Innovation Capabilities Outlook 2026

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Executive summary

Knowledge is expanding globally, yet most countries struggle to harness this growth effectively. Global innovation remains strikingly concentrated: a small number of leading economies account for the vast majority of scientific publications, patents, trademarks, and advanced exports, whereas most contribute less than 1 percent to any innovation dimension. Success does not require a big push in all fields, but instead lies in strategically diversifying into complex skills while at the same time maintaining intensity in high-value areas – a balancing act that only the most sophisticated innovation ecosystems have mastered.

Mapping the global innovation landscape

The *Innovation Capabilities Outlook (ICO) 2026* analyzes 2,508 innovation capabilities across four dimensions – science, technology, entrepreneurship, and production – using comprehensive datasets spanning 2001–2023. The analysis reveals that innovation emergence depends critically on connections between these four dimensions, with the most sophisticated capabilities emerging only in highly diversified ecosystems able to support complex, interdependent knowledge networks.

A tale of two innovation worlds

Global innovation output has expanded dramatically, yet this growth remains highly uneven and concentrated in no more than 30 percent of the world's economies. Asian economies – led by **China, India and Viet Nam – have mastered sophisticated capability development strategies**, consistently achieving both smart diversification (gaining breadth and complexity simultaneously) and smart capability management (intensifying focus on high-value skills while protecting them with complementary knowledge). In contrast, many established and emerging economies struggle with this dual challenge: 46 percent of ecosystems have not meaningfully diversified, and **complexity gains remain elusive for 70 percent of economies**.

Strategic opportunities

The *ICO 2026* identifies substantial untapped potential – **only 10 percent of economies fulfill their technological potential**. Ecosystems collectively underperform by **339,000 technological innovations** annually. Regional patterns reveal distinct strategic pathways: Europe possesses strong foundations, but struggles with technological translation; Asia shows balanced capabilities, but faces entrepreneurial commercialization challenges; and Africa should focus on foundational capability building while gradually targeting more complex activities.

Policy implications

Innovation policy cannot rely on one-size-fits-all approaches. Success requires **tailoring strategies to regional development levels, existing capability portfolios, and institutional contexts**. Countries that align innovation investments with these evidence-based insights can break traditional development constraints and accelerate a transition toward knowledge-based competitiveness. The systematic nature both of diversification constraints and untapped potential suggests that targeted, level-appropriate interventions yield the highest probability of success.

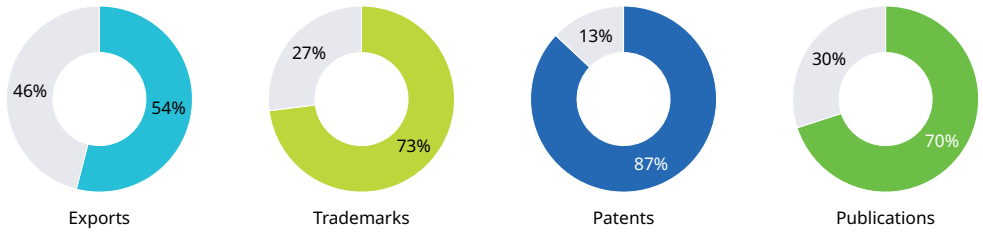
Introducing the global network of innovation capabilities

What drives innovation success? The answer is not in isolated breakthroughs, but in how different innovation capabilities connect and reinforce each other around the globe.

Innovation is a multidimensional force encompassing various facets of human endeavor across economies and industries. Yet global innovation remains strikingly concentrated: a small number of leading economies account for the vast majority of advanced exports, trademarks, patents, and scientific publications, while most countries contribute less than 1 percent to any of these innovation dimensions (see Figure 1.1). Such a concentration reveals the existence of barriers preventing most economies from meaningfully participating in the global innovation system.

International innovations are heavily concentrated

Figure 1.1 Share of total international innovations by dimension, top 10 economies vs. rest of the world, 2023



Note: The colored portion represents the top 10 countries' share, while the gray portion represents all remaining economies. The four dimensions capture only international innovations. For exports, this means international trade; for trademarks, brands with foreign applicants; for patents, international patent families; for publications, SCOPUS indexed articles..

Source: WIPO, 2026.

Innovation capabilities can help answer this challenge. They represent the demonstrated ability of economies and organizations to create competitive advantage in fields such as artificial intelligence or clean energy. These capabilities serve as **the fundamental building blocks of innovation** and, in addition, they help identify which economies excel in certain areas while revealing gaps and weaknesses elsewhere. For this reason, assessing capabilities across science, technology, entrepreneurship and production is essential for evidence-based policymaking.

Yet many ecosystems struggle with imbalances between their innovation activities. Some economies excel at producing internationally recognized scientific research, but struggle to transform discoveries into commercial applications. Others contribute significantly to international production, but fail to develop the technological learning that drives innovation. Still others master individual technologies, but cannot scale them globally.

These mismatches are both a challenge and an opportunity. Economies with unbalanced capability portfolios can benefit greatly from strategic guidance on **where to focus limited resources to clear innovation roadblocks**.

Understanding these patterns empowers policymakers to make informed decisions about building more integrated and effective innovation ecosystems.

Four dimensions reveal patterns in the innovation landscape

The outlook spans 2,508 distinct fields across four dimensions. Innovation ecosystems possess capabilities in these fields when they demonstrate sufficient specialization or output (see Box 1.1).

Production – 862 fields. Manufacturing capabilities and scaling innovations from laboratory to market, encompassing advanced manufacturing, industrial processes, quality systems, and supply chain innovation.

Entrepreneurship – 538 fields. Commercialization and market-oriented activities including venture creation, business model innovation, technology transfer, and ecosystem development.

Technology – 480 fields. Applied research and development (R&D) focused on practical solutions, including information technology, biotechnology, materials science, and engineering applications.

Science – 628 fields. Fundamental research and knowledge creation across physics, chemistry, biology, mathematics, and so on.

Capabilities derive from different areas of innovation

Table 1.1 Innovation capability fields, by domain and dimension

Dimension	Domain	Number of fields of innovation
Note: Fields of innovation are grouped into customized domains for visualization purposes.		
Production	Machinery and transportation	160
Production	Wood, paper and textiles	131
Science	Medical and health sciences	128
Production	Base metals and metal products	112
Production	Chemicals and pharmaceuticals	112
Production	Plant products and food processing	112
Science	Social sciences	104
Technology	Engines and transport	93
Science	Engineering and energy	90
Entrepreneurial	Research and technology	76
Science	Agricultural and environmental sciences	73
Entrepreneurial	Health	62
Production	Precision goods and miscellaneous	62
Technology	Machines	62
Entrepreneurial	Food, beverages and tobacco	61
Entrepreneurial	Leisure and education	57
Entrepreneurial	Construction	53
Technology	Chemicals	52
Entrepreneurial	Clothing	51
Entrepreneurial	Household equipment	51
Production	Plastics, rubber and leather	51
Production	Construction materials and precious goods	50
Science	Business and economics	46
Science	Computer science	46
Science	Physical sciences and mathematics	46
Science	Life sciences	44
Technology	Instruments	43

Dimension	Domain	Number of fields of innovation
Production	Raw materials and mining	42
Entrepreneurial	Business services	41
Entrepreneurial	Transportation	40
Technology	Consumer	39
Technology	ICTs	32
Entrepreneurial	Chemicals	31
Science	Psychology and neuroscience	31
Production	Agriculture and live animals	30
Technology	Materials	29
Technology	Biopharma	28
Technology	Electronics	27
Technology	Civil engineering	26
Technology	Processing and environmental	26
Science	Chemistry and pharmaceuticals	20
Technology	Semiconductors and optics	16
Entrepreneurial	Services	11
Technology	Audio-visual	7
Entrepreneurial	Agriculture	4

Note: Fields of innovation are grouped into customized domains for visualization purposes.
Source: WIPO, 2026.

Granular classification (see Table 1.1) enables detailed analysis of specialization patterns, capability gaps, and emerging innovation areas across different regions and economies.

Box 1.1 Data sources and methodology

The report measures innovation capabilities using four complementary datasets that capture the industrial, entrepreneurial, technological, and scientific dimensions of innovation. The analysis covers the period 2001–2023 at economy and field levels. While this economy-level focus enables global trend analysis, innovation policy design may require more disaggregated analysis at the regional, cluster and city levels. The timeframe, though substantial, may not capture complete innovation cycles which can span decades from initial research to market implementation.

International trade data

Production capabilities are assessed through manufactured exports using the UN COMTRADE database, tracking distinct product fields grouped into production domains. The focus on internationally traded products ensures a minimum threshold of competitiveness and innovation content, as products must meet international market standards.

International trademark data

Entrepreneurial innovation is captured through international trademark filings from the WIPO Global Brand Database, covering granted applications across multiple jurisdictions. Rather than relying solely on the Nice Classification system, the analysis employs clustering algorithms to identify innovation fields that better reflect actual market and technological relationships. This provides more nuanced insights into entrepreneurial activities and commercialization patterns.

International patent data

Technological advancement is measured through international patent families, combining data from World Intellectual Property Organization (WIPO) patent databases and the European Patent Office (EPO) PATSTAT. Analysis focuses on first filings of granted patent families that sought protection beyond the applicant's economy of origin, ensuring international

relevance. Patents are classified using 4-digit International Patent Classification (IPC) codes, providing detailed technological categorization. Economytem assignment is based on inventors' addresses.

Scientific publication data

Scientific progress is captured through the OpenAlex database, focusing on publications indexed in Scopus. To ensure quality and impact, the analysis concentrates on the 10 percent most cited papers. Scientific publications are grouped into innovation fields using clustering algorithms that identify thematic relationships. Economies are assigned publications based on authors' institutional affiliations.

Innovation capabilities vary in complexity

Whereas some capabilities can flourish in specialized economies, **the most sophisticated innovation capabilities** – such as advanced biotechnology, quantum computing or next-generation artificial intelligence – **emerge only within highly diversified innovation ecosystems**. These complex capabilities are inherently interdependent, requiring a dense web of supporting capabilities, institutions and knowledge domains to function effectively. Economic complexity methodology helps to quantify the extent of capabilities that need to be present within an ecosystem.

