR	54	51	51	66	33
Nigeria	NGA	55	69	55	23	10
Ukraine	UKR	56	59	56	48	25
Kenya	KEN	57	68	62	63	2
South Africa	ZAF	58	52	61	46	57
Pakistan	PAK	59	63	66	50	14

Overall Ranking			Pillar Ranking			
Country	Acronym	CHIPS	Connect	Harness	Innovate	Protect + Sustain
Egypt	EGY	60	58	59	45	53
Ghana	GHA	61	57	57	67	34
Guatemala	GTM	62	66	67	54	7
Bangladesh	BGD	63	56	69	64	16
Uzbekistan	UZB	64	60	68	59	24
Dominican Republic	DOM	65	61	59	70	38
Ecuador	ECU	66	67	70	57	8
Ethiopia	ETH	67	71	53	61	4
Iraq	IRQ	68	65	65	59	40
Sri Lanka	LKA	68	64	63	65	42
Algeria	DZA	70	62	71	68	38
Rwanda	RWA	71	70	58	69	9

Source: IPCIDE Team

Annex 2: Global CHIPS Scores

Table A2 Global Digitalisation Scores— Five Asian Economies in the Top 10

Overall Ranking			Pillar Ranking			
Country	Acronym	CHIPS	Connect	Harness	Innovate	Protect + Sustain
USA	USA	64.4	61.2	56.9	82.2	57.3
China	CHN	51.6	68.1	52.0	40.5	45.8
Singapore	SGP	38.2	58.2	30.2	25.0	39.5
United Kingdom	UK	38.2	49.5	31.3	23.0	48.9
India	IND	36.9	47.6	36.8	21.3	42.1
United Arab Emirates	UAE	34.6	67.3	22.8	10.4	38.1
France	FRA	33.7	57.9	24.3	16.6	36.0
Germany	DEU	33.5	44.2	25.3	25.0	39.8
Republic of Korea	KOR	32.7	47.7	26.1	14.4	42.6
Canada	CAN	31.7	47.1	24.7	15.9	39.1
Japan	JPN	31.6	47.7	27.4	15.4	36.1
Sweden	SWE	31.5	44.9	25.7	16.5	39.0
Denmark	DNK	31.4	46.8	23.9	12.7	42.4
Ireland	IRL	31.4	45.0	30.5	12.6	37.5
Netherlands	NLD	30.8	47.5	22.4	13.5	39.9
Brazil	BRA	30.1	48.3	21.3	7.7	43.0
Israel	ISR	30.0	47.3	20.7	15.2	37.0
Australia	AUS	29.9	42.7	22.2	14.6	39.9
Norway	NOR	29.8	43.1	23.2	12.7	40.3
Spain	ESP	29.6	47.2	21.5	8.8	41.1
Switzerland	CHE	29.5	46.5	21.4	17.9	32.4
Finland	FIN	29.2	42.8	25.7	11.7	36.8
Austria	AUT	29.0	41.7	19.5	14.1	40.8
New Zealand	NZL	28.5	45.1	15.9	7.2	45.8
Chile	CHL	28.4	45.0	19.8	7.3	41.3
Poland	POL	28.1	45.4	19.6	6.1	41.5
Qatar	QAT	27.7	49.1	15.2	10.4	36.1
Portugal	PRT	27.5	44.6	16.6	6.0	43.0
Saudi Arabia	SAU	27.1	40.4	20.8	11.6	35.9
Belgium	BEL	27.1	40.1	18.4	11.5	38.5

