TRIM
CENTER OF EXPERTISE

PEOPLE, TECHNOLOGY, AND GLOBALIZATION: A NEW SYSTEM OF COORDINATES

A REPORT ON THE OUTCOMES OF THE SECOND OPEN DIALOGUE

Moscow | 2026

NATIONAL CENTRE RUSSIA
OPEN DIALOGUE
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Foreword

The world and the global economy are undergoing profound structural changes. The model of globalization and demographic trends are changing, the financial system is being transformed, and technological development is radically accelerating these processes.

Taken together, these changes are shaping a new configuration of the global economy and require a reassessment of previous approaches to economic growth and international cooperation.

One of the key trends is the emergence of a new multipolarity. We are seeing intensifying global competition for technological, economic, and institutional sovereignty. In today's environment, sovereignty is defined not only by access to resources, but also by the ability to develop critical competencies, ensure technological self-sufficiency, and participate in shaping global standards and values.

At the same time, sustainable long-term development is directly linked to human capital. Amid accelerated digitalization, the ability to think critically, adapt to change, and retain agency in an environment shaped by algorithmic decision-making is becoming increasingly important.

The *Open Dialogue: Future of the World* project was launched in 2025 and is aimed at creating an international platform for discussing long-term global changes. In 2026, the project included expert discussions and an international essay competition in which anyone in the world could present their vision of the future, share ideas, and propose practical steps for bringing them to life. This made it possible to collect a broad range of assessments, ideas, and scenarios for the development of the global economy and society.

This report summarizes the results of these discussions and presents an analytical view of future global development trends needed for strategic planning and decision-making under conditions of high uncertainty.

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Deputy Chief of Staff of the Presidential Executive Office

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C-39

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The report on the outcomes of the Second Open Dialogue, "The future of the world: A new
F79 platform for global growth," was prepared by the TRIM Center of Expertise. The work is based on discussions held as part of the expert dialogues in January 2026, as well as more than 1,600 essays from 100 countries in 20 languages submitted by project participants.

The report analyzes global structural changes, including the transformation of the globalization model, the restructuring of the financial system, demographic shifts, and the acceleration of technological development.

The publication is intended for representatives of government authorities, international organizations, the expert and academic communities, as well as all those interested in global changes in the economy.

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CONTENTS

Executive summary

The global economy is entering a phase of structural transformation characterized by changes in the architecture of globalization, accelerating technological development, and demographic shifts. A new model of global interaction is emerging, based on a distributed system of economic centers and the growing role of technology platforms. Sovereignty is becoming a key factor of competitiveness and is defined by the ability to manage resources, technologies, and critical dependencies.

The financial system is being transformed as it encounters the limitations of the traditional debt-based model. Rising government and corporate debt, higher transaction costs, and the geopolitical fragmentation of financial flows are increasing the vulnerability of the existing settlement infrastructure. Under these conditions, **interest is growing in alternative financial instruments and institutional solutions**, including digital currencies and new payment architectures.

Demographic changes are becoming one of the key factors shaping long-term economic dynamics. **Declining birth rates and population aging in a number of countries are accompanied by a growing burden on healthcare and social security systems,** while other regions continue to retain demographic growth potential. This increases the unevenness of global development and creates new challenges for labor markets and social policy.

The technological transformation of the economy is leading to the emergence of new models of production and governance. Artificial intelligence, automation, and digital platforms are reducing transaction costs, increasing productivity, and changing the structure of employment. At the same time, the importance of adaptability, technology management, and lifelong learning is increasing.

Taken together, **these processes are shaping a new agenda for human capital development,** in which lifelong education, preventive medicine, and the development of competencies that ensure the resilience of individuals and organizations amid technological change are becoming critically important.

Methodology and Research sources

This report was prepared as part of the Open Dialogue project. The project is an international expert initiative aimed at identifying global trends and discussing possible scenarios for the development of the global economy and society. It is implemented on a regular basis and brings together researchers, business representatives, government institutions, and independent thinkers from different countries.

The work on the report combined analytical research with a foresight approach. On the one hand, the analysis was based on quantitative data, academic research, and reports by international organizations. On the other hand, collective discussion of the future became an important part of the process. This included identifying ideas, hypotheses, and weak signals that may shape long-term development trajectories. This approach makes it possible not only to describe trends that have already taken shape, but also to identify areas that are only beginning to emerge.

A key stage of the project was the expert dialogues held in January 2026. During these discussions, international experts examined fundamental changes in the global economy, technology, finance, demographics, and human capital development. The purpose of the discussions was not only to describe current processes, but also to form a comprehensive picture of possible long-term transformations.

Ideas and assessments submitted by participants in the second international essay competition also became an important part of the report. In 2026, more than 1,600 authors from over 100 countries took part in the competition. They included researchers, entrepreneurs, students, and representatives of civil society organizations. Participants were invited to examine key issues in the development of the economy and society. They were also asked to offer their own interpretations of the changes being observed. Submissions were accepted in four areas: investment in people, investment in the environment, investment in technology, and investment in connectivity.

The use of competition materials made it possible to broaden the range of perspectives. It also complemented the expert analysis with practical observations and ideas that go beyond established research paradigms. The quotations included in the report reflect the diversity of approaches to understanding the future. They are used as illustrative examples, not as independently proven statements.

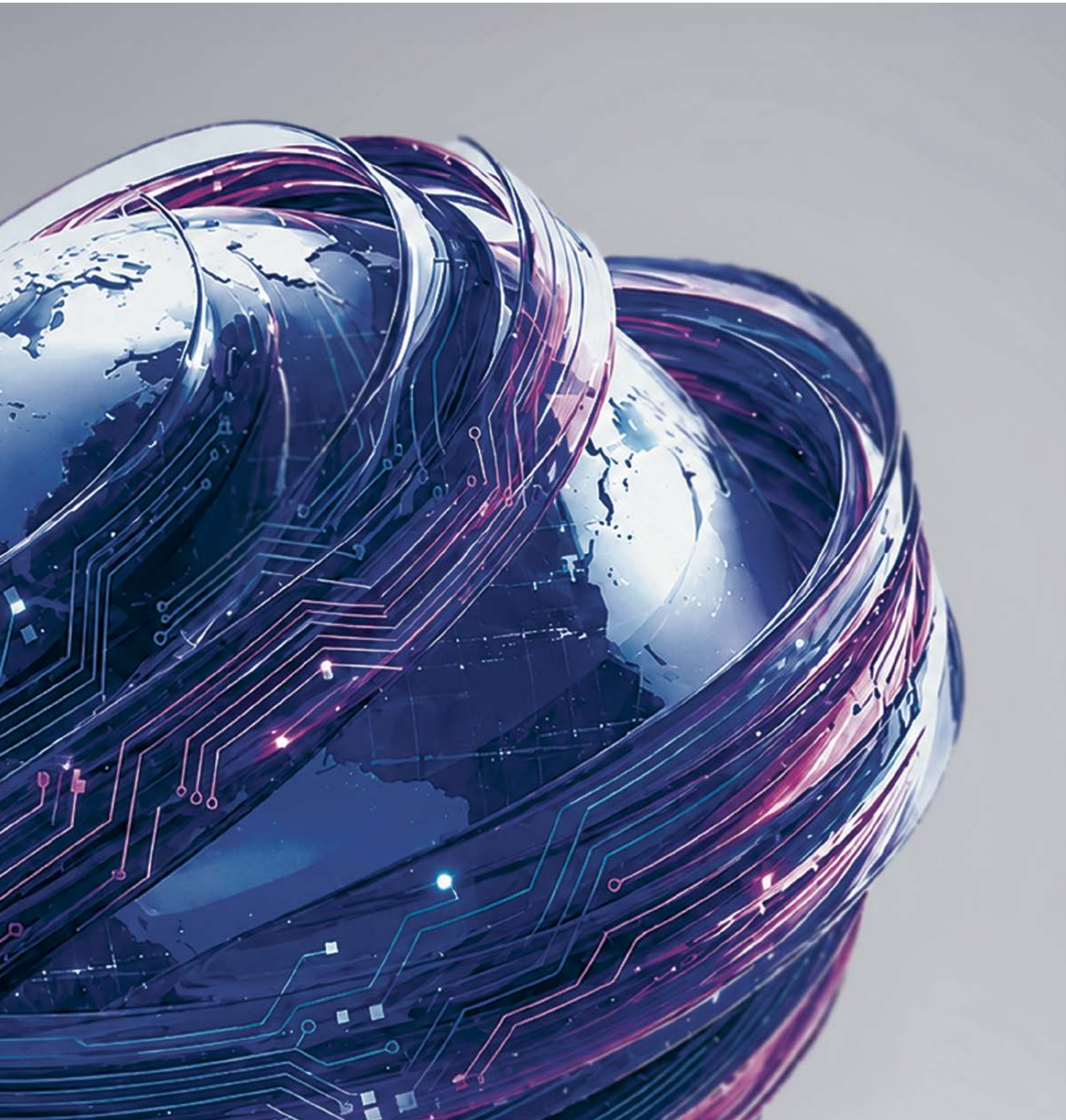
It is important to emphasize that this report is not a forecast in the strict econometric sense. It is a foresight study aimed at identifying possible directions of long-term change and discussing their potential consequences. A foresight approach inevitably involves some element of interpretation and hypothesis. The authors deliberately focused on selected trends in order to make them more analytically distinct and to stimulate discussion of strategic challenges. This approach makes it possible to identify risks and opportunities at an early stage of their formation.

For this reason, some scenarios and formulations in the report may appear more pronounced than current statistical trends suggest. This deliberate “sharpening of contrast” is a conscious analytical technique. Its purpose is not to predict the exact configuration of the future, but to show possible development trajectories and stimulate discussion of strategic challenges.

The report brings together statistical data, expert assessments, and the views of project participants. The trends presented should be regarded as an analytical basis for further discussion, strategy development, and refinement of the parameters of long-term development in the global economy and society.

CHAPTER 1

GLOBALIZATION 2.0: THE ARCHITECTURE OF THE FUTURE WORLD ORDER



1. GLOBALIZATION 2.0: THE ARCHITECTURE OF THE FUTURE WORLD ORDER

The global economy is moving toward "Globalization 2.0." New centers of growth are emerging, supported by demographic and technological potential. Sovereignty is becoming a key factor of competitiveness. It is defined by the ability to manage resources, technologies, and critical dependencies.

New players are entering the global arena. These include digital platforms and decentralized actors. At the same time, connector countries are gaining importance amid uncertainty and competition for trade, digital, and technology flows. As a result, a networked, multipolar architecture of the global economy is taking shape.

1.1 Signs of a structural shift in the global economy

Changes in the structure of global GDP

The global economy has entered a phase of structural transformation that goes beyond cyclical crises and market fluctuations. Traditional growth drivers are facing constraints. Record levels of debt, population aging, and the crisis of established global institutions are changing the previous architecture. Structural transformation is not limited to changes in the contribution of individual countries or regional blocs to global gross domestic product (GDP). Its key element is the strengthening of the countries of the Global Majority[1,2], which are transforming from peripheral participants in the world economy into self-sufficient poles of economic growth.

New centers of economic growth are becoming conduits of structural change in the global economy. Their advantages include human capital and fiscal space for investment in infrastructure, industry, and technology. The combined GDP at purchasing power parity of the BRICS countries—Brazil, Russia, India, China, South Africa, Egypt, Iran, the United Arab Emirates, Ethiopia, and Indonesia—already accounts for about 40% of the global total. This exceeds the share of the G7 countries—the United Kingdom, Germany, Italy, Canada, the United States, France, and Japan—by approximately 30%[3] (Figure 1).

Demographic shift

The demographic factor supports the trend toward a stronger role for the countries of the Global Majority. In 2024, these countries were home to approximately 6.95 bn people, or 85.5% of the world's population[4]. They also lead in the number of births (Figure 2).

Relatively high fertility rates and a young population structure create significant long-term growth potential. In the countries of the Global Majority, these factors support the expansion of labor and consumer markets. They also provide a foundation for long-term economic growth (see Chapter 3 for more detail).

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1 The term "Global Majority" was first mentioned in an interview with Russian Foreign Minister S. V. Lavrov in December 2022. This group primarily includes BRICS+ countries and other states in Asia, Latin America, Eastern Europe, and Africa, which together hold significant economic weight in the global economy and are ready to develop new, effective mechanisms of cooperation.

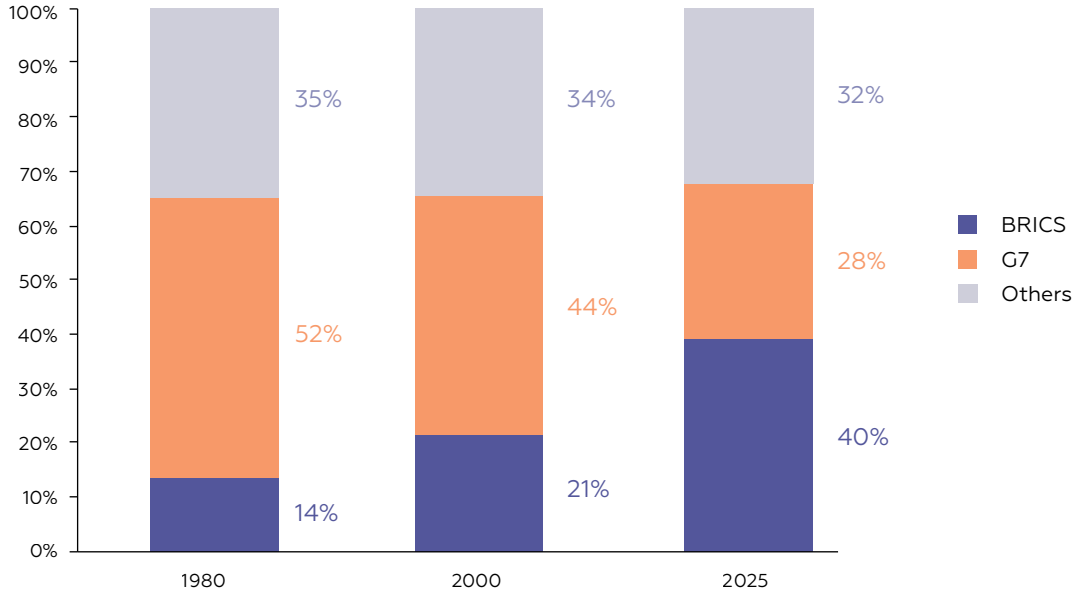
2 Ministry of Foreign Affairs of the Russian Federation. (2022, December 28). Interview of the Minister of Foreign Affairs of the Russian Federation S.V. Lavrov on the "Big Game" program on Channel One, Moscow [in Russian]. https://www.mid.ru/ru/foreign_policy/news/1845915/

3 BenCham Shanghai. (2024). BRICS vs. G7: A tiny comparison. https://www.imf.org/external/datamapper/PPPSH@WEO/OEMDC/ADVEC/WEOWORLD

4 IMF and World Bank data, TRIM calculations, 2025.

Figure 1

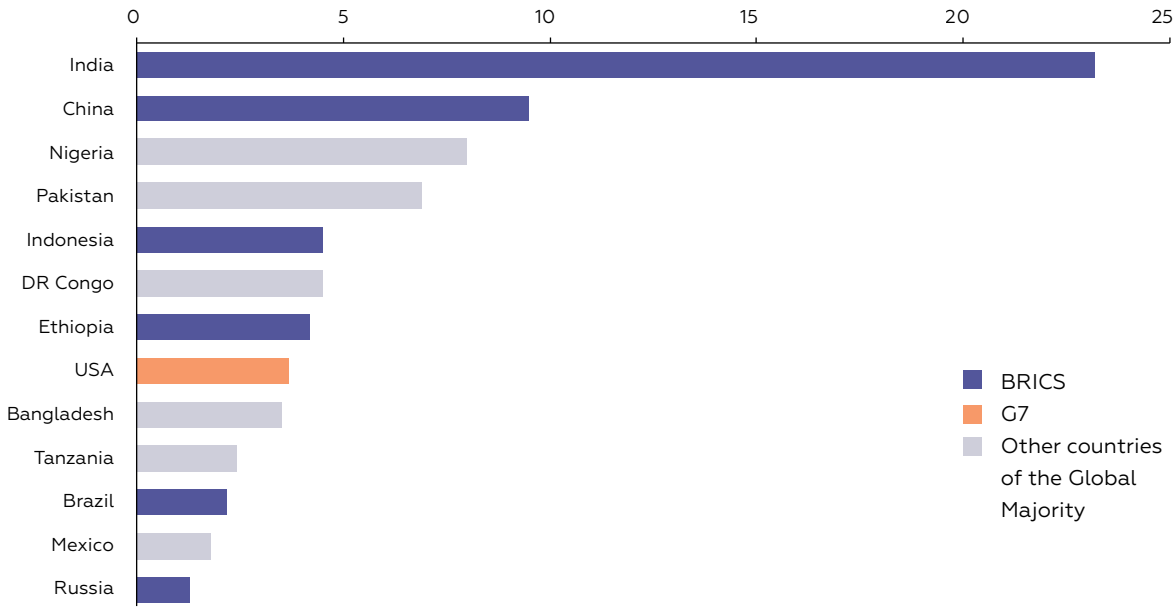
Economic share of country groups in the world economy



Note: The total share may not equal 100% due to rounding.
Source: IMF and World Bank data, TRIM calculations, 2025[5].

Figure 2

Number of births by country, mn people, 2024



Source: World Bank.

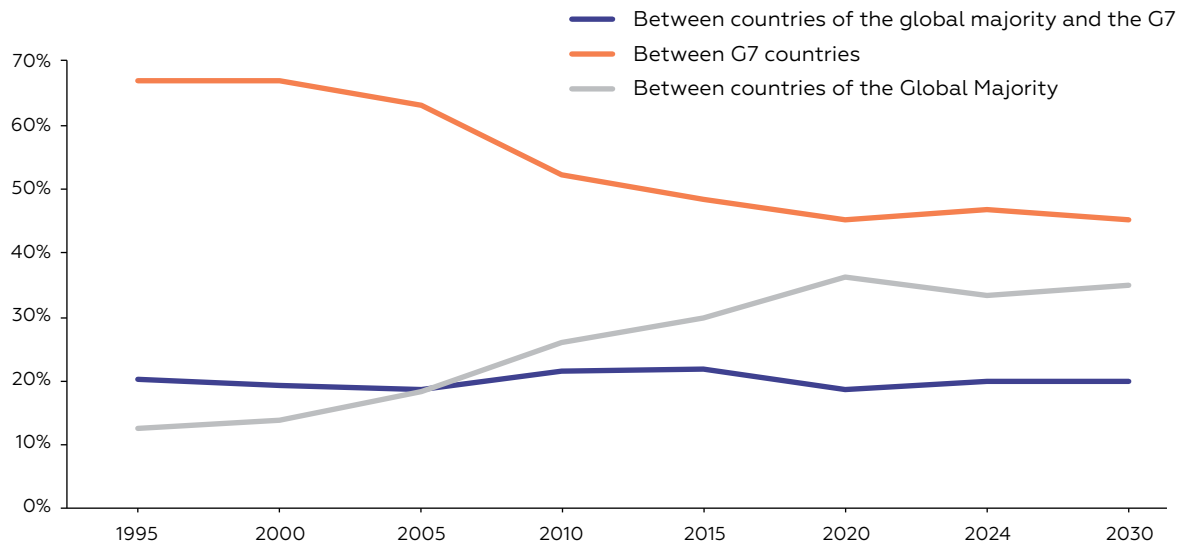
Unlike the G7 countries, which have moderate growth rates, many economies in Asia, Africa, and Latin America have the potential to expand both domestic demand and production at the same time. **This makes them the main engine of the global economy in the medium term.** In the rest of this report, they are referred to as new centers of economic growth. This reflects their demographic potential, expanding domestic demand, and growing production and technological capabilities.

[5] International Monetary Fund. (2025). GDP based on PPP, share of world. https://www.imf.org/external/datamapper/PPPSH@WEO/OEMDC/ADVEC/WEOWORLD

Global trade and logistics

The traditional model, in which mature economies served as the main centers of demand, is gradually giving way to a system of horizontal ties among the countries of the Global Majority. In 2024, their share of global trade reached one-third. **This share is projected to continue growing** (Figure 3). The growth of mutual trade outside mature economies is becoming one of the key signs of a new global configuration.

Figure 3
Trends in the composition of global trade



Source: United Nations Conference on Trade and Development (UNCTAD)[6].

Moses Mutinda[7]
Kenya

« Deliberate investments in cross-regional connectivity, particularly through inclusive infrastructure, digital networks, and alternative financial flows centered on the Global South, can build a more resilient and equitable platform for global growth. »

BRICS+ countries are forming a new core of global trade. This expanded BRICS grouping includes Belarus, Bolivia, Kazakhstan, Cuba, Malaysia, Thailand, Uganda, and Uzbekistan. Together, these countries account for approximately 24% of global trade turnover[8]. From 2002 to 2024, **their share of global merchandise trade more than doubled**[9,10], exceeding USD 800 bn[11]. They are building new economic partnerships and hedging risks in the event of sudden supply disruptions or unilateral protectionist measures.

Over the past 25 years, **the number of bilateral, regional, and mega-regional trade agreements in force worldwide has increased to approximately 370.** This represents an almost fourfold increase[12].

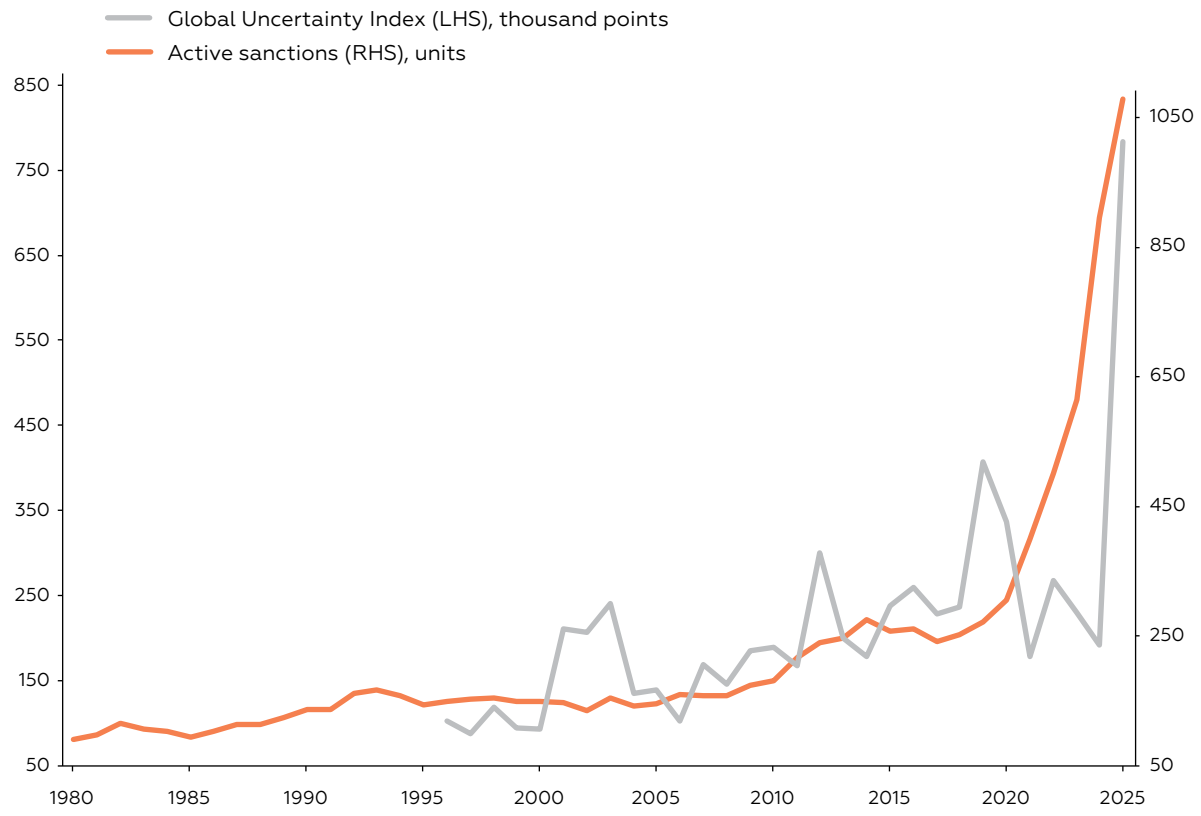
6 United Nations Conference on Trade and Development. (n.d.). UNCTAD data hub. https://unctadstat.unctad.org/
7 Here and henceforth, quotations are given from the publication: National Centre "Russia". (2026). Open dialogue: A collection of essays from the second competition [in Russian]. dialog.russia.ru/essay_collection
8 Official Portal of Brazil's BRICS Chairmanship. (n.d.). BRICS. https://brics.br
9 International Monetary Fund. (2025). Macroeconomic and financial indicators. https://www.imf.org/en/Data
10 World Bank. (n.d.). World Bank Open Data. [Data set] https://data.worldbank.org
11 United Nations Conference on Trade and Development. (n.d.). UNCTAD Data Hub. https://unctadstat.unctad.org/
12 World Trade Organization. (n.d.). Regional Trade Agreements Database. https://rtais.wto.org/UI/charts.aspx

Mustafizur Rahman
Bangladesh

«Global trade is becoming more fragmented. [...] An increasingly larger share of global trade is taking place through intra-regional trade. [...] The nature of global trade has been undergoing important changes and the calls for WTO reforms from powerful quarters have been on the rise in recent years.»

Geoeconomic competition and rising protectionism are increasing the fragmentation of the trade system. Economic instruments are being used more frequently as mechanisms of pressure. From 2020 to 2025, their number increased 3.5 times, reaching 1,080 active sanctions (Figure 4). By early 2026, the share of global trade conducted under the World Trade Organization's (WTO) most-favored-nation regime had fallen from 80% to 72%[13]. The number of sanctions imposed had reached approximately 1,000 cases.

Figure 4
Number of active sanctions (units) and Global Uncertainty Index (thousand points)



Source: World Uncertainty Index, Global Sanctions Database, LSEG[14, 15].

Global uncertainty is being intensified not only by economic rivalry, but also by political conflicts, natural disasters, and technical failures. **A separate factor of instability is the dependence of global trade on several transport and logistics hubs.** More than 50% of maritime trade passes through the Strait of Malacca, the Strait of Hormuz, the Suez Canal, and the Panama Canal. These routes are regularly exposed to political and logistical shocks.

[13] World Trade Organization. (2026). Global Trade Outlook and Statistics, March 2026. https://www.wto.org/english/res_e/booksp_e/gtos0326_e.pdf
[14] Ahir, H., Bloom, N., & Furceri, D. (n.d.). World uncertainty index. https://worlduncertaintyindex.com/
[15] Global Sanctions Database. (n.d.). Global sanctions database [Data set]. https://www.globalsanctionsdatabase.com/

Freight shipping crises in the Suez Canal were caused by the technical blockage of the route by a container ship in 2021[16] and by security problems beginning in 2023[17]. In the Panama Canal, they were caused by a severe drought in 2023–2024 and by issues related to port management beginning in 2025[18]. In the Strait of Hormuz, they were caused by the military conflict in the Middle East beginning in 2026[19,20].

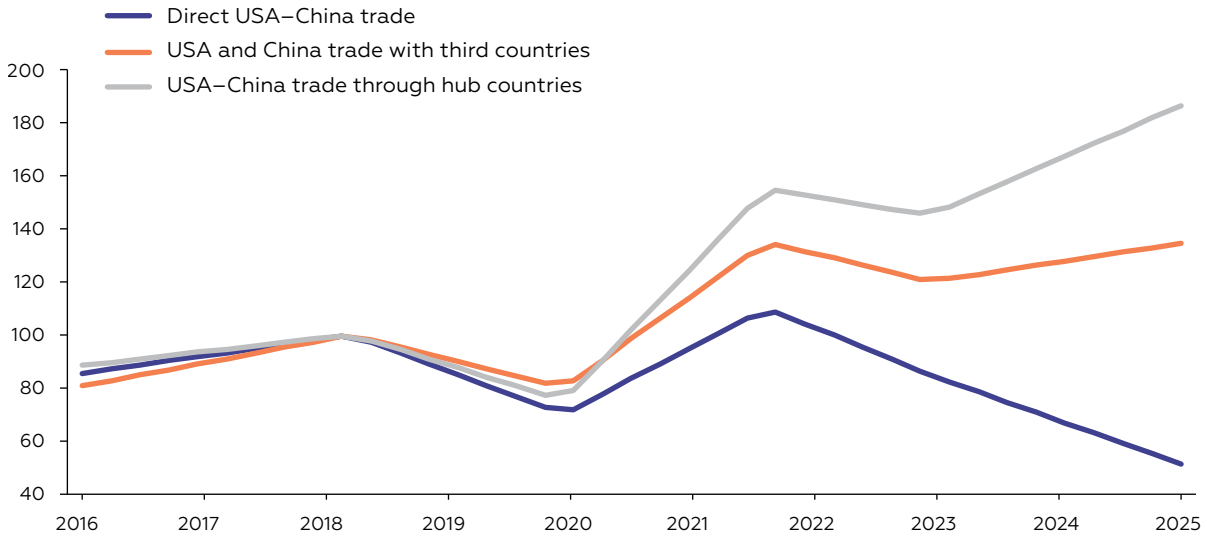
The response to the instability of transport infrastructure is the development of alternative global logistics channels and the growing role of connector countries. In this report, connector countries are understood as states that perform an important linking function in the global economy by providing their transport, logistics, financial, or institutional infrastructure.

Rakhim Oshakbayev[21], Chief Economist of the TALAP Center for Applied Research
Kazakhstan

« Today, global connectivity is less about efficiency and more about the resilience of trade routes against external pressure. »

Financial centers, logistics hubs, and production nodes are becoming key intermediaries in the global economic system. **These include financial centers such as Malaysia and the United Arab Emirates, logistics hubs such as Turkey, Saudi Arabia, and Ethiopia, and production nodes such as Vietnam.** Their importance is supported by their neutral status and high level of technological capacity.

Figure 5
Index of trade volume between the US and China directly and via third countries



Source: WTO, based on TRIM calculations.