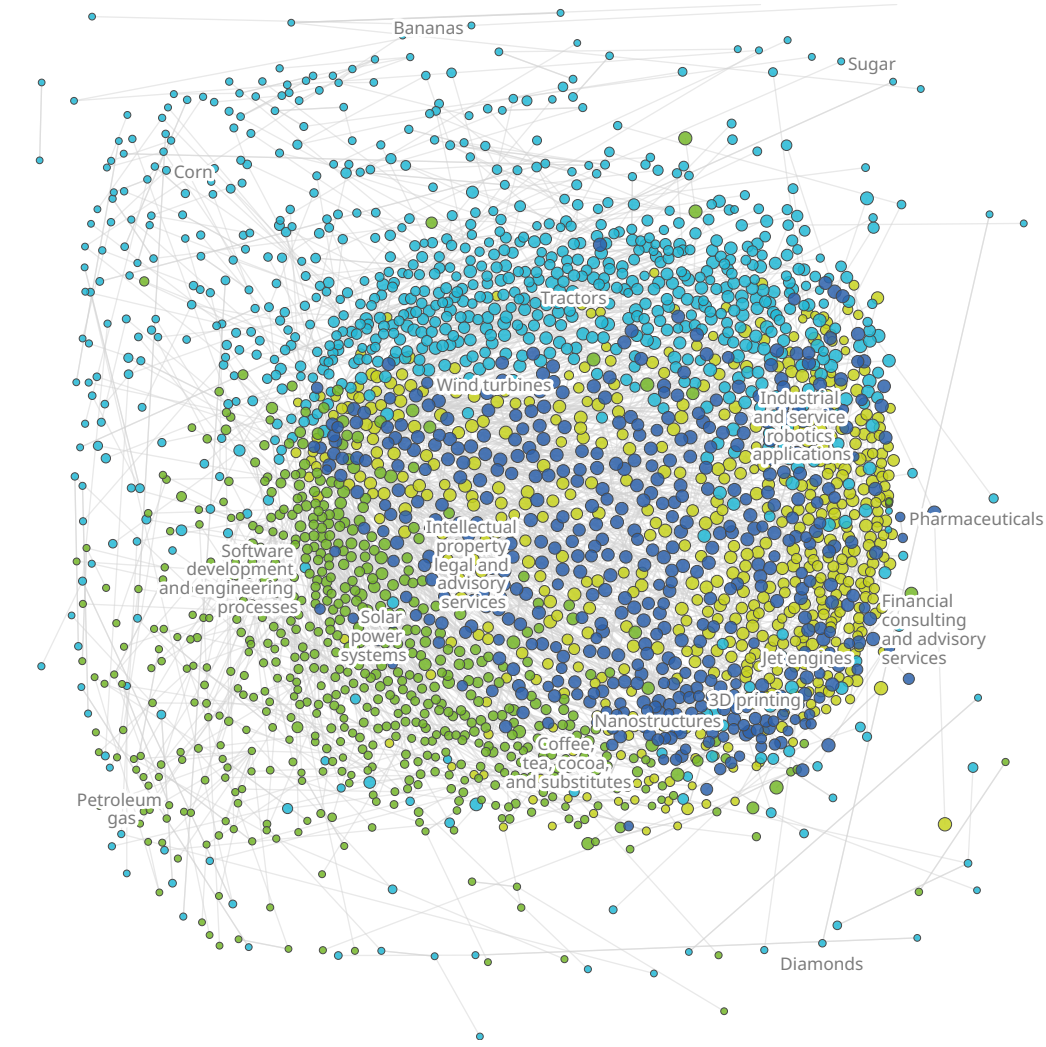
Complex capabilities cannot simply be transplanted or developed in isolation. When economies attempt to leapfrog into complex capabilities without first building the necessary foundation of related knowledge and supporting infrastructure, these efforts typically result in failed investments and unrealized potential. This complexity creates a natural hierarchy in the innovation landscape, where the most valuable and transformative capabilities tend to concentrate within ecosystems that have systematically developed broad, interconnected innovation foundations.

Power is in connections

Just as a symphony requires different instruments working in harmony, **breakthrough innovations emerge when dimensions interconnect** (see Figure 1.2). Strong science–technology links indicate effective translation of basic research into applied innovations. Robust entrepreneurship–production connections suggest efficient commercialization pathways bringing innovations to market.

Innovation capabilities form an intricate network of connections, with complex fields at the core

Figure 1.2 The innovation capability space, 2023



Note: Innovation capabilities are located spatially based on how often they coincide within the same innovation ecosystem. Size refers to the complexity of the field. Revealed links are limited to the highest proximity of each node.
Source: WIPO, 2026.

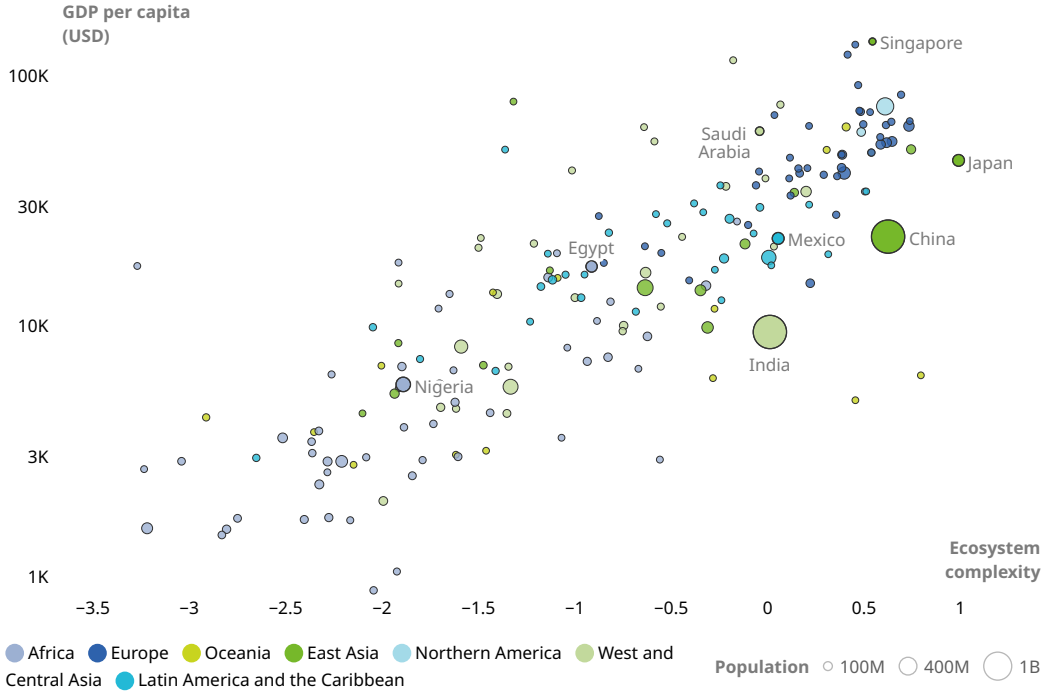
Innovation ecosystems excelling at fostering interdimensional connections consistently demonstrate superior innovation performance. These **connections facilitate knowledge spillovers**, reduce transaction costs in innovation processes, and enable rapid capability recombination to address emerging challenges and opportunities.

Connections reveal ecosystem maturity

Connection strength indicates how developed an innovation system has become. Developing ecosystems often exhibit strong individual dimensional capabilities, but weak cross-dimensional linkages, limiting their ability to translate innovative potential into competitive advantage. **Mature innovation systems demonstrate dense connection networks enabling rapid knowledge transfer and collaborative innovation across boundaries** (see Figure 1.3).

The complexity of an innovation ecosystem is related to income level

Figure 1.3 Ecosystem complexity and GDP per capita, 2023



Note: Ecosystem complexity is calculated by looking at overall complexity of innovation capabilities across the four dimensions of this study. GDP = gross domestic product, K = thousand, M = million, B = billion.

Sources: WIPO, 2026, World Bank, 2024.

Innovation capabilities are dynamic

Innovation capabilities evolve through investment, learning and strategic positioning within global knowledge networks. Understanding and strengthening these interdimensional connections represents a key strategic priority for innovation policy and investment decisions, because these linkages ultimately determine an innovation system's capacity to create value from its constituent capabilities.

The Innovation Capabilities Outlook maps these global knowledge networks, revealing where capabilities concentrate, how they evolve, and where the greatest opportunities lie.

Is the world leveraging its innovation capabilities?

Global innovation capabilities are expanding, yet most economies struggle to harness this growth effectively. Success requires a strategic balancing act: diversifying into complex fields while at the same time maintaining intensity in high-value areas.

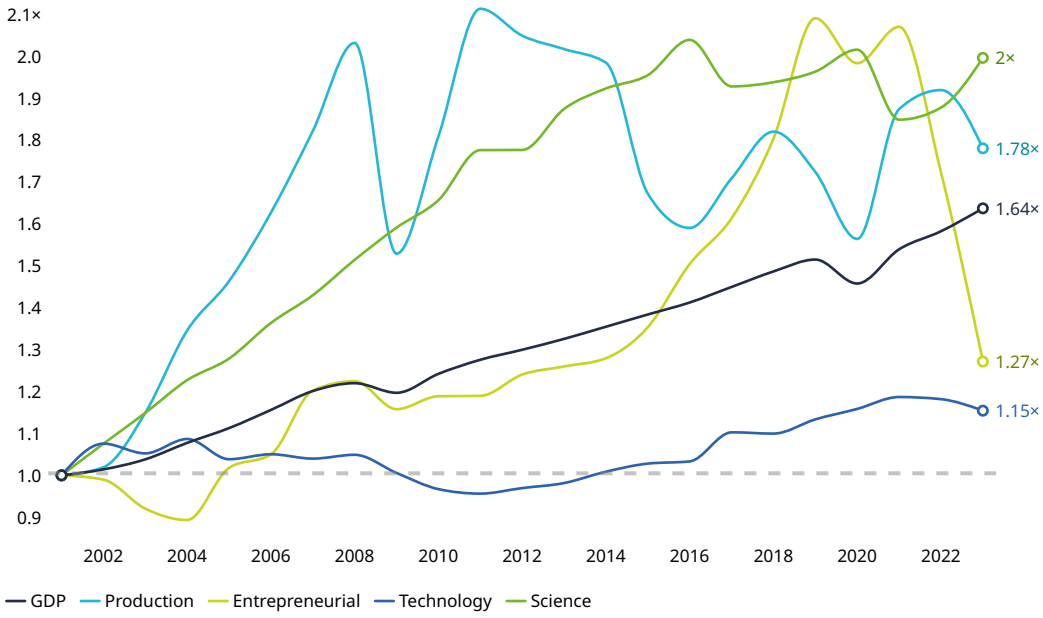
In the 21st century, **economic competitiveness increasingly depends on the ability to create, adapt and commercialize new knowledge** (see Figure 2.1). Innovation ecosystems that fail to build innovation capabilities risk being relegated to low-value production activities while innovation leaders capture the highest economic returns.

Global innovation expansion and growing complexity

Since 2000, economic growth has increased alongside innovations per capita across exports, trademarks, and scientific publications, though growth in patents has been more modest. This upward trajectory reflects the global shift toward knowledge-based economies where innovation capabilities increasingly determine national competitiveness.

International innovations have grown since 2000, following economic growth

Figure 2.1 Evolution of innovations per capita and GDP growth, 2001–2023



Note: Indicators are expressed as growth rates, indexed at 2001 values. GDP = gross domestic product.
Source: WIPO, 2026; World Bank, 2026.

However, growth has been highly uneven across countries (see Table 2.1). While some economies have expanded dramatically – with China showing a 62-fold growth rate in scientific publications and 65-fold increase in entrepreneurial activities, and the Republic of Korea demonstrating an over 12-fold entrepreneurial growth – established leaders like the United States of America (US), Japan and European countries have seen modest gains, typically only doubling or tripling output. This divergence suggests a fundamental restructuring, with Asian emerging economies rapidly building innovation capabilities while traditional leaders face the challenge of sustaining growth from an already high baseline.

China, the Republic of Korea and India have consistently grown across all four dimensions of international innovations per capita, placing Asia as the main origin of international innovations

Table 2.1 Innovation growth per capita, by economy and dimension, 2001–2023

	Economy	GDP	Trademarks	Exports	Scientific publications	Patents
1	**China**	**5.2×**	**65.8×**	**6.4×**	**62.0×**	**28.4×**
2	United States	1.4×	1.4×	1.4×	1.0×	1.1×
3	Japan	1.2×	1.7×	1.1×	1.1×	1.6×
4	Germany	1.2×	1.1×	1.7×	1.8×	0.9×
5	**Republic of Korea**	**1.9×**	**11.9×**	**2.4×**	**6.0×**	**5.3×**
6	United Kingdom	1.2×	1.5×	0.9×	1.3×	0.9×
7	France	1.2×	1.2×	1.1×	1.3×	1.0×
8	Italy	1.0×	1.8×	1.6×	3.0×	1.3×
9	**India**	**3.0×**	**6.9×**	**4.7×**	**9.7×**	**5.8×**
10	Canada	1.2×	3.5×	1.1×	1.4×	1.2×

Additional 175 rows not shown.