Overall Ranking			Pillar Ranking			
Country	**Acronym**	**CHIPS**	**Connect**	**Harness**	**Innovate**	**Protect + Sustain**
Kuwait	KWT	27.1	46.4	19.6	0.1	42.3
Malaysia	MYS	26.9	41.3	22.0	4.5	39.7
Viet Nam	VNM	26.8	44.9	12.6	6.7	43.1
Romania	ROU	26.8	43.7	16.0	4.2	43.2
Indonesia	IDN	26.7	34.7	16.8	9.3	45.9
Thailand	THA	26.5	41.3	16.5	4.0	44.2
Italy	ITA	25.9	36.6	18.8	9.7	38.6
Peru	PER	25.8	37.9	14.0	4.1	47.2
Croatia	HRV	25.7	39.9	16.6	7.7	38.5
Russian Federation	RUS	25.2	38.3	15.9	8.3	38.4
Hungary	HUN	25.2	39.8	15.4	5.9	39.8
Greece	GRC	25.1	36.3	16.4	7.5	40.4
Costa Rica	CRI	25.1	36.5	10.9	2.2	50.8
Mexico	MEX	25.0	35.9	18.5	6.2	39.3
Bulgaria	BGR	25.0	37.4	15.3	3.8	43.4
Czechia	CZE	24.9	36.2	16.0	7.4	40.2
Serbia	SRB	24.8	37.7	18.6	2.4	40.6
Türkiye	TUR	24.6	35.7	14.6	5.5	42.4
Argentina	ARG	24.2	32.0	13.9	6.7	44.3
Colombia	COL	23.9	36.8	11.8	4.6	42.5
Slovakia	SVK	23.5	35.2	16.6	5.5	36.9
Kazakhstan	KAZ	22.8	31.1	7.4	8.0	45.0
Philippines	PHL	22.7	31.0	13.1	4.1	42.7
Morocco	MOR	22.4	34.0	12.3	1.6	41.8
Nigeria	NGA	22.1	20.8	10.9	10.8	46.1
Ukraine	UKR	21.9	30.2	10.1	4.5	42.9
Kenya	KEN	21.8	22.9	8.9	1.8	53.5
South Africa	ZAF	21.3	32.7	9.0	4.6	39.0
Pakistan	PAK	21.1	27.6	7.2	4.4	45.3
Egypt	EGY	21.0	30.3	9.0	5.4	39.5
Ghana	GHA	20.8	30.7	9.3	1.5	41.6
Guatemala	GTM	20.8	25.6	6.4	4.0	47.1
Bangladesh	BGD	20.6	30.9	5.4	1.8	44.3

Overall Ranking			Pillar Ranking			
Country	Acronym	CHIPS	Connect	Harness	Innovate	Protect + Sustain
Uzbekistan	UZB	20.2	30.0	5.5	2.4	42.9
Dominican Republic	DOM	20.0	29.8	9.0	0.1	41.1
Ecuador	ECU	19.9	25.4	4.9	2.5	46.7
Ethiopia	ETH	19.7	16.6	11.0	2.2	49.3
Iraq	IRQ	19.2	26.4	7.2	2.4	41.0
Sri Lanka	LKA	19.2	26.6	7.9	1.7	40.8
Algeria	DZA	18.6	27.7	4.3	1.3	41.1
Rwanda	RWA	18.4	17.4	9.2	0.8	46.5

Annex 3: CHIPS Framework and Methodology

The CHIP framework was conceptualised in 2023 to assess the state of major digital economies and their varied approaches to transformation. The framework was organized around four pillars – Connect, Harness, Innovate and Protect – that capture key aspects of digital transformation, enabling comparison across countries and over time. The second iteration of the SIDE report in 2024 expanded the framework to include a fifth pillar – Sustain, with CHIP now expanded to CHIPS. With each iteration, the indicators have been expanded and updated wherever possible, to capture broader, deeper and more relevant aspects of digitalisation. The structure of the framework, allow for the computation of a composite index, as well as disaggregated scores by pillar and sub-pillar to enable for more modular and in-depth analysis. The 2026 report's inclusion of AI has also been done through the CHIPS framework, as an additional sub-pillar within each pillar to capture its contribution through each of these dimensions of digitalisation.