[16] Reuters. (2021, July 7). Ever Given container ship leaves Suez Canal 106 days after getting stuck. https://www.reuters.com/world/ever-given-container-ship-set-leave-suez-canal-2021-07
[17] Coface. (2025). Houthi attacks in the Red Sea: Why maritime trade is (still) not smooth sailing. https://www.coface.com/news-economy-and-insights/houthi-attacks-in-the-red-sea-why-maritime-trade-is-still-not-smooth-sailing
[18] Foreign Policy. (2025, October 17). Trump's Panama port predicament. https://foreignpolicy.com/2025/10/17/panama-canal-ports-ck-hutchison-cosco-china-us-trump
[19] Deloitte. (2026). The Middle East conflict begins to cast a shadow on the global economy. https://www.deloitte.com/us/en/insights/topics/economy/iran-middle-east-conflict-impacts-global-economy.html
[20] International Monetary Fund. (2026, March 30). How the war in the Middle East is affecting energy, trade, and finance. https://www.imf.org/en/blogs/articles/2026/03/30/how-the-war-in-the-middle-east-is-affecting-energy-trade-and-finance
[21] Oshakbayev, R. (2026). Presentation at the "Open Dialogue" conference: Panel pitching "The Future of Peace: Investing in Connectivity" [Video]. YouTube. [in Russian]. https://www.youtube.com/watch?v=t58wenZxxVw

The redirection of trade flows through connector countries in 2025 became an example of adaptation to trade wars. Direct trade between the United States and China fell by 19% in 2025 due to the introduction of U.S. tariffs. However, trade through connector countries grew by 8% (Figure 5). The Association of Southeast Asian Nations (ASEAN) began to be used as a transit hub. ASEAN countries increased imports from China by 10%. At the same time, external market shipments from Vietnam rose by 18%, from Malaysia by 14%, from Singapore by 12%, and from Thailand by 13%. For the same reason, freight traffic along the North-South International Transport Corridor (ITC) is projected to triple by 2030[22].

Ravi Raj
India

« The need to diversify trade routes and avoid sanctioned areas has sparked a 'transport renaissance', reviving initiatives like the Trans-Caspian International Transport Route (TITR) and the International North-South Transport Corridor (INSTC). [...] [We] should focus on the faster digital sovereignty to minimize strategic weaknesses, harmonizing the technical standards along competing routes. »

New mechanisms for international settlements

New centers of economic growth and connector countries are becoming channels for alternative payment mechanisms. The trigger is the precedent of using international financial settlements as instruments of coercion. This includes the freezing of central bank reserves, disconnection from SWIFT, and bans on investment. As a result, **diversification of currency settlements is accelerating.** The dollar's share of global foreign exchange reserves fell from approximately 70% in 2000 to around 56% by the fall of 2025[23]. By 2035, the dollar's share of reserves may decline to approximately 50%, while the yuan's share may triple to around 6%[24].

Mughees Khan
Pakistan

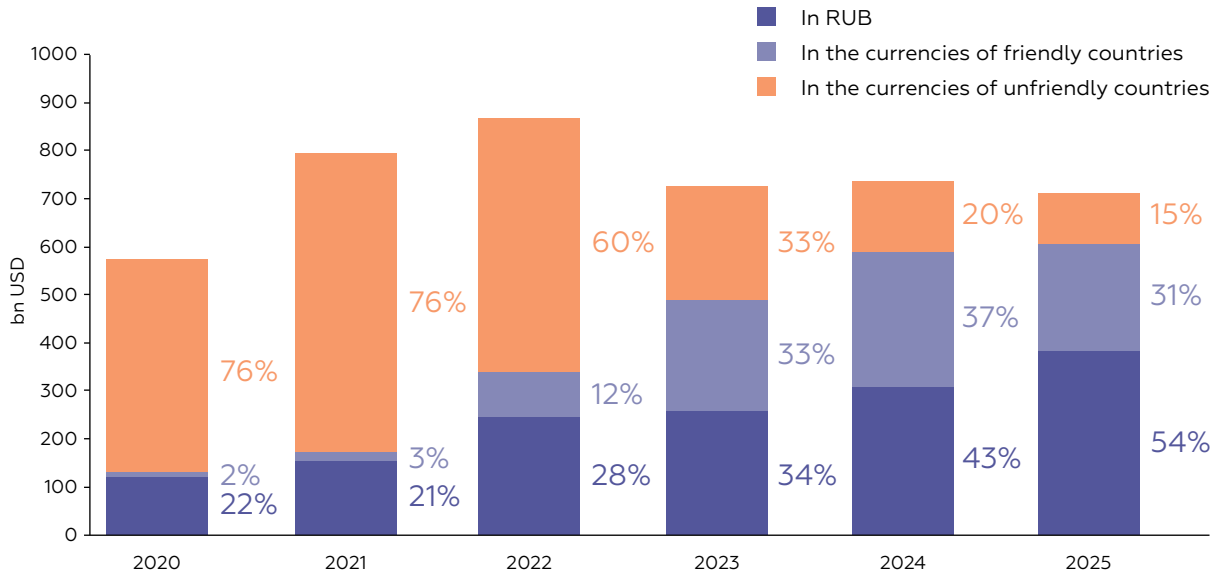
« BRICS is the most viable institutional platform for reshaping the global financial system into a more decentralized and democratic order. The primary constraint confronting BRICS' ambition to dilute dollar dominance does not lie in the absence of a single, unified currency, but in a more subtle structural limitation, which is the issue of 'currency mismatch and stuck balances'. When trade is settled in national currencies, [...] they cannot easily use elsewhere, because third parties for example, China do not accept rupees. »

Countries are making more active use of national currencies in bilateral trade and developing regional clearing mechanisms. Under these conditions, Russia has demonstrated the practical possibility of redirecting settlements and diversifying the currency structure of foreign trade. Since 2022, Russia's external trade turnover has declined to USD 711 bn. This was caused by falling commodity prices on global markets. However, the currency structure of trade has changed significantly. The share of settlements in rubles and in the currencies of friendly countries increased from 22% in 2021 to more than 80% in 2025 (Figure 6).

[22] Transport Russia. (2024). NSTC "North–South": Time to realize potential [in Russian]. https://transportrussia.ru/razdely/avtomobilnye-dorogi/10995-mtk-sever-yug-vremya-realizovat-potentsial.html
[23] International Monetary Fund. (2025). Currency composition of official foreign exchange reserves (COFER) [Data set]. https://data.imf.org/en/Data-Explorer?datasetUrn=IMF.STA:COFER(7.0.1)
[24] Reuters. (2025, June 24). Exclusive: Central banks eye gold, euro and yuan as dollar dominance wanes. https://www.reuters.com/world/china/central-banks-eye-gold-euro-yuan-dollar-dominance-wanes-2025-06-24/

Figure 6

Currency structure of Russia's foreign trade



Source: Bank of Russia, TRIM estimates[25].

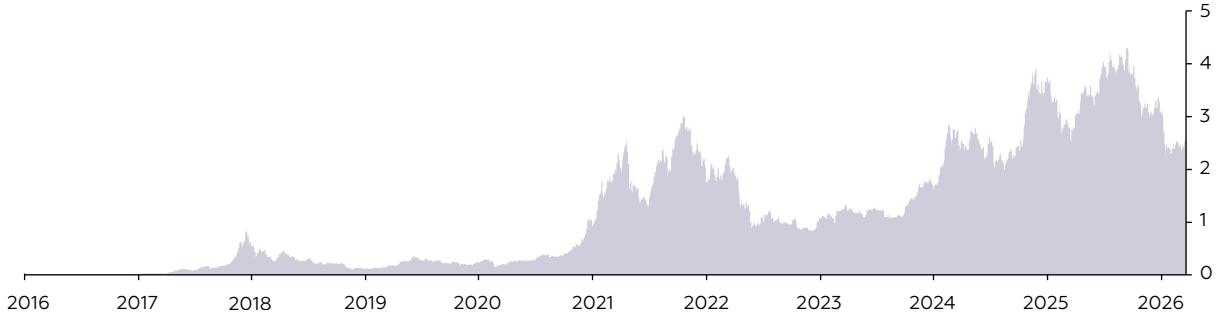
New digital ecosystems are also developing. Indian digital payment and service platforms, including UPI, ONDC, and others, are revolutionizing retail trade. In Africa, mobile fintech services such as M-Pesa and similar platforms are spreading rapidly. **Platform technologies and digital services make it possible to move directly to a modern information model, bypassing the long stage of building traditional infrastructure.** As a result, the countries of the Global Majority can increase productivity more quickly. They can also integrate into global value chains with high-value-added products and services.

Decentralized financial operations are developing in parallel. These include cryptocurrencies, stablecoins, smart contracts, and related instruments. They make it possible to conduct transactions without traditional banks and intermediaries. The capitalization of cryptocurrencies increased from USD 0.8 tn in 2021 to USD 4 tn in 2025 (Figure 7). They are becoming new centers of economic activity and influencing the behavior of users and companies globally.

As a result, some state functions as an intermediary in the economy are partially shifting toward new actors. These actors are effectively replacing conventional institutions in certain areas (see Chapter 2 for more detail).

Figure 7

Cryptocurrency market capitalization, tn USD



Source: Coin Gecko.

[25] Bank of Russia. (2026). External sector statistics [Data set]. https://www.cbr.ru/statistics/macro_itm/external_sector/etg/

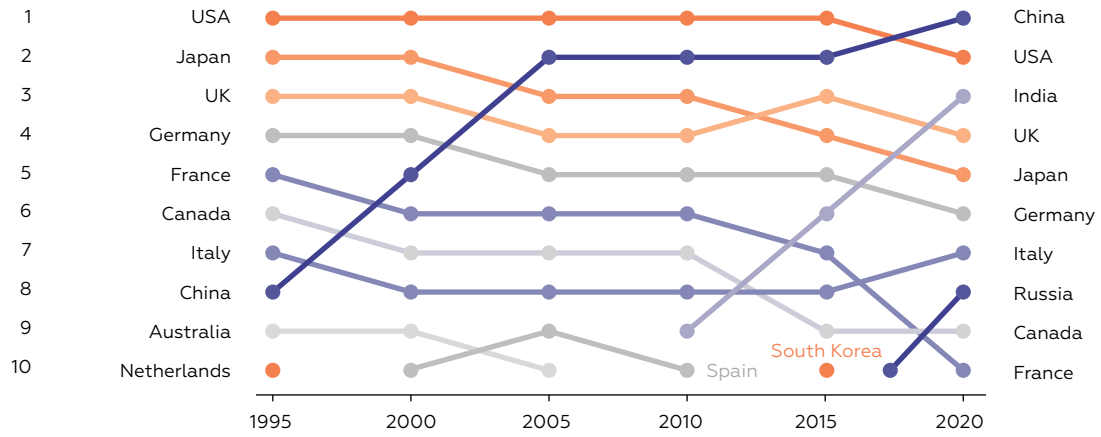
Milena Milich
Russia

« We suggest that the key acting unit of climate change is not a public authority body or a business but a community, an established set of people in a region sharing the territory, practices, and values. In our concept, countries are considered as community networks, while the Cross-Border Regional Climate Club is a means of connecting such networks across the borders into a community of communities. »

Changing Technological Leadership

Technological leadership is no longer tied to a single region. Over the past 30 years, **the countries of the Global Majority have significantly increased their presence in the global patent race.** This will inevitably translate into innovative products brought to market. In 2020, four of the ten leading countries by the number of English-language publications in the Dimensions scientific database were representatives of the Global Majority. They accounted for 37% of publications (Figure 8).

Figure 8
Leading countries by number of English-language scientific publications in the dimensions database



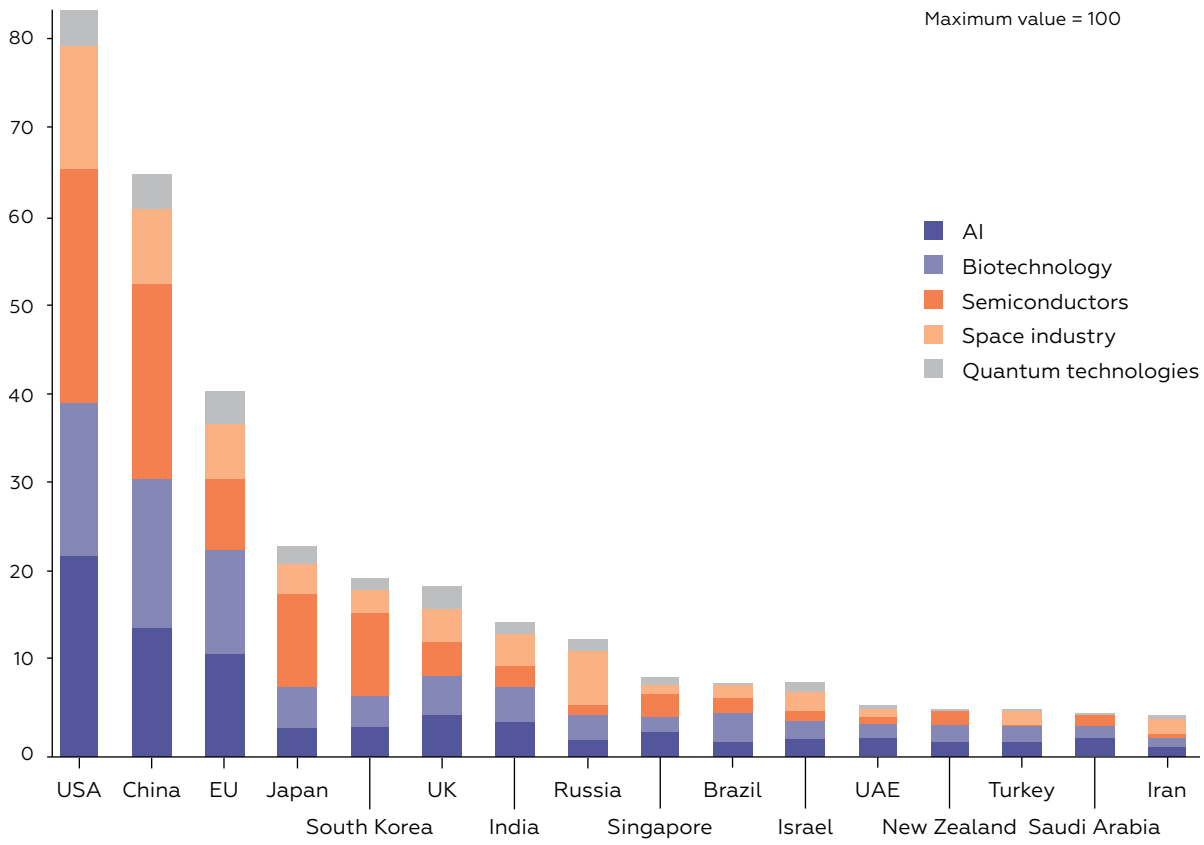
Source: The Geography of Science[26].

The gap in critical technologies is narrowing. In several areas, countries of the Global Majority have joined the ranks of global leaders. China ranks second in the Critical and Emerging Technologies Index. India and Russia also hold high positions (Figure 9). China accounts for the world's largest number of patents in artificial intelligence (AI), six times more than the United States[27]. It also accounts for more than 50% of global industrial robot production and over 90% of global investment in solar energy. Russia leads in nuclear energy, implementing approximately 80% of nuclear power plant construction projects worldwide. India has become one of the key players in the global IT industry, accounting for more than 50% of global outsourcing in software development and maintenance[28]. The expected financial impact of AI adoption in BRICS+ countries by 2030 is estimated at USD 1.9–3.0 tn[29] (see Chapter 4 for more detail).

[26] Nagaraj, A., & Yao, R. (2026). The geography of science (Working Paper No. 34694). National Bureau of Economic Research. https://www.nber.org/system/files/working_papers/w34694/w34694.pdf
[27] United Nations. (2024, July). China-based inventors lead on global GenAI patents: UN report. https://news.un.org/en/story/2024/07/1151761
[28] Nikkei ScoutAsia. (2022). India: IT & BPM industry [Report]. https://cms.scout.asia/wp-content/uploads/2022/06/20220610-INR-37-00.pdf
[29] Yakov & Partners. (2025). The future of GenAI in BRICS+ countries [in Russian]. https://yakovpartners.ru/publications/gen-ai-brics/

The share of BRICS countries in global high-tech product exports has grown sharply. In 2000, BRICS countries accounted for about 5% of global high-tech product shipments. By 2022, their share had reached 38%[30]. India, Brazil, and the economies of Southeast Asia have become centers for the export of IT services, fintech, and software[31,32,33].

Figure 9
Critical and emerging technologies index, 2025



Source: Belfer Center[34].

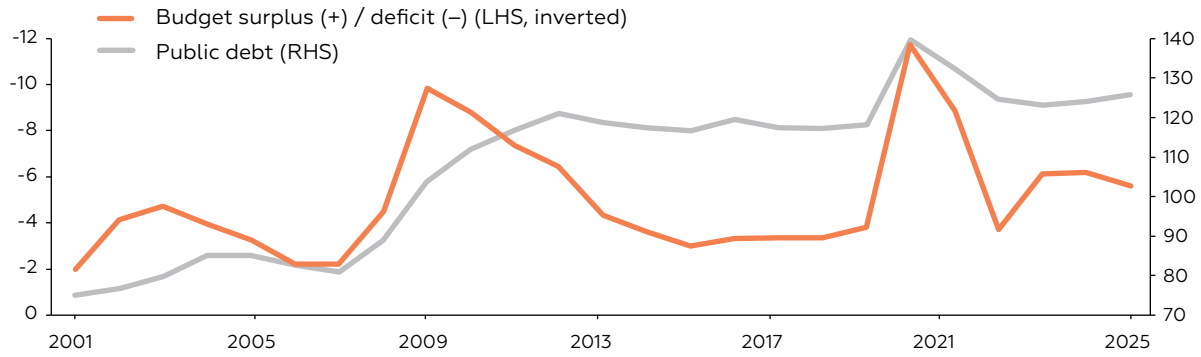
Debt burden and inequality

The use of debt as a mechanism for money creation is becoming unsafe from the standpoint of long-term sustainability. The largest economies entered the post-COVID era with an unprecedented public debt burden. In the United States, public debt stood at approximately 125% of GDP[35]. The EU average was around 87%, while in France, Italy, and Belgium the figure exceeded 100%[36] (Figure 10). Narrowing fiscal capacity, combined with demographic decline and population aging, is limiting further growth in G7 economies. It also increases the risk of stagnation or crisis in the event of new shocks. Budgets will continue to expand amid growing demand to maintain high social living standards and efforts to ensure sovereignty[37].

[30] UNCTAD. (2023). BRICS investment report [Report]. https://unctad.org/system/files/official-document/diae2023d1_en.pdf
[31] Indian Times. (2025). India's IT industry to hit $300-bn revenue mark in FY26: Nasscom report. https://economictimes.indiatimes.com/tech/information-tech/indias-it-industry-to-hit-300-bn-revenue-mark-in-fy26-nasscom-report/articleshow/118531334.cms?from=mdr
[32] OECD. (2022). Digital trade review of Brazil [Report]. https://www.oecd.org/content/dam/oecd/en/publications/reports/2022/09/digital-trade-review-of-brazil_71463ecc/0b046dfe-en.pdf
[33] International Chamber of Commerce. (2022). MSMEs digital exports in Southeast Asia [Report]. https://iccwbo.org/wp-content/uploads/sites/3/2022/11/icc-msme-digital-exports-in-southeast-asia.pdf
[34] Belfer Center. (2025). Critical and emerging technologies index [Data set]. https://www.belfercenter.org/critical-emerging-tech-index
[35] US Department of the Treasury. (2025). What is the national debt? [Online guide]. https://fiscaldata.treasury.gov/americas-finance-guide/national-debt/
[36] Eurostat. (2025). Government finance statistics [Data set]. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Government_finance_statistics
[37] International Monetary Fund. (2025, November 4). How can Europe pay for things it cannot afford? https://www.imf.org/en/news/articles/2025/11/04/sp110425-ak-how-can-europe-pay-for-things-it-cannot-afford

Figure 10

G7 debt burden, % of GDP



Source: Global Debt Database[38].

The other side of debt accumulation is the growth of assets among one part of the population and the growth of debt among another. **The structural cause is institutionally embedded inequality in the financial system, which constrains the growth of the countries of the Global Majority.** While issuers of key global currencies gain access to cheaper and more stable financing, other countries are forced to pay a "risk premium."[39]

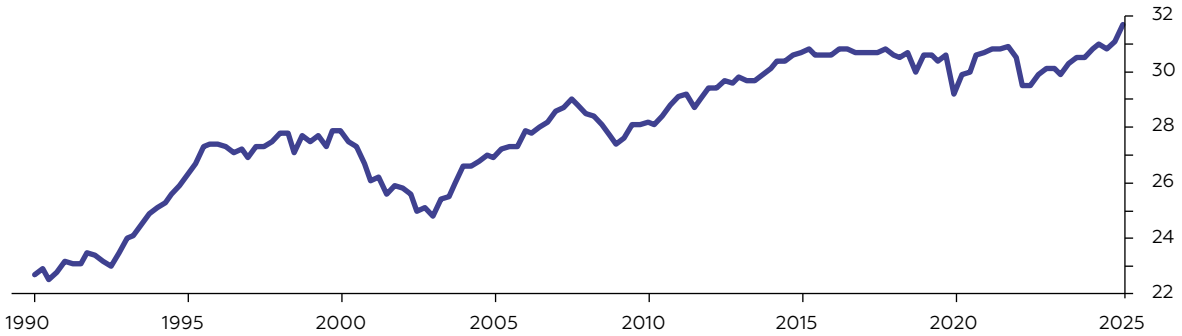
Vitaliy Kozlov
Thailand

« As one study on BRICS external debt shows, these countries, while key players in the global economy, face debt management challenges and need investments for growth. The G7 uses the threat of capital withdrawal as a lever to block projects involving BRICS countries in developing nations. »

As a result, the wealthiest issuers traditionally have access to greater leverage. This gives them additional opportunities to strengthen their position. This is confirmed by data showing an increase in the share of wealth held by the top 1%. In the United States, for example, this share rose from approximately 23% in 1989 to more than 31% in 2025[40] (Figure 11).

Figure 11

Share of net worth held by the top 1%, %



Source: World Inequality Database[41].

[38] International Monetary Fund. (2025). Global Debt Database [Data set]. https://www.imf.org/external/datamapper/datasets/GDD
[39] Reinhart, C. M., & Rogoff, K. S. (2024). Original sin: Fiscal rules and government debt in foreign currency in developing countries. Journal of Macroeconomics. Advance online publication. https://www.sciencedirect.com/science/article/pii/S0164070424000156
[40] Federal Reserve Bank of St. Louis. (2025). Net worth held by the top 1% [Data set]. FRED. https://fred.stlouisfed.org/series/WFRBLT01026
[41] World Inequality Database. (n.d.). United States. [Data set] https://wid.world/country/usa/

Andrés Giussepe
Venezuela

« Fair Income Distribution plus Multidimensional Well-Being Index is not merely a static indicator but an instrument of strategic navigation. BRICS+ will not only be the largest bloc by PPP GDP but also the one with the greatest systemic well-being and distributive justice on the planet by the end of this decade. »

The imbalance in access to investment and resources strengthens countries' desire to regain control over their own development trajectory. This means restoring the full scope of national sovereignty.

1.2 A new quality of sovereignty and the balance of power in globalization 2.0

Types of sovereignty

In the new economic paradigm, control over critical technologies, supply chains, and platforms is becoming more important than production volumes. **A state may account for a moderate share of global GDP, while still serving as a key node in a particular technology or logistics chain.** The integrated competitiveness of new centers of economic growth is shaped by a combination of logistics, technological, resource, and demographic factors.

Under the influence of increasing geoeconomic competition and the fragmentation of global markets, sovereignty is no longer an exclusively political category. It is acquiring a multilayered nature. Full sovereignty can be achieved only through effective management of three spheres: the state, society, and the socioeconomic system.

Figure 12
Three levels of sovereignty

Type of sovereignty	*Key question*	*Key concepts*
State sovereignty	To be or not to be?	• Territorial integrity • Security • Independence of state authority
Public sovereignty	Which way to be?	• Values • Cultural code • History • Language • Religion
Socio-economic sovereignty	How should one be?	• Resources • Human capital • Technologies • Resource management

Source: compiled by TRIM.

The three levels of sovereignty reflect the principles of state resilience in the new economic reality (Figure 12). The state level is responsible for the system's basic capacity to exist and make independent decisions. The societal level determines internal coherence and identity. It ensures the reproduction of values, norms, and behavioral models. The socioeconomic level ensures resilience through control over resources, technologies, and management processes. The balance among these levels forms the state's comprehensive sovereignty[42].

[42] Kremlin. (2022, October). Meeting of the International Valdai Discussion Club [in Russian]. http://www.kremlin.ru/events/president/news/69695

The architecture of globalization 2.0

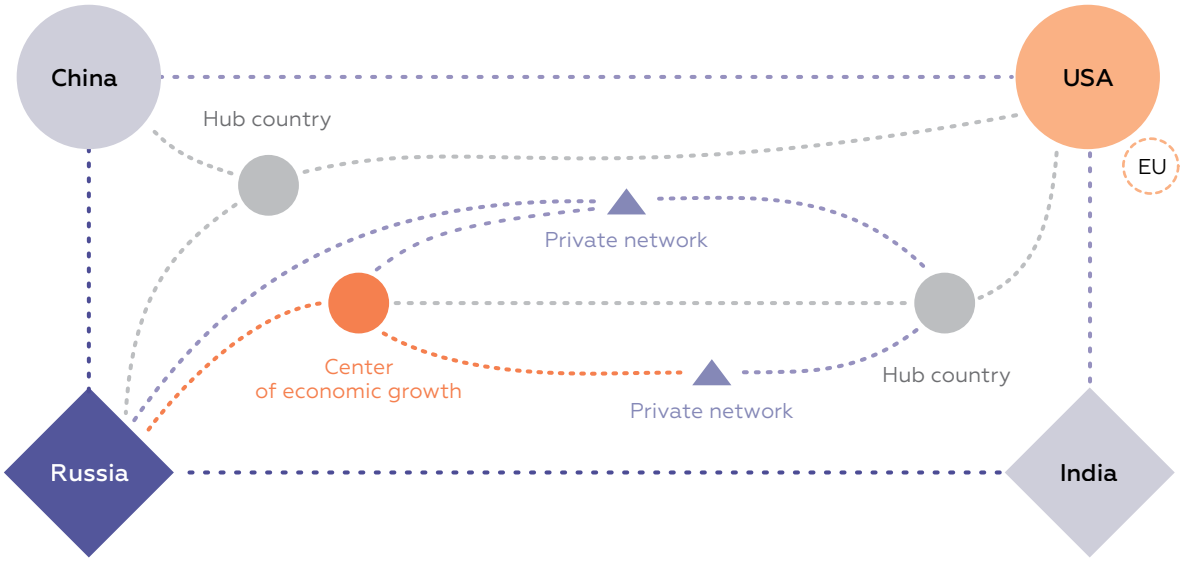
Geoeconomic competition is intensifying amid growing interdependence. This interdependence is not weakening. Instead, it is taking on a more complex form. The phenomenon of "weaponized interdependence" is emerging[43]. While maintaining close trade, economic, and technological exchanges, countries may intensify competition for access to critical value chains. These include semiconductors, critical minerals, raw materials, and data[44].

The global economy is being transformed into a system in which interdependence is used as an instrument of pressure. Under these conditions, **the level of sovereignty is determined not by the possibility of full autonomy, but by the ability to manage dependency.** This means minimizing vulnerabilities while benefiting from participation in global networks. This ability is becoming a key factor of competitiveness in the new economic architecture.

Salman Bangash
Pakistan

« By reclaiming their geoeconomic destiny through these mechanisms, these nations will transition from being the 'objects' of global history to the 'sovereign subjects' of a new, multipolar architecture. »

Figure 13
New model of global economic influence



Source: compiled by TRIM.

As a result of the observed changes, the global economy is ceasing to be a hierarchical system with a fixed core and periphery. It is acquiring a networked character, in which functions are distributed across different levels and actors (Figure 13). The authors of the report project that, in the long term, a new model of international economic interaction may emerge. It can be described as a five-level ecosystem:

[43] Weaponized interdependence refers to a new paradigm of international cooperation in which the development of economic ties creates opportunities for leverage and coercion through economic instruments. It was introduced by Henry Farrell and Abraham Newman in their 2019 work Weaponized Interdependence: How Global Economic Networks Shape State Coercion.
[44] Oxford University Press. (2017). Economic interdependence and conflict. https://oxfordre.com/politics/display/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-563

1. Major centers of sovereignty: These countries shape standards and infrastructure, for example the United States, China, India, and Russia. They have the highest level of sovereignty across all three types: state, societal, and economic. They form the "system-forming four," or Big Four.

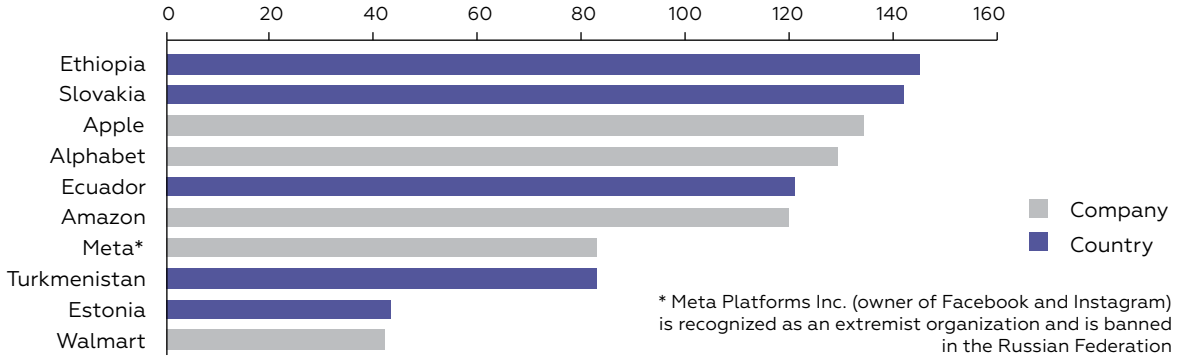
2. New centers of growth: These actors provide demographic and consumer dynamics, as well as new production competencies. They include Africa, Asia, and Latin America.

3. Connector countries: These countries act as hubs for capital, logistics, and rules. They also serve as "translators" between systems. Examples include the United Arab Emirates, Singapore, and others.

4. Non-state networks: These include platforms, social networks, and infrastructure services that shape economic behavior beyond national borders. The EBITDA of the top five ecosystem companies already exceeds the GDP of a number of countries (Figure 14). EBITDA stands for earnings before interest, taxes, depreciation, and amortization. At the same time, the number of social media users exceeds the population of the largest states (Figure 15).

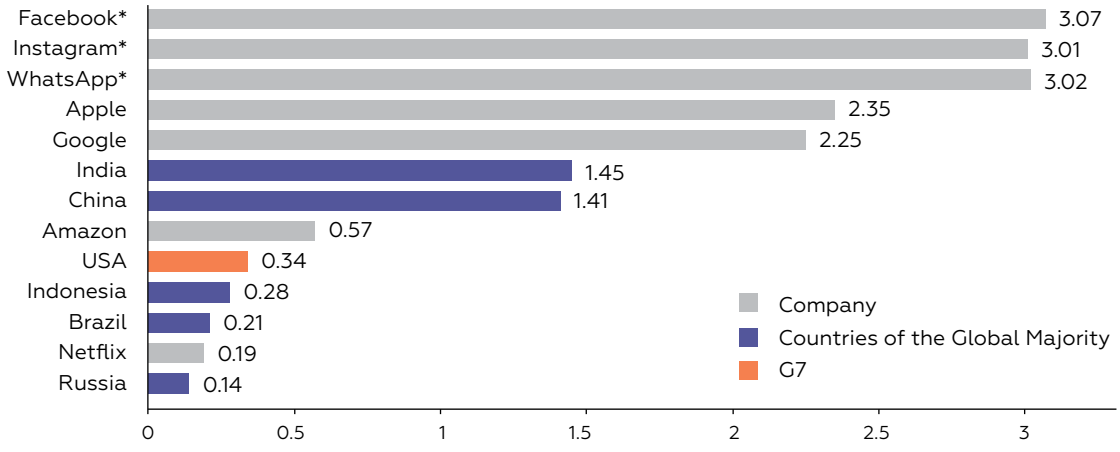
5. Local networks: These include cities, technology clusters, and sectoral chains. They are becoming "microcenters" of growth and experimentation.