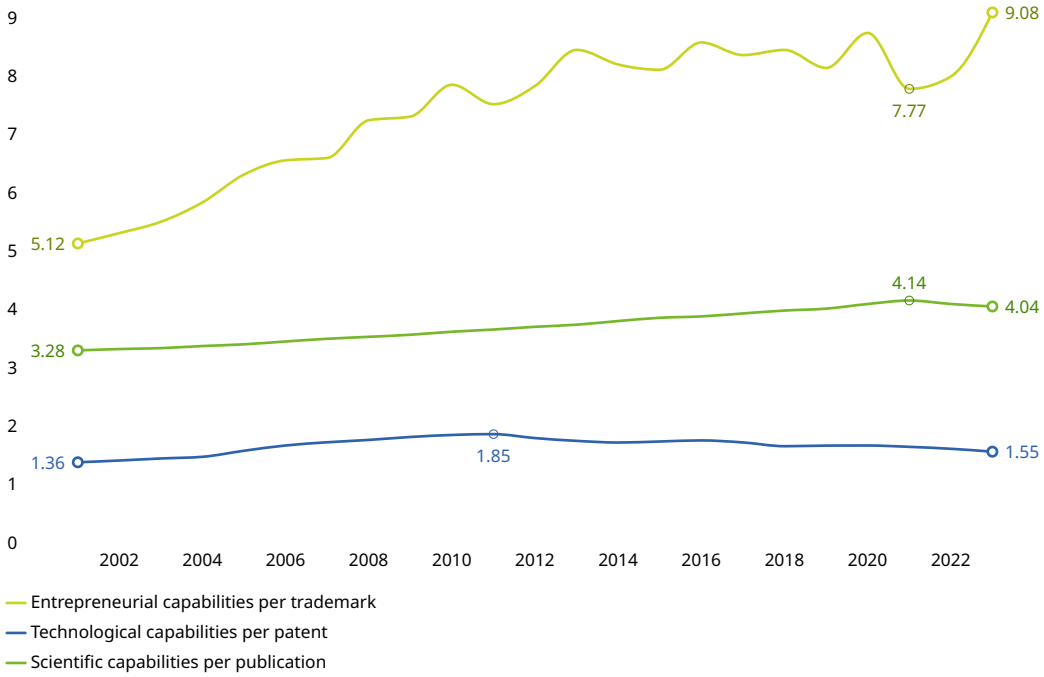
Note: Innovation ecosystems are sorted by their global contribution to innovations across the four dimensions of this report. GDP = gross domestic product. To access and search the complete set of data go to the digital edition: https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Source: WIPO, 2026; World Bank, 2024.

Beyond volume, innovations are becoming increasingly sophisticated and interdisciplinary (see Figure 2.2). The average international trademark now covers nine fields of innovation – for example, a smartphone brand spanning electronics, software, telecommunications, and entertainment – while scientific publications span four fields, for example, artificial intelligence research combines computer science, neuroscience, ethics, and statistics. Patents remain more focused at 1.5 fields on average, typically addressing specific technical solutions. This cross-field integration suggests that modern innovations increasingly require diverse knowledge capabilities.

Scientific and entrepreneurial innovations are becoming more integrated, combining increasingly diverse innovation capabilities

Figure 2.2 Number of capabilities per innovation, 2001–2023



Note: Calculation for the production dimension is not available due to the way the data source is built.
Source: WIPO, 2026; World Bank, 2024.

In sum, while innovations are becoming increasingly sophisticated and global innovation capacity continues to expand, growth remains highly uneven. This raises a deeper strategic question: beyond generating individual innovations, are economies successfully building and leveraging their capabilities so as to adapt to a rapidly evolving knowledge economy?

Most innovation ecosystems have diversified their capabilities; however, many are falling behind

Modern innovation increasingly depends on the diversity of knowledge capabilities within innovation ecosystems. While knowledge embodied in tools, codes and processes can move across borders, tacit knowledge, and the ability to understand and combine this knowledge, resides within the human mind and thus subject to natural limitations. Historically, when humanity's knowledge base was smaller, brilliant individuals like Da Vinci, Newton, and Descartes were able to master multiple disciplines simultaneously. Today, rapid knowledge growth makes such broad individual mastery impossible.

The solution has been collective specialization: individuals develop deep expertise in narrow domains while collaborating in diverse teams. A breakthrough in artificial intelligence, for instance, requires that specialists in computer science, neuroscience, ethics, and engineering work together. Hence, individuals specialize, but ecosystems diversify.

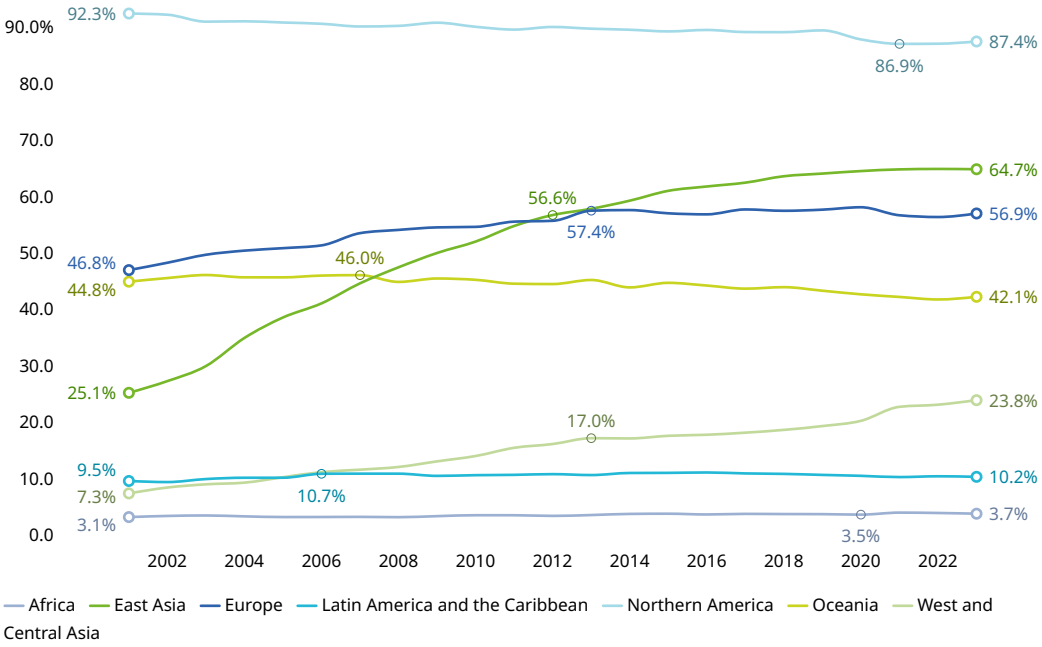
At the innovation ecosystem level, this translates to a diversity of capabilities. Successful innovation ecosystems are characterized by high diversity – they can combine specialized knowledge to tackle complex, interdisciplinary challenges (see Box 2.1).

Box 2.1 When does an innovation ecosystem master a field of innovation?

Determining whether an innovation ecosystem has mastered a specific field can be achieved through either of two approaches. *Absolute specialization* identifies global leaders – like the United States in artificial intelligence research or China in manufacturing technologies. Alternatively, *relative specialization* reveals focused excellence – like Denmark's strength in wind energy or Switzerland's pharmaceutical expertise, where smaller ecosystems excel disproportionately in specific fields compared to their overall innovation activity.

Most innovation ecosystems now master more diverse innovation capabilities

Figure 2.3 Average diversity of innovation ecosystems, by region, 2001–2023



Note: Regional diversity is weighted by economy population.

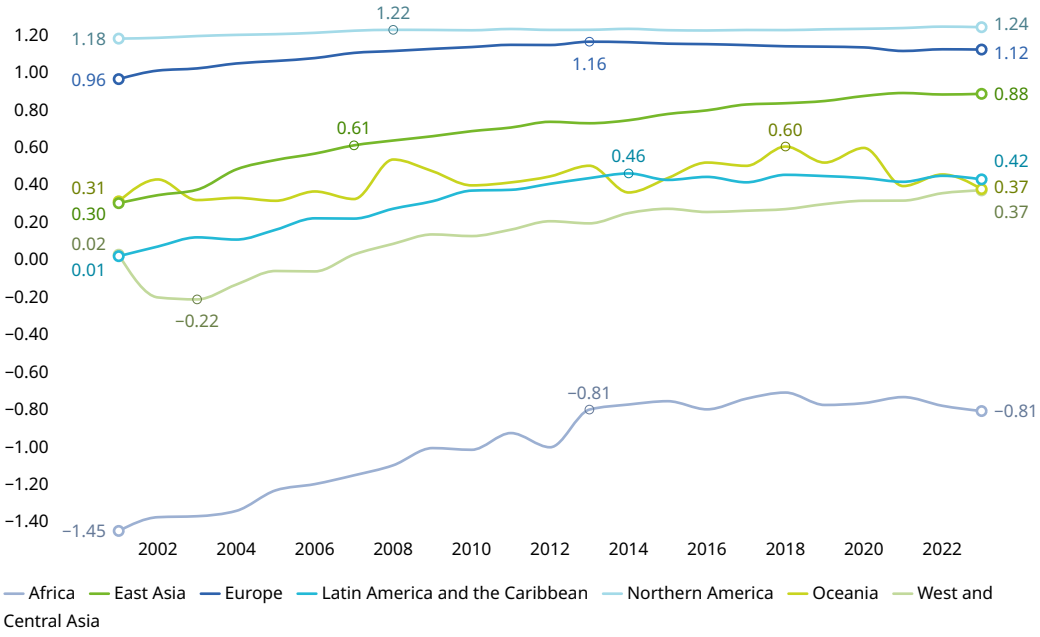
Source: WIPO, 2026; World Bank, 2024.

Diversification is happening globally, though unevenly (see Figure 2.3). More than half of innovation ecosystems worldwide – 54 percent – now master more diverse innovation capabilities than they did at the beginning of the century. The most dramatic transformation has occurred in East Asia, where economies have collectively expanded capability diversity from 25 percent to 64 percent of all tracked innovation fields over the past 23 years. This remarkable 39 percentage point increase represents the largest regional shift in innovation capability building of the modern era.

The fact that 46 percent of innovation ecosystems have not significantly diversified their capabilities is not necessarily problematic. Strategic specialization in an economy's most competitive fields can be an effective path to short- and mid-term success. The critical question is whether ecosystems are developing higher-quality, more sophisticated capabilities over time – regardless of breadth.

Ecosystem complexity has increased since the 2000s, but stagnated over the last 10 years

Figure 2.4 Average complexity of innovation ecosystems, by region, 2001–2023



Note: Regional complexity is weighted by economy population.
Source: WIPO, 2026; World Bank, 2024.

Once again, East Asia leads the transformation toward complex capabilities, with complexity levels that have surpassed those of Oceania and are closing the gap with Europe and Northern America (see Figure 2.4). African economies have made notable progress in building more sophisticated capabilities, though they remain significantly behind other regions. This pattern reinforces East Asia's emergence not just as a source of innovation volume, but as a region developing increasingly advanced innovation ecosystems.

Population size influences but does not determine innovation capability diversity (see Table 2.2). Large developing economies like India leverage scale effectively, mastering nearly a third of all tracked fields, while Austria achieves 77 percent capability coverage with just nine million inhabitants. More revealing are comparisons between similarly-sized economies with vastly different outcomes. Brazil exhibits almost nine times Nigeria's capability diversity despite having a comparable population. Similarly, Japan demonstrates five times Mexico's diversity despite a similar demographic scale.

These disparities reveal that factors beyond population – including educational system, institutional quality and innovation policies – play a decisive role. Success depends less on demographic advantages and more on strategic choices about knowledge infrastructure investment.

Small and medium-sized ecosystems can still achieve a high level of diversity

Table 2.2 Diversity share and population, by economy, 2023

	Economy	Population	Diversity ▼
1	China	1.4B	92.4%
2	United States	333.3M	89.8%
3	Germany	84.1M	88.7%
4	Netherlands (Kingdom of the)	17.7M	80.3%
5	Italy	58.9M	79.5%
6	France	67.9M	78.1%
7	Austria	9M	77.3%
8	United Kingdom	67M	74.7%
9	Sweden	10.5M	74.5%
10	Spain	47.6M	73.2%

Additional 183 rows not shown.