This year's report expands the analysis from 32 to 71 countries selected based on following criteria: (1) population greater than 20 million or (2) GDP greater than 100 billion USD in 2025 and (3) non-missing values for key indicators like smartphone users and internet users and data for at least 80 percent indicators. Rwanda, an exception to these criteria was also included due to special interest given its position as a digital leader in the region. As in the previous report, three version of the index were calculated: CHIPS Scale (previously known as CHIPS Economy), CHIPS Intensity (previously known as CHIPS User), and CHIPS combined. An AI index with just the indicators from AI sub pillar in each pillar was also calculated separately. (See Table A4 for a full list of indicators)

Calculations of index

Two versions of the index were calculated. The CHIPS (Scale) measures digitalization at the aggregate (economy-wide) level and the CHIPS (Intensity) captures the intensity of outcomes per capita, user, firm or unit of economic activity. Both versions of the index consist of similar indicators, but the latter is normalized by the relevant unit (e.g., population, internet users, firms, GDP etc.). A total of 58 indicators are grouped into 16 sub-pillars, which are then categorised under the 5 pillars of CHIPS.

In order to enable comparability and aggregation into an index, each indicator is standardised as follows:

$$\text{Standardised Value} = \frac{(\text{Value - Min})}{(\text{Max-Min})} \times 100$$

This standardizes all values to a scale between 0 and 100, with 0 being assigned to the lowest value in the range and 100 for the highest. The scale is inverted for indicators where a higher value indicates a less desirable outcome (e.g., cost of smartphone, number of cyberattacks). In this case, the formula is as follows:

$$\text{Standardised Value} = \frac{(\text{Max - Value})}{(\text{Max-Min})} \times 100$$

A number of other methods of standardisation, including a z-score standardisation, were considered before arriving at this one. The current standardisation was chosen in order to adequately reflect outliers when they stand out from the rest of the distribution as they form the frontiers and are of interest for further investigation within the analysis.

Changes to the CHIPS 2026

The CHIPS framework remains largely the same, with the inclusion of an additional AI sub-pillar into each pillar except Sustain. The Sustain pillar has been consolidated into a single pillar rather than two sub-pillars. Certain indicators were replaced or dropped due to lack of updated data or sufficient coverage of countries. The gender gap in internet users, individuals receiving public sector wages into an account, individuals receiving government transfer/pension into account, value of neobanking transactions, ·and the market sizes of green data centers, EHS software, and sustainable electronics were dropped. Number of mobile of app downloads replaced was replaced with consumer spend on mobile apps, ICT service exports replaced with digitally delivered service exports, and market valuation of listed IT and communications services replaced with ICT sector employment as a proxy for the size of the ICT sector. Data for digital payments users and price of cheapest smartphone were taken from different sources than last year.

New indicators added include the crypto index score, robotics revenue and drones revenue within the Innovate pillar in order to incorporate productive use of emerging technologies in addition to consumer uses; Ransomware victims within the Protect pillar; and within the Sustain pillar: share of energy startups that are digital, patents filed in ICT in mobility, VC investments in AI and environmental sustainability, renewable share of electricity production and average annual loss by climate to telecom infrastructure.

In the previous report, all AI related indicators were within the AI subpillar in the Innovate Pillar. Given that SIDE 2026 augments the entire CHIPS framework to account for the proliferation of AI, some of these indicators have been redistributed to other pillars as appropriate. For example, the Infrastructure in AI score was moved to the AI subpillar within the Connect pillar.

The principles for weighting and methodology for calculation remain similar to last year.

Weighting

The index is calculated as a weighted average of the indicators. The weighting of indicators has been designed carefully to ensure commensurate representation of each of the key aspects covered. Within each sub-pillar, weights are assigned equally to indicators such that they add up to 1. Please refer to Table A3 for the weights for each indicator. In the case that values for an indicator are missing for a country, the weights are readjusted only for that country such that the weights for the non-missing indicators in that sub-pillar add up to 1.