Figure 14
EBITDA of the leading ecosystem companies and GDP of selected countries, bn USD, 2024



Source: World Bank[45], Stock Analysis[46].

Figure 15
Number of platform users and residents of selected countries, bn people, 2024



Source: World Bank and corporate reports.

[45] World Bank Group. (2026). GDP (current US$). [Data set] https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
[46] Stock Analysis. (n.d.). Stock analysis watchlist. https://stockanalysis.com/watchlist/

In the paradigm of globalization 2.0, the economic system consists of multiple overlapping networks. States interact within these networks through a complex balance of trust and rivalry. A distributed network of global trade and finance is taking shape, with diverse nodes and parallel corridors. Resilience is achieved not through the unity of the system, but through managed connectivity between levels.

Parag Khanna[47], Founder & CEO of AlphaGeo
Singapore

« A political map of the world no longer explains how it actually works. We need to think of geography in the plural—geographies. There is the natural geography of topography and natural resources, the political geography of borders, and the functional geography of connections—infrastructure, transportation, energy and communications, as well as the human geography, the distribution of people. »

Conclusion to Chapter 1

The transition to globalization 2.0 reflects a profound transformation in the structure of the global economy. A more complex and multipolar system is emerging. In this system, the size of economies is not the only factor that matters. Their role in trade, financial, and technological exchanges is also becoming increasingly important. Stronger ties among the countries of the Global Majority and the restructuring of value chains point to the formation of a new architecture of global interaction.

The vulnerability of key logistics hubs, recurring supply chain disruptions, and rising delivery costs are increasing the role of alternative routes. They are also redistributing flows among regions. **The phenomenon of weaponized interdependence is intensifying.** Countries continue to maintain dense economic ties, but they are increasingly using them as instruments of pressure. This includes restricting access to technologies, markets, and infrastructure. As a result, the global economy is not breaking up into isolated blocs. Instead, it is becoming more fragmented.

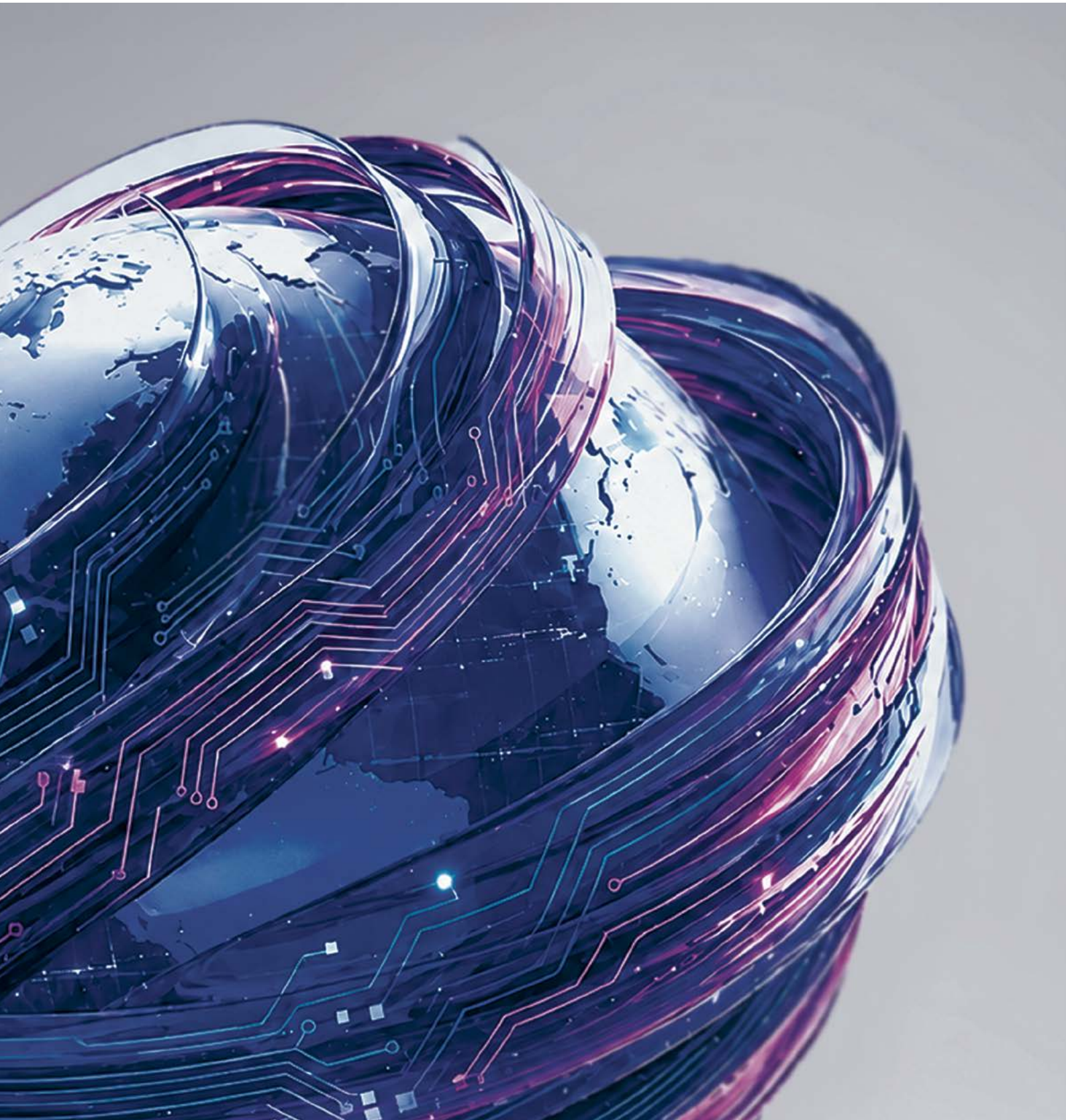
Access to capital remains uneven, while the debt-based model that financed growth is increasingly becoming a source of vulnerability. Countries seeking to accelerate development and reduce the technology gap are forced to attract resources more actively. At the same time, they face the constraints of the existing financial system. As a result, a contradiction is accumulating between the needs of the new economic architecture, which is flexible and networked, and the financing instruments shaped in the previous era.

Competition for resources, technologies, and markets is becoming tougher. Sovereignty is acquiring economic significance. Against this backdrop, the transformation of the financial system is coming to the forefront. This concerns not only access to capital, but also the speed of payments, their cost, and control over global financial flows.

[47] Open Dialogue Podcast. (n.d.). "OD on Air" | Maxim Oreshkin and Parag Khanna [Video]. YouTube. https://www.youtube.com/watch?v=Ne9QX5IzZDs

CHAPTER 2

THE DECLINE OF TRADITIONAL FINANCE



2. THE DECLINE OF TRADITIONAL FINANCE

The traditional debt-based model that supported economic growth and global connectivity is reaching its limits. Governments and corporations are accumulating debt faster than GDP is growing. This leads to asset concentration and greater vulnerability to shocks.

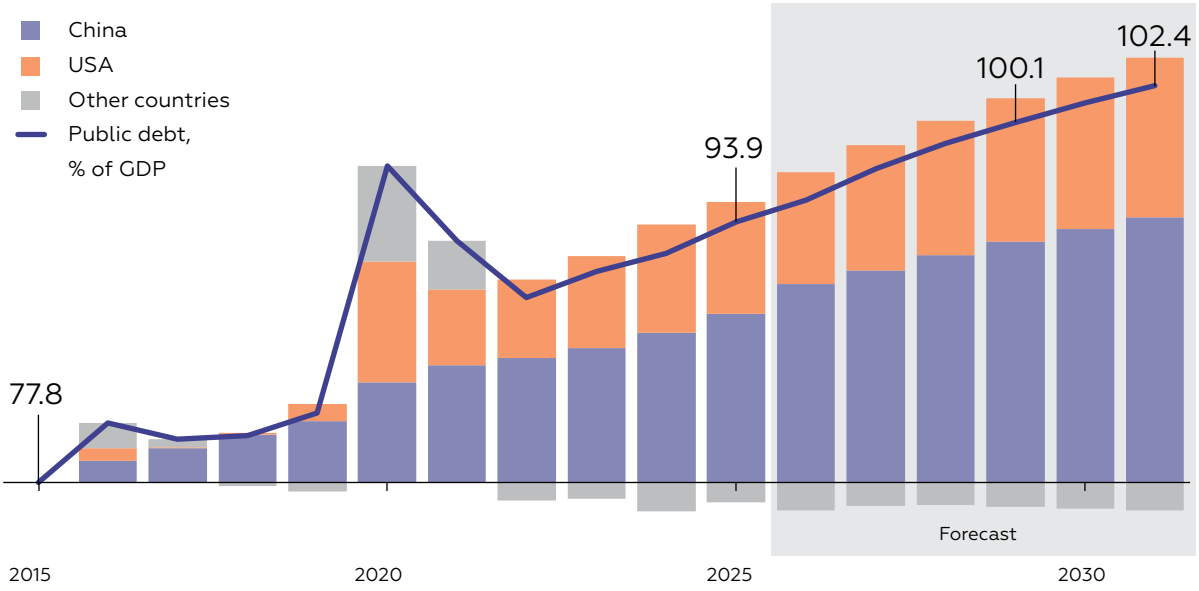
Bank intermediation is increasingly associated with high fees, long correspondent chains, and sanctions risks. The changing financial architecture will combine national digital money, asset tokenization, and platform-based settlement infrastructure.

2.1 Structural constraints of the debt-based model

The architecture of the financial system is built on central banks issuing cash and reserves, commercial banks generating most of the cashless money supply through lending, and cross-border settlements operating through a network of correspondent relationships. Today, however, t**his structure is coming into conflict with economic, technological, and geopolitical realities.**

The growing debt burden is becoming the key problem. As long as debt growth did not exceed GDP growth, the risks remained limited. As economic growth slows, debt servicing costs rise even as debt volumes continue to grow. In 2025, global public debt reached 93.9% of GDP. By 2030, it may exceed 100%[48] (Figure 16).

Figure 16
Government debt—global level and country contributions, % of GDP



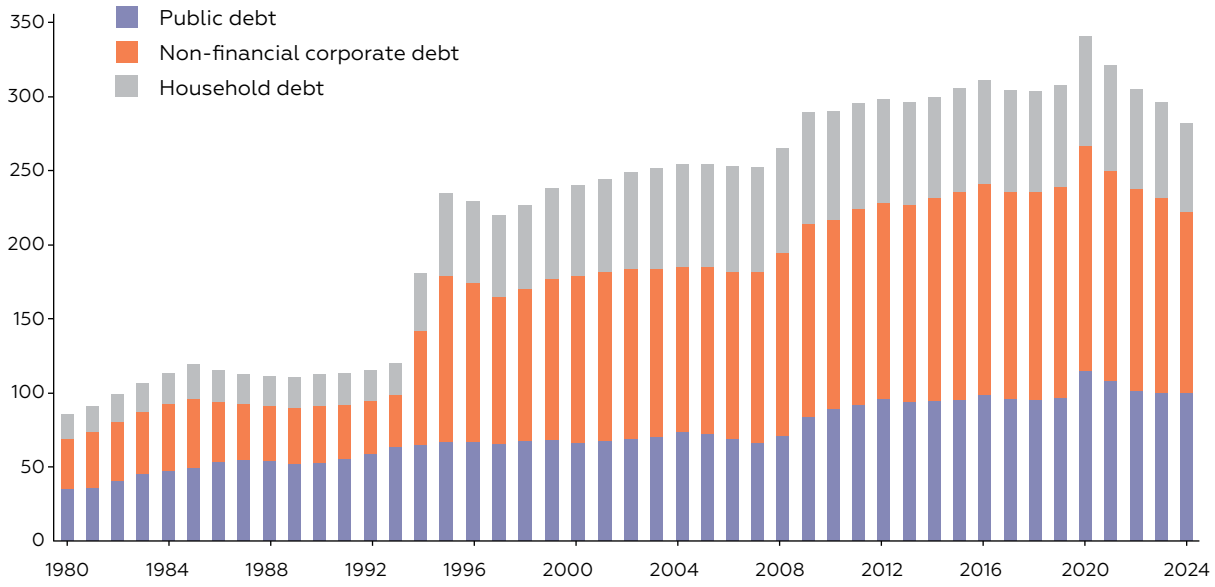
Source: IMF[49] , calculations by TRIM.

Another problem in debt accumulation is the creation of sources to cover it. Forecasts for economic growth in the world's largest economies are mixed. Debt financing is being attracted not so much for investment and capacity expansion as for "recovery" purposes in the economy[50]. Social spending is rising, but so are defense and security expenditures. This makes the current model unsustainable. The accumulation of debt imbalances creates risks for future growth, which remains closely tied to credit.

[48] International Monetary Fund. (n.d.). IMF data. [Data set] https://www.imf.org/en/data
[49] See Footnote 48
[50] OECD. (2025). Global debt report 2025. https://www.oecd.org/en/publications/global-debt-report-2025_8ee42b13-en.html

Outside the public sector, debt is also outpacing GDP growth[51]**.** When financing needs are met primarily through corporate credit, rather than through budget financing or deep capital markets, the system becomes vulnerable and procyclical. The higher the accumulated debt, the more sensitive the system becomes to shocks[52] (Figure 17).

Figure 17
Global debt, % of GDP



Source: Global Debt Database[53].

2.2 The cost of intermediation and sanctions risks

The design of traditional finance, based on a system of intermediaries, entails significant transaction costs. An indirect indicator of the high cost of traditional finance is the volume of gross value added (GVA) generated by financial sectors. **The largest financial sector is in the United States.** It currently exceeds USD 2 tn, or 2% of global GDP[54] (Figure 18).

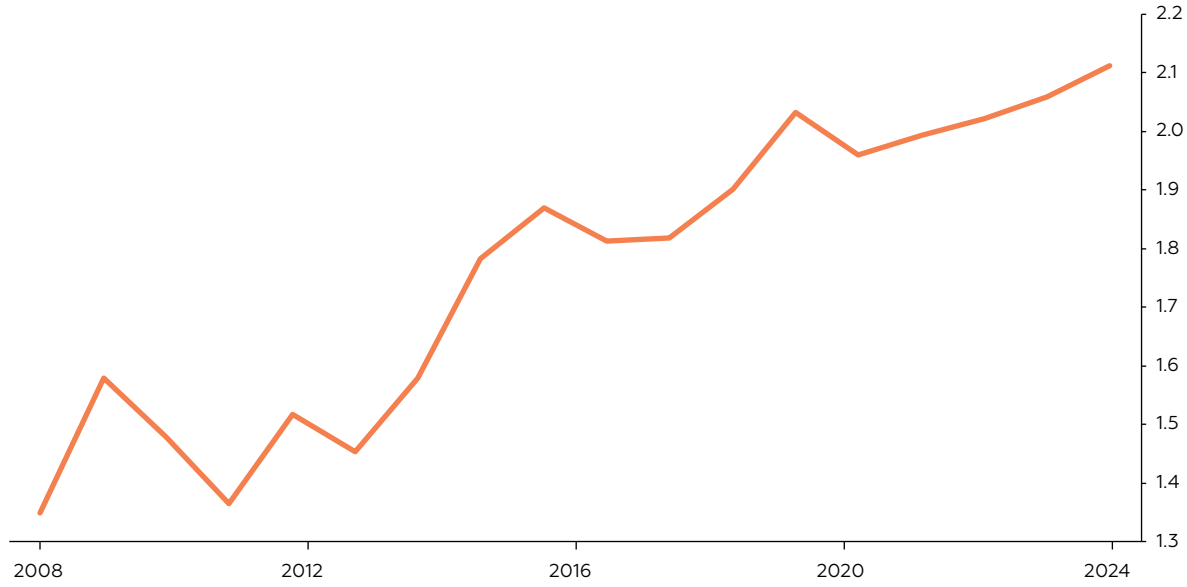
A significant share of the financial system serves its own costs. These include fees, spreads, and infrastructure expenses. The purpose of commissions and other service charges is often not transparent to clients.

Sanaa Haouata
Morocco

« Imagine a Brazilian exporter and a Kenyan importer wishing to trade. In order to understand each other financially and logistically, they must go through a third-party translator: the correspondent banks of New York or London. Each transaction is then converted from the real to the dollar, then from the dollar to the Kenyan shilling. This process imposes a structural 'intermediation tax', since it slows down exchanges and generates significant costs. »

[51] International Monetary Fund. (2025, September 17). Global debt remains above 235% of world GDP. https://www.imf.org/en/blogs/articles/2025/09/17/global-debt-remains-above-235-of-world-gdp
[52] Greenwood, R., et al. (2021). Predictable financial crises. Harvard Business School. https://www.hbs.edu/ris/Publication%20Files/20-130_77e0879b-606a-4bbe-bd5a-1aa9dd77b6fe.pdf
[53] International Monetary Fund. (2025). Global debt database. [Data set] https://www.imf.org/external/datamapper/datasets/GDD
[54] OECD. (2026). Annual value added and its components by economic activity. OECD Data Explorer. https://data-explorer.oecd.org/vis?lc=en&df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_NAMAIN10%2540DF_TABLE6&df[ag]=OECD.SDD.NAD&dq=A.EU27_2020%2BEA20%2BUSA%2BGBR%2BJPN...B1G..K..XDC.V..&pd=1980%2C2024&to[TIME_PERIOD]=false&vw=tb

Figure 18
US financial sector, % of global GDP



Source: OECD Data Explorer[55].

Surveys of European associations and financial institutions show that almost 40% of clients see insufficient transparency in fee policies as the main problem with current accounts[56]. A U.S. study shows that Americans spend about USD 82 bn a year on bank fees. This amounts to roughly USD 300 per consumer annually[57].

The problem is even more pronounced in cross-border settlements. **Long chains of correspondent banks make transfers expensive, slow, and unpredictable[58].** At the same time, the costs of using network payment infrastructure can be especially high in new centers of economic growth[59].

Muhammad Obaid Ahmed
Pakistan

« When Fatima, a domestic worker in Dubai, sends $200 home to her family in Pakistan, she loses $16 to transfer fees, enough to feed her children for a week. When a small textile manufacturer in Bangladesh tries to receive payment from a buyer in Brazil, the transaction takes five days and costs 7% in fees, eroding already thin margins. Meanwhile, a software developer in Nigeria offering services to clients across Africa spends hours navigating multiple payment platforms, each extracting its toll. These aren't isolated inconveniences, they're systematic barriers costing the Global South an estimated $400 bn annually in remittance fees, delayed settlements, and lost trade opportunities. »

The geopoliticization of financial infrastructure has created an additional layer of costs. These include the costs of building alternative settlement circuits, more complex compliance, and insurance. The dynamics of active sanctions are an indicator of structural fragmentation in

[55] See Footnote 54.
[56] European Banking Authority. (2022). Thematic review on the transparency and level of fees and charges for retail banking products. https://www.eba.europa.eu/sites/default/files/document_library/Publications/Reports/2022/1045497/Report%20on%20the%20thematic%20review%20on%20fees%20and%20charges.pdf
[57] Ernst & Young. (2024). Payments and bank fees: An $82B balancing act. https://www.ey.com/en_us/insights/banking-capital-markets/payments-and-bank-fees-an-82b-balancing-act
[58] Bank for International Settlements. (2022). Can multilateral platforms improve cross-border payments? https://www.bis.org/cpmi/publ/bb17.pdf
[59] World Bank. (2025). The cost of sending remittances is higher than 3% in 28 countries. World Bank Blogs. https://blogs.worldbank.org/en/opendata/the-cost-of-sending-remittances-is-higher-than-3--in-28-countrie

the global market. Most of these sanctions directly or indirectly affect the financial sector. This has not only increased the cost of using traditional finance. It has also increased the risks of asset freezes and sudden disruptions to transactions.

The financial system has become both expensive and politically vulnerable. The expanding role of the banking sector, combined with the risks described above, raises the question of the need to move toward a different model for organizing the financial system.

2.3 Technological preconditions for the transformation of finance

Tools of the new financial architecture

The spread of distributed ledger technology (DLT) is a key precondition for transforming the model of international settlements. **The operating rules of DLT-based systems are formed by their participants.** They cannot be changed, or violated, without general consent.

In finance, the use of blockchain emerged as a response to the need to eliminate intermediaries and ensure the confidentiality of transactions and accounts[60]**.** Countries are now studying cryptocurrencies and cryptoassets[61] and developing regulatory frameworks for them. However, the practical application of these instruments is already moving beyond experimental projects.

A distributed system makes it possible to remove the main intermediary or a long chain of intermediaries, each of which creates risks. If DLT becomes widely used in finance and a clear regulatory framework is created for it, financial relations within and between countries will move to a new level.

Francisco Tuñez
Argentina

« Decentralization does not imply disconnection. Rather, it entails a reconfiguration of connectivity from hub-and-spoke systems toward distributed networks capable of local adaptation and global coordination. [...] Blockchain technologies exemplify this shift by enabling shared ledgers, programmable coordination, and verifiable accountability without centralized intermediaries. »

Interest in DLT is confirmed by the emergence of new international initiatives. BRICS countries are working on the creation of the BRICS Pay payment system to move away from dollar settlements and Western financial messaging systems[62]. **China has launched a cross-border settlement system using the digital yuan.** It has become available in ASEAN countries, the Middle East, Russia, and other CIS countries[63].

Another significant advantage of blockchain technology is the implementation of smart contracts. They enable advanced automation of operations and can significantly simplify the execution and verification of transactions.

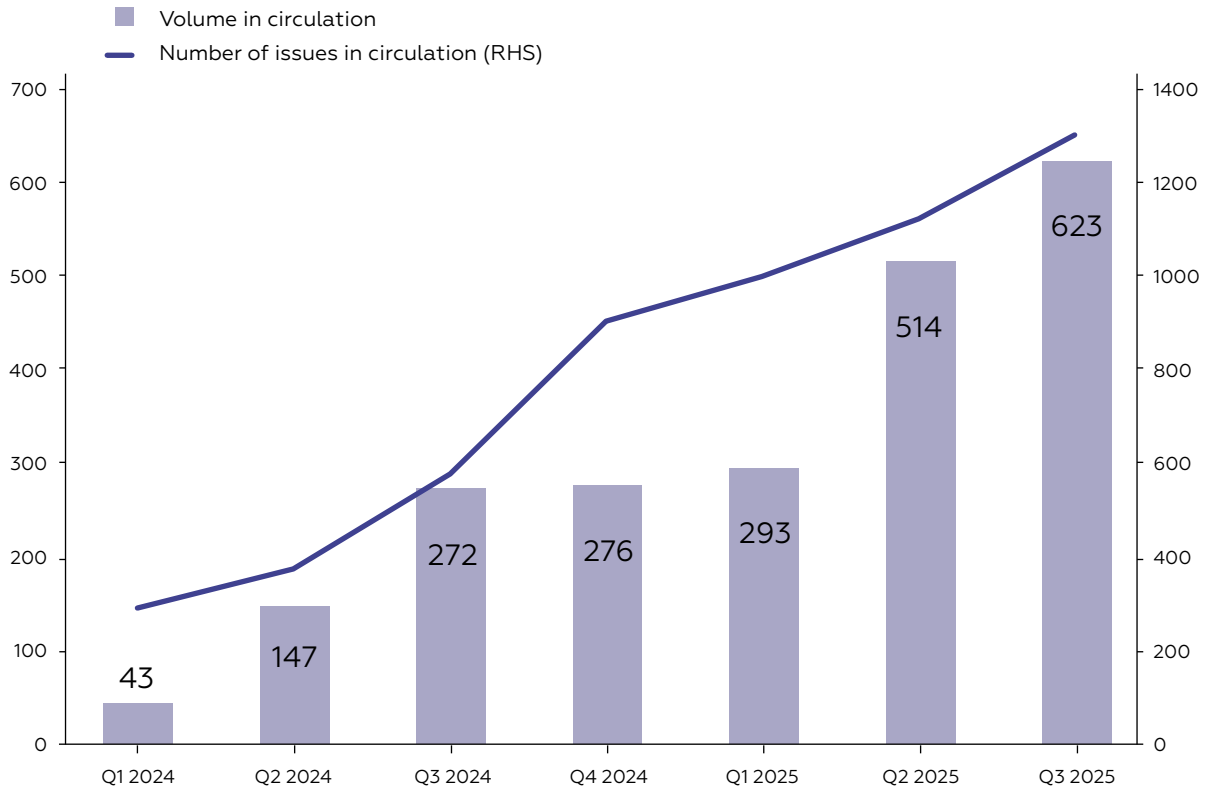
[60] Nakamoto, S. (2008). Bitcoin: A peer-to-peer electronic cash system. https://bitcoin.org/bitcoin.pdf
[61] PwC. (2026). Global crypto regulation report 2026. https://www.pwc.de/de/unterlagen/pwc-global-crypto-regulation-report-2026.pdf
[62] Rossiyskaya Gazeta. (2026, January 26). Berliner Zeitung: The BRICS Pay settlement system could become an alternative to the dollar [in Russian]. https://rg.ru/2026/01/26/berliner-zeitung-sistema-raschetov-brics-pay-mozhet-stat-alternativoj-dollaru.html?utm_referrer=https%3A%2F%2Fwww.google.com%2F
[63] RBC. (2025). China launches its own SWIFT alternative for the digital yuan [in Russian]. https://www.rbc.ru/rbcfreenews/690222ee9a7947374362eae2

The desire of states to move toward financial systems with low transaction costs was already visible more than ten years ago. Economies around the world were creating fast payment systems, such as Russia's "Faster Payments System." These systems helped reduce transaction costs, ensure instant crediting of funds, and support financial inclusion[64]. Today, the presence of a fast payment system can provide convenient integration with blockchain-based products.

Brazil provides a telling example. **The use of cryptocurrencies has significantly intensified financial flows between residents and nonresidents.** Stablecoins account for about two-thirds of the volume of such transactions. The integration of the national Pix system with crypto exchanges has contributed significantly to the simplification of settlements.

Digital financial assets, or tokens in international terminology, have become one of the blockchain-based products. In 2025, the capitalization of the world's largest digital financial assets doubled to USD 70 bn[65]. Digital financial assets make it possible to carry out exchanges without the physical or accounting movement of the underlying asset, which simplifies settlements. **Tokenized assets, together with smart contracts, will enable more flexible transactions with lower operating costs.** In Russia, digital financial assets have now occupied the niche of digital bonds. The issuance costs of digital financial assets may be 5 to 30 times lower than the issuance costs of traditional securities[66] (Figure 19).

Figure 19
Volume of the digital financial assets market in Russia (bn RUB) and number of issues in circulation (units)



Source: Bank of Russia[67].

[64] Bank for International Settlements. (2024). Central bank digital currencies and fast payment systems: Rivals or partners? https://www.bis.org/publ/bppdf/bispap151.htm
[65] Yakov & Partners. (2025). Going digital: How digital financial assets are transforming global financial markets [in Russian]. https://yakovpartners.ru/publications/digital-finance/
[66] See Footnote 65.
[67] Bank of Russia. (2025). Financial markets risk review No. 10 [in Russian]. https://www.cbr.ru/Collection/Collection/File/59388/ORFR_2025-10.pdf

Uganda's project may serve as an example of tokenization at the national level. The country plans to develop a tokenized payment infrastructure. The project is estimated at approximately USD 5.5 bn, or 8.5% of GDP. This will make it possible to conduct settlements through a digital accounting system. It is expected that this may both stimulate domestic production and attract foreign investors.

At the same time, technological progress alone does not resolve issues of trust, which are central to finance. For the new model to become more effective than the current one, the public sector must be actively involved in shaping it.

2.4 Possible transformation of the role of central banks and commercial banks

One way to create an institutional environment is a large-scale transition to central bank digital currencies (CBDCs). Unlike public blockchain networks, CBDCs operate in centrally managed systems, where the central bank retains control over issuance, transaction validation, and network access.

Today's money creation mechanism differs significantly from models in which the central bank directly managed the monetary base or controlled the money supply based on gold and foreign exchange reserves. **The emergence of CBDCs may restore to central banks the ability to issue all money in the economy. Most countries are currently at the CBDC pilot stage[68], while only a few have fully launched such projects.** China is an example of a country with one of the largest CBDC pilots in terms of the share of the population covered by digital wallets. Approximately one in eight Chinese citizens has a digital yuan wallet[69].

Single-tier financial system

One scenario for the spread of CBDCs, consistent with technological trends, is the transformation of the financial system into a single-tier system. All economic agents would be able to hold digital money with the most reliable issuer, bypassing the banking sector. This creates a direct monetary link between the central bank and the end user.

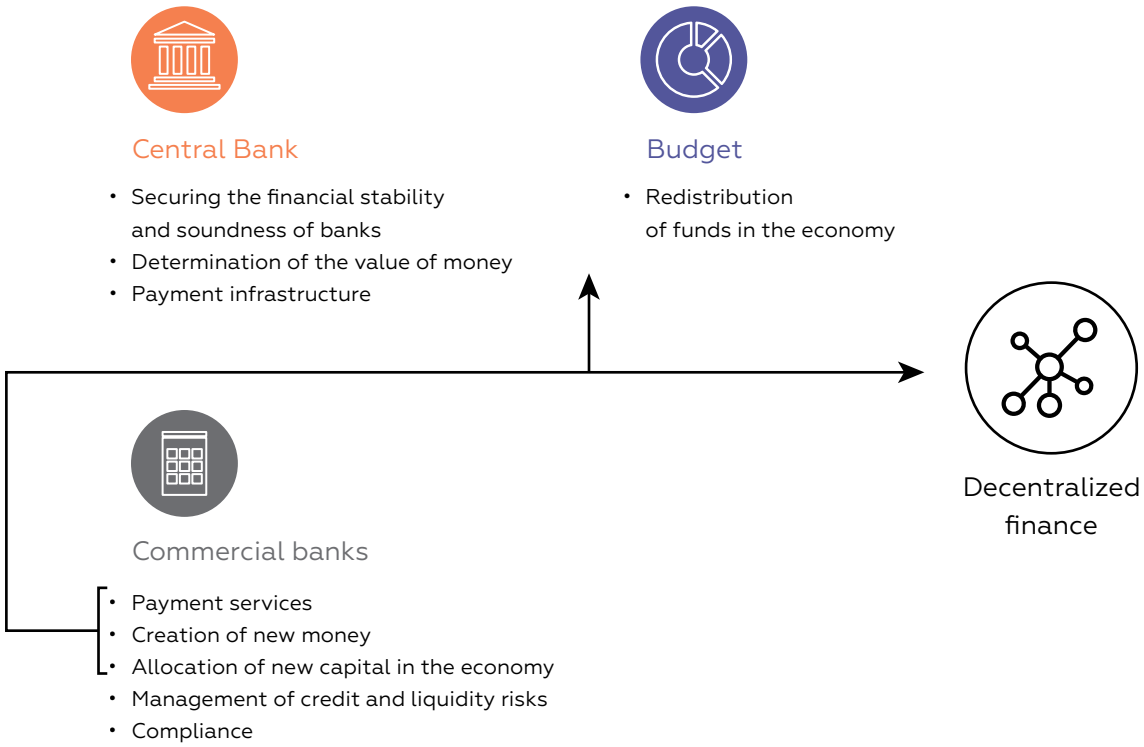
The role of the central bank in money creation would expand from regulation to monopoly. Responsibility for the volume and management of the money supply would be concentrated in a single institution. The same institution would also become the recipient of interest income from lending. This would return such income from external players to the state perimeter.