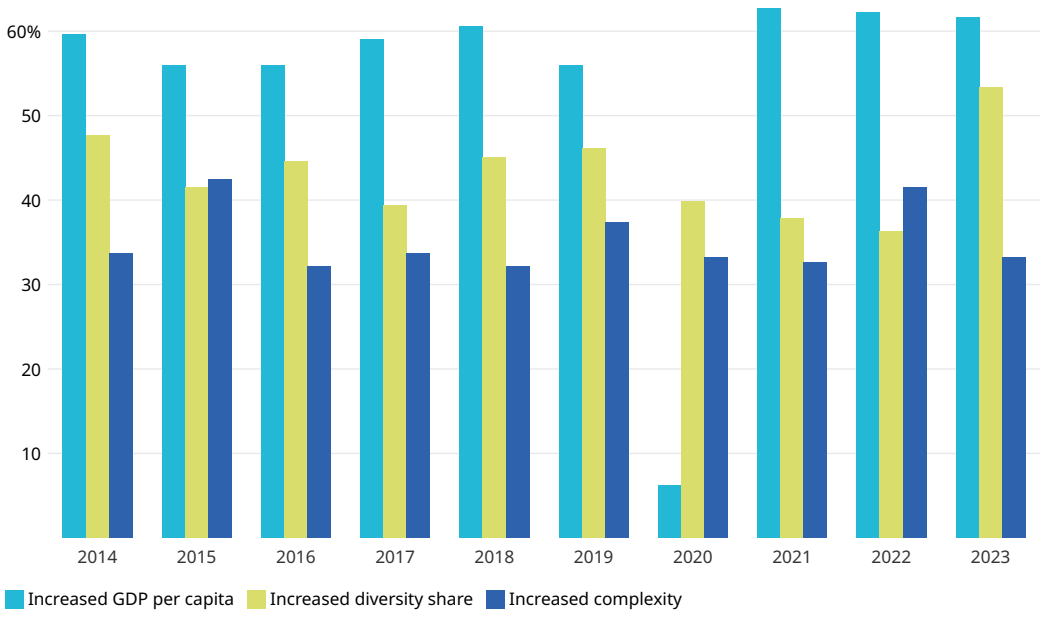
Note: Innovation ecosystems are sorted by diversity, measured as the share of different capabilities present within the given ecosystem. M = million, B = billion. To access and search the complete set of data go to the digital edition:https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Source: WIPO, 2026; World Bank, 2024.

Building innovation capabilities proves significantly more challenging than achieving economic growth (see Figure 2.5). While 68 percent of economies have increased GDP per capita over the past two decades and a similar share (66 percent) achieved greater diversity, only 30 percent managed to increase innovation complexity – revealing complexity to be the most elusive development goal.

Most economies get wealthier every year, but struggle to simultaneously increase international innovation output, upgrade and diversify capabilities

Figure 2.5 Share of economies with economic growth, diversity growth, and complexity growth, 2014–2023



Note: GDP = gross domestic product.

Source: WIPO, 2026; World Bank, 2024.

Year-on-year progress tells an even starker story. In the last decade, excluding the 2020 pandemic, GDP has grown in 55–65 percent of economies annually. Diversity gains have

proved harder to achieve, reaching only 35–50 percent of ecosystems each year. Complexity improvements are the rarest to achieve, occurring in just 30–40 percent of countries annually. These patterns suggest that while economic growth remains challenging, developing sophisticated innovation capabilities requires the sustained, strategic effort that most economies struggle to maintain consistently.

The most complex capabilities are now harder to get

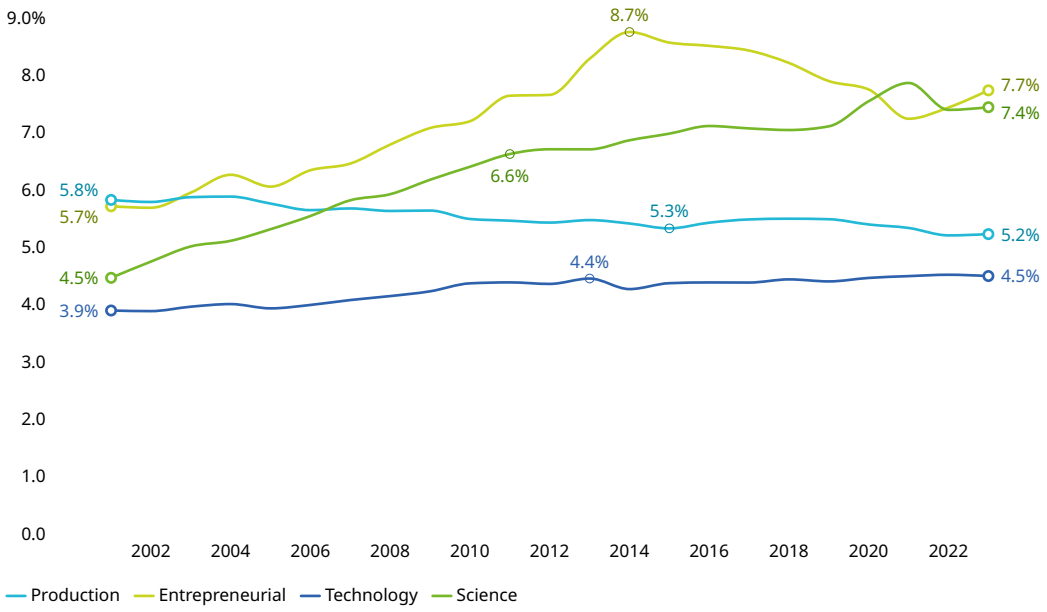
Innovation capabilities have become increasingly concentrated among a small group of leading economies. Over the past decade, most global innovation capabilities have concentrated in just 30 percent of economies, reversing earlier trends toward broader diffusion.

However, capabilities remain more democratically distributed than economic wealth – they are three times more spread than GDP and six times more spread than population. Most capability diffusion occurred during the first decade of this century; the process has since significantly slowed.

Despite this deceleration, **several economies have successfully entered the global innovation landscape as relevant players**: Brazil, India, Jordan, Kazakhstan, Latvia, Lebanon, Lithuania, Malta, Morocco, Qatar, the Russian Federation, Saudi Arabia, Serbia, Tunisia, Ukraine and Viet Nam. These newcomers demonstrate that capability building remains possible, though increasingly difficult in today's concentrated innovation environment.

Technological fields remain the most concentrated capabilities, heavily present in just 4.5 percent of all economies

Figure 2.6 Capability diffusion, by dimension, 2001–2023



Note: Diffusion is expressed as a percentage of economies that contentrate most innovations in each dimension of innovation.

Source: WIPO, 2026.

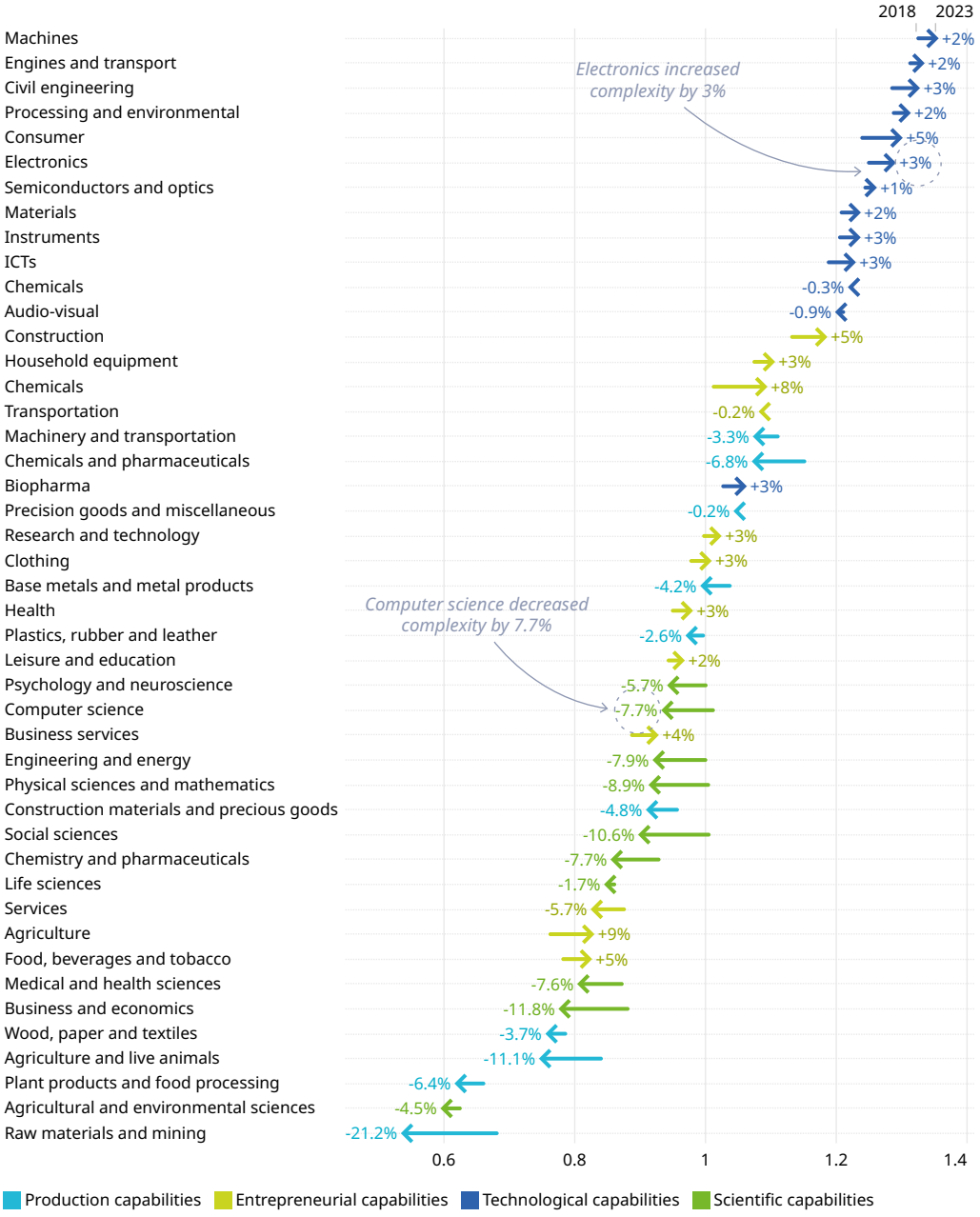
Most of these newcomers inserted themselves by developing entrepreneurial and scientific capabilities (see Figure 2.6). Scientific (7.4 percent of ecosystems) and entrepreneurial capabilities (7.7 percent) became less concentrated over time, enabling broader global participation. In contrast, technology (4.5 percent) and production capabilities (5.2 percent) remained more exclusive among established leaders.

Technological capabilities remain the most complex innovation field and are increasingly diverging from the other dimensions (see Figure 2.7). Over the last five years, technology complexity has accelerated beyond other fields, creating a widening gap with scientific, entrepreneurial, and production capabilities.

Interestingly, **scientific and production domain complexity has actually decreased**, making these capabilities less dependent on related knowledge for mastery. While these capabilities remain relatively rare globally, they have become more accessible as standalone competencies. This trend suggests that while technology development requires ever-deeper interconnected knowledge, other innovation domains are becoming more modular and independently acquirable.

Technological capabilities remain the most complex set of capabilities, and are breaking away from other fields

Figure 2.7 Average complexity of innovation capabilities, by domain, 2018 vs 2023



Note: Domains are ordered by the average complexity indexes of the fields they covered in 2023. Percentages indicate the change in complexity between 2018 and 2023. ICT = information and communication technology.