For the next level of aggregation from sub-pillar to pillar level, weights are assigned to each sub-pillar such that they add up to 1 for each pillar. The final level of aggregation to the overall CHIPS score is then derived by assigning equal weights of 1/4 to each of the three pillars C, H and I and 1/8 to each of the two pillars P and S. The

Protect and Sustain pillars are given lower representation in the index due to limitations in data availability and data quality, although we believe that both these pillars are equally important in ensuring a robust, resilient and inclusive digital economy. To summarize, the weighting scheme is therefore designed such that the three pillars of C, H and I are equally represented while the pillars of P and S are given half the representation as the other three. Each pillar is composed of a set of sub-pillars that contribute equally.

Aggregation from indicator to sub-pillar:

Equation 1:

$$\sum_{i=1}^{n} (W_i X V_{im}) \text{ such that } \sum_{i=1}^{n} (W_i) = 1$$

where i represents each indicator within the given sub-pillar, n represents the number of indicators within each sub-pillar and m represents each country. Wi is therefore the weight for indicator i and Vim the value of indicator i for each country m.

The CHIPS combined score is the equally weighted average of the CHIPS Scale score and a CHIPS Intensity score.

Annex 4: List of Indicators, Weights and Sources

Please see Annex 3 for the rationale behind the weights.

Table A3 Indicators, Weights and Sources

Sub pillar	Indicator	Indicator weight within sub pillar	Final Weight	Unit (CHIPS Scale)	Unit (CHIPS Intensity)	Source
CONNECT						
Affordability	Price of mobile data & voice basket (HC)	0.25	0.02	USD PPP	% of monthly GNI per capita	ITU
	Price of mobile data & voice basket (LC)	0.25	0.02			ITU
	Price of cheapest smartphone	0.25	0.02			GDIP
	Fixed broadband internet price	0.25	0.02			ITU
Quality	Median Mobile Download Speeds	0.50	0.04	Mbps	Mbps	Speedtest
	Median Fixed Broadband Download Speeds	0.50	0.04			Speedtest
Access	Internet users	0.25	0.02	Number	% of population	ITU and Findex
	Mobile cellular subscriptions	0.25	0.02			ITU
	Population covered by LTE	0.25	0.02			ITU
	Smart phone users	0.25	0.02			Findex and Statista
AI	AI users	0.33	0.03	Number	% of population	OpenAI and Anthropic
	Compute Capacity Score	0.33	0.03	Score	Score	Oxford: Govt AI Readiness Index
	AI Infrastructure Score	0.33	0.03			Tortoise: The Global AI Index

Sub pillar	Indicator	Indicator weight within sub pillar	Final Weight	Unit (CHIPS Scale)	Unit (CHIPS Intensity)	Source
HARNESS						
Apps and platforms	Users of social media for work-related activities (16-64 years)	0.17	0.01	Number	% of internet users	DataReportal
	Digital food delivery platforms users	0.17	0.01			Statista
	Digital health applications users	0.17	0.01			Statista
	E-commerce users	0.17	0.01			Statista
	Consumer Spend on Mobile Apps	0.17	0.01	USD PPP	USD PPP per internet user	DataReportal
	Video On Demand Users	0.17	0.01	Number	% of internet users	Statista
Data Intensity	Monthly fixed broadband internet traffic	0.50	0.03	TB	GB per subscription	ITU
	Monthly mobile broadband internet traffic	0.50	0.03			ITU
Fintech	Value of digital transactions	0.50	0.03	USD	USD PPP per internet user	Statista
	Digital payments users	0.50	0.03	Number	% of internet users	Statista
Real Economy	Digitally delivered services (exports)	0.50	0.03	USD	% of GDP	WTO
	ICT sector employment	0.50	0.03	Number	% of labour force	ILO
AI	Open Data Score	0.25	0.01	Score	Score	Open Data Inventory
	Open-Source Models Score	0.25	0.01	Score	Score	Tortoise: The Global AI Index
	Relative AI Skill Penetration	0.25	0.01	Rate	Rate	Stanford: Global AI Vibrancy Tool
	AI Talent Score	0.25	0.01	Score	Score	Tortoise: The Global AI Index