The central bank would become a platform for settlements. In this case, programmability, smart contracts, and other capabilities of blockchain technology would serve as factors facilitating the management of the full volume of transactions in the economy.

Commercial banks would then be transformed into financial agents building their business around money that has already been issued. Their key function would no longer be liquidity creation. Instead, it would be the efficient redistribution of funds, transaction structuring, and risk transformation. **Hybrid models may also emerge. For example, CBDC wallets could be serviced by new types of banks** (Figure 20).

[68] CBDC Tracker. (2025). Today's central bank digital currencies status. https://cbdctracker.org/
[69] State Council of the People's Republic of China. (2024, September 5). China's digital yuan transactions hit 7 tn yuan. https://english.www.gov.cn/archive/statistics/202409/05/content_WS66d9ab78c6d0868f4e8eaa27.html

Figure 20
Possible redistribution of functions among financial institutions



Source: compiled by TRIM.

If the monopoly on money creation shifts to central banks, it will have to participate in money allocation together with the government. The essence of this function is the selection of priority sectors, projects, or economic agents for credit issuance. Income from lending to the economy would be transferred to governments in whole or in part. **Central banks already transfer part of their profits to the state budget. In Russia, this share is 75%**[70]**.** This would make it possible to finance growing budget needs for social spending without creating new debt. If the government budget deficit nevertheless remains, governments could borrow money already in circulation from the private sector. In that case, the money supply would not expand.

The key advantages of this model include the formation of new revenues by restoring the central bank's exclusive right to create money. They also include direct management of issuance, elimination of risks typical of the traditional banking sector, and optimization of transaction costs.

The challenges of such a transformation would include ensuring reliable operations and maintaining strict inflation discipline. They would also include creating high-quality institutions to regulate interaction between the central bank and the government, as well as defining ethical standards for data privacy.

[70] Federal Law No. 86-FZ On the Central Bank of the Russian Federation (Bank of Russia). (2002, July 10, as amended December 15, 2025). Art. 26. ConsultantPlus [in Russian]. https://www.consultant.ru/document/cons_doc_LAW_37570/cdf81b8e3df3ac921f02131ec7689f289c6ba650/

Conclusion to Chapter 2

The traditional financial system is approaching its limits. Rising public and corporate debt, the concentration of assets among a narrow group of the population, and the procyclical nature of the credit mechanism are creating structural constraints. These constraints prevent the previous architecture from ensuring sustainable growth without accumulating imbalances.

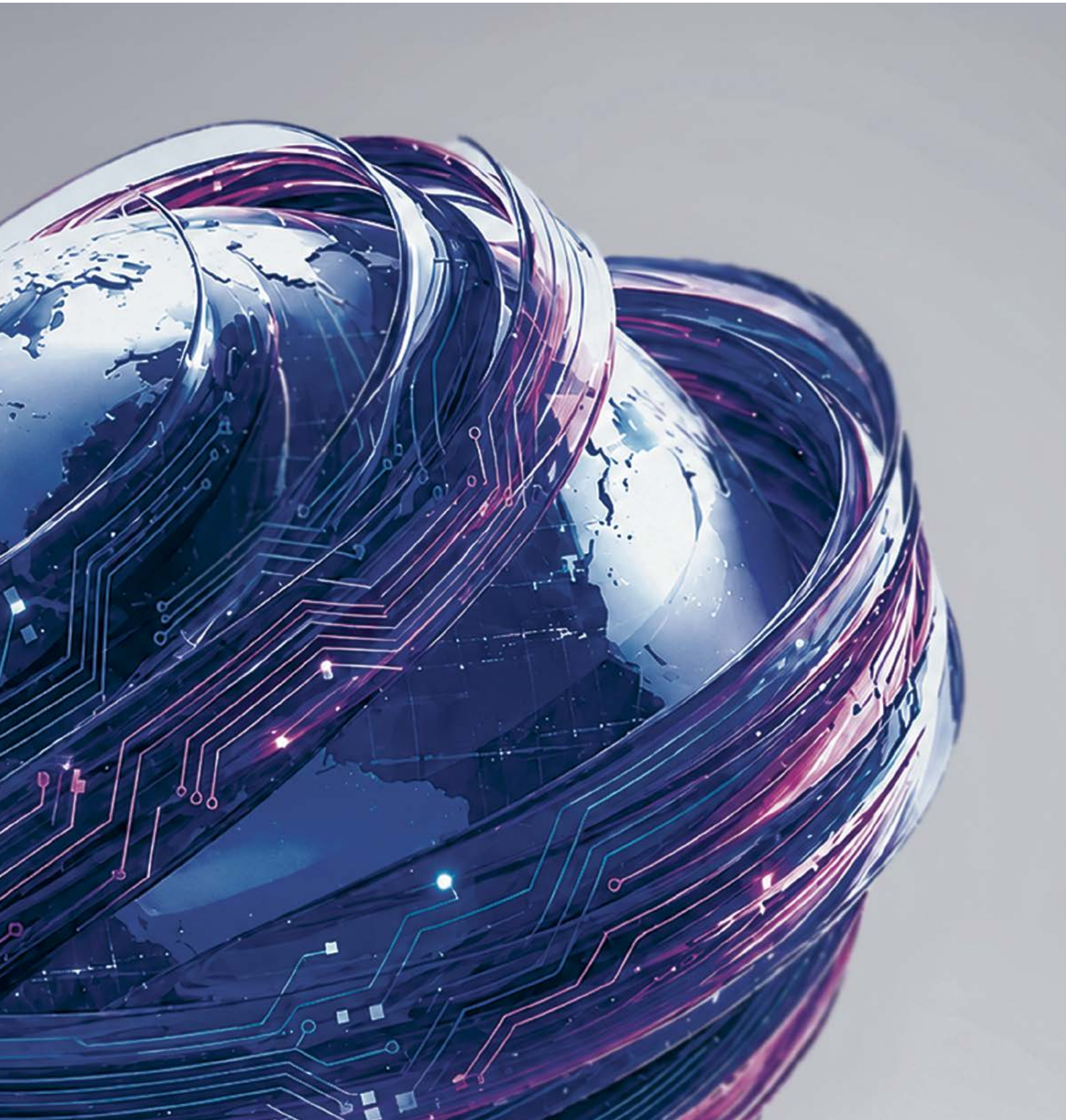
High transaction costs, non-transparent fees, and long chains of intermediaries remain weak points in the current system. This is especially true in cross-border settlements. **The geopoliticization of financial infrastructure and the growth of sanctions add political risks to economic inefficiency.** They increase the cost of operations and threaten payment stability.

Against this backdrop, technological preconditions are creating demand for a new model. These include blockchain and distributed ledgers, digital assets, and platforms. However, the introduction of innovation does not automatically resolve the crisis of trust in counterparties and regulators. **The state must participate in creating the institutional environment.**

The spread of CBDCs could become the core of a new financial architecture. It would strengthen direct central bank control over issuance, settlements, and liquidity. In the limiting scenario, this would lead to a single-tier system. In this system, banks would stop creating money and would be transformed into financial agents. The state would receive an instrument for financing social spending. **The key challenges remain discipline in interinstitutional communication, operational reliability, and data protection.**

CHAPTER 3

THE DEMOGRAPHIC CRISIS AFTER THE POPULATION PEAK



3. THE DEMOGRAPHIC CRISIS AFTER THE POPULATION PEAK

Global demographics are entering a turning point. Fertility is approaching replacement level, making it likely that the global population will peak as early as the middle of the 21st century. Declining fertility and rising life expectancy are leading to accelerated population aging. The demographic burden will begin to grow as the share of older people increases. Despite advances in medical technology, the gap between overall life expectancy and healthy life expectancy is widening.

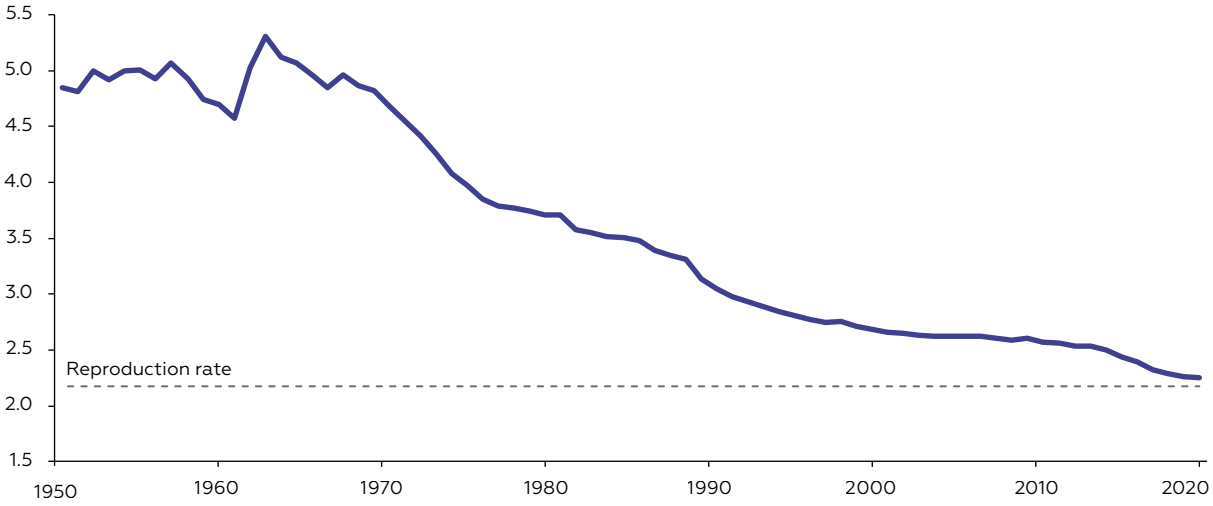
These processes are leading to structural changes in society and the economy. They range from the transformation of cities and the crisis of pension systems to changes in consumer demand. At the same time, demographic dynamics remain highly uneven. Against the backdrop of global aging, African countries continue to have high fertility rates. This is creating a growing "youth bulge," which becomes a factor of instability when investment in human capital and infrastructure is limited.

3.1 Demographic crisis: trends and causes

Global fertility rates at a historical low

The global total fertility rate (TFR) fell from 3.7 children per woman in 1980 to 2.2 in 2023. It has come close to the replacement threshold of approximately 2.1–2.3[71] (Figure 21). **Global fertility is now approaching the level at which population replacement is no longer assured.**

Figure 21
Total fertility rate in the world



Source: UN[72].

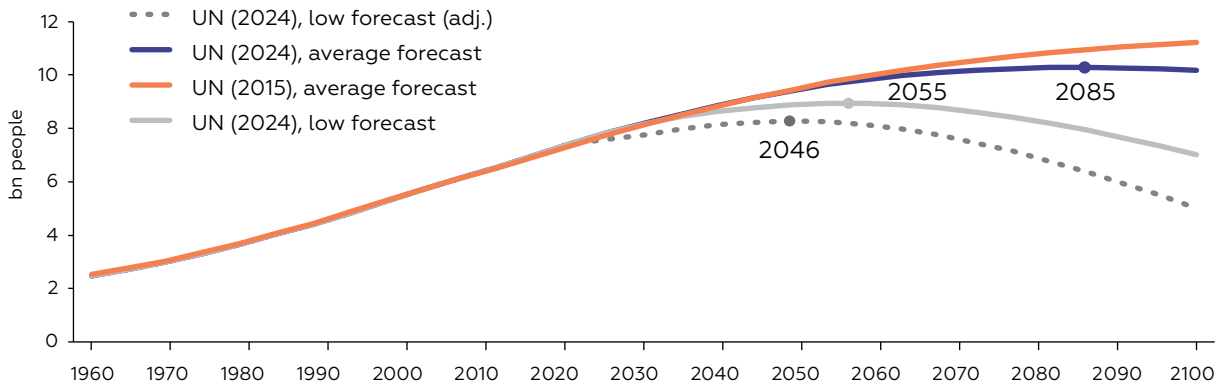
The decline in fertility has led to a revision of population forecasts. In the 2015 UN forecast[73], **the population peak was not expected before the end of the century. In the 2024 edition, however, the population reaches its maximum in 2085** under the medium scenario and in 2055 under the low scenario (Figure 22). The expected timing of the global population peak has moved significantly closer.

[71] United Nations Department of Economic and Social Affairs. (2024). World population prospects 2024: Summary of results. https://population.un.org/wpp/Publications/Files/WPP2024_Summary_of_Results.pdf
[72] United Nations Department of Economic and Social Affairs. (n.d.). World population prospects [Data set]. https://population.un.org/wpp/downloads?folder=Standard%20Projections&group=Most%20used
[73] See Footnote 72.

At the same time, UN estimates should be treated as highly optimistic[74]. First, its data diverge from national registries. Second, UN models assume a recovery of fertility in countries with ultra-low rates, such as South Korea, China, and Italy. Historical experience does not confirm such a recovery. **Alternative models take into account the rise in women's education in Africa and forecast a faster decline in fertility**[75,76]**.** With the adjusted fertility trajectory in the UN low scenario, humanity will reach its population peak as early as around 2046[77].

Figure 22

UN world population projections adjusted by fertility rate



Source: UN, low scenario; TRIM analysis[78].

The decline in fertility should not be viewed as a rejection of family values. Rather, it reflects a fundamental transformation in the economic model of childbirth and childrearing. In an agrarian society, where children served as a labor resource, high fertility was a survival strategy. In a postindustrial economy, a child becomes an object of long-term investment[79]. Modern households rationally concentrate resources on one or two children in order to improve their quality of life.

Research confirms[80] that in countries that have already passed through a period of rapid economic growth, **reproductive behavior is increasingly shaped by the calculation of childrearing costs.** It is also formed by the desire to give children competitive advantages in adulthood. For the middle class, having many children becomes an economically irrational strategy.

Wang Feng[81], Distinguished Professor, University of California, Irvine
USA

« The decline in birth rates is not driven by unwillingness to have children—survey after survey around the world shows that people still want to have children. The issue is that their expectations cannot be met because of a wide range of socio-economic constraints. »

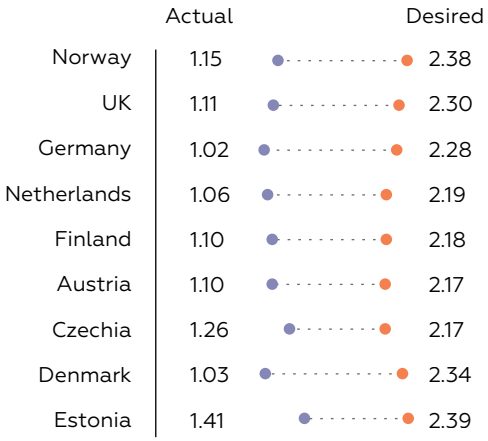
[74] Fernández-Villaverde, J. (2025). The demographic future of humanity: Facts and consequences. University of Pennsylvania. https://www.sas.upenn.edu/~jesusfv/Slides_London.pdf
[75] Institute for Health Metrics and Evaluation. (2020). Population forecasting. https://www.healthdata.org/data-tools-practices/interactive-visuals/population-forecasting
[76] K.C., S., et al. (2024). Updating the shared socioeconomic pathways (SSPs) global population and human capital projections (IIASA Working Paper). International Institute for Applied Systems Analysis. https://pure.iiasa.ac.at/id/eprint/19487/
[77] Evaluated by TRIM.
[78] United Nations Department of Economic and Social Affairs. (n.d.). World population prospects [Data set]. https://population.un.org/wpp/downloads?folder=Standard%20Projections&group=Most%20used
[79] Lee, R. (2013). Intergenerational transfers, the biological life cycle, and human society. Population and Development Review, 38(Suppl. 1), 23–35.
[80] Wei, Z., et al. (2024). Unpacking discourses on childbirth and parenthood in popular social media platforms across China, Japan, and South Korea. Proceedings of The International AAAI Conference on Web and Social Media. https://arxiv.org/pdf/2510.06788
[81] National Centre "Russia." (2026). "OD on Air" | Maxim Oreshkin and Wang Feng [Video]. YouTube. https://youtu.be/0ZZFDi_LWMA?si=51CiW32r-gtJCk2Y

By this logic, low fertility becomes a manifestation of hyper-responsible parenting and adaptation to institutional constraints. Empirical data[82] and studies of young people's reproductive attitudes[83] show a persistent gap between the desired number of children and actual fertility (Figure 23). This gap is driven by high standards of motherhood and the incompatibility of women's professional employment with childcare under the current level of infrastructure development. **The "motherhood penalty" and high poverty risks force families to postpone childbirth or forgo having additional children.** They do so to preserve their standard of living and ensure the well-being of children already born[84].

Ruben Gali
Mexico

« [...] the family constitutes the most cost-efficient and culturally universal infrastructure of human capital, and that its preventive strengthening is a necessary condition for demographic sustainability, institutional stability, and cooperation in a multipolar order. »

Figure 23
Average gap between desired and actual number of children in select EU countries



Source: Federal Institute for Population Research, 2025[85, 86].

The fertility crisis is most acute in East Asia. South Korea recorded a world-low total fertility rate (TFR) of 0.72 in 2023. Although the rate increased slightly to 0.75 in 2024 and 0.80 in 2025, it remains one of the lowest in the world. Japan's TFR is slightly higher, at 1.2, but still far below the replacement level of 2.1. These countries were the first in which the concept of the "last child"[87] entered public and academic debate. This refers to the estimated date of birth of the last citizen if current trends continue. East Asia has become the most visible example of ultra-low fertility and its long-term demographic risks.

[82] UN Women. (2019). Progress of the world's women 2019–2020: Families in a changing world. https://www.unwomen.org/en/digital-library/publications/2019/06/progress-of-the-worlds-women-2019-2020
[83] Friedrich, C., & Bujard, M. (2025). Intended, ideal, and actual fertility in 11 European countries: Evidence on fertility gaps in different age groups from the Generations and Gender Survey. Federal Institute for Population Research. https://www.bib.bund.de/Publikation/2025/pdf/Intended-ideal-and-actual-fertility-in-11-European-countries-Evidence-on-fertility-gaps-in-different-age-groups-from-the-Generations-and-Gender-Survey.pdf?__blob=publicationFile&v=2
[84] OECD. (2024). OECD society at a glance 2024: OECD social indicators. https://www.oecd.org/en/publications/society-at-a-glance-2024_918d8db3-en.html
[85] Average values across nine EU countries: Norway, the United Kingdom, Germany, the Netherlands, Finland, Austria, the Czech Republic, Denmark, and Estonia.
[86] Friedrich, C., & Bujard, M. (2025). Intended, ideal, and actual fertility in 11 European countries: Evidence on fertility gaps in different age groups from the Generations and Gender Survey. Federal Institute for Population Research. https://www.bib.bund.de/Publikation/2025/pdf/Intended-ideal-and-actual-fertility-in-11-European-countries-Evidence-on-fertility-gaps-in-different-age-groups-from-the-Generations-and-Gender-Survey.pdf?__blob=publicationFile&v=2
[87] The Japan Times. (2025, January 6). 2720 — the year when Japan is left with just one child. https://www.japantimes.co.jp/news/2025/01/06/japan/society/695-years-later-1-child/

In addition to the institutional constraints and practices of hyper-responsible parenting already mentioned, experts identify further factors behind the fertility decline in the region. The persistence of elements of the patriarchal model plays an important role.

These include insufficient flexibility in employment and the unequal distribution of household responsibilities. As a result, women are increasingly rejecting marriage and childbirth as strategies that may worsen their social and economic position. This is confirmed by the decline in the number of marriages in South Korea to historical lows[88].

The negative spiral and countries that have broken the trend

A decline in fertility below 1.5 children per woman triggers an irreversible process in society. **The number of future mothers falls, and small families become the norm[89].** Measures of comprehensive support are intended to stop this process. These include long-term payments, developed childcare infrastructure, and preservation of mothers' careers[90].

Muhammad Alim
Bangladesh

« The state must recognize child-rearing as a 'full-time job'. When a mother or father is creating the nation's future 'human capital', they must be provided with a government salary, insurance, and advancement benefits. »

No country in the world has yet fully stopped the decline in fertility. However, in Israel, France, and Sweden, the measures adopted have helped slow its pace (Figure 24).

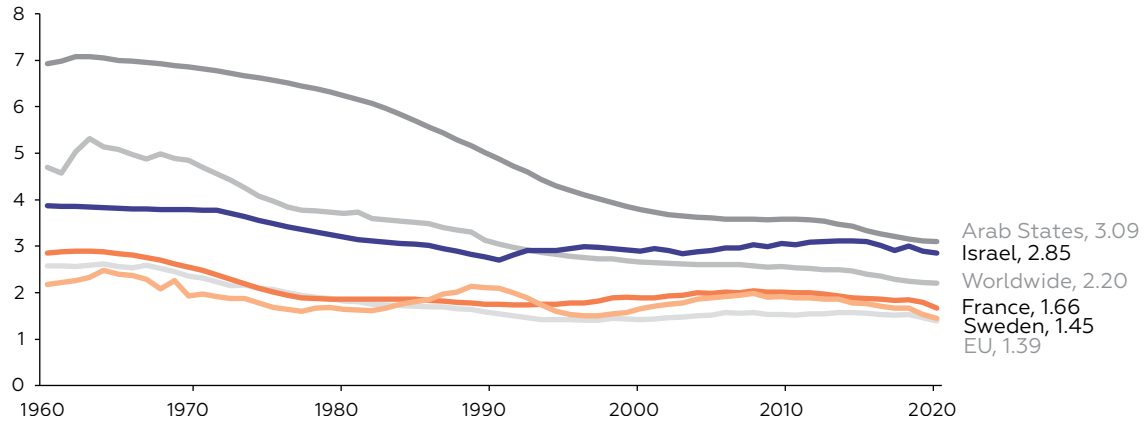
Israel's high TFR[91], at approximately 2.9, is based on a specific religious and cultural code. A child-oriented social contract plays a critical role. In addition to active government support measures for families with children, Israeli society integrates children into public life.

High tolerance for the presence of children in universities and offices reduces the social isolation of parents. It turns childrearing from a private burden into a socially approved norm. Israel's experience shows the importance of a broader child-oriented social environment.

France[92] and Sweden[93] achieved results through institutional solutions. France created strong infrastructure for working mothers. Sweden focused on gender equality and engaged fatherhood. **These cases show that family policy is most effective when it reduces the conflict between work and parenting.**

[88] Hwang, J., & Yoo, I. (2025). The motherhood effect on earnings amid declining fertility: Evidence from Korea. RFBerlin. https://www.rfberlin.com/wp-content/uploads/2025/08/25057.pdf
[89] Testa, M. R., Skirbekk, V., & Lutz, W. (2006). The low-fertility trap hypothesis: Forces that may lead to further postponement and fewer births in Europe. Vienna Yearbook of Population Research, 2006: 167–192.
[90] Luci-Greulich, A., & Thévenon, O. (2011). The impact of family policies on fertility trends in developed countries. European Journal of Population, 29(4), 387–416.
[91] Giurelli, E. (2023). Israel's exceptional fertility rate: Demography as a national security issue and the role of women in a Jewish State [Master's thesis, Luiss University]. Luiss University Repository. https://tesi.luiss.it/35991/
[92] Zubchenko, L. A. (2009). Family policy in France. Actual Problems of Europe: Collection of Scientific Papers, (2), 72–92. Moscow: INION [in Russian].
[93] Duvander, A. Z., Lappegård, T., & Andersson, G. (2010). Family policy and fertility: Fathers' and mothers' use of parental leave and continued childbearing in Norway and Sweden. Journal of European Social Policy, 20(1), 45–57.

Figure 24
Total fertility rate in Israel, France, and Sweden



Source: World Bank[94].

However, such measures only slow the decline. They do not change the overall trend toward lower fertility. Under these conditions, states will have to proceed from the assumption that the share of older people will continue to grow. **Population aging must therefore become a baseline assumption for long-term policy planning.**

Maria Kabisova
Republic of South Ossetia

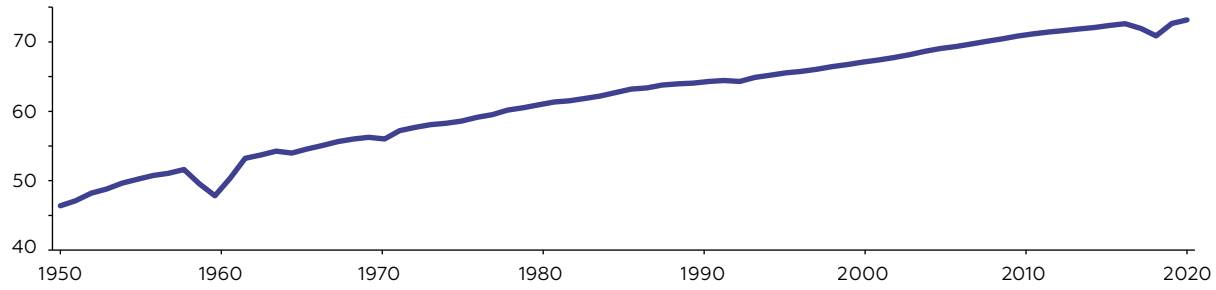
«Traditional measures of demographic policy—economic incentives, administrative controls, legal frameworks, education, and awareness campaigns—often fail to boost birth rates reliably.»

3.2 Scenarios of fertility decline and population aging

Population aging and increasing life expectancy

Another important demographic trend is **the increase in life expectancy.** Since 1950, this indicator has risen by 57%, from 46.4 years to 73.3 years in 2023 (Figure 25).

Figure 25
Life expectancy at birth, years



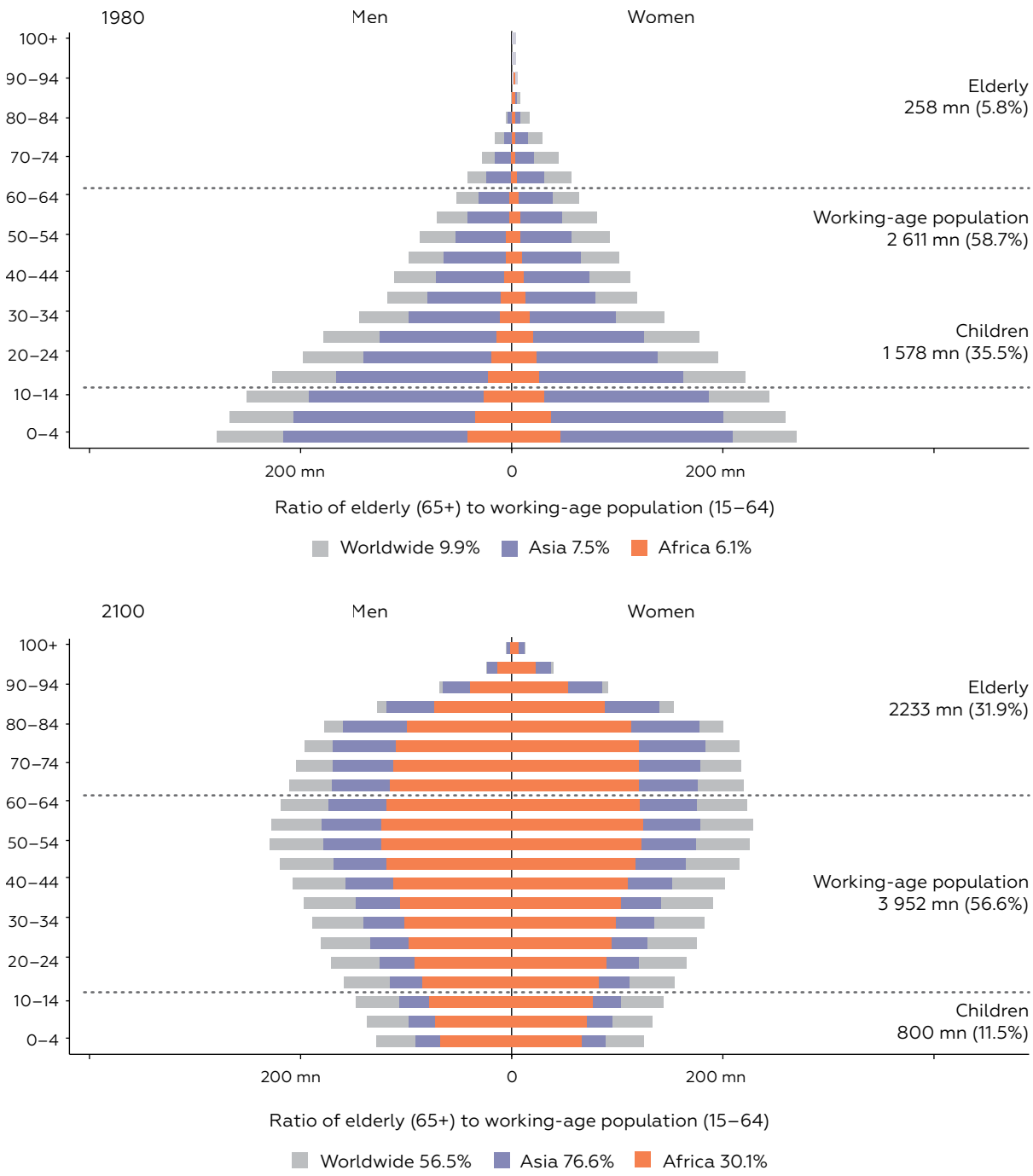
Source: UN[95]

[94] World Bank. (n.d.). World Bank open data [Data set]. https://data.worldbank.org
[95] United Nations Department of Economic and Social Affairs. (n.d.). World population prospects [Data set]. https://population.un.org/wpp/downloads?folder=Standard%20Projections&group=Most%20used

The decline in fertility and the increase in life expectancy have jointly launched the process of structural population aging (Figure 26). The share of older people in the world will increase from 5.8% in 1980 to 32.0% in 2100. In absolute terms, the number of people over 65 will rise from 258 mn to 2.23 bn. **At the same time, the share of children will decline from 35.5% to 11.5%.**

Figure 26

World population pyramid, 1980 vs. 2100



Source: UN[96].