Source: WIPO, 2026.

Among the 100 fastest-growing innovation fields, 40 percent represent complex capabilities, but exhibit vastly different diffusion patterns across ecosystems (see Table 2.3). Some high-growth fields are concentrating among fewer players, while others are spreading to new economies. The internet of things exemplify concentration. This complex technology field has grown by 4.1 times over the past five years, yet is present in fewer innovation ecosystems,

suggesting an increasing specialization among leading players. Conversely, the scientific field related to the impact and application of artificial intelligence demonstrates a broader diffusion, growing 3.6 times and spreading to 30 percent more economies. This field is, surprisingly, at the lower end of the complexity spectrum. This is because, much like many capabilities within the realm of scientific progress in artificial intelligence, it has diffused into economies that are not highly diversified and yet able to contribute significantly.

These contrasting patterns reveal that **rapid innovation growth does not guarantee widespread adoption**. The most complex emerging technologies tend to concentrate among established leaders, while moderately complex fields can diffuse more broadly across the global innovation landscape.

Of the top 100 fastest growing fields, 40 percent are complex capabilities

Table 2.3 Top 10 fastest growing fields, 2018–2023

	Domain	Field	▼ Field growth	Capability diffusion	Complexity ranking
1	Medical and health sciences	Studies on COVID-19 impacts and responses	7.9×	1.3×	2429th
2	Semiconductors and optics	Light-emitting semiconductors	6.9×	1.2×	14th
3	Semiconductors and optics	Light-sensitive semiconductors	4.4×	1.3×	26th
4	ICTs	IoT technology	4.1×	0.9×	417th
5	Computer science	Impact and applications of artificial intelligence and technology	3.6×	1.4×	2022nd
6	Business and economics	Impacts of economic factors and digitalization on global development	3.6×	1.3×	2418th
7	Semiconductors and optics	Inorganic semiconductors	3.6×	1.2×	38th
8	ICTs	Computer vision	2.8×	1.2×	1038th
9	ICTs	Computational chemistry	2.8×	0.8×	287th
10	Social sciences	Vaccine hesitancy and its global health implications	2.5×	0.9×	2466th

Additional 90 rows not shown.

Note: Innovation fields are sorted by overall growth since 2018. Diffusion refers to the spread of capabilities to new innovation ecosystems. Complexities are ranked from with 1 being the most complex field. ICT = information and communication technology. To access and search the complete set of data go to the digital edition: https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Source: WIPO, 2026.

These divergent patterns highlight a critical strategic challenge: not all diversification is created equal. Simply expanding into more innovation fields may prove insufficient if those capabilities remain isolated or lack the complexity needed for sustained competitiveness. The question becomes whether economies can strategically navigate this landscape – identifying which emerging capabilities to target based on their existing knowledge base and the incremental complexity required for successful adoption.

Who is taking a strategic approach to capability development?

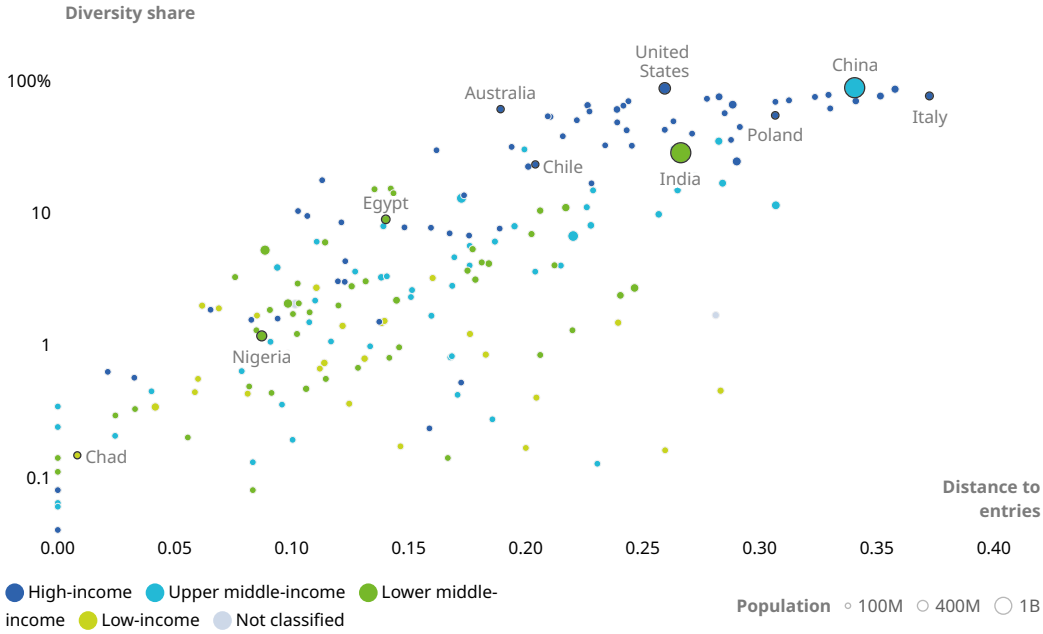
Strategic capability diversification as a path to development

Strategic capability diversification requires simultaneously gaining diversity while increasing ecosystem complexity – a significantly more challenging endeavor than simple field expansion. The principle of relatedness, where economies naturally diversify into fields closest to their existing capabilities, creates a potential trap for developing ecosystems. Those starting with low diversity and complexity may find themselves systematically acquiring only low-complexity capabilities, perpetuating their position in the global innovation hierarchy.

This challenge is compounded by path dependency patterns visible across different development levels (see Figure 2.8). Less diversified ecosystems tend to acquire capabilities very close to their current capabilities, while more diverse ecosystems can successfully master fields further from their existing knowledge base.

Diversified economies are more likely to make strategic leaps, whereas low diversified economies tend to be more path dependent

Figure 2.8 Ecosystem diversity and distance to new attained capabilities, 2018–2023



Note: Distance is measured by the share of related fields that the economy did not have when mastering a new capability. High distance means that the ecosystem acquired fields that were not necessarily the safest option. M = million, B = billion

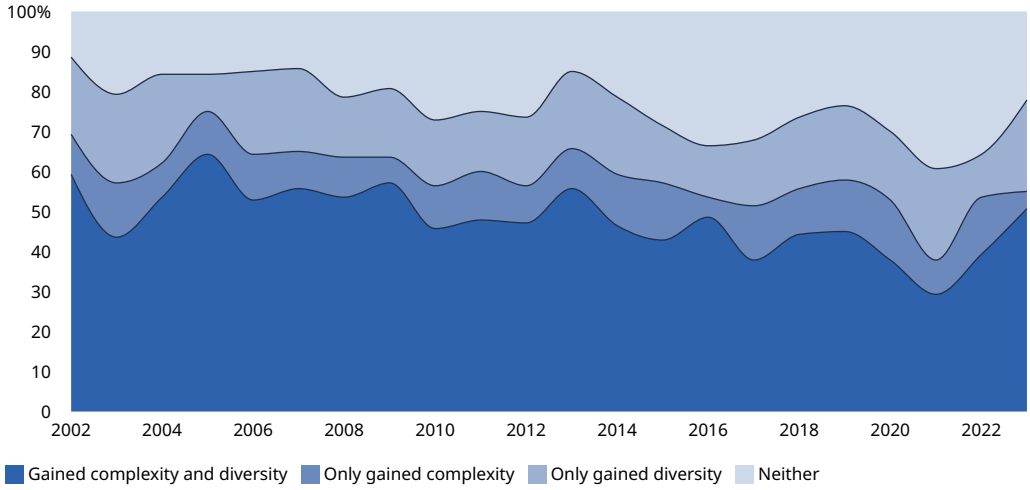
Source: WIPO, 2026; World Bank, 2024.

However, **there is a notable heterogeneity among diversification strategies**. Fast-growing economies like India and Poland are managing to leapfrog into more distant, complex fields, while others like Australia and Chile are taking a more incremental, step-by-step diversification approach.

Measuring smart diversification reveals concerning trends in global capability building (see Figure 2.9). **The number of economies simultaneously gaining both diversity and complexity has declined over the past decade**, whereas those losing both dimensions in the same year has increased – suggesting that many innovation ecosystems are struggling to navigate the twin challenges of breadth and sophistication.

Strategic diversification strategies are less common among economies

Figure 2.9 Share of economies by type of capability development strategy, 2002–2023



Note: Strategic diversification requires that the economy gains diversity and complexity during the same period.
Source: WIPO, 2026.

However, **recent data suggests potential signs of recovery after 2020**, hinting that some ecosystems may be adapting their strategies to overcome these dual development challenges.

Fast growing economies have consistently diversified into complex capabilities over the past decade

Table 2.4 Capability diversificaiton strategy by count of years, by economy, 2014–2023

	Economy	Gained both	Only gained complexity	Only gained diversity	Neither
1	China	8/10 year/s	0/10 year/s	2/10 year/s	0/10 year/s
2	Indonesia	8/10 year/s	0/10 year/s	2/10 year/s	0/10 year/s
3	Viet Nam	8/10 year/s	1/10 year/s	1/10 year/s	0/10 year/s
4	Colombia	7/10 year/s	0/10 year/s	2/10 year/s	1/10 year/s
5	Costa Rica	7/10 year/s	0/10 year/s	0/10 year/s	3/10 year/s
6	Côte d'Ivoire	7/10 year/s	1/10 year/s	0/10 year/s	2/10 year/s
7	Ghana	7/10 year/s	0/10 year/s	1/10 year/s	2/10 year/s
8	Guinea	7/10 year/s	0/10 year/s	0/10 year/s	3/10 year/s
9	India	7/10 year/s	1/10 year/s	2/10 year/s	0/10 year/s
10	Oman	7/10 year/s	1/10 year/s	0/10 year/s	2/10 year/s

Additional 130 rows not shown.

Note: Innovation ecosystems sorted by the number of years in which they diversified and gained complex capabilities. To access and search the complete set of data go to the digital edition: https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Source: WIPO, 2026.

The most successful performers are those fast-growing economies that achieved consistent smart diversification throughout the decade (see Table 2.4). **China, Indonesia and Viet Nam excelled with simultaneous diversity and complexity gains in eight out of 10 years**. In contrast, economies like South Africa and Austria frequently experienced simultaneous losses in both dimensions. Such economies might benefit from more strategic capability targeting, focusing on acquiring capabilities that bridge existing competencies with higher-complexity domains.

However, the data reveals another strategic pattern: **highly diversified economies like the United States, despite not having gained any new capabilities, increased complexity most years by shedding lower-value ones** while retaining the most rewarding competencies. This suggests that beyond acquiring new capabilities, successful innovation ecosystems must also strategically manage their existing portfolio of capabilities.

Deepening specialization as complement to diversification

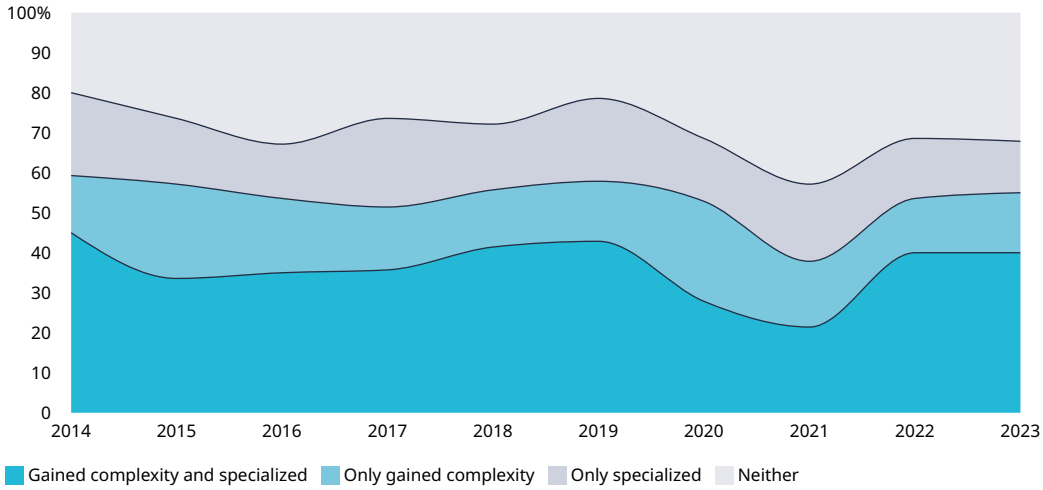
Deepening specialization involves strategically focusing resources on the most complex, high-value capabilities while protecting them with complementary knowledge that enables them to flourish. Unlike diversification strategies that seek breadth, this approach emphasizes depth and interconnectedness – identifying which capabilities generate the highest returns and ensuring they remain viable through supporting competencies.