Sub pillar	Indicator	Indicator weight within sub pillar	Final Weight	Unit (CHIPS Scale)	Unit (CHIPS Intensity)	Source
INNOVATE						
Investments and Startups	Number of start-ups	0.33	0.03	Number	per LLC	Tracxn
	Total Unicorn Valuation	0.33	0.03	USD	% of GDP	World Population Review
	Total Startup funding till date	0.33	0.03	USD	USD per startup	Tracxn
Other Emerging Technology	Consumer IOT Revenues	0.14	0.01	USD	USD PPP per internet user	Statista
	AR/VR Revenues	0.14	0.01	USD	USD PPP per smartphone user	Statista
	Metaverse Revenues	0.14	0.01			Statista
	DeFi Revenues	0.14	0.01	USD	USD PPP per internet user	Statista
	Robotics revenues	0.14	0.01			Statista
	Drones revenues	0.14	0.01			Statista
	Crypto Index Score	0.14	0.01	Score	Score	Chainalysis
AI	Total AI Private Investment	0.17	0.01	USD	% of GDP	Stanford: Global AI Vibrancy Tool
	Newly Funded AI Companies	0.17	0.01	Number	per LLC	Stanford: Global AI Vibrancy Tool
	AI Commercial Score	0.17	0.01	Score	Score	Tortoise: The Global AI Index
	AI Research Score	0.25	0.02	Score	Score	Tortoise: The Global AI Index
	AI Research & Development Score	0.25	0.02	Score	Score	Stanford: Global AI Vibrancy Tool
PROTECT						
Preparedness	Cybersecurity Revenue	0.50	0.02	USD	USD PPP per internet user	Statista
	Number of Secure servers	0.50	0.02	Number	per internet user	World Bank
Risk of Attack	Ransomware attacks 30 day average	0.33	0.01			Cybermap Kaspersky
	Ransomware victims	0.33	0.01			Ransomware. live
	Number of email leaks	0.33	0.01			Surfshark

Sub pillar	Indicator	Indicator weight within sub pillar	Final Weight	Unit (CHIPS Scale)	Unit (CHIPS Intensity)	Source
AI	Safety and Security Score	0.33	0.01	Score	Score	Oxford: Govt AI Readiness Index
	Conference Submissions on RAI Topics	0.33	0.01	Number	Number	Stanford: Global AI Vibrancy Tool
	Public Trust Score	0.33	0.01	Score	Score	Tortoise: The Global AI Index
SUSTAIN						
Sustain	E-waste generated	0.17	0.02	kgs	kgs per capita	Global E-waste Monitor 2024
	Energy startups that are digital	0.17	0.02	Number	%	IEA
	VC investments in AI & envi sustainability	0.17	0.02	USD	USD per capita	OECD.ai
	Patents filed (2000-2024) in Smart Grids	0.17	0.02	Number	% of enabling tech patents	IRENA INSPIRE
	Renewable energy production	0.17	0.02	GWh	% of total energy	IRENA
	Average Annual Loss in Telecom due to climate	0.17	0.02	USD	% of exposed value	GIRI

Notes: HC=High consumption. LC=Low consumption. GDP = Gross Domestic Product. GNI = Gross National Income. LLC = Limited Liability Company.

The sources for data used as denominators in CHIPS Intensity are: Population by age groups from World Population Prospects 2024; GNI per capita, GDP (current USD), PPP conversion factor and total labour force from World Bank Databank; Number of LLCs from World Bank's Entrepreneurship Database; Exchange rates from IMF and World Bank.

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