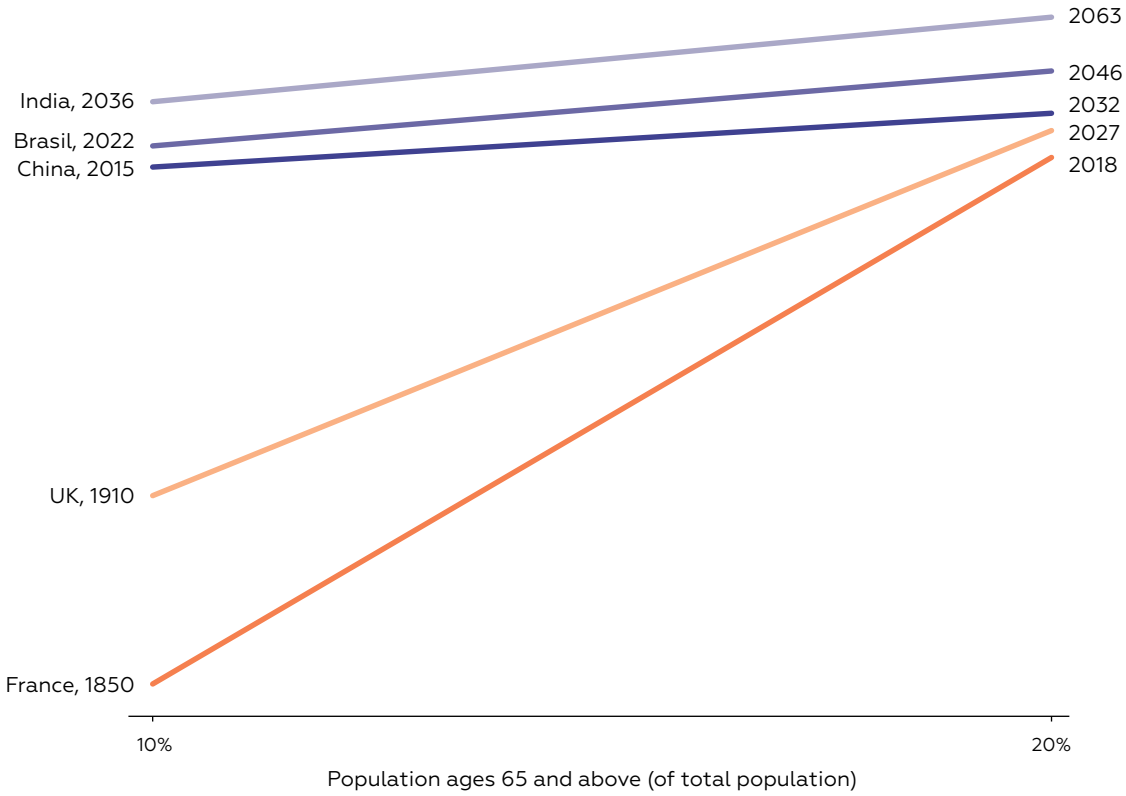
The countries of the Global Majority are aging faster than Europe and North America[97]. France needed 115 years for the share of older people aged 65 and above to rise from 10% to 20%. China, India, and Brazil are passing through the same transition in just 17–25 years (Figure 27).

[96] World Bank Open Data. URL: https://data.worldbank.org.
[97] World Health Organization. (2015). World report on ageing and health. https://www.who.int/publications/i/item/9789241565042

This accelerated aging creates the phenomenon of "growing old before growing rich." Middle-income countries[98] are forced to assume social obligations typical of wealthy states, while lacking a comparable asset base and level of labor productivity[99].

Figure 27

Years for the elderly population share to double



Source: UN[100], WHO[101].

Against this backdrop, the world is passing through a short window of minimal total demographic dependency. After that, the main source of pressure on the working-age population will no longer be high fertility, but aging. Under the UN low scenario, the total dependency ratio will reach its minimum of 52.2% in 2033. This means that each working-age person will have relatively fewer dependents than in the past or future (Figure 28). After that, however, the dependency burden will begin to rise due to the growing number of older people. **The global ratio of people over 65 to the population aged 15–64 will increase from 9.9% in 1980 to 56.5% by 2100.**

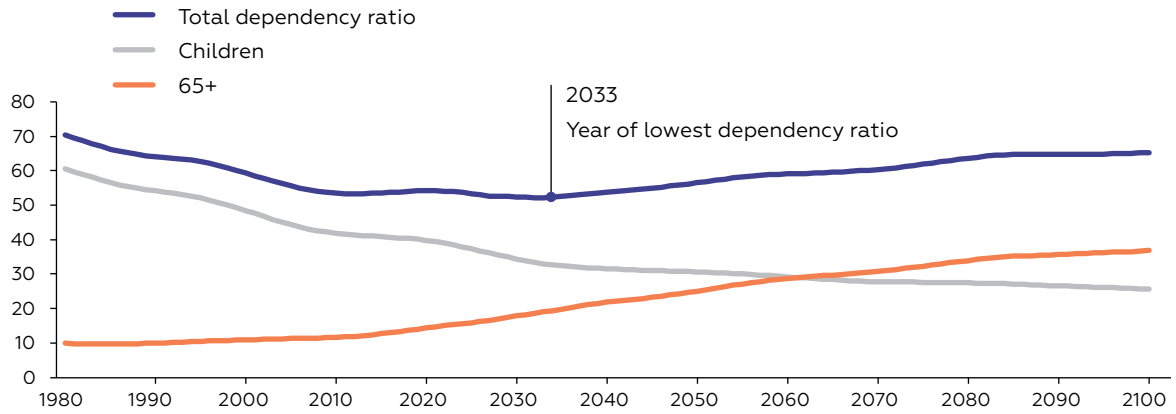
Bolor-Erdene Bayaraa
Mongolia

« Effective demographic policy is not about demanding that people have children, but about creating an environment where people can work even after they have children and can still be useful to society even after they grow old. »

[98] 6,000–12,000 USD income range.
[99] Peterson Institute for International Economics. (2024). China's population decline is getting close to irreversible. https://www.piie.com/research/piie-charts/2024/chinas-population-decline-getting-close-irreversible
[100] United Nations, Department of Economic and Social Affairs. (n.d.). World population prospects [Data set]. https://population.un.org/wpp/downloads?folder=Standard%20Projections&group=Most%20used
[101] World Health Organization. (2015). World report on ageing and health. https://www.who.int/publications/i/item/9789241565042

Figure 28

Total dependency ratio, %

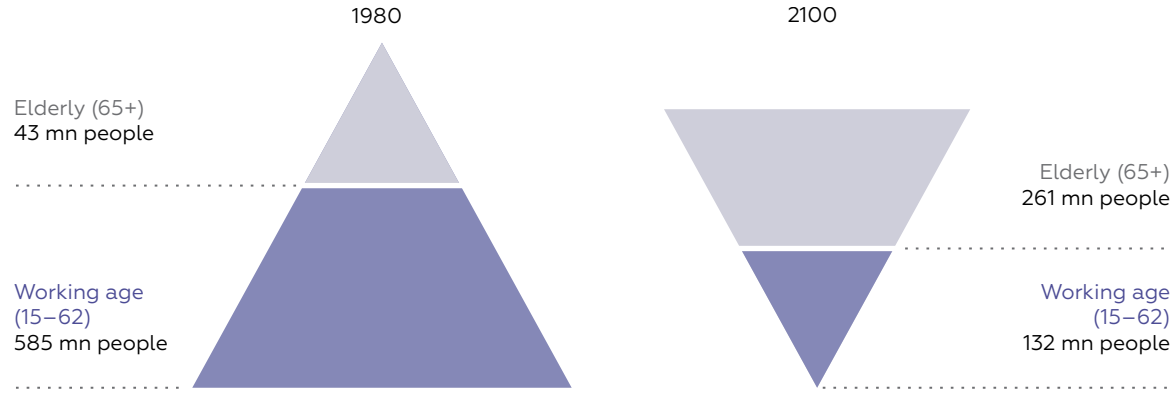


Source: UN[102].

China will become one of the clearest examples of simultaneous population aging and population contraction. In 1980, its age structure resembled a classic pyramid, with a broad base of working-age people and a relatively small share of older people. By 2100, it will effectively be "inverted." The number of working-age people will begin to decline, while the upper part of the pyramid, represented by the population aged 65 and above, will expand. **As a result, demographic aging in China will increase pressure on the labor market, the pension system, healthcare, and long-term care.** It will also limit economic growth potential by reducing the labor force (Figure 29).

Figure 29

China's population pyramid, 1980 vs. 2100



Source: UN[103].

Weilan Xu
China

« Qiqihar is located in Heilongjiang Province, China, with a population of 5.06 mn, and the proportion of elderly people aged 60 and above is 29.2%, indicating a higher degree of aging than the national average, while its economy remains at a relatively low level domestically. »

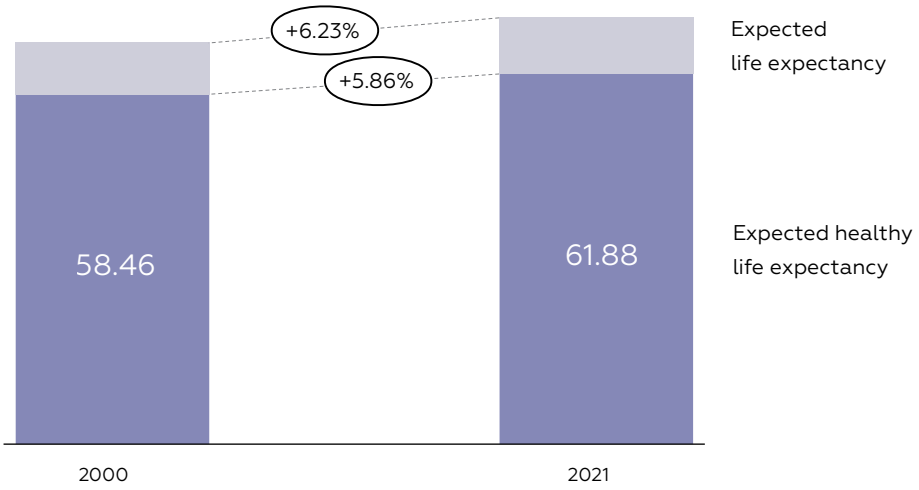
[102] United Nations, Department of Economic and Social Affairs, Population Division. (n.d.). World Population Prospects. https://population.un.org/wpp/downloads?folder=Standard%20Projections&group=Most%20used
[103] See Footnote 102.

The global demographic transition is changing not only the age structure of the population, but also the logic of the life cycle itself. In addition to overall life expectancy, healthy life expectancy is also increasing. **People are not only living longer; on average, they are also remaining healthy and functional for longer** (Figure 30).

A study of the biological age of the U.S. population in 1988–1994 and 2007–2010 showed[104] that Americans became biologically younger on average. However, the scale of this "rejuvenation" varied by age and gender. The strongest effect was recorded among people aged 60–79. Biological age declined by 4.29 years for men and 3.63 years for women. In the 40–59 age group, the decline was 2.65 and 2.36 years, respectively. **Among people aged 20–39, the decline was much smaller: only 1.27 years for men and 0.63 years for women.**

Figure 30

Gap between life expectancy (LE) and healthy life expectancy (HALE) at birth, years



Source: WHO[105].

However, this positive shift does not yet resolve the key challenge. Healthy life expectancy is growing more slowly than overall life expectancy. As a result, **the additional years gained do not always become years of healthy and independent life.** Part of the increase in life expectancy consists of periods of chronic disease, functional limitations, and dependence on care. This is why the aging agenda is shifting from simply extending life to extending healthy, active, and autonomous life.

Wang Feng[106], Distinguished Professor, University of California, Irvine
USA

« We should stop looking at the population as just a number; what matters is the composition and the quality of the population. Aging is in fact a happy outcome of human progress: we now have a longer-living, healthier, much more educated population. Aging does not have to mean decline—if economies and institutions can adapt, this population becomes a resource for development rather than a burden. »

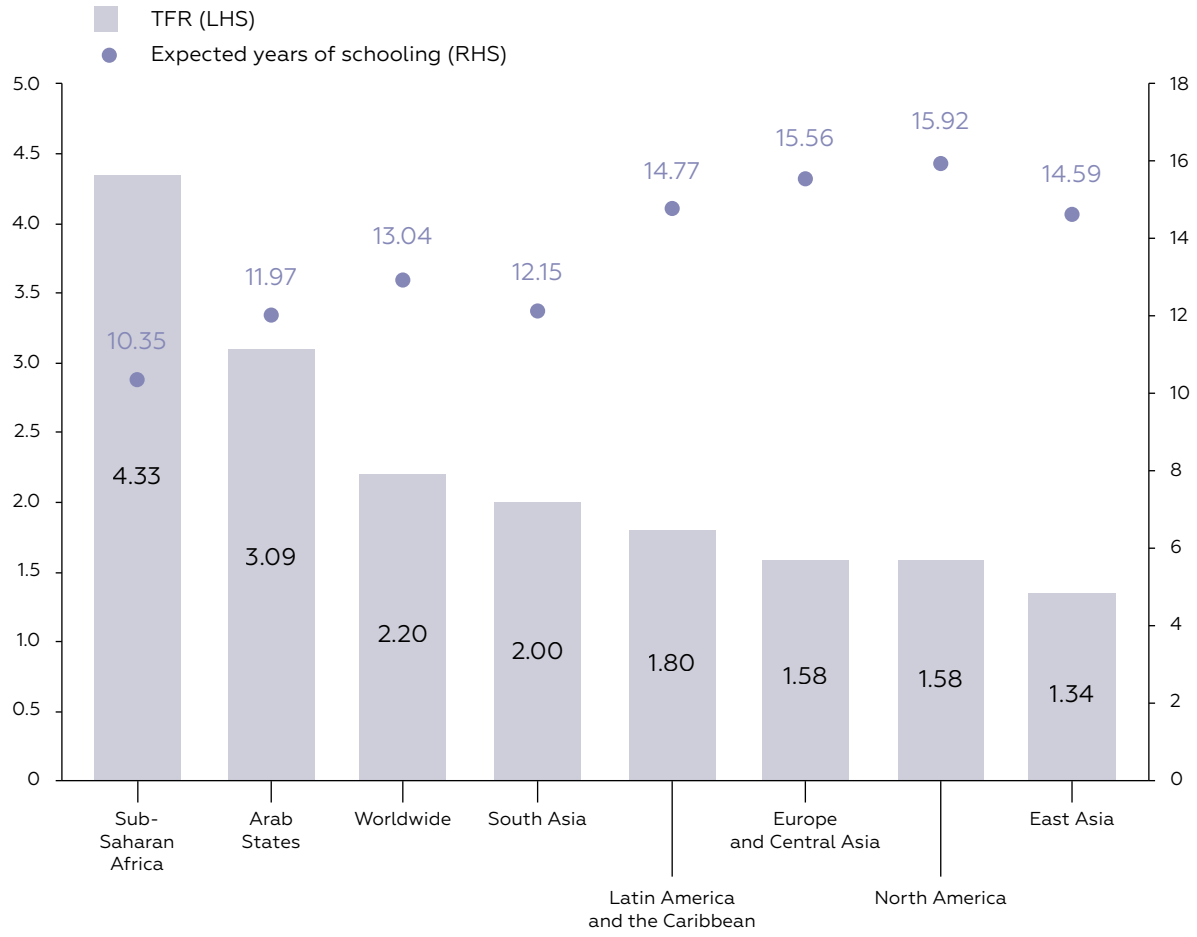
[104] Levine, M., & Crimmins, E. (2018). Is 60 the new 50? Examining changes in biological age over the past two decades. Demography, 55(2), 387–402.
[105] World Health Organization. (2026). Healthy life expectancy (HALE) at birth (years). https://www.who.int/data/gho/data/indicators/indicator-details/GHO/gho-ghe-hale-healthy-life-expectancy-at-birth
[106] National Centre "Russia." (2026). "OD on Air" | Maxim Oreshkin and Wang Feng [Video]. YouTube. https://youtu.be/0ZZFDi_LWMA?si=51CiW32r-gtJCk2Y

Global Redistribution

The global demographic transition will lead not only to population aging, but also to a redistribution of sources of labor force growth. Fertility is declining in almost all regions of the world. Against this backdrop, Sub-Saharan Africa will remain the main demographic reserve of the 21st century. **A significant share of the growth in the working-age population will be concentrated there.**

However, **this potential is not an automatic demographic dividend.** First, the countries of the region face low levels of investment in human capital. Expected years of schooling remain among the lowest in the world, at 8–10 years compared with the global average of 13 years. This limits the future productivity of new generations (Figure 31).

Figure 31
Fertility rate and average years of schooling, 2023



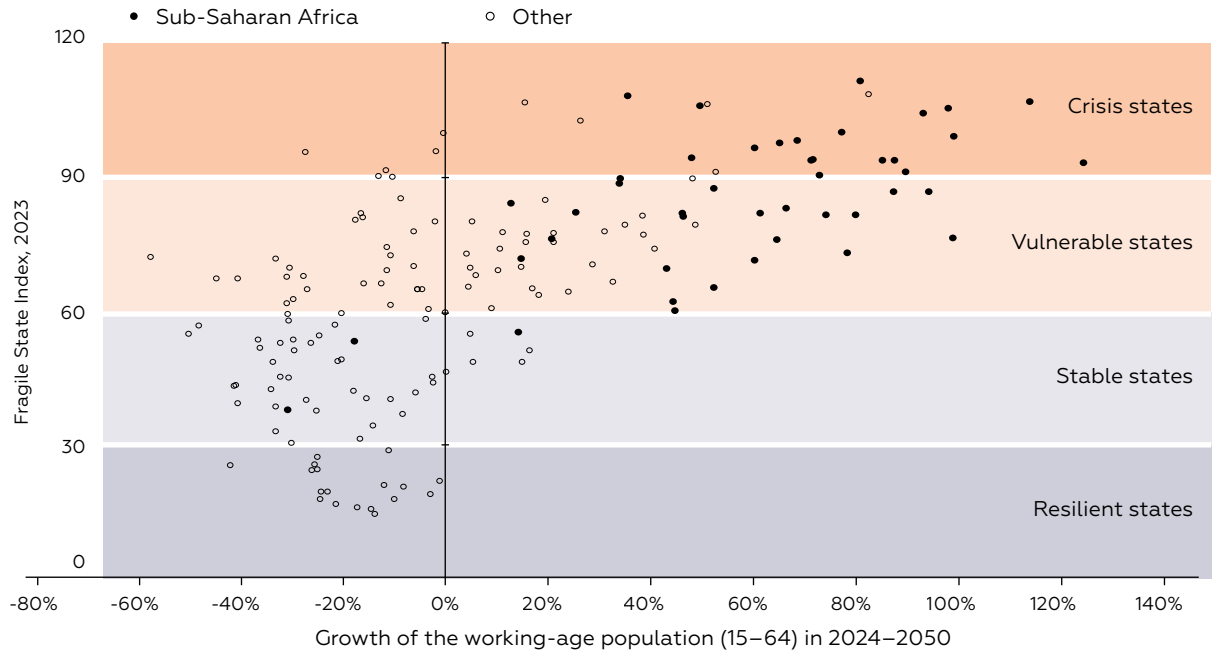
Source: World Bank[107].

Rapid growth in the youth population creates the phenomenon of a "youth bulge."[108] It can become both a driver of growth and a source of instability. By 2050, the net increase in the working-age population in African countries will exceed 620 mn people. Three-quarters of them will live in low-income countries, as well as in territories affected by instability and conflict (Figure 32). **To provide every person with employment, these countries will need to create 2 mn jobs every month. So far, they are creating only 3 mn jobs per year[109].**

[107] World Bank Group. (2024). Expected years of schooling. https://genderdata.worldbank.org/en/indicator/se-sch-life
[108] The World Bank. (2004). The devil in the demographics: The effect of youth bulges on domestic armed conflict. https://documents1.worldbank.org/curated/en/794881468762939913/pdf/29740.pdf
[109] World Bank Group. (2025). Pathways to job creation in Africa. https://openknowledge.worldbank.org/server/api/core/bitstreams/8322b452-2d9c-4708-9fa7-425245c58a7d/content

Figure 32

Growth of the working-age population in 2025–2050, and the Fragile State Index in 2023



Source: World Bank[110], Fund for Peace[111].

3.3 Urban collapse and the crisis of pension systems

Global demographic shifts are radically changing the structure of the economy and the social organization of society. The growth model based on a constant inflow of new workers—the so-called "demographic dividend"—has exhausted itself for most regions. In the late 20th century, this model fueled many fast-growing economies, including China.

Urban collapse

Demographic decline is reinforcing the trend toward a shrinking urban population. **Against the backdrop of a global housing crisis, megacities are becoming increasingly difficult to move to[112].** Population decline is already projected for a number of the world's largest cities, including Seoul, Osaka, Tokyo, and New York[113].

Wang Feng[114], Distinguished Professor, University of California, Irvine
USA

« The future of cities is not really about competition in the narrow economic sense—it is more of a redistribution of human capital. Cities with a clear strategy and a clear purpose will attract people and thrive, while those that fail to find their specific role are bound to decline. »

[110] World Bank Group. (2025). Pathways to job creation in Africa. https://openknowledge.worldbank.org/server/api/core/bitstreams/8322b452-2d9c-4708-9fa7-425245c58a7d/content
[111] Fragile States Index. (n.d.). Fragile States Index. https://fragilestatesindex.org/
[112] Potts, D. (2020). Broken cities: Inside the global housing crisis. Bloomsbury Publishing.
[113] Our World in Data. (2025). Population of the world's largest cities. https://ourworldindata.org/grapher/population-of-the-worlds-largest-cities?country=Tokyo+%28Japan%29~Istanbul+%28Turkey%29~Seoul+%28South+Korea%29~Osaka+%28Japan%29~Seoul~Tokyo~Osaka~New+York+City
[114] National Centre "Russia." (2026). "OD on Air" | Maxim Oreshkin and Wang Feng [Video]. YouTube. https://youtu.be/0ZZFDi_LWMA?si=51CiW32r-gtJCk2Y.

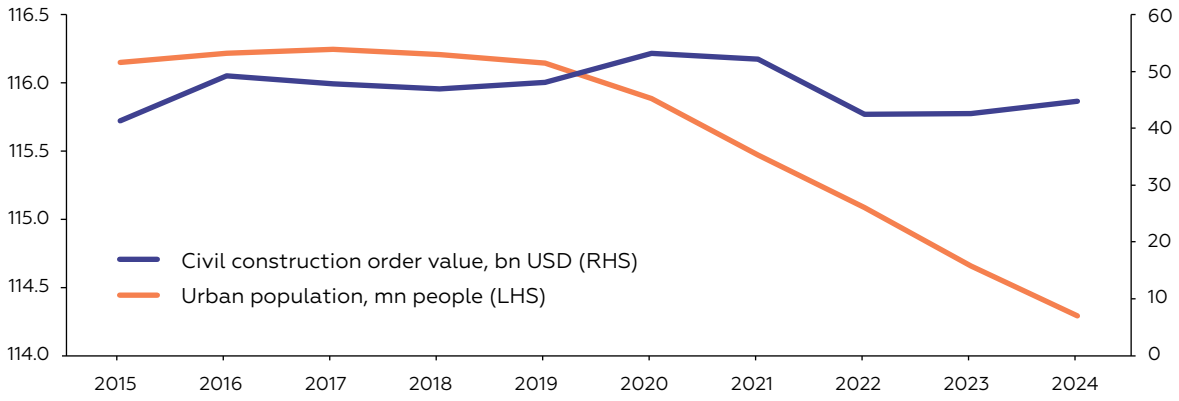
The concentration of people and resources in cities creates new risks[115]. The high cost of living, combined with a shortage of living space, creates barriers to family planning. **Dense development, integrated infrastructure, and increasingly complex networks raise the frequency and severity of natural and technological disasters.** Floods, fires, and accidents at critical infrastructure facilities become catastrophic not only locally, but also economically for the entire country. In Asian and North American megacities, where the population is concentrated in limited areas, damage from natural disasters has increased dozens of times over the past 20 years[116].

Daria Zorko
Belarus

« Investment in the environment thus ceases to be a question of ecology or social policy in the narrow sense and becomes a question of fundamental economic competitiveness and survival today. »

Under these conditions, cities face the problem of excess infrastructure, which is becoming increasingly difficult to maintain. As it degrades, the traditional advantage of large urban agglomerations also declines[117]. **As a result, these agglomerations risk turning into "ghost cities."** In Japan, a highly urbanized country, infrastructure spending continues to grow despite the depopulation trend. This is partly due to the need to renew infrastructure assets created in the 1960s and 1970s (Figure 33).

Figure 33
Trends in infrastructure spending and urban population in Japan

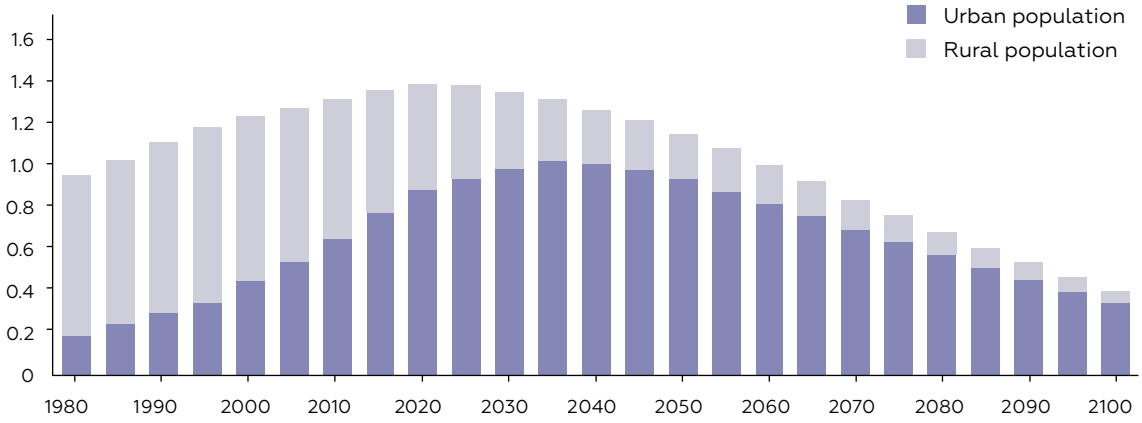


Source: Statistics of Japan[118], World Bank[119].

Based on the UN low scenario, the trend toward megacity depopulation may also affect China. Until the mid-2030s, the country's urban population will continue to grow due to migration from rural areas. After that, however, the demographic resource will be exhausted (Figure 34). **Competition for human capital will pull the population into China's most successful agglomerations, while peripheral areas become depopulated.**

[115] Das, S., et al. (2024). Unraveling the urban climate crisis: Exploring the nexus of urbanization, climate change, and their impacts on the environment and human well-being – A global perspective. AIMS Public Health, 11(3), 963–1001.
[116] Global Facility for Disaster Reduction and Recovery. (2016). The making of a riskier future: How our decisions are shaping future disaster risk. https://www.gfdrr.org/sites/default/files/publication/Riskier%20Future.pdf
[117] Martinez-Fernandez, C., et al. (2012). Shrinking cities: Urban challenges of globalization. International Journal of Urban and Regional Research, 36(2), 213–225.
[118] e-Stat. (2026). Current survey on orders received for construction Big 50 constructors. https://www.e-stat.go.jp/index.php/en/stat-search/files?page=1&iroha=21&toukei=00600130&tstat=000001015811&cycle=1&tclass1=000001015812&layout=datalist&tclass2val=0
[119] Kriss, P., et al. (2021). Evolution of quality infrastructure investment in Japan. World Bank. https://openknowledge.worldbank.org/server/api/core/bitstreams/ac7caa3f-78e4-5de2-8ed2-b076ebaf3bdc/content

Figure 34
Population dynamics in China, bn people



Source: UN (actuals and low scenario)[120], National Bureau of Statistics of China[121].

Crisis of Pension Systems

One consequence of population aging is pressure on traditional pension funds using PAYG, or pay-as-you-go, systems. In these systems, payments are financed by contributions from current workers. **As the demographic balance deteriorates, the internal rate of return of such schemes declines.** Governments then face a choice: either increase taxes and contributions or reduce payments[122]. In a number of countries, the retirement age is already being raised, while pensions are being cut to minimum guaranteed benefits[123].

Egor Komyagin
Russia

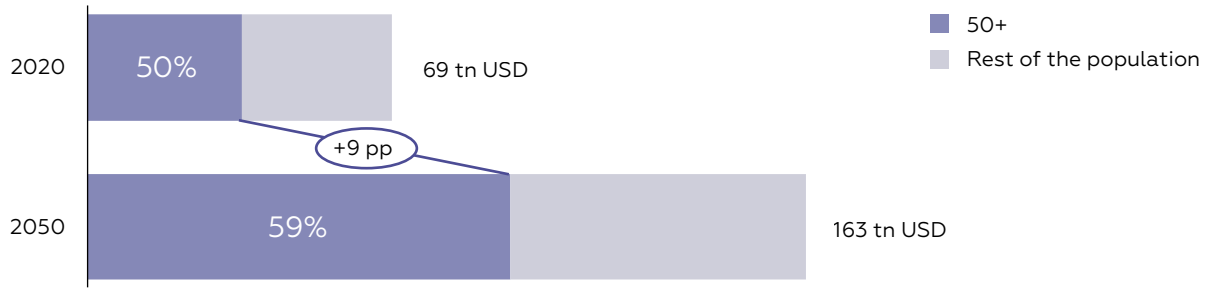
« The proposed ecosystem, based on a single base salary, accrued points for personal contributions, and a 'social matching' mechanism, radically transforms pensions from a tool for survival into a powerful incentive for active longevity, human capital, and economic growth. This is a workable model that has been tested in Russia and is easily scalable to regions across Asia, Africa, Latin America, and the BRICS+ country, thus creating a global growth platform through investments in people and technological sovereignty. »

The traditional pension system is giving way to mixed models. These models rely on private savings, financial literacy, investment, and long-term planning, rather than redistribution through taxes and social contributions. **The prerequisites for this transition already exist today:** older generations have the highest level of accumulated capital compared with other age segments[124].

Global spending by people aged 50 and older will become the main driver of the global consumer market[125]. **In 2020, this age group accounted for about 50% of total global spending; by 2050, this share will rise to 59%** (Figure 35).