Consider biotechnology: mastering genetic engineering requires not just laboratory skills, but complementary capabilities in regulatory compliance, clinical research, data analytics, and ethical frameworks. Economies that abandon these supporting fields may find their core biotechnology capabilities weakened or unsustainable.

This management approach explains how established innovation leaders can maintain competitiveness despite losing some of their diversity – they strategically concentrate on their most sophisticated capabilities while maintaining the ecosystem of knowledge that sustains them.

Only a few economies managed both to increase intensity in their most complex capabilities and protect them at the same time

Figure 2.10 Share of economies by type of specialization strategy, 2014–2023



Note: Strategic specialization requires that the economy specializes in high value fields and gains complexity during the same period.

Source: WIPO, 2026.

Deepening specialization is achievable but challenging. **Every year, around 40 percent of innovation ecosystems successfully increase intensity in their most complex capabilities while simultaneously gaining overall complexity** – demonstrating the dual focus required for sophisticated innovation leadership (see Figure 2.10).

However, this balance proves fragile during crisis periods. The 2020 pandemic created a notable disruption, forcing most economies to choose between specializing in existing capabilities or improving complexity, but not both simultaneously. Fortunately, performance had stabilized again by 2022, suggesting that capability management disruptions during crises may be temporary rather than structural.

China, India and Viet Nam prioritized their most complex capabilities consistently

Table 2.5 Specialization strategy by count of years, by economy, 2014–2023

	Economy	Gained both	Only gained complexity	Only specialized	Neither
1	China	8/10 year/s	0/10 year/s	1/10 year/s	1/10 year/s
2	India	8/10 year/s	0/10 year/s	2/10 year/s	0/10 year/s
3	Viet Nam	8/10 year/s	1/10 year/s	0/10 year/s	1/10 year/s
4	Cambodia	7/10 year/s	0/10 year/s	1/10 year/s	2/10 year/s
5	Côte d'Ivoire	7/10 year/s	1/10 year/s	0/10 year/s	2/10 year/s
6	Indonesia	7/10 year/s	1/10 year/s	2/10 year/s	0/10 year/s
7	Sri Lanka	7/10 year/s	1/10 year/s	1/10 year/s	1/10 year/s
8	Benin	6/10 year/s	1/10 year/s	0/10 year/s	3/10 year/s
9	Oman	6/10 year/s	2/10 year/s	1/10 year/s	1/10 year/s
10	Rwanda	6/10 year/s	0/10 year/s	0/10 year/s	4/10 year/s

Additional 130 rows not shown.

Note: Innovation ecosystems sorted by the number of years in which they both prioritized their most complex capabilities and gained complex capabilities. To access and search the complete set of data go to the digital edition: https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Source: WIPO, 2026.

Performance in specialization strategies varies dramatically across economies (see Table 2.5). **China, India and Viet Nam lead with eight out of 10 years successfully increasing intensity in complex capabilities while gaining overall complexity**. These three economies demonstrate strategic focus on the most rewarding capabilities without sacrificing sophisticated competencies.

Conversely, South Africa and the Russian Federation have faced significant challenges, struggling to achieve this balance in most years. Their difficulties highlight how resource constraints or strategic misalignment can prevent economies from simultaneously deepening their most valuable capabilities while maintaining innovation sophistication.

So, is the world leveraging its innovation capabilities?

While global innovation capacity continues expanding, **only a select group of economies has mastered the sophisticated strategies needed to transform this growth into sustained competitive advantage**.

The data paint a picture of two distinct innovation worlds. In one world, fast-growing Asian economies – led by China, India and Viet Nam– have cracked the code of smart capability development. They have consistently achieved both smart diversification (gaining breadth and complexity simultaneously) and smart capability management (intensifying focus on high-value capabilities while protecting them with complementary knowledge).

In the other world, **many established and emerging economies struggle with the dual challenge**. Despite global capability expansion, 46 percent of ecosystems have not meaningfully diversified. Complexity gains remain elusive for 70 percent of countries, and capability diffusion has stagnated over the past decade. Even advanced economies like the United States have succeeded primarily through selective capability management rather than broad-based capability building.

The implications are clear: in an increasingly knowledge-based global economy, generating innovations is no longer sufficient. Success requires mastering the delicate balance between diversification and specialization, between acquiring new capabilities and deepening existing ones. **The economies that learn to navigate this strategic complexity will shape the innovation landscape of the coming decades**, while those that don't risk being relegated to the periphery of the knowledge economy.

Where are the opportunities for innovation?

Innovation opportunities remain unevenly distributed and often untapped. Strategic success requires identifying optimal diversification paths and revealing hidden potential across global ecosystems.

Given that most economies struggle with smart diversification and strategic capability management, **identifying untapped opportunities becomes essential for informed policy decisions**. Two complementary perspectives reveal where innovation potential lies: where individual economies can strategically expand their capabilities, and where the global innovation system reveals systematic gaps.

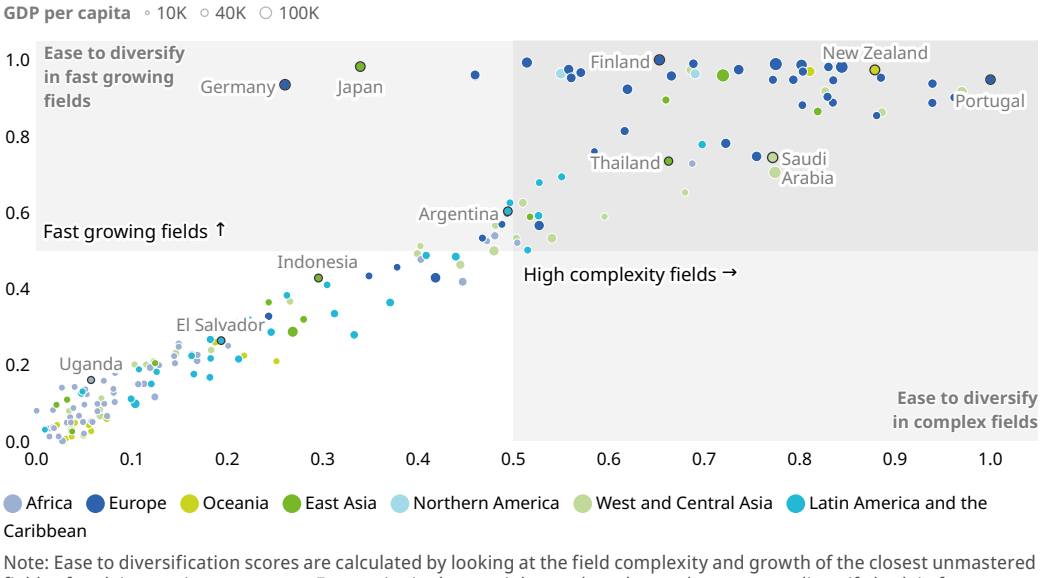
A virtuous cycle: stronger ecosystems unlock more opportunities

The first perspective analyzes diversification opportunities by examining the proximity of potential new fields to existing knowledge bases and the complexity required to master them. Not all diversification paths are equally accessible – economies can more easily develop capabilities closely related to current strengths, while distant fields require greater strategic investment. The key question becomes: which new fields offer the optimal combination of accessibility and long-term value creation?

Analyzing how easily economies can access both complex and fast-growing fields reveals important strategic insights about diversification pathways and the underlying capabilities that enable successful expansion.

Economies well-positioned to master complex fields are generally also best-positioned to enter fast-growing fields

Figure 3.1 Diversification ease of economies, 2023



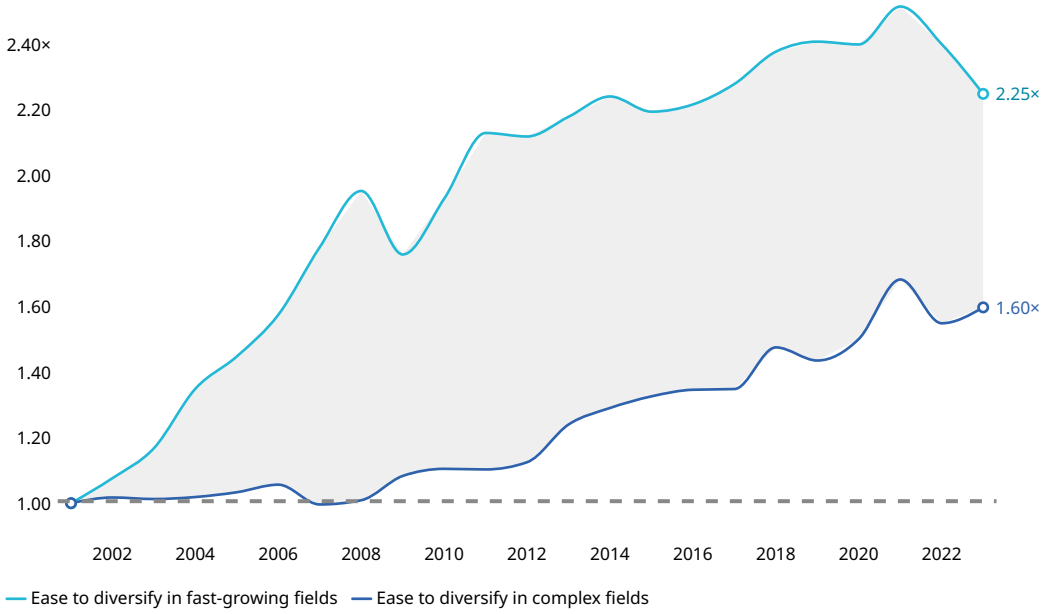
Note: Ease to diversification scores are calculated by looking at the field complexity and growth of the closest unmastered fields of each innovation ecosystem. Economies in the top right quadrant have advantages to diversify both in fast growing and complex fields. GDP = gross domestic product, K = thousand.

Source: WIPO, 2026; World Bank, 2024.

The relationship between diversification opportunities reveals a fundamental pattern: **economies well-positioned to master complex capabilities are generally also best-positioned to enter fast-growing fields** (see Figure 3.1). However, notable exceptions emerge: Germany and Japan. These two mature economies can more easily access emerging fast-growing fields than develop entirely new complex capabilities. Portugal exemplifies the typical pattern with high performance in both dimensions, whereas Uganda faces challenges in both areas, highlighting how economies at different development levels face varied difficulties in respect to strategic diversification.

Ease to diversify has increased overall, but the gap between accessing emerging markets versus developing sophisticated capabilities has actually widened

Figure 3.2 Evolution of diversification ease, 2001–2023



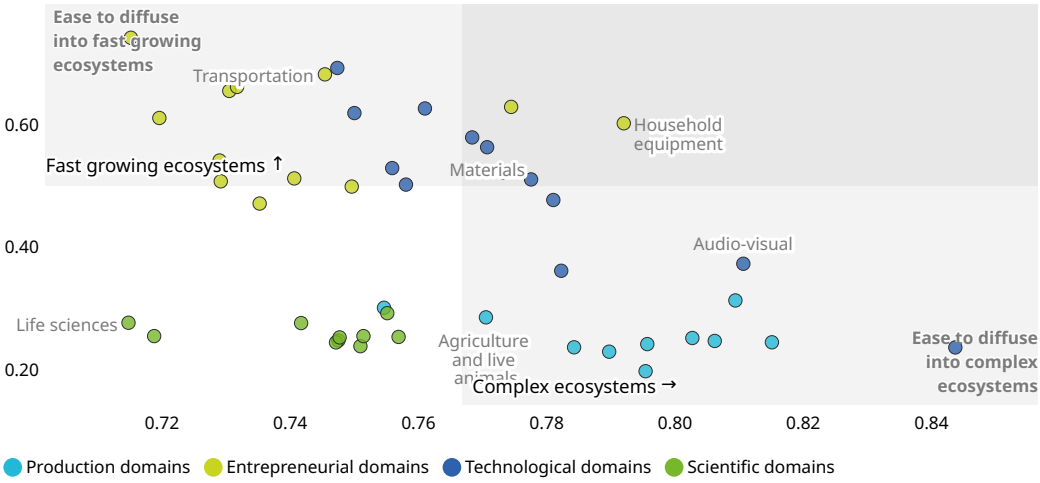
Note: Ease to diversification scores are calculated by looking at the field complexity and growth of the closest (not mastered) fields of each innovation ecosystem. Indicators are expressed as growth rates, indexed at 2001 values.

Source: WIPO, 2026; World Bank, 2026.

This virtuous cycle has strengthened over time, though unevenly across opportunity types (see Figure 3.2). Since 2001, economies' ability to access fast-growing innovation fields has more than doubled (2.25×) while access to complex fields has grown more modestly (1.60×). This divergence suggests that while diversification opportunities have generally expanded, the gap between accessing emerging markets versus developing sophisticated capabilities has actually widened, potentially reinforcing existing development disparities.

Ease to adopt capabilities depends on an ecosystem's complexity and its innovation growth

Figure 3.3 Ease of diffusion for innovation domains, 2023



Note: Ease to diffusion scores are calculated by looking at ecosystem complexity and growth to the closest economies that have not mastered each field of the innovation ecosystem. Domains in the top right quadrant have advantages to diffuse into fast growing and complex ecosystems.

Source: WIPO, 2026.

This pattern extends to individual innovation capabilities (see Figure 3.3), revealing distinct strategic pathways for different types of ecosystems.

- In general, **scientific capabilities emerge as the most accessible entry point**, suitable for economies with limited complexity – including basic research, academic publications, and fundamental studies.
- **Entrepreneurial capabilities are most compatible with low complexity, rapid growth ecosystems**.
- **Many production capabilities tend to require high complexity, but offer modest growth**.
- **Technological capabilities demand sophistication and target economies with fast technological growth**.

This segmentation suggests successful diversification strategies should align capability targets with ecosystem development levels (see Table 3.1). Analyses at the innovation ecosystem level reveal how **development levels fundamentally shape diversification opportunities**. For instance, Portugal's most rewarding opportunities concentrate in advanced technology development – reflecting its existing capabilities. Meanwhile, Afghanistan's opportunities focus on foundational scientific research and basic production activities, representing accessible entry points for building initial innovation capabilities.

The path to smart diversification can be mapped by combining relatedness and complexity indicators

Table 3.1 Top 10 most rewarding smart diversification opportunities, by economy, 2023

Economy	Field name	Relatedness	Capability complexity
Portugal	Electrical discharge machining	45.5%	7th
Portugal	Labeling machines	45.4%	6th
Portugal	Railway traffic control	47.7%	28th
Portugal	Explosives	46.2%	10th
Portugal	Percussive tools	46.7%	13th
Portugal	Vehicle connections	47.9%	33rd
Portugal	Door and window mechanisms	48.8%	47th
Portugal	Legal aspects of digital technologies and intellectual property	47.0%	19th
Portugal	Hand-propelled vehicles	48.1%	43rd
Portugal	Leather chemistry	45.1%	8th

Additional 1390 rows not shown.

Note: Fields are sorted by a combination of relatedness and complexity. Relatedness indicates the probability that an economy will master a given field, and complexity represents potential rewards. To access and search the complete set of data go to the digital edition: https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Souce: WIPO, 2026.

Reversing this perspective – examining which economy is best positioned to develop each specific innovation field – confirms this complexity hierarchy (see Table 3.2). The **most sophisticated fields concentrate opportunities among leading innovation hubs, whereas simpler fields increasingly favor less developed economies**. This dual perspective provides valuable strategic intelligence both for policymakers planning capability development and companies identifying optimal locations for innovation investment.

High-complexity ecosystems tend to be the best match for high-complexity fields, whereas simpler fields increasingly benefit emerging ecosystems

Table 3.2 Best-positioned economy for each innovation field, by complexity level, 2023

Field	Capability complexity rank	Best match	Relatedness
Customer loyalty services for retailers	1st	Germany	63.6%
Electrophotography	2nd	Germany	67.7%
Heating, cooling, and climate control devices	3rd	Austria	63.8%
Engine starting	4th	Austria	62.6%
Printing surface manufacturing	5th	France	61.2%
Labeling machines	6th	Austria	62.7%
Electrical discharge machining	7th	Sweden	60.1%
Leather chemistry	8th	Austria	62.5%
Incandescent lamps	9th	Austria	62.6%
Explosives	10th	Switzerland	60.1%

Additional 2497 rows not shown.

Note: Relatedness indicates the probability that an economy will master a field based on its current capabilities, and complexity represents potential rewards. To access and search the complete set of data go to the digital edition: https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Source: WIPO, 2026.

This methodology enables a **risk–reward framework for innovation policy**, recognizing that no unique development path exists. Policymakers should understand the risks of targeting distantly-related fields while using complexity as a guide to potential rewards. However, individual country opportunities represent only part of the innovation landscape – systematic gaps across the global system reveal where expected innovations remain absent despite favorable conditions.

Where innovation potential remains untapped

Innovation ecosystems rarely operate at their full potential. The potential indicator estimates **how much more output an economy should produce in any given field based on its performance in related areas**. For instance, a country strong in materials science and precision manufacturing should theoretically excel in advanced battery technologies – its existing capabilities provide the foundation. Untapped potential represents the gap between this theoretical capacity and actual performance, revealing where ecosystems fail to fully leverage their knowledge base (see Table 3.3).

However, not all untapped potential deserves attention. Just as smart capability management focuses resources on the most rewarding capabilities, **economies should prioritize gaps in high-complexity fields** that offer greater returns on investment. Low-complexity, untapped potential may simply reflect strategic choices to concentrate efforts elsewhere rather than true inefficiencies.

Most economies have untapped potential based on their innovation capabilities

Table 3.3 Share of achieved innovation potential in complex fields, by economy, 2023

Economy	Exports	Trademarks	Patents	Publications
China	100%	100%	93%	100%
Germany	100%	93%	95%	85%
Sweden	80%	100%	91%	100%
Switzerland	100%	100%	63%	96%
United States	71%	87%	100%	100%
Netherlands (Kingdom of the)	100%	99%	57%	95%
Republic of Korea	100%	85%	100%	62%
Canada	95%	49%	100%	100%
Georgia	100%	92%	50%	100%
France	67%	100%	76%	93%

Additional 183 rows not shown.

Note: Percentages refer to the achieved potential of each economy in complex fields based on its expected innovations in that dimension. To access and search the complete set of data go to the digital edition: https://www.wipo.int/web-publications/innovation-capabilities-outlook-2026/en/index.html

Source: WIPO, 2026.

The most significant pattern emerges in technological innovation: **only 10 percent of economies fulfill their patenting potential based on all their other capabilities**. This compares to 27 percent achieving expected trademark volumes, 30 percent meeting export expectations, and 32 percent fulfilling scientific publication potential. This suggests systematic barriers in translating scientific knowledge and manufacturing capacity into patentable innovations – highlighting a critical bottleneck in the global innovation system.

The global scale of untapped complex innovation reveals significant missed opportunities across most dimensions

Table 3.4 Number of untapped innovations, 2023

Type of outputs	Share of untapped complex potential	Untapped complex outputs	Share of potential innovations
Complex patents	26%	339K	88%
Complex exports	17%	1.4T	46%
Complex trademarks	15%	40.6K	72%
Complex publications	12%	7.5K	5%

Note: K = thousand, T = trillion.
Source: WIPO, 2026.

The global scale of untapped innovation reveals significant missed opportunities across most dimensions. Worldwide, **innovation ecosystems collectively underperform by approximately 339,000 technologies annually** – representing 26 percent of all actual technological innovations – while 40,000 trademarks (15 percent of actual volumes) and 17 percent of export potential remain unrealized (see Table 3.4).

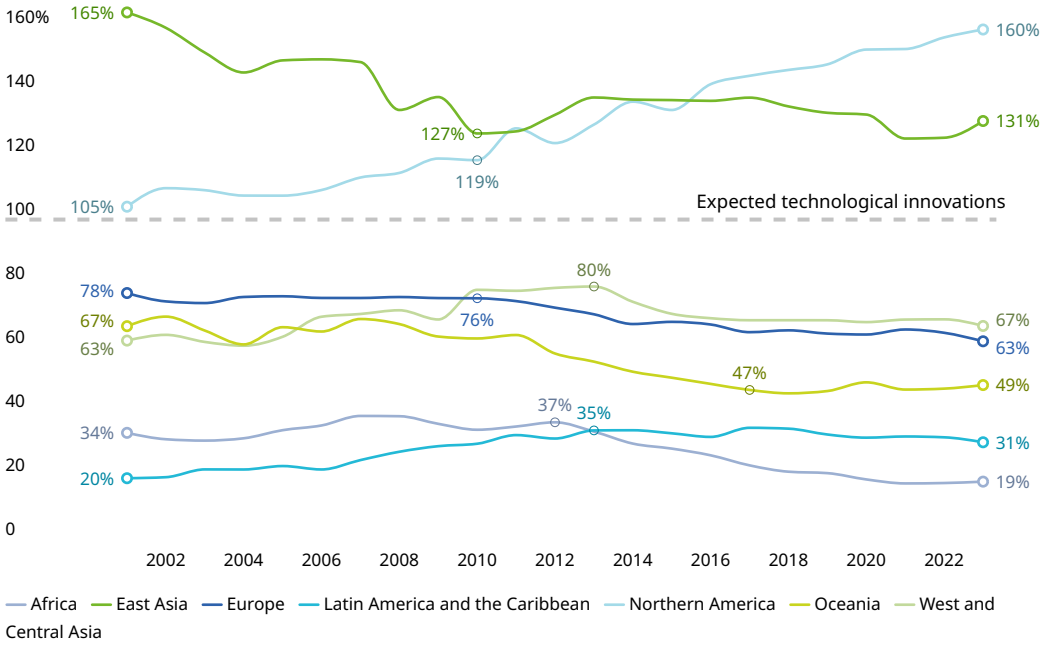
Science presents a markedly different pattern. Only 7,500 complex scientific publications remain untapped globally, representing just 5 percent of all unrealized scientific potential. The remaining 95 percent of untapped scientific publications concentrate in fields that offer limited strategic value to ecosystems.

These patterns indicate that while most innovation dimensions face systematic barriers preventing full utilization of existing capabilities, scientific research demonstrates a more effective alignment between capability development and strategic publication in complex, high-value fields.

Regional patterns in technological potential reveal global disparities in innovation system effectiveness (see Figure 3.4). Only Asia and Northern America consistently exceeded expected patent production, with Northern America's achievement rising dramatically from full potential in 2001 to 60 percent above potential by 2023. Asia has maintained strong over-performance throughout, although declining from 65 percent above potential to 31 percent above. In contrast, Europe operates at just 63 percent of its technological potential, while Oceania achieves only 49 percent. The most concerning trend appears in Africa, where technological potential achievement has declined from what was an already low 34 percent in 2001 to just 19 percent in 2023.