[120] United Nations Department of Economic and Social Affairs. (n.d.). World population prospects [Data set]. https://population.un.org/wpp/downloads?folder=Standard%20Projections&group=Most%20used
[121] National Bureau of Statistics of China. (n.d.). National data. https://data.stats.gov.cn/dg/website/page.html#/pc/national/en/yearData
[122] Koutsogeorgopoulou, V., & Morgavi, H. (2025). Ageing populations, their fiscal implications and policy responses. OECD Economics Department Working Papers. https://www.oecd.org/en/publications/ageing-populations-their-fiscal-implications-and-policy-responses_6aec03b3-en.html
[123] OECD. (2025). Pensions at a glance 2025: OECD and G20 indicators. https://www.oecd.org/en/publications/pensions-at-a-glance-2025_e40274c1-en.html
[124] UBS. (2025). Global wealth report 2025. https://www.ubs.com/global/en/wealthmanagement/insights/global-wealth-report.html
[125] AARP. (2020). The global longevity economy. https://www.aarp.org/pri/topics/work-finances-retirement/economics-aging/global-longevity-economy/

Figure 35
Share of expenditures by people aged 50+ in total household spending



Source: AARP[126].

The realization of the consumer potential of older generations is directly linked to the use of accumulated savings. As large age cohorts move from saving to active spending, there is a risk that asset values will decline. This is because supply in capital markets will grow, while demand will be limited. **Pension funds and private investors will begin selling stocks, bonds, and real estate to finance current expenses.** Smaller younger generations will not be able to fully absorb these assets[127].

As a result, sustained pressure on prices across major asset classes may emerge, along with a decline in their returns. The real estate market appears especially vulnerable, as it is a key savings instrument for the middle class. A significant volume of secondary and inherited housing will enter the market, while the number of potential buyers will decline. **This creates a risk of price declines in mass-market segments and the depreciation of savings at the very moment when they are needed to support life in old age.**

Conclusion to Chapter 3

The demographic crisis is shifting from a background issue to one of the key factors shaping the limits of economic growth, the resilience of social systems, and the spatial organization of the world.

The rapid decline in fertility in many countries has already approached the level of simple population replacement. In some cases, it has fallen below that level. This process is driven by the completion of the demographic transition. It is also driven by a fundamental transformation of the economic and social models of the family: the changing role of women, rising childrearing costs, urbanization, and shifting life priorities. **Together, these factors are changing the logic of family formation and reproductive behavior.**

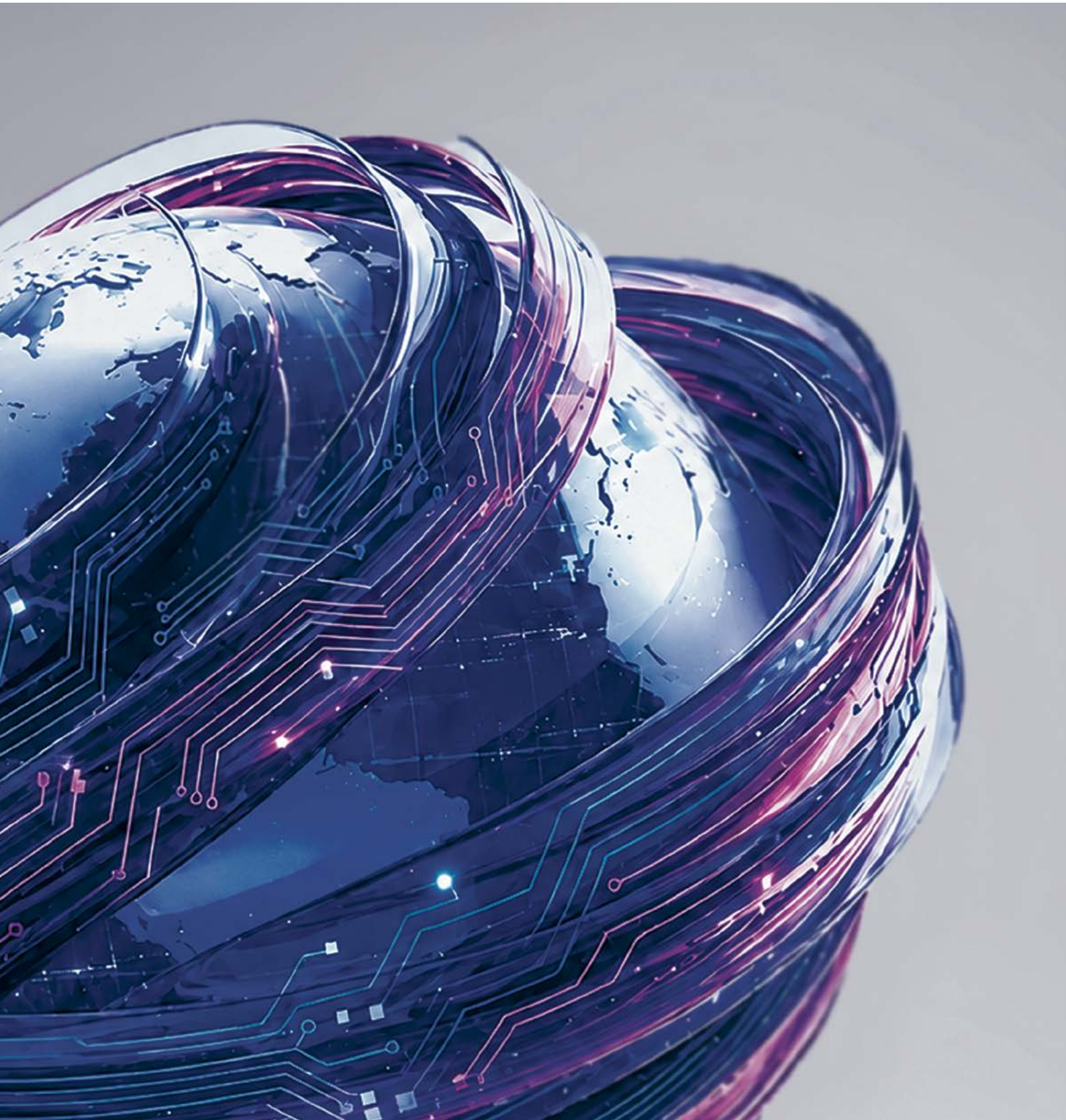
Life expectancy is increasing faster than the number of years lived in good health. People are living longer, but they spend a significant share of these additional years with chronic diseases and limitations.

Together, these processes are creating unprecedented pressure on pension systems, social support institutions, and urbanization processes. The shrinking share of the working-age population, combined with the growing number of older people, calls into question the sustainability of existing social security models. **The concentration of labor in the most successful megacities may lead to the collapse of other cities that lose the global competition for talent.**

[126] AARP. (2020). The global longevity economy. https://www.aarp.org/pri/topics/work-finances-retirement/economics-aging/global-longevity-economy/
[127] Takáts, E. (2010). Ageing and asset prices. BIS Working Papers. https://www.bis.org/publ/work318.pdf

CHAPTER 4

TECHNOLOGICAL TRANSFORMATION OF THE ECONOMY



4. TECHNOLOGICAL TRANSFORMATION OF THE ECONOMY

Technological transformation determines the ability of economies to adapt to demographic constraints. Productivity and the redistribution of global capacities depend on the speed of technology adoption.

AI is moving from individual tools to agentic systems. These systems can independently perform complex tasks, manage processes, and create new models of commerce. Digital platforms are becoming infrastructure for the algorithmic market governance. They reduce transaction costs, while also increasing the risks of dependency and concentration of power.

Autonomous systems, robotics, and unmanned solutions are changing transport, production, logistics, and services. They are shifting the economy from process management to outcome management. Biotechnology, in turn, is opening a new growth frontier in medicine, agriculture, materials, and chemistry. It is turning biological processes into a manageable engineering foundation for the economy of the future.

4.1 Artificial Intelligence: The path toward an agentic economy

AI is rapidly becoming one of the key technologies of the modern global economy. It is already changing approaches to production and consumption. It is also automating business processes and increasing productivity. By early 2026, **AI had become an integral part of life for more than 1 bn people**[128,129,130]**.** In business, the technology is moving from experimentation to standard practice. In 2025, 88% of companies used AI in one form or another, and 79% had implemented generative AI in at least one business function[131].

The widespread adoption of AI will have a long-term impact on the global economy. **Analysts forecast that from 2025 to 2030, its use could increase average annual global GDP growth by 0.5%**[132]**.**

The evolution of AI towards artificial general intelligence

The evolution of AI has moved from simple programs following rigid rules to deep neural networks capable of learning from large datasets and imitating human logic. **The modern history of AI development can be divided into three major stages** (Figure 36).

The first stage was the broad adoption of narrow AI for specific tasks, such as service personalization and customer interaction. This was supported by the deep learning revolution and the mass adoption of graphics processing units and cloud computing. These technologies improved AI accuracy in domain-specific tasks and radically reduced the cost of data processing.

The second stage was the accelerated development of generative AI. Its starting point was 2022, when OpenAI made the ChatGPT chatbot publicly available[133]. Unlike narrow AI, generative AI can create new content in response to natural language prompts. Since 2025, as multi-step reasoning skills have developed, it has gradually evolved from reactive assistants into autonomous agents.

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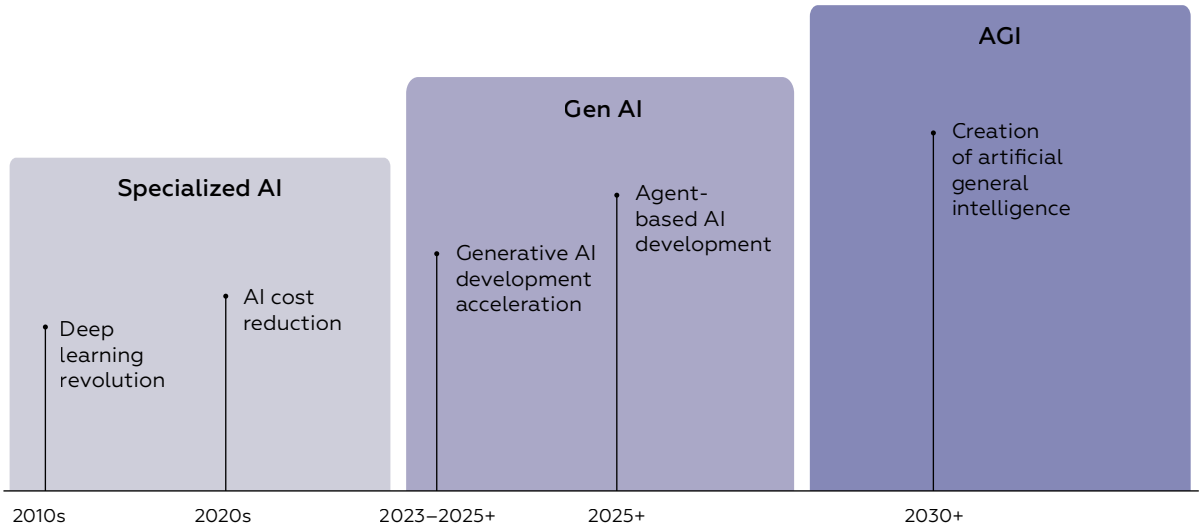
[128] Various estimates suggest the number of active AI users worldwide ranges from 1.1 to 1.5 bn.
[129] Resourcera. (2026). Global AI users: Insights on 1.1 bn active users. https://resourcera.com/data/artificial-intelligence/ai-users/
[130] DataReportal. (2025). Digital 2026: More than 1 bn people use AI. https://datareportal.com/reports/digital-2026-one-bn-people-using-ai
[131] McKinsey & Company. (2025). The state of AI 2025: Agents, innovation, and transformation. https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai
[132] Bogmans, C., et al. (2025). Power hungry: How AI will drive energy demand. IMF. https://www.imf.org/-/media/files/publications/wp/2025/english/wpiea2025081-print-pdf.pdf
[133] OpenAI. (2022). Introducing ChatGPT. https://openai.com/index/chatgpt/

The third stage is the emergence of artificial general intelligence[134], or AGI. It will be capable of performing tasks that require generalized understanding, self-awareness, and adaptation at a level comparable to that of humans. According to the median expert estimate[135], its emergence is not expected before 2032.

Figure 36
Modern history of AI development



Source: compiled by TRIM.

Chen Qiufan[136], Science-fiction writer and co-author of AI 2041
China

« What sets the current stage apart is that AI is already embedded in users' everyday practices and is changing the way people interact with information—it is no longer a laboratory technology. The shift in user behavior has become a more meaningful indicator of technological change than individual breakthroughs in algorithms. »

Generative AI: A revolution in productivity

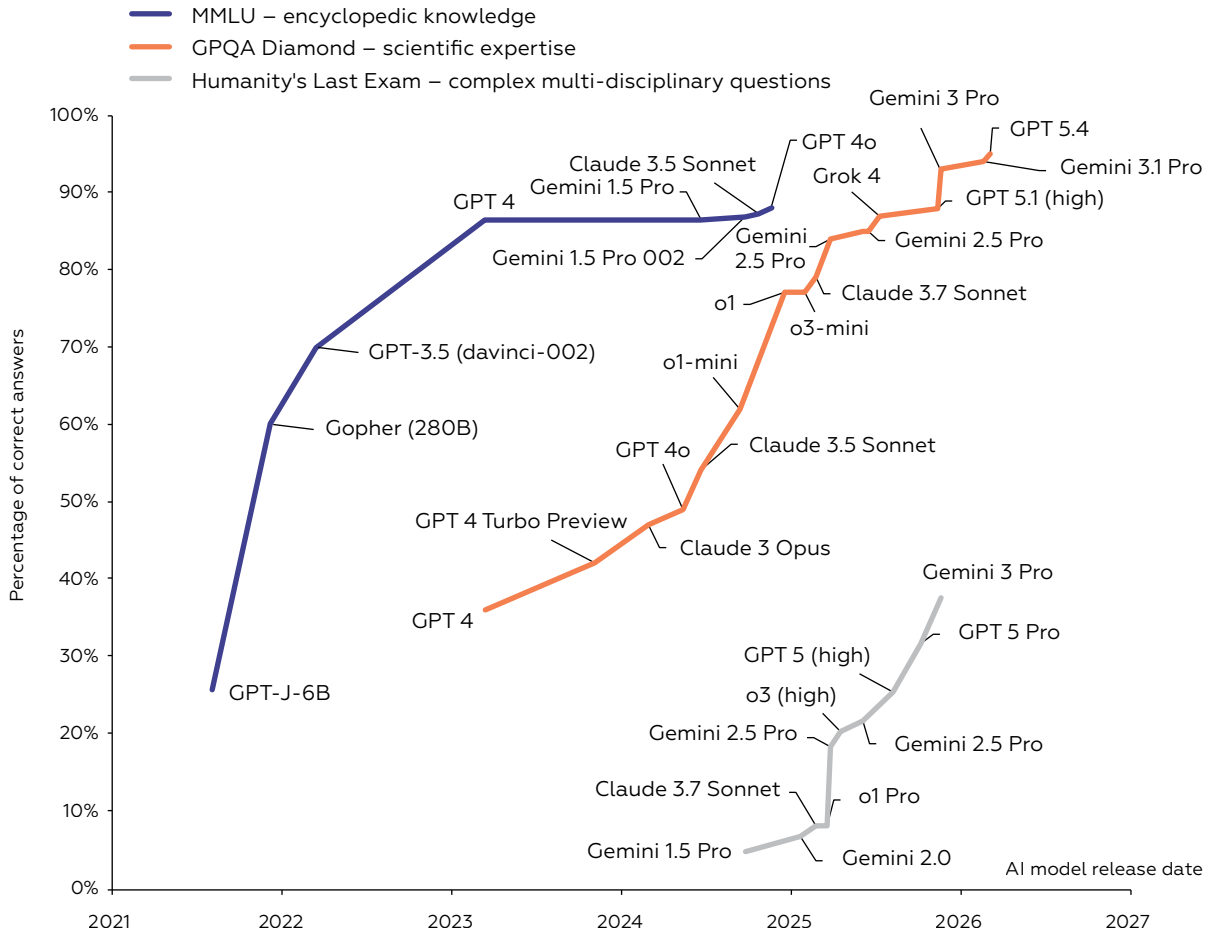
Generative AI has made it possible to automate complex cognitive tasks. **It has reduced the time needed to perceive and process large volumes of data from hours to seconds.**

The results of specialized tests, or benchmarks, confirm the continuous performance improvement of frontier AI models. From 2021 to 2026, frontier models expanded their capabilities from basic general knowledge, measured by MMLU[137], to the level of narrow PhD-level experts, measured by GPQA Diamond[138]. Moreover, they have effectively exhausted the potential of simple tests. **They have moved on to solving highly complex tasks that require deep reasoning and cross-domain synthesis,** as measured by Humanity's Last Exam[139] (Figure 37).

[134] Artificial General Intelligence (AGI) is the concept of AI capable of understanding, learning, and applying intelligence at a human level.
[135] Metaculus. (2020). When will the first general AI system be devised, tested, and publicly announced? https://www.metaculus.com/questions/5121/date-of-first-agi-strong/
[136] National Centre "Russia." (2026, May 15). Open Dialogue Podcast "OD on Air" | Maxim Oreshkin and Chen Qiufan [Video]. YouTube. https://www.youtube.com/watch?v=hDS51fUd5o0
[137] MMLU is a benchmark testing encyclopedic knowledge with 14,000 questions across 57 academic disciplines.
[138] GPQA Diamond is a benchmark testing scientific reasoning with PhD-level questions in natural sciences.
[139] Humanity's Last Exam is a benchmark testing ability to solve complex interdisciplinary problems at the limit of formalized questions.

Figure 37

Frontier AI models benchmark performance

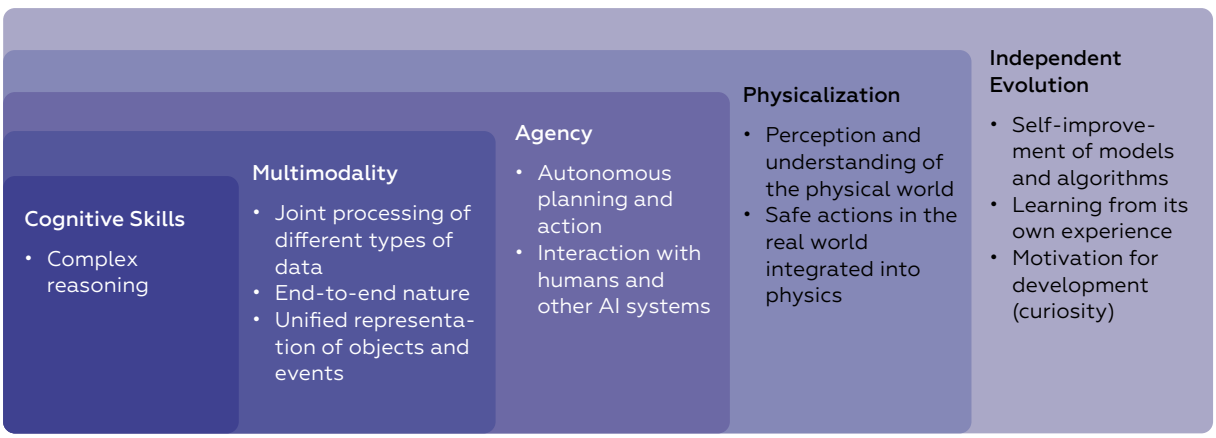


Source: Epoch AI[140].

The main areas of generative AI development include **improving models' cognitive capabilities,** advancing multimodality, developing agent capabilities, enabling physical interaction, and enhancing self-learning mechanisms (Figure 38).

Figure 38

Main directions of generative AI development



Source: compiled by TRIM.

[140] Epoch AI. (2026). AI capabilities. https://epoch.ai/benchmarks?view=graph&tab=eci

A new type of market power: Control over computing infrastructure

In the new economy, computing capacity is becoming a critical factor of production. **Ownership of computing clusters and access to cheap energy are strategic resources,** comparable to oil in the 20th century.

From 2026 to 2030, the global data center market will grow at an average annual rate of 14%[141]. This corresponds to the addition of roughly 100 GW of new computing capacity. **This expansion will require up to USD 3 tn in additional investment,** including USD 1.2 tn in real estate for data center construction and USD 1–2 tn for graphics processing units and network infrastructure[142].

New projects are becoming increasingly large-scale and expensive. Among the largest projects announced in recent years are Meta[143] Hyperion in the United States, with 5 GW and USD 30 bn in investment[144,145]; Microsoft Fairwater Wisconsin in the United States, with 3.3 GW and USD 7 bn[146,147]; the Yotta Data Services cluster in India, with 2 GW and USD 2 bn[148]; OpenAI Stargate Shackelford in the United States, with 1.4 GW and USD 25 bn[149,150]; the Chindata cluster in China, with 1.2 GW and USD 4 bn[151]; the Google and AdaniConneX AI hub in India, with 1 GW and USD 20 bn[152,153]; and the OpenAI Stargate regional campus in the United Arab Emirates, with 1 GW and USD 20–30 bn[154,155].

The significant costs of development and the high complexity of building and operating modern computing infrastructure are forcing the data center market to consolidate. Global cloud providers are gaining the advantage. **They are increasing investment in new projects in response to rising demand. With sufficient resources, they can control other developers' access to computing infrastructure** (Figure 39).

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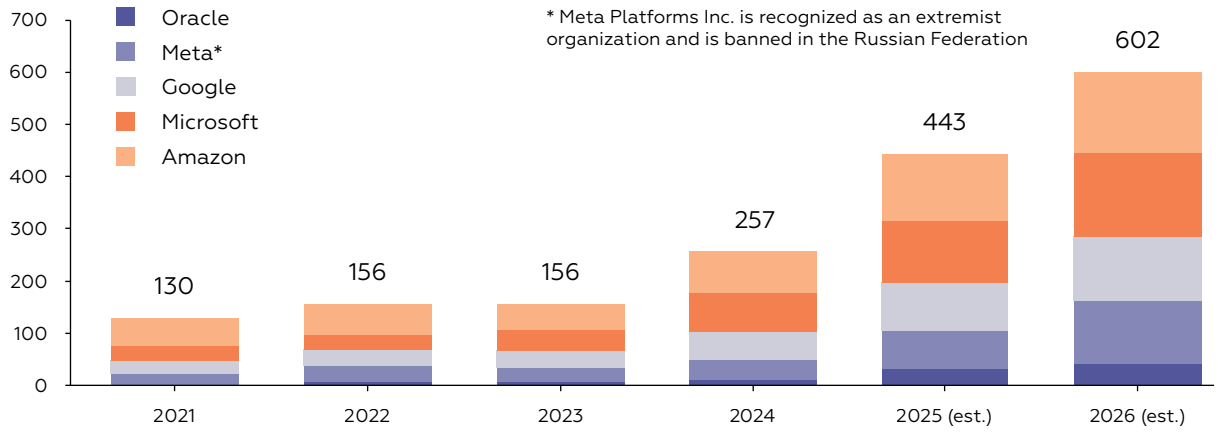
141 JLL. (2026). 2026 Global Data Center Outlook. https://www.jll.com/en-us/insights/market-outlook/data-center-outlook
142 See Footnote 141.
143 Meta has been designated an extremist organization and its activities are banned in Russia.
144 Data Centers Meta. (2025). The largest Meta data center yet brings big impact to Louisiana. https://datacenters.atmeta.com/richland-parish-data-center
145 Datacenterdynamics. (2025). Meta to invest "hundreds of bns of dollars into compute to build superintelligence," with several multi-GW data center clusters. https://www.datacenterdynamics.com/en/news/meta-to-invest-hundreds-of-billions-of-dollars-into-compute-to-build-superintelligence-with-several-multi-gw-data-center-clusters/
146 Microsoft. (2025). The official Microsoft blog. https://blogs.microsoft.com/blog/2025/09/18/inside-the-worlds-most-powerful-ai-datacenter
147 Reuters. (2025). Microsoft boosts Wisconsin data center spending to $7 bn. https://www.reuters.com/business/microsoft-boosts-wisconsin-data-center-spending-7-billion-2025-09-18/
148 Yotta. (2026). Yotta to deploy one of Asia's largest NVIDIA Blackwell HGX B300 superclusters with over 20,000 NVIDIA Blackwell Ultra GPUs. https://yotta.com/press-releases/yotta-to-deploy-20000-nvidia-blackwell-ultra-gpus
149 Datacenterdynamics. (2025). Vantage breaks ground on Texas gigawatt data center campus for OpenAI. https://www.datacenterdynamics.com/en/news/vantage-breaks-ground-on-texas-gigawatt-data-center-campus-for-openai
150 Reuters. (2025). Vantage Data Centers plans $25 bn AI campus in Texas. https://www.reuters.com/business/vantage-data-centers-plans-25-bn-ai-campus-texas-2025-08-19/
151 Mingtiandi. (2025). Bain Capital sells China data centre business to local consortium for $3.9B. https://www.mingtiandi.com/real-estate/data-centres/bain-capital-sells-chindata-china-data-centres-to-hec/
152 Adani. (2025). Adani and Google partner to build India's largest data centre campus in Visakhapatnam. https://www.adani.com/newsroom/media-releases/adani-and-google-partner-to-build-indias-largest-data-centre-campus-in-visakhapatnam
153 Reuters. (2025). India's Adani seeks up to $5 bn investment in Google data center to join AI boom. https://www.reuters.com/business/media-telecom/indias-adani-seeks-up-5-bn-investment-google-data-center-join-ai-boom-2025-11-28/
154 OpenAI. (2025). Introducing Stargate UAE. https://openai.com/index/introducing-stargate-uae
155 Capacity Global. (2026). UAE's Stargate AI data centre project to cost over $30bn. https://capacityglobal.com/news/stargate-uae-data-centre

Figure 39

Capital expenditure trends among cloud providers, bn USD



Source: CreditSights[156].

Redistribution of knowledge production costs

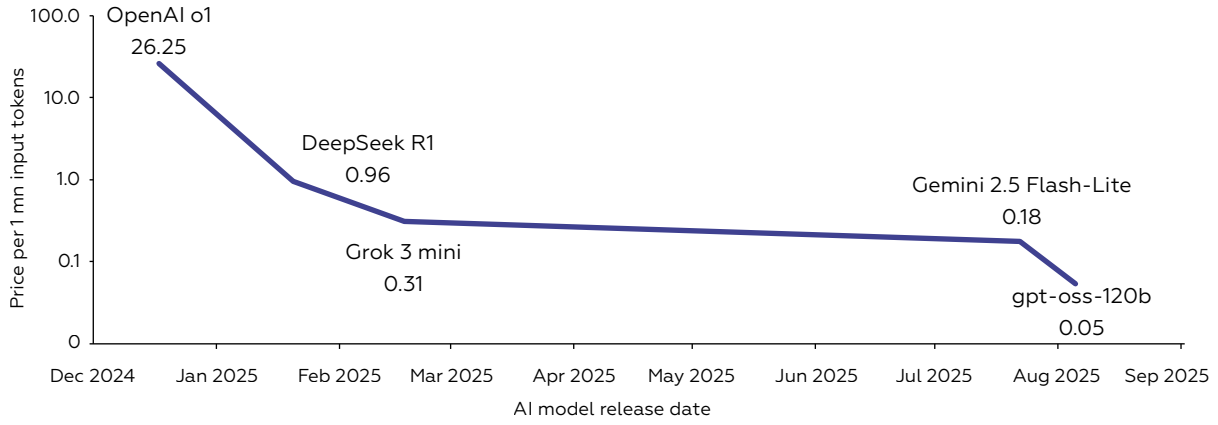
Traditionally, the production of intellectual products required highly skilled human labor. This was the main constraint on scaling[157]. Thanks to generative AI, **the cost of producing a unit of content is shifting from labor compensation to computing capacity.** The cost of content generation now depends linearly on the cloud provider's tariff or on the cost of electricity needed to operate a local data center.

At the same time, the cost of using trained models is declining. The Chinese model DeepSeek R1 marked a breakthrough in this respect, as it was trained at a fraction of the cost of U.S. models.

This is becoming possible due to more efficient computing infrastructure and model optimization, as well as lower prices for cloud services driven by competition among cloud providers (Figure 40).

Figure 40

Cost of using AI models, USD



Note: The sample includes models with an Intelligence Index score above 40 points, where the Intelligence Index is a composite measure of a model's capabilities based on results from 10 benchmark tests.

Source: Price Per Token[158].

[156] Creditsights. (2025). Technology: Hyperscaler CapEx 2026 estimates. https://know.creditsights.com/insights/technology-hyperscaler-capex-2026-estimates/

[157] Drucker, P. F. (1999). Management challenges for the 21st century. New York: HarperBusiness.

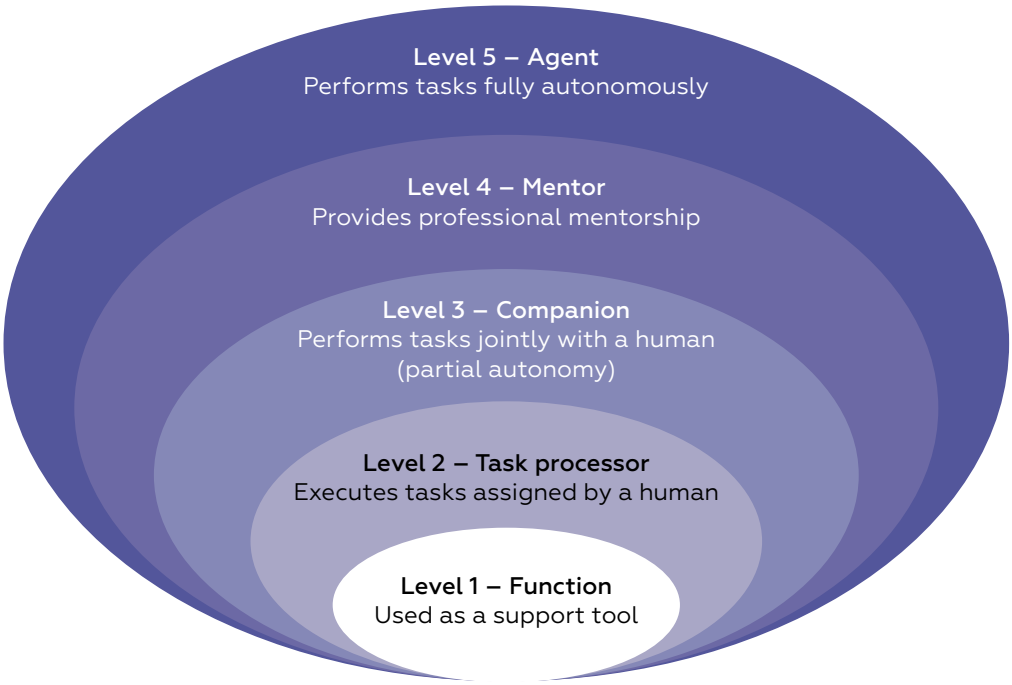
[158] Price per Token. (n.d.). https://pricepertoken.com/

Agentic economy: AI functions as an operating system

The concept of AI as an agentic operating system is replacing fragmented tools. In this paradigm, AI is no longer an external service for one-off requests. It becomes **a system core that assumes the functions of managing data, software interfaces, and transactions.**

The development of this concept is directly determined by the degree of autonomy of AI agents. Based on today's agents[159], most of them are still at the early stages of autonomy. However, the open-source OpenClaw project, presented in late 2025[160], has already enabled agents to evolve to the level of a **"companion" capable of performing tasks jointly with humans** (Figure 41).

Figure 41
Five levels of AI agents



Source: Huawei[161].

The highest stage in the development of agent capabilities is the transition to multi-agent systems. In these systems, AI evolves from a universal executor into **an orchestrator of narrow specialists.** These specialists independently distribute roles, verify one another's results, and resolve conflicts within a unified goal-setting framework. This creates an emergent effect[162]. **Collective intelligence can solve tasks whose complexity exceeds the cognitive limit of any single model,** even the most powerful one.

A logical continuation of multi-agent systems is the development of agentic commerce. In this model, **AI agents become autonomous economic actors capable of making financial decisions without human involvement.** Such agents can manage the full transaction cycle: from identifying optimal conditions and conducting negotiations to making payments and controlling logistics[163].

[159] Huawei. (2026). Intelligent World 2035. https://www.huawei.com/en/giv
[160] OpenClaw. (n.d.). OpenClaw: Personal AI Assistant. https://github.com/openclaw/openclaw
[161] Huawei. (2026). Intelligent World 2035. https://www.huawei.com/en/giv
[162] Emergent effect (emergence) is the appearance of new properties or qualities in a complex system that its individual components do not possess.
[163] McKinsey & Company. (2025). The agentic commerce opportunity: How AI agents are ushering in a new era for consumers and merchants. https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-agentic-commerce-opportunity-how-ai-agents-are-ushering-in-a-new-era-for-consumers-and-merchants

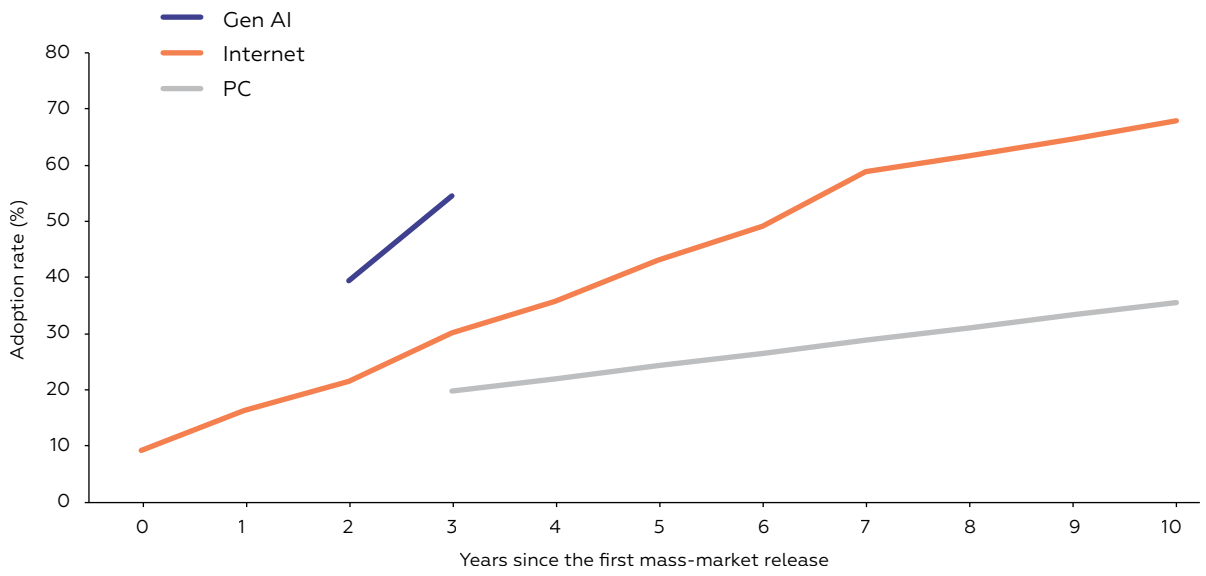
The transition to agentic commerce shifts the focus from marketing oriented toward human emotions to interoperability between agents through application programming interfaces, or APIs. **The key requirement is the accurate transmission of structured, machine-readable data** about a product or service.

The potential size of the global consumer market for agentic commerce is estimated at USD 3–5 tn by 2030[164]. **In the enterprise segment, an even more rapid surge is expected, reaching USD 15 tn as early as 2028[165].**

Generative AI as a driver of change

The spread of generative AI is unprecedented in speed. In the United States, its **household adoption reached 54.6% just three years after its mass market launch.** This is several times faster than the adoption of personal computers, at 19.7%, and the Internet, at 30.1%, over the same period[166] (Figure 42).

Figure 42
Technology adoption rate in U.S. households



Source: Federal Reserve System[167].

Ayalew Muche
Ethiopia

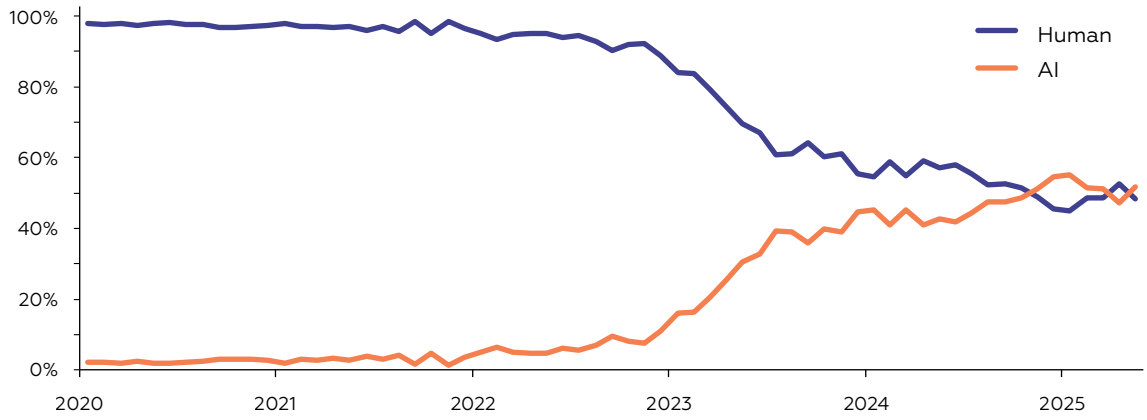
« Previous technological revolutions were powerful but limited. Steam-engines moved goods, electricity powered industry, and semiconductors enabled digital computation. Each transformed a sector of society. Artificial intelligence, in contrast, is of omni-sectoral impact, self-improving, and scalable as a resource. It transforms all sectors simultaneously, enhances decision making, accelerates discovery and innovation, automates routine tasks, and generates new knowledge at rates which no other previous technology could approach. »

[164] See Footnote 163.
[165] Digital Commerce 360. (2025). Gartner: AI agents to drive $15 tn in B2B purchases by 2028. https://www.digitalcommerce360.com/2025/11/28/gartner-ai-agents-15-tn-in-b2b-purchases-by-2028
[166] Federal Reserve Bank of St. Louis. (2024). The rapid adoption of generative AI. https://www.stlouisfed.org/on-the-economy/2024/sep/rapid-adoption-generative-ai
[167] See Footnote 166.

Generative AI is changing approaches to content creation. Large language models make it possible to generate new texts quickly.

After the launch of ChatGPT in November 2022, the number of AI-generated articles on the Internet increased. In late 2024 and early 2025, **the number of such articles exceeded the number of articles written by humans**[168] (Figure 43).

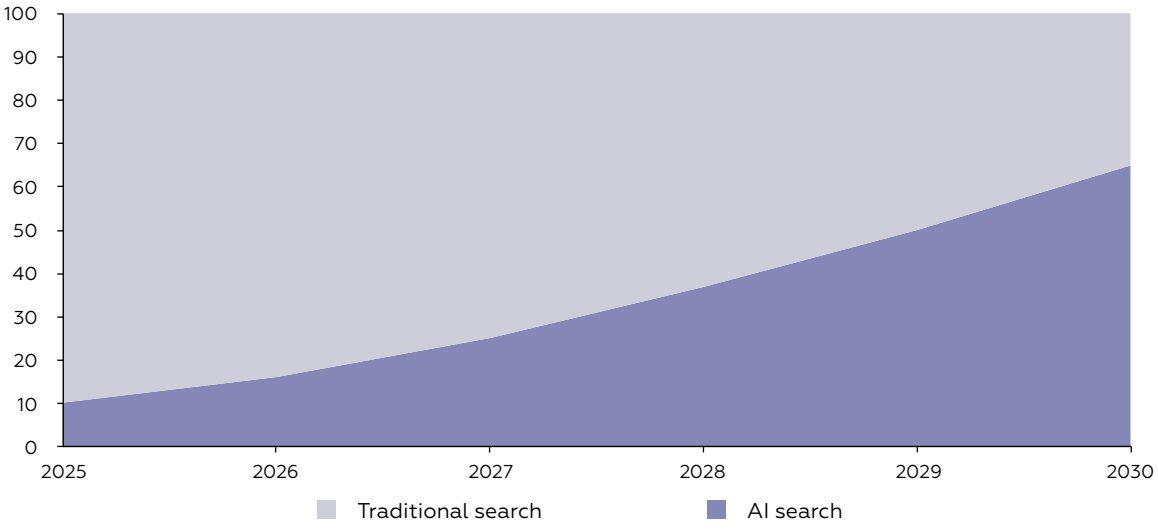
Figure 43
Human-written and AI-generated articles on the internet



Source: Graphite.io[169].

Generative AI is transforming methods of information search. It offers an alternative to traditional search engines. **The use of chatbots makes it possible to obtain comprehensive responses to queries,** eliminating the need to consult multiple sources and synthesize information manually. Analysts forecast that in 2025–2030, **the share of AI search in global search traffic may increase from 10% to 65%**[170] (Figure 44).

Figure 44
Forecast of the share of AI in global search traffic, %



Source: ARK Invest, 2026[171].

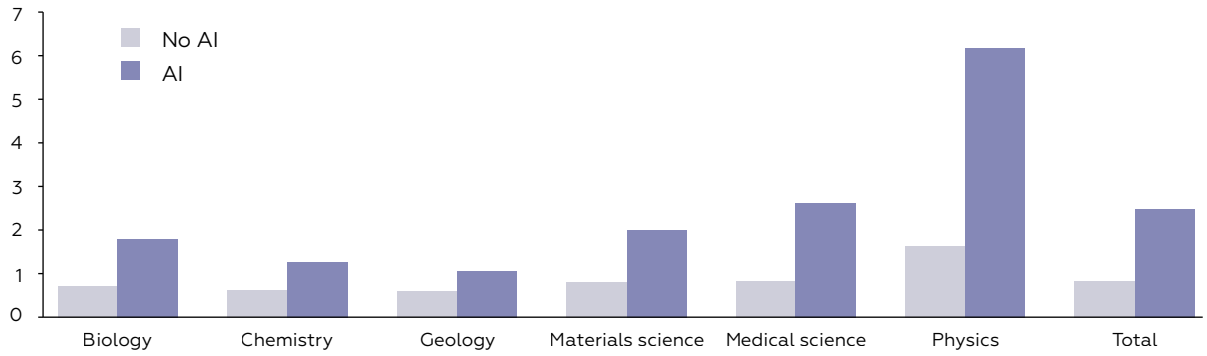
[168] Graphite. (2024). More articles are now created by AI than humans. https://graphite.io/five-percent/more-articles-are-now-created-by-ai-than-humans
[169] See Footnote 168.
[170] ARK Invest. (2026). Big ideas 2026. https://www.ark-invest.com/big-ideas-2026
[171] See Footnote 170.

Generative AI contributes to scientific research by providing researchers with advanced tools for data processing. AI can analyze academic articles, **identify underestimated or previously unnoticed connections between facts,** and suggest new directions for research.

Studies confirm an increase in the productivity of scientists who use AI. Scientists who have integrated AI into their work publish, on average, **three times more academic papers per year** than their colleagues who do not use AI[172] (Figure 45).

Figure 45

Average annual number of publications per researcher among those who do and do not use AI in their work, number of publications



Source: Nature, 2026[173].

Moreover, the emergence of specialized agentic systems is enabling AI to generate increasingly sophisticated academic papers. In March 2025, Sakana AI's AI Scientist-v2 generated a paper that successfully passed blind peer review for the A* level ICLR conference[174].

Sovereign AI: A foundation for long-term development

Sovereignty in AI is becoming one of the elements of long-term competitiveness. **Having sovereign AI means that a state is able to develop, deploy, and operate AI systems based on its own values.** At the same time, it must preserve control, flexibility, and resilience through a combination of domestic investment and international cooperation[175].

The concept of sovereign AI implies state control over critical elements of the AI stack: **infrastructure, models, and data.**

Having domestic infrastructure makes it possible to develop and operate AI within the national perimeter. **This infrastructure covers the entire value chain from energy generation and the production of computing equipment to the deployment and management of data centers.**

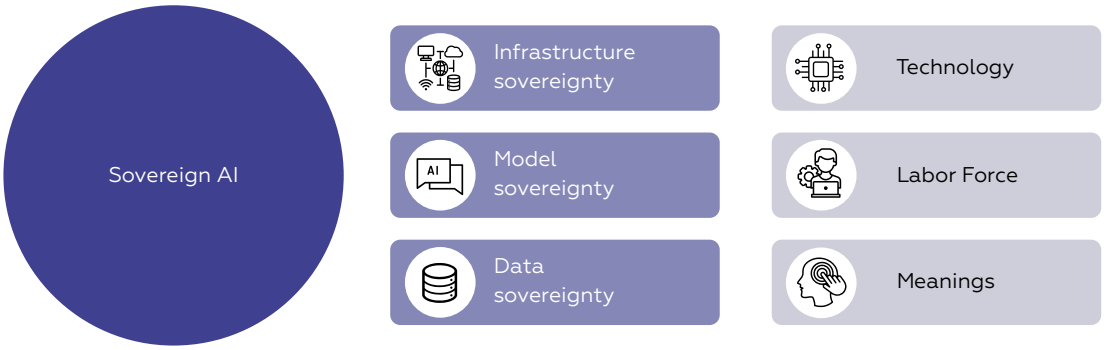
Model sovereignty includes the ability to develop domestic architectures and algorithms that do not depend on proprietary technologies from third countries. It also includes training domestic specialists to develop models, manage their life cycle, and implement them in business processes. **It further requires training models on national cultural codes, languages, and values.**

[172] Hao, Q., et al. (2026). Artificial intelligence tools expand scientists' impact but contract science's focus. Nature, 649, 1237–1243.
[173] See Footnote 172.
[174] The AI Scientist Generates its First Peer-Reviewed Scientific Publication // Sakana AI. 2025. URL: https://sakana.ai/ai-scientist-first-publication/
[175] World Economic Forum. (2026). Rethinking AI sovereignty: Pathways to competitiveness through strategic investments. https://www.weforum.org/publications/rethinking-ai-sovereignty/

Data is of particular importance. **High-quality national datasets for model training, domestic storage and processing of citizens' personal data, and protection of sensitive information from leaks all bring a country closer to sovereign AI** (Figure 46).

The United States and China currently possess the highest levels of AI sovereignty. Their models are trained by domestic developers using data and computing capacity within the national perimeter. Competition between the two countries also concerns the number and performance of models. **In 2025, the United States developed 59 models compared with China's 35**[176]**,** while the performance gap between U.S. and Chinese frontier models across different benchmarks was insignificant[177].

Figure 46
Sovereign AI



Source: compiled by TRIM.

Only a few countries can afford a fully sovereign AI stack and equal competition with the United States and China. Under these conditions, countries are seeking their own unique paths. These paths are based more on their comparative competitive advantages than on copying the development models of leading countries[178]. This is reflected in their strategic documents, which define the direction of AI development.

Since 2023, **more than 35 countries around the world have adopted AI strategies,** including countries of the Global Majority[179]. Russia is developing AI on the foundation of its strong scientific tradition and advanced engineering capabilities. It prioritizes the adoption of the technology in key sectors of the economy and society. India, in turn, relies on the scale of its domestic market, its developed traditional IT sector, and the democratization of access to data and computing capacity. It is developing domain-specific AI solutions for priority industries. At the same time, the UAE is focusing on attracting global tech companies and investment. It is also creating a favorable regulatory environment and positioning itself as an international hub for AI development and deployment.

Most countries' AI strategies emphasize the importance of developing models trained from scratch or fine-tuned on local languages. A significant advantage of such models over proprietary models from leading countries is their ability to reflect local cultural values. Recent studies show that widely used large language models such as ChatGPT, when trained only in English, are closest in cultural values to the United States, Canada, the United Kingdom, Germany, and the Netherlands[180]. **This may create biases in algorithmic decision-making in countries with collectivist values.**

[176] Epoch AI. (2026). Data on AI models. https://epoch.ai/data/ai-models
[177] Arena AI. (2026). Leaderboard overview. https://arena.ai/leaderboard
[178] See Footnote 177.
[179] OECD.AI. (2026). Policy initiatives dashboard. https://oecd.ai/en/dashboards/policy-initiatives
[180] Atari, M., et al. (2023). Which humans? University of Massachusetts Amherst. https://evolvinglanguage.ch/wp-content/uploads/Which-Humans-Atari-et-al.pdf

Serhat Burmaoglu
Turkey

« […] current AI systems largely follow a 'one-size-fits-all' approach, embedding decision architectures developed primarily in Western contexts. […] We propose 'Reality Architecture'—a new paradigm for developing geographically-adaptive AI decision support systems that align with local cultural values, social structures, and decision-making norms. »

4.2 Digital platforms: Algorithmic market governance

Digital platforms are active players in the global economy. They are transforming the nature of interaction among economic actors. **They efficiently connect supply and demand in markets,** reduce transaction costs, and create new business models.

Transaction activity on the largest digital platforms and the number of their users show the sustained influence of platforms on the global economy. According to expert estimates, by 2029, the value of transactions on platforms may approach USD 13 tn. **The number of users may reach 4.4 bn**[181]**.**

Historical path: From the alienation of humans from the process to the alienation of humans from the institution

The historical path of economic development is linked to the alienation of humans from direct participation in the production process. With the emergence of industry in the late 18th and early 19th centuries, human labor in production gradually began to be replaced by machine labor[182]. At the current level of physical labor automation, **humans have almost ceased to participate directly in the transformation of natural resources into industrial products.**

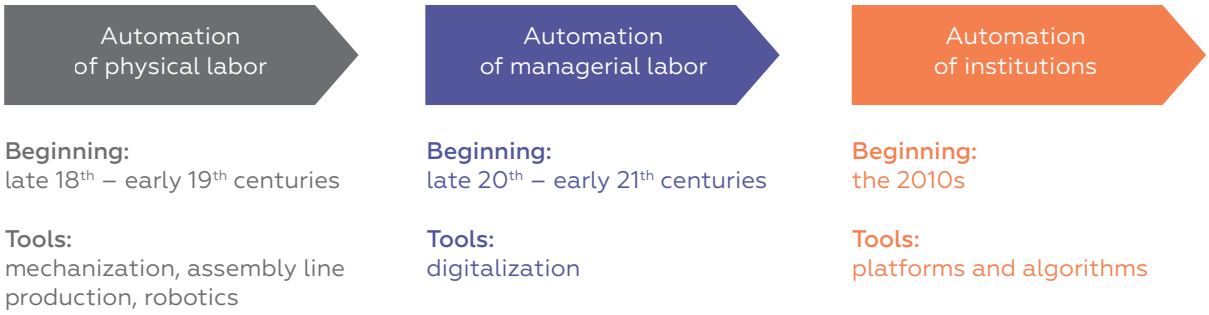
At the next stage, in the late 20th and early 21st centuries, digitalization made it possible to launch the automation of intellectual labor[183]. Through the introduction of digital planning tools and the transition to data-driven management, **the work of middle managers could be automated.**

The widespread adoption of digital platforms since the 2010s made it possible to go even further: to automate institutions, meaning the formal and informal rules of the market. Platforms increasingly determine how demand is formed, how resources are allocated, who gains access to goods and services, and how risk is assessed. **As a result, platforms are beginning to perform functions that were previously associated with market institutions themselves** (Figure 47).

Platform-based automation is fundamentally different from previous stages. At the first two stages, humans remained the final holders of decision-making authority. At the third stage, **platform algorithms become permanent participants in decision-making at the system level.**

[181] Statista. (2025). Digital commerce – Worldwide. https://www.statista.com/outlook/fmo/payments/digital-payments/digital-commerce/worldwide?currency=USD#transaction-value
[182] Marx, K. (1988). Capital: Critique of political economy (Vol. 1, Book 1, pp. 382–395). Moscow: Politizdat.
[183] Brynjolfsson, E., & McAfee, A. (2016). The second machine age: Work, progress, and prosperity in a time of brilliant technologies. New York: W. W. Norton & Company.

Figure 47
Three stages of automation



Source: compiled by TRIM.

Sergey Petrenko
Russia

« The automation of institutions implies a qualitative change and a conceptually different stage in development. Now basic market rules, which were previously implemented through laws, contracts, judicial practice, professional communities, and unwritten norms, are increasingly being embedded directly into digital platforms. The terms of service, public offer, ranking algorithms, ratings, automatic penalties, and bonuses are not merely technical settings—they represent a method of codifying institutional logic. »

In the platform era, **the economy becomes programmable.** The rules and incentives embedded in platform architecture are applied not after the fact, as before, but automatically. For example, an e-commerce platform can automatically reduce the visibility of a product with poor reviews. This immediately incentivizes sellers to improve the quality of goods and services.

The end of traditional capitalism: Algorithms replace the market

A distinctive feature of the platform economy is a radical reduction in transaction costs. This includes the costs of finding a price and a counterparty, conducting negotiations, and concluding transactions. **This becomes possible by reducing a large number of market intermediaries to a single digital intermediary: the platform**[184] (Figure 48).

Figure 48
Key features of the platform economy

	Reduction in price search costs	Reduced costs of finding and verifying counterparties	Reduction in market entry costs	Removal of intermediary costs
Platform economy	✓	✓	✓	✓
Traditional economy	✗	✗	✗	✗

Source: compiled by TRIM.

[184] Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). Platform revolution: How networked markets are transforming the economy and how to make them work for you. New York: W. W. Norton & Company.

Algorithms powered by transaction data are becoming a key decision-making tool. Platforms use hundreds of algorithms that together form the "digital nervous system" of a business. **This transforms the platform from an online storefront into an automated management system.**

Decisions are made **without human involvement.** This allows the platform to scale to mns of transactions per day, while still maintaining a personalized approach to each user.

Rais Hussin[185], CEO of EMIR Research
Malaysia

« Territory is no longer confined to geography—it is now the platform. Platforms increasingly dictate how the world operates economically and how trade is conducted, together with the protocols and standards built into them. In some sectors a handful of platforms already control 80 to 90% of the retail market, effectively replacing traditional markets. »

The paradox of the platform economy is that, within the platform, the market mechanism is partially replaced by planning[186]. A telling example is the platformization of the taxi market. Modern ride-hailing services have replaced taxi fleets and taken over key decisions for drivers and passengers. Price and counterparty are determined by an algorithmic allocation system. Importantly, this is done much more efficiently than under market conditions. The high efficiency of the "planned" platform model is driven by the ability of its algorithms to process large volumes of data in real time.

At the same time, the platform's interaction with competitors remains within market logic. **This applies to competition both with traditional players and with other platforms in the market.**

When a platform enters a market dominated by traditional players, it almost always wins the competition because of the specific features of its business model. Expert estimates show that **platform companies deliver stronger financial performance than traditional companies,** with an additional 6–7 percentage points of earnings before interest and taxes (EBIT)[187]. Another 2020 study found that the 43 largest publicly traded platform companies had almost twice the operating profit, growth rates, and market capitalization[188] of the 100 largest firms in the same industries over a 20-year period. At the same time, they had half as many employees.

A telling example of competition between platform and traditional players in the countries of the Global Majority is the e-commerce platform MercadoLibre in Latin America[189]. The company was able to offer local consumers a comprehensive digital ecosystem at a time when traditional retailers were slow to adapt to digital transformation. **As a result, MercadoLibre effectively became the region's "digital foundation," bringing commerce, finance, and logistics together into a single highly efficient network.**

In turn, market competition among platform players goes beyond competition between individual products. The winner is the player that builds the deepest links within its ecosystem and imposes its own technological standards on the market[190].

[185] National Centre "Russia." (2026). Open Dialogue podcast OD on Air: Maxim Oreshkin and Rais Hussin [Video]. YouTube. https://youtu.be/rwt6kHw0ui0?si=J71DlCHWlAUNf999
[186] Phillips, L., & Rozworski, M. (2019). The People's Republic of Walmart: How the world's biggest corporations are laying the foundation for socialism. London; New York: Verso.
[187] McKinsey & Company. (2017). New evidence for the power of digital platforms. https://www.mckinsey.com/capabilities/tech-and-ai/our-insights/new-evidence-for-the-power-of-digital-platforms
[188] MIT Sloan Management Review. (2020). The future of platforms. https://sloanreview.mit.edu/article/the-future-of-platforms/
[189] Perez, A. (2020). Mercado Libre: A winner in Latin America. Digital Innovation and Transformation. https://d3.harvard.edu/platform-digit/submission/mercado-libre-a-winner-in-latin-america/
[190] Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). Platform revolution: How networked markets are transforming the economy and how to make them work for you. New York: W. W. Norton & Company.

Ownership of unique datasets allows such platforms to forecast demand more accurately and personalize services, creating an almost insurmountable barrier to entry for new players. Ultimately, the platform that wins is the one that becomes an indispensable environment for users.

The history of the ride-hailing service Uber became one of the most illustrative cases of **competition among digital platforms in the Global Majority markets.** After rapid growth in its home market, the company began a large-scale international expansion. However, in 2013–2018, it lost to local platform players in a number of Global Majority countries: DiDi in China, Grab in Southeast Asia, and Yandex.Taxi in Russia. The overall result of this competition was Uber's exit from these regions through the sale of its business to local players in exchange for minority stakes in their capital.

Platformization of the economy is leading to the formation of a hybrid model. **In this model, market mechanisms are combined with elements of planning.**

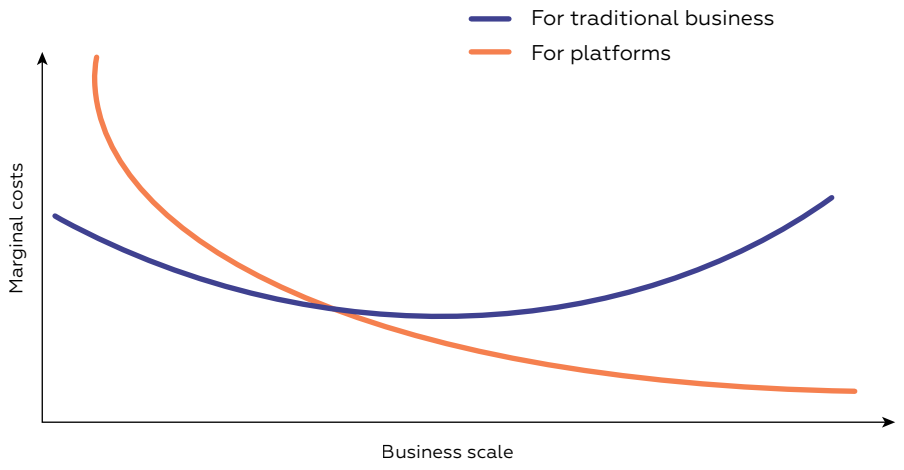
Economies of scale: From the boundaries of the firm to the "firm without boundaries"

According to Ronald Coase's theory[191], the firm emerges as an alternative to the market mechanism in cases where transaction costs become too high. Within the firm, the market mechanism is replaced by administrative authority. **Resource allocation takes place through directive planning.**

However, the growth of a traditional firm is always constrained by a "ceiling" of management costs. **A firm grows as long as the savings on market transactions exceed internal management costs.** At some point, bureaucracy, managerial errors, and growing information asymmetry become too expensive. The firm then stops growing.

Platforms overcome the "growth boundaries" of traditional firms. At the start, platforms may incur relatively high costs. However, after attracting a critical mass of users into their ecosystem and launching network effects, their marginal costs begin to approach zero. **The scale of the ecosystem becomes the main source of its competitive advantage**[192] (Figure 49).

Figure 49
Economies of scale: comparison of traditional business and platforms

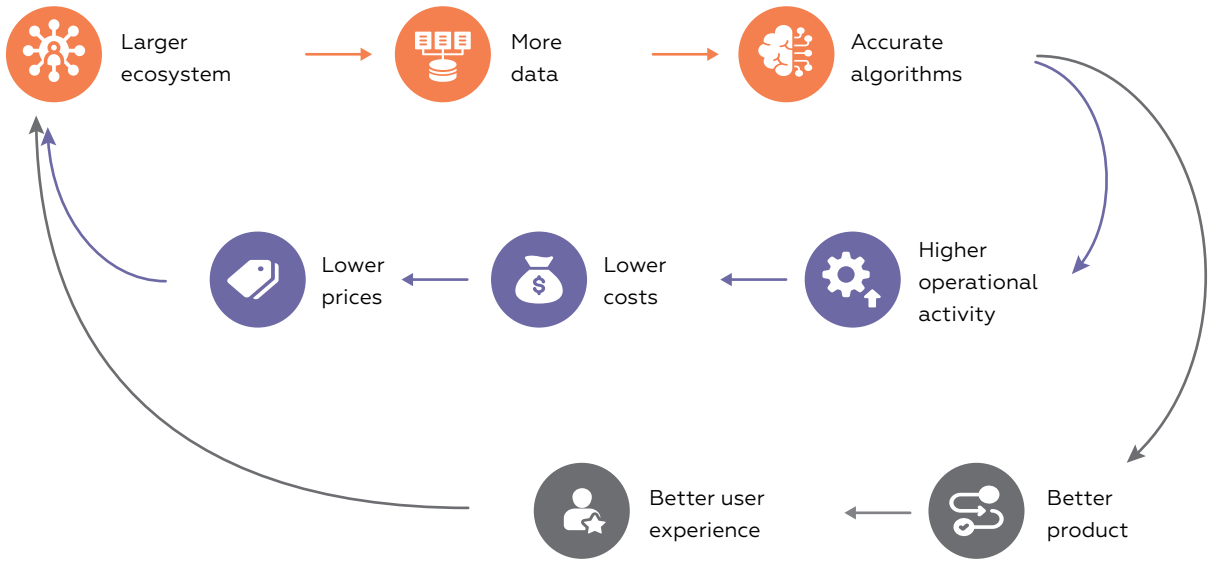


Source: compiled by TRIM.

[191] Coase, R. H. (1937). The nature of the firm. Economica (New Series), 4(16), 386–405.
[192] Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). Platform revolution: How networked markets are transforming the economy and how to make them work for you. New York: W. W. Norton & Company.

Platforms create a virtuous cycle. A large user base generates a continuous flow of data, which makes algorithms more accurate. **This allows platforms to improve operational efficiency, reduce internal costs and consumer prices, and enhance product quality and user experience.** As a result, platforms can attract new market participants into their ecosystem (Figure 50).

Figure 50
Positive cycle of platform improvements



Source: compiled by TRIM.

MD Kamil Safi
Nepal

« To the nations of the Global Majority, where digital adoption is outpacing institutional preparedness, big data is an opportunity in history to hasten economic change. »

In the traditional economy, monopoly is a path to inefficiency. The absence of competitive pressure allowed traditional monopolies to pass the rising costs of their inflated bureaucratic apparatus on to consumers through excessive prices.

The paradox of the platform economy is that a platform reaches peak efficiency when it unites all market participants into a single ecosystem. However, once it achieves a dominant position, **it shifts its focus from attracting new users to maximizing profits by imposing its terms on users already "locked in" the ecosystem**[193].

Traditional antitrust tools focused only on price control are ineffective in addressing platform monopolies. **This forces regulators to seek new approaches,** such as mandatory data portability and technical interoperability with competitors' products, in order to preserve room for competition and innovation[194].

[193] Tirole, J. (2020). Competition and the industrial challenge for the digital age. Toulouse School of Economics. https://www.tse-fr.eu/sites/default/files/TSE/documents/doc/by/tirole/competition_and_the_industrial_challenge_april_3_2020.pdf
[194] Crémer, J., de Montjoye, Y.-A., & Schweitzer, H. (2019). Competition policy for the digital era. Publications Office of the European Union. https://op.europa.eu/en/publication-detail/-/publication/21dc175c-7b76-11e9-9f05-01aa75ed71a1

Umeda Shukurova
Tajikistan

« Responding to the dynamics of technological development, today's public policy-making and regulation are evolving away from rigid restrictions towards smart regulation. To transform digital platforms into engines of public good, the following mechanisms need to be implemented: Anti-monopolistic control over data [...] [and] algorithmic transparency. »

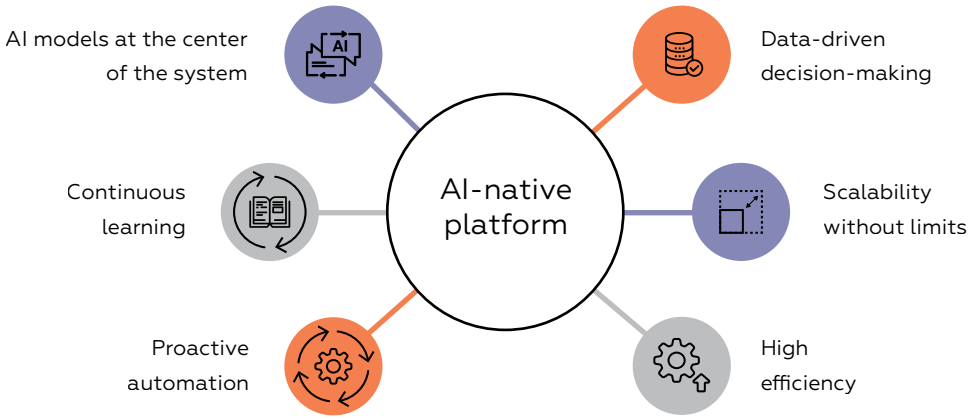
AI-native: Platforms become an environment for unlocking AI potential

The most advanced companies are moving to a new level of AI maturity, known as the AI-native approach[195]. This operating model assumes that AI models are no longer an add-on to existing business processes. Instead, they become the core of decision-making[196]. Key characteristics of this approach include data collection, cleaning, and transfer for algorithmic processing; continuous algorithm training; and proactive automation of business processes through the introduction of AI agents. The role of these agents in the technological transformation of the economy is described in detail in Section 4.1. **In the AI-native model, AI becomes the organizing principle of business operations rather than an auxiliary tool.**

In this model, the main costs are associated with training the core algorithms. At the same time, the cost of each subsequent decision or transaction tends toward zero. **This creates a situation in which scale becomes the decisive factor**[197]**.**

The platform model is an ideal environment for the development of AI-native solutions. It eliminates digital gaps and brings together data from an entire industry into a single dataset suitable for algorithm training. Unlike traditional companies, a platform allows AI solutions to scale instantly. Each algorithm update becomes a qualitative leap in efficiency for all market participants in the ecosystem. **As a result, the platform becomes the most flexible and competitive way to organize the market** (Figure 51).

Figure 51
Characteristics of an AI-native platform



Source: compiled by TRIM.

[195] The closest equivalent for AI-native in Russian is ИИ-центричный (AI-centric).
[196] Enterprise Machine Assistant. (2025). Understanding the concept of AI native and its impact on business. https://www.ema.co/additional-blogs/addition-blogs/understanding-the-concept-of-ai-native-and-its-impact-on-business
[197] Iansiti, M., & Lakhani, K. R. (2020). Competing in the age of AI: Strategy and leadership when algorithms and networks run the world. Harvard Business Review Press. https://rudyct.com/sm.vuca/Competing%20in%20the%20Age%20of%20AI%20Strategy%20and%20Leadership%20When%20Algorithms%20and%20Networks%20Run%20the%20World%20by%20Karim%20R.%20Lakhani,%20Harvard%20BR%202020.pdf

Depth of platform penetration

Platform solutions are being adopted across the board. **They are changing the very architecture of transactions:** how people work, study, receive medical care, travel, invest, interact with the state, and more.

Platformization becomes possible in any market where several conditions are present. These include mass standardized transactions, data-driven decision-making, a high share of intermediaries and transaction costs, and the absence of regulatory barriers. **Together, these conditions create a favorable environment for platform business models.**

Platform business models already have broad penetration in sectors such as trade, including e-commerce; finance, including digital payments, P2P lending, and crowdfunding; transport, including ride-hailing and car-sharing; food services, including prepared food and grocery delivery; and tourism, including booking and short-term rental services. In addition, platforms are gradually entering the social sector. **Countries of the Global Majority already have successful platforms of their own in all these sectors** (Figure 52).

Further improvement of AI algorithms and the structuring of chaotic data will, over time, make it possible to platformize sectors where platform business models still have low penetration. These include industry, energy, and construction. **The next wave of platformization may therefore extend to sectors that have so far remained less digitized.**

Figure 52
Examples of industry digital platforms from countries of the Global Majority

Source: compiled by TRIM.

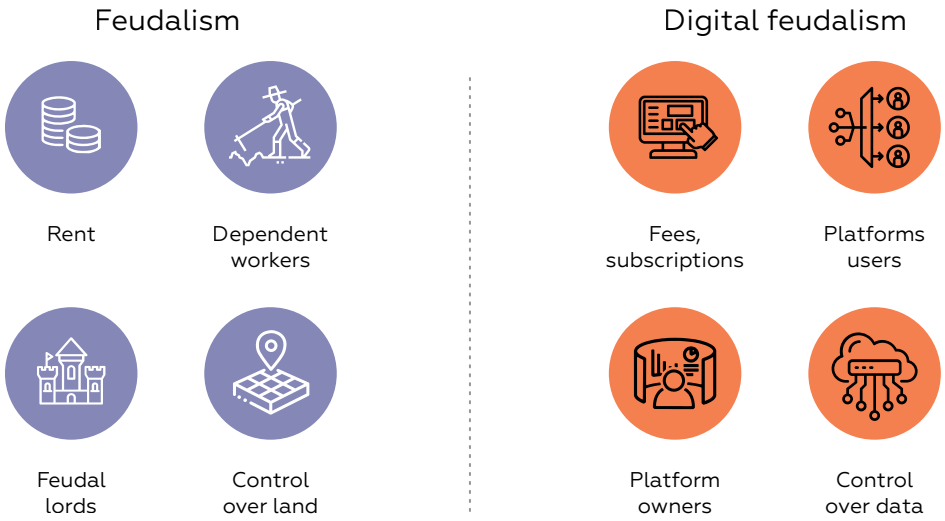
Digital feudalism and platform colonization

Platformization creates not only opportunities, but also challenges for socioeconomic resilience. When algorithms become the foundation of transactions, they begin to operate as mechanisms for redistributing power. They increase inequality between platform owners and users by managing the size of rent and creating a closed loop of data use. **As a result, these relationships begin to resemble feudal ones** (Figure 53).

Ruslan Gafarov
Azerbaijan

« [...] we risk permanent relegation to the status of technological colonies, renting others' platforms and importing others' standards. »

Figure 53
Characteristics of feudal relations in digital platforms



Source: compiled by TRIM.

Platform owners do not sell their own goods and services. Instead, they extract rent from every transaction within the ecosystem. By setting commissions and determining subscription costs, **the platform captures a significant share of the margin from producers of goods and services** who use the platform[198].

The problem of inequality also has an international dimension. Countries that do not have their own systemically important and sector-specific platforms become dependent on foreign platforms and their standards[199]. **In some countries, this may take the form of "platform colonization."**

[198] Varoufakis, Y. (2024). Techno-feudalism: What killed capitalism. New York: Melville House.
[199] Policy Center for the New South. (2025). Digital sovereignty and data colonialism: Shaping a just digital order for the Global South. https://www.policycenter.ma/sites/default/files/2025-10/PP_38-25%20(Marcus%20Vinícius%20De%20Freitas).pdf

Rais Hussin[200], CEO of EMIR Research
Malaysia

« Technological dependence has become a systemic risk. Countries must critically assess the technological solutions and vendors offered to them, rather than automatically accepting ready-made solutions from outside. When sanctions were imposed on Russia, SAP simply pulled the plug. More than 90% of the global microchip supply chain is concentrated in one island, Taiwan. Countries and companies that rely entirely on external platforms are renting someone else's architecture—and they remain vulnerable to shutdowns, sanctions and political pressure. You do not want everything to be dictated by others. »

The Free Basics project[201] became one of the most widely discussed examples of platform colonization in the countries of the Global Majority. Under the program, Meta[202] partnered with local telecom operators to provide users with free access to the company's Internet resources and those of its partners. By 2019, the project covered 65 countries in Africa, Asia, and Latin America. **The main criticism concerned a violation of the principle of net neutrality.** The corporation effectively decided for users which segments of the Internet were available to them and which were not.

Solomon Gardie
Ethiopia

« In many cases, data generated in the Global South is extracted by dominant external platforms, processed abroad, and returned as high-value services under asymmetric conditions. This pattern, increasingly described as data colonialism, mirrors earlier extractive economic models and risks entrenching new forms of dependency. »

Platform colonization manifests itself in the fact that the state is forced to pay a commission on every transaction conducted through foreign platforms. At the same time, it cannot track how these platforms collect, store, and process its citizens' data. **The state also has no ability to control or audit the outcomes produced by such platforms' algorithms.** Another risk is that the platform's country of origin may restrict or completely block access to it at any time.

Digital sovereignty in the platform era

Achieving full digital sovereignty in the platform era is practically impossible, because it loses its territorial foundation. **It cannot be achieved simply by localizing computing infrastructure.**

Even if servers are localized within a country, they may be built on imported hardware and software. These and other critical components, including app stores, open-source libraries, and AI models, form **an "invisible" layer of the country's dependence on the outside world.**

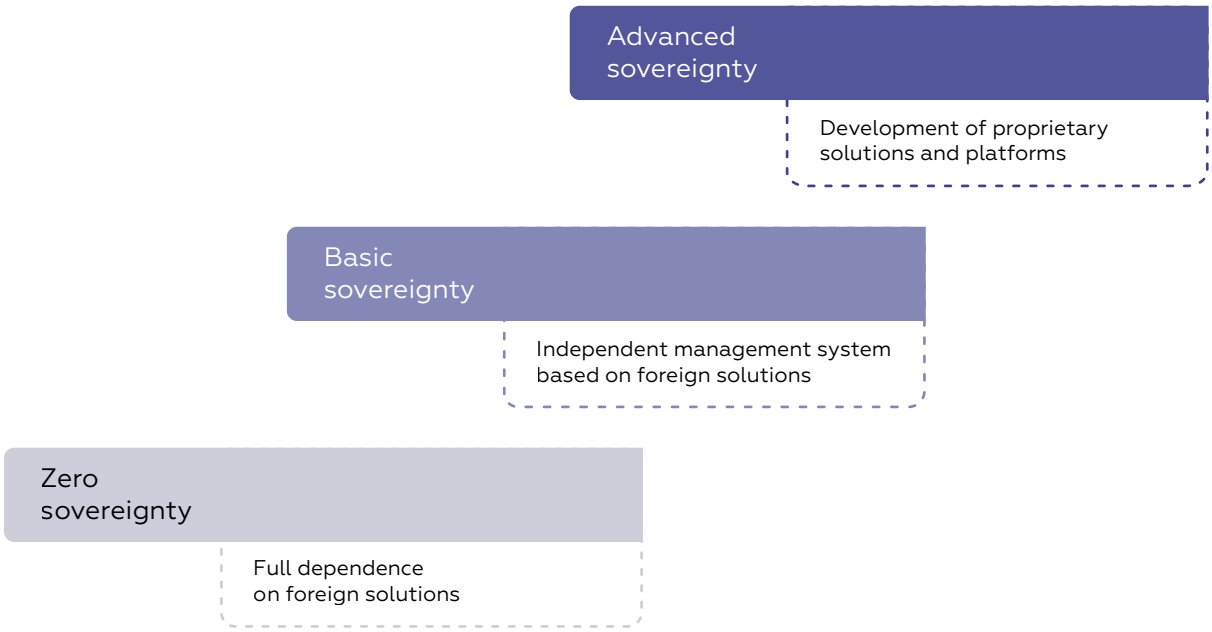
Another reason is network effects, through which a platform creates value for its users. When a platform expands beyond a single country, it creates a "fabric" of cross-border interactions. This fabric cannot be cut without damaging the established system of economic and social ties.

[200] National Centre "Russia." (2026). Open Dialogue Podcast "OD on Air" | Maxim Oreshkin and Rais Hussin [Video]. YouTube. https://youtu.be/rwt6kHw0ui0?si=J71DlCHWlAUNf999
[201] Nothias, T. (2020). Access granted: Facebook's Free Basics in Africa. Stanford Center on Philanthropy and Civil Society. https://journals.sagepub.com/doi/full/10.1177/0163443719890530
[202] Designated an extremist organization and banned in Russia.

For example, if access to the App Store and Google Play were "switched off," app developers would lose their sales market, while consumers would lose access to a variety of services.

In the platform era, digital sovereignty becomes three-tiered: **from a zero level to an advanced level** (Figure 54).

Figure 54
Three levels of sovereignty



Source: compiled by TRIM.

Digital sovereignty in the platform era is a balance between developing domestic solutions and maintaining compatibility with foreign ones in order to reduce risks.

Only a small number of countries have their own solutions and platforms across all key industries. These are primarily the United States, China, and Russia. Countries of the Global Majority in the Asia-Pacific region, Africa, Latin America, and the Middle East are developing local platforms in selected sectors, including trade, finance, transport, and logistics. **They are building a balance between domestic and foreign players in the market.**

Ivan Shumilov
Russia

« The transition to a new digital architecture will create trust through the resilience, distribution tenability, and compatibility of the system. This is an approach [...] where the focus is on decentralized governance models, data comparability, reducing systemic risks, and strengthening the digital sovereignty of countries and their economic systems. »

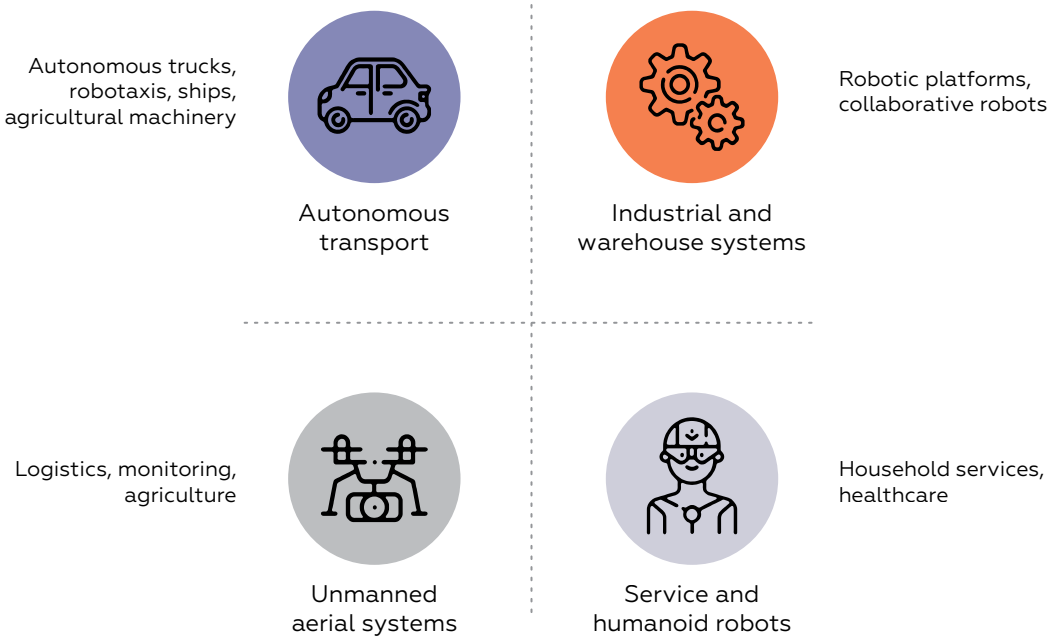
In addition to a higher level of digital sovereignty, local platforms make it possible to better adapt digital services to the cultural and behavioral characteristics of users in specific countries. **This allows such platforms to gain the trust of governments and citizens,** since they are perceived as stakeholders in domestic markets.

4.3 A new level of autonomy: Transport of the future and the robotization of labor

The spread of autonomous solutions is becoming one of the key factors transforming the economy and everyday life. Autonomy reflects a shift from a service economy to an outcome economy, where value is determined not by the process, but by the actual result. **At the same time, autonomous systems reduce the importance of distance and expand access to services,** making processes in the physical world more manageable and predictable.

In terms of technological maturity and scale of impact, four key areas can be identified: autonomous ground transport, unmanned aircraft systems (UAS), industrial robotics, and service and humanoid robots (Figure 55). Today, sales of new devices in these markets, excluding maintenance and other related services, amount to approximately USD 100 bn. **By 2050, Morgan Stanley estimates that this figure could exceed USD 25 tn**[203].

Figure 55
Key development areas of autonomous systems



Source: TRIM analysis.

Autonomous ground transport

The development of autonomous ground transport is changing the architecture of mobility. The key role is played not by the vehicles themselves, but by software, data, connectivity, and traffic coordination across the entire system. **This is why autonomy is developing simultaneously across several interconnected segments:** private vehicles, robotaxis and roboshuttles, autonomous trucks, autonomous special-purpose equipment, and rail transport (Figure 56).

[203] Hesai. (2025). Hesai recognized as the only LiDAR company on Morgan Stanley's "Humanoid Tech 25" of global robotics leaders. https://www.hesaitech.com/hesai-recognized-as-the-only-lidar-company-on-morgan-stanleys-humanoid-tech-25-of-global-robotics-leaders/

Figure 56

Expected effects of the implementation of autonomous ground transport

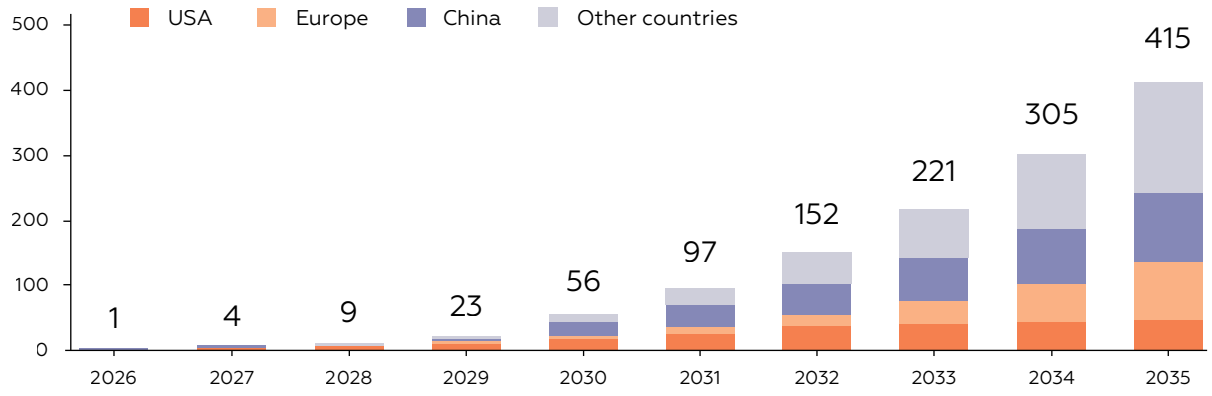
	Personal vehicles	Robotaxis and robo-shuttles	Autonomous trucks	Autonomous special-purpose vehicles
Expected effects	Increased road safety due to reduced human error; improved travel comfort	Increased flexibility of public transport; reduced operating costs and improved accessibility	Solving the acute driver shortage; increased efficiency and flexibility through 24/7 operation	Improved safety in complex conditions; increased efficiency of specialized tasks
Operating environment	Highways, suburbs, urban areas	Suburbs, urban areas	Highways, suburbs	Specialized environments and sites

Source: World Economic Forum[204].

According to forecasts, all of these markets will grow actively over the next decade. At the same time, their geographic structure will change significantly. Today, the United States is the main market for the robotaxi segment. By 2035, however, the United States and Europe together will account for only 33% of the market. **Key demand will instead be formed in China and other economies, including countries of the Global Majority**[205] (Figure 57).

Figure 57

Robotaxi market forecast, mn USD



Source: Goldman Sachs[206].

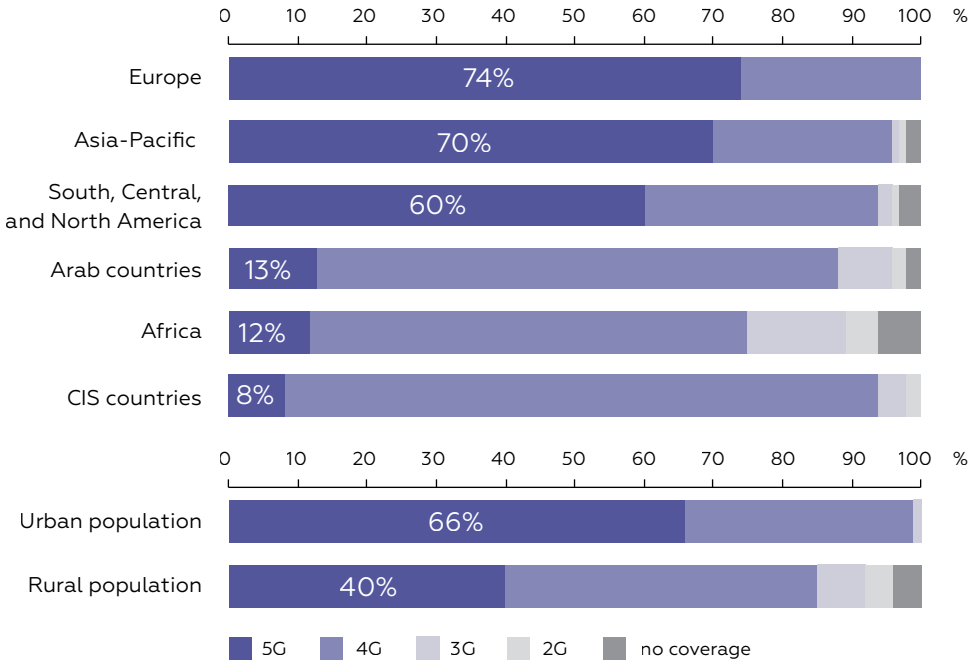
Competition will take place not so much between individual vehicle manufacturers as between autonomous mobility ecosystems. **A shift is already visible toward the separation of hardware and software,** as well as flexible configuration, or mix-and-match sourcing. In this model, the software stack, computing platform, and sensors may be supplied by different companies[207]. This means that value is increasingly concentrated in platform architecture, data, fleet management systems, remote monitoring technologies, and solutions that ensure integration with infrastructure.

[204] World Economic Forum. (2025). Autonomous vehicles: Timeline and roadmap ahead. https://www.weforum.org/publications/autonomous-vehicles-timeline-and-roadmap-ahead/
[205] Goldman Sachs. (2026). Robotaxis are forecast to become a $400 bn market in 2035. https://www.goldmansachs.com/insights/articles/robotaxis-to-become-a-400-billion-dollar-market-in-2035
[206] See Footnote 205.
[207] McKinsey & Company. (2026). Where to next? Insights from autonomous-vehicle experts. https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/our-insights/future-of-autonomous-vehicles-industry

In the long term, the autonomy of ground transport will lead to the formation of a multilayered system. At the lower level of urban demand, robotaxis, shuttles, and first-mile/last-mile systems will operate. At the mainline level, autonomous trucks will operate along restricted corridors. On high-density and predictable routes, automated rail systems will be used. **Above all these levels, layers of digital coordination, remote management, predictive maintenance, and platform-based routing will emerge.**

However, such a transition is possible only with a sufficient level of infrastructure readiness. For the countries of the Global Majority, the key challenge is therefore not only access to technology through imports, transfer, or the development of domestic competencies. It is also the improvement of infrastructure capacity. This includes coverage by satellite navigation systems, stable and high-speed Internet connectivity, and the availability of necessary road markings. Today, substantial inequality can be observed in these areas both globally and within individual regions. For example, 5G mobile Internet coverage in Europe, the Asia-Pacific region, and South, Central, and North America is much higher than in Arab countries, Africa, and the CIS. **At the same time, all regions face serious gaps between urban and rural areas** (Figure 58).

Figure 58
Mobile network coverage of the population by world regions and settlement type, 2025



Source: International Telecommunication Union (ITU)[208].

Unmanned aircraft systems

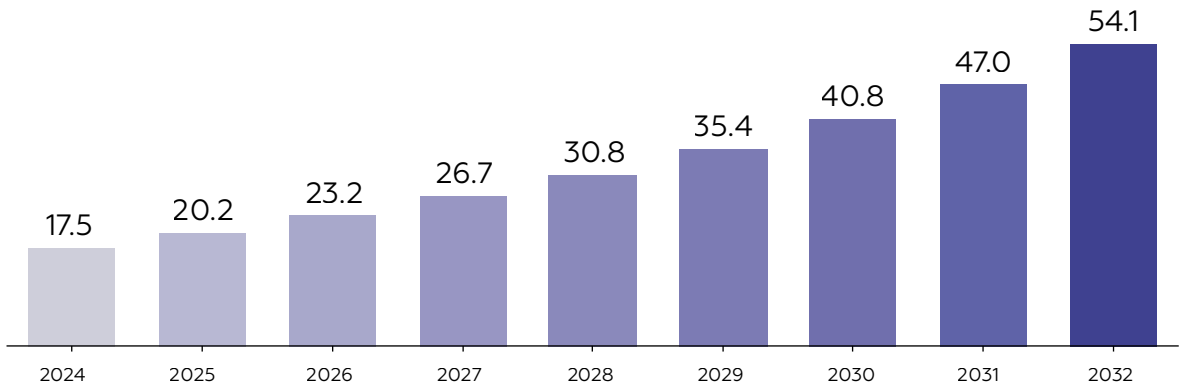
UAS are becoming a universal platform for improving operational efficiency across many industries. In developed urban agglomerations, drones are integrated into complex transport infrastructure. In less urbanized regions, **they provide access to logistics, healthcare, communications, and public services without the construction of expensive infrastructure.** They are also used to address specific industry-level tasks.

[208] International Telecommunication Union. (2026). More than half of the world's population is covered by 5G. https://www.itu.int/itu-d/reports/statistics/2025/10/15/ff25-mobile-network-coverage/#chart-2

For example, in agriculture, drones monitor crops, perform biochemical operations, and analyze soil conditions. Specifically, the use of innovative drone-based precision spraying systems can reduce chemical use by 45%[209]. In industry, drones are used for infrastructure inspection and monitoring. This improves safety and, in some cases, reduces inspection costs by up to 50%[210]. **In emergency response, drones can cover 40–80% more search area than traditional methods.** They can also reduce the time needed to locate victims by 80–90%[211].

The global UAS market may exceed USD 54 bn by 2032 (Figure 59). The share of Asia-Pacific countries is already approaching that of North America, at 29.4% versus 38.6%, respectively[212]. The number of operations is increasing exponentially. In 2024, drone-based deliveries totaled approximately 5 mn. By 2034, this figure may exceed 800 mn[213]. **A significant reduction in delivery costs is also expected, to around USD 2 per operation[214].** This would radically change the economics of the "last mile," the most expensive segment of logistics chains.

Figure 59
Assessment and forecast of the global UAS market, bn USD



Source: Credence Research[215].

Alongside companies from the United States, including AeroVironment, Northrop Grumman, Boeing, and Skydio, and France, including Parrot and Thales, key players also include companies from the Global Majority. These include China's DJI, Autel Robotics, and EHang; Turkey's Baykar; and India's IdeaForge and Garuda Aerospace. **Countries of the Global Majority are already among the major players in the UAS market.**

The adoption of UAS does not require the same level of investment in physical infrastructure as the adoption of autonomous road and rail transport. However, its scaling depends directly on the readiness of the regulatory environment. Brazil provides an example. In Brazil, the use of drones in agriculture is driven by the fact that a significant share of cultivated areas is difficult to farm, including hills and wetlands. **The rapid growth of drone adoption in the agricultural sector resulted from the formal establishment of rules for using drones to treat plants and soil from the air.** According to estimates, the number of drones used in agriculture increased from 3,000 in 2021 to 35,000 in 2025[216].

[209] Guebsi, R., Mami, S., & Chokmani, K. (2024). Drones in precision agriculture: A comprehensive review of applications, technologies, and challenges. Drones, 8(11), 686.
[210] World Economic Forum. (2022). Drones: Ensuring cost-effective maintenance of oil and gas pipelines. https://www3.weforum.org/docs/WEF_Drones_Ensuring_cost_effective_maintenance_of_oil_and_gas_pipelines_2022.pdf
[211] Claesson, A., et al. (2017). Drones may be used to save lives in out-of-hospital cardiac arrest due to drowning. PubMed. https://pubmed.ncbi.nlm.nih.gov/28110000/
[212] Credence Research. (2024). Unmanned aerial vehicles (UAV) market overview. https://www.credenceresearch.com/report/unmanned-aerial-vehicles-uav-market
[213] PWC. (2024). Drone deliveries: Taking retail and logistics to new heights. https://cee.pwc.com/drone-powered-solutions/drone-deliveries-taking-retail-and-logistics-to-new-heights.html
[214] See Footnote 213.
[215] Credence Research. (2024). Unmanned aerial vehicles (UAV) market overview. https://www.credenceresearch.com/report/unmanned-aerial-vehicles-uav-market
[216] AgroSpectrum Asia. (2025). MAPA regulation fuels surge in Brazil's agri-drone industry. https://agrospectrumasia.com/2025/06/11/mapa-regulation-fuels-surge-in-brazils-agri-drone-industry.html

Ilkhom Askarov
Uzbekistan