Most economies have untapped technological potential based on their innovation capabilities

Figure 3.4 Achieved technological potential of innovation ecosystems, by region, 2001–2023



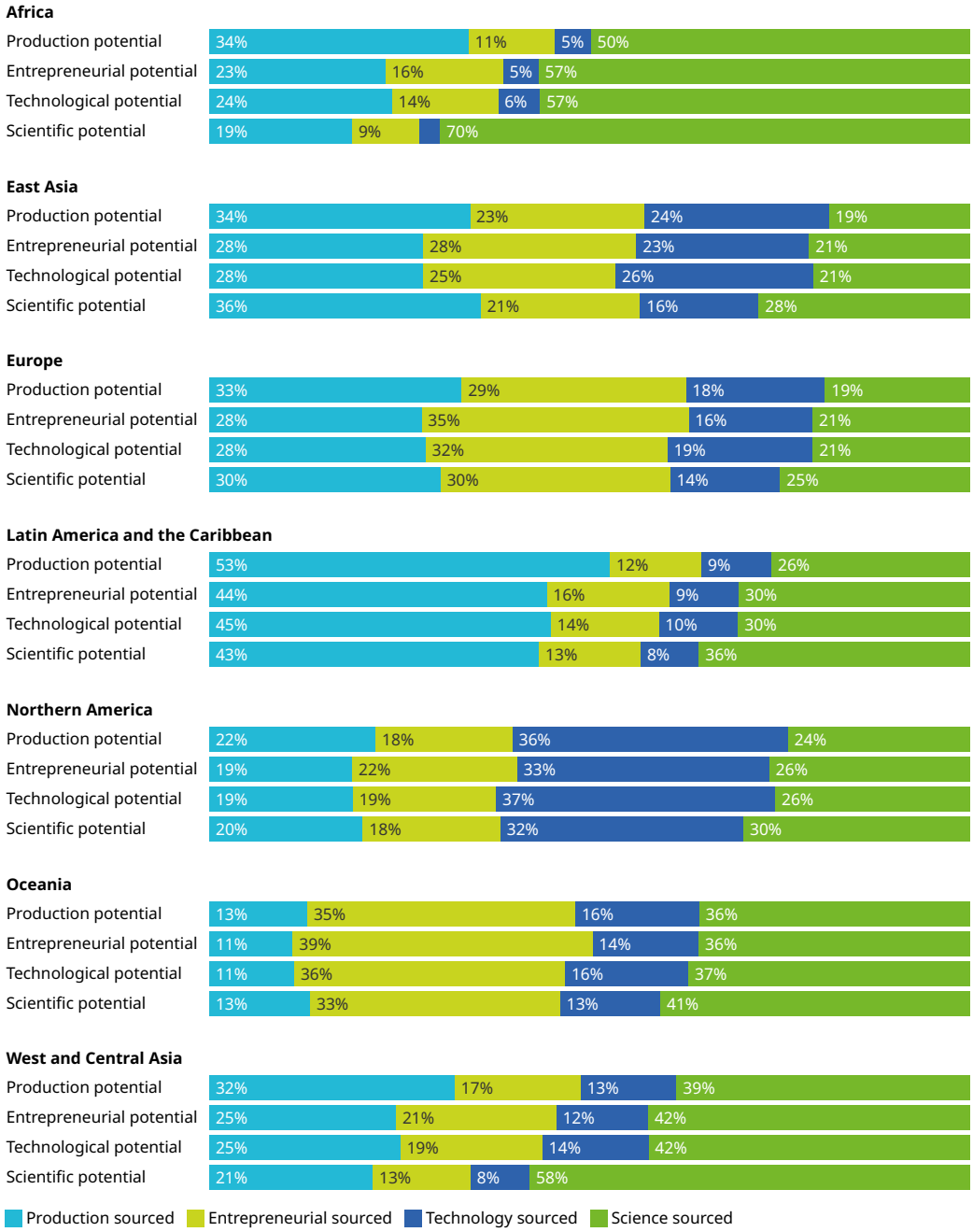
Note: Achieved technological potential is measured by the ratio between the number of technological innovations (based on patents) and the expected number of technological innovations based on other capabilities.

Source: WIPO, 2026; World Bank, 2026.

These divergent trends suggest an increasing concentration of effective innovation systems specifically in complex technological capabilities. **Northern America has strengthened its ability to convert capabilities into sophisticated patents** – indicating an improved commercialization of its most advanced knowledge. Conversely, Asia's decline suggests weakening effectiveness in translating existing capabilities into its most complex technological innovations, despite maintaining overall strength. This pattern reveals that possessing underlying scientific and manufacturing capabilities is insufficient; regions need increasingly sophisticated institutional frameworks to realize their potential in high-complexity technological innovation.

Innovation systems reveal distinct patterns in how different types of capabilities build upon each other to generate potential

Figure 3.5 Sources of innovation potential by region and type of innovation, 2023



Note: Percentages refer to the achieved potential of each economy based on its expected innovations in that dimension.
Source: WIPO, 2026.

Innovation systems reveal distinct patterns in how different types of capabilities build upon each other to generate potential, patterns that go beyond the underlying distribution of innovation fields (see Figure 3.5). While production capabilities represent the largest category (34 percent of all fields) and science the second largest (25 percent), regional specialization patterns show a marked deviation from these baseline proportions.

Latin America and the Caribbean exemplifies a science and production-driven system, where scientific research contributes 26–36 percent of potential across innovation dimensions, complemented by strong production capabilities (43–53 percent). This suggests economies that excel at fundamental research and manufacturing, but struggle to translate these into entrepreneurial ventures and technological breakthroughs.

Northern America demonstrates the most balanced innovation ecosystem, with technology capabilities contributing strongly (32–37 percent of potential) while maintaining significant contributions from all other dimensions. Each innovation type draws more evenly from different sources, suggesting sophisticated knowledge flows between activities.

In contrast, **Africa shows a heavy dependence on scientific research as a driver for untapping potential** (50–70 percent across most dimensions). This, added to a low diversity in all other dimensions, points to relatively strong academic foundations, but weaker commercialization pathways. Europe and Oceania rely more heavily on entrepreneurial capabilities to drive potential, while East Asia presents a relatively balanced profile with strong contributions from production capabilities alongside other dimensions.

The highest untapped potential in complex capabilities appears in European ecosystems

Table 3.5 Innovation potential, by domain and region, 2023

Domain	Africa	East Asia	Europe	LAC	Northern America	Oceania	WCA
Semiconductors and optics	2%	0%	80%	4%	0%	4%	10%
Machines	2%	0%	78%	4%	0%	4%	11%
Engines and transport	2%	0%	78%	4%	0%	4%	11%
Consumer	2%	0%	78%	4%	0%	4%	11%
Electronics	2%	0%	78%	4%	0%	4%	11%
Business services	3%	49%	0%	5%	29%	0%	14%
Civil engineering	4%	74%	0%	6%	0%	0%	16%
ICTs	2%	0%	78%	4%	0%	4%	11%
Processing and environmental	2%	0%	77%	4%	0%	4%	12%
Research and technology	2%	54%	0%	4%	29%	0%	11%

Additional 35 rows not shown.

Note: Percentages refer to the share of each domain that correspond to each region. ICT = information and communication technology; LAC = Latin America and the Caribbean; WCA = West and Central Asia.

Source: WIPO, 2026.

Examining untapped potential by innovation domain reveals a clear complexity hierarchy across regions (see Table 3.5). **Europe dominates missed opportunities in the most sophisticated technological fields** – holding 87–90 percent of untapped potential in advanced domains like manufacturing systems, electronics, physics instruments, and chemistry. This concentration reflects Europe's strong scientific and production foundations that remain underutilized for complex technological innovation.

As complexity levels decrease, untapped potential shifts toward other regions. **East Asia emerges prominently in mid-complexity entrepreneurial and production domains**, particularly in chemicals, research services, and manufacturing sectors. Africa's untapped potential concentrates in lower-complexity areas like agriculture, raw materials, and basic production activities, consistent with its development level and existing capabilities.

The geographical distribution of missed opportunities suggests that targeted interventions should focus on Europe's technological translation gaps, Asia's entrepreneurial commercialization challenges, and Africa's foundational capability building. This pattern reinforces the finding that untapped potential varies systematically in respect to both regional development levels and innovation complexity, providing clear strategic guidance for where different types of policy interventions might yield the highest returns.

Opportunities as a road map for strategic innovation policy

These two complementary perspectives – diversification opportunities and untapped potential – provide a comprehensive framework for identifying where innovation investments can yield the highest returns. Evidence reveals clear strategic pathways: economies should pursue diversification opportunities aligned with their development levels while addressing systematic gaps that prevent them from realizing their full innovation potential.

The patterns are remarkably consistent across both analyses. Advanced economies like those in Europe possess strong foundational capabilities, but struggle with technological translation, suggesting the need for improved commercialization infrastructure and technology transfer mechanisms. Emerging economies in Asia show balanced capabilities, but face entrepreneurial commercialization challenges, pointing toward policy interventions that strengthen market linkages and business development support. Developing economies, particularly in Africa, should focus on foundational capability building in accessible scientific and production domains while gradually building toward more complex activities.

Perhaps most importantly, these findings reveal that **innovation policy cannot rely on one-size-fits-all approaches**. The systematic nature both of diversification constraints and untapped potential suggests that successful strategies must be tailored to regional development levels, existing capability portfolios, and institutional contexts. Countries and regions that align innovation investments with these evidence-based insights are positioned to break out of traditional development constraints and accelerate a transition toward knowledge-based competitiveness.

Glossary

Core concepts

Innovation ecosystems The interconnected network of institutions, organizations and capabilities within an economy that collectively drive innovation activities. These ecosystems are analyzed through their scientific, technological, entrepreneurial, and productive dimensions.

Innovation capabilities The specialized skills, knowledge, and institutional strengths that enable economies to create competitive advantage in specific innovation fields. These capabilities are revealed through outputs in different dimensions.

Absolute specialization Captures an ecosystem's mastery in a field by identifying global leaders in specific innovation fields based on the highest absolute volumes of output (e.g., most patents, trademarks, publications, or exports).

Relative specialization Captures competitive advantage by identifying economies that perform exceptionally well in specific fields compared to their overall innovation activity. Countries that have more output compared to their "fair share" are assumed to exhibit relative specialization.

Relatedness The degree to which different innovation capabilities share common knowledge, skills or infrastructure, determining how easily an ecosystem is able to diversify from one field to another. The relatedness is calculated by the co-production patterns in different fields that can possibly come from different dimensions.

Strategic capability diversification The strategic process of simultaneously gaining capability diversity while increasing ecosystem complexity — expanding into new complex innovation fields.

Strategic capability specialization The strategic approach of focusing resources on the most complex, high-value skills while protecting them with complementary knowledge that enables these capabilities to flourish.

Core indicators

Capability complexity A measure of how sophisticated and interconnected an innovation capability is, indicating the density of knowledge, skills, and supporting infrastructure required for successful development.

Ecosystem complexity The overall level of sophistication of an innovation ecosystem, determined by the complexity of capabilities it has mastered and the density of connections between different innovation fields.

Ease of diversification A measure of how readily an economy can access new innovation fields (fast growing or complex) based on its current capability portfolio.

Ease of diffusion The degree to which innovation capabilities spread across different economies over time, indicating whether specific fields are becoming more accessible globally or concentrating among fewer players.

Innovation potential A measure that estimates how many innovations an economy should produce in any given field based on its demonstrated capabilities in related innovation areas.

Untapped potential The gap between an economy's theoretical innovation capacity in a given field (based on its performance in related areas) and its actual innovation output.

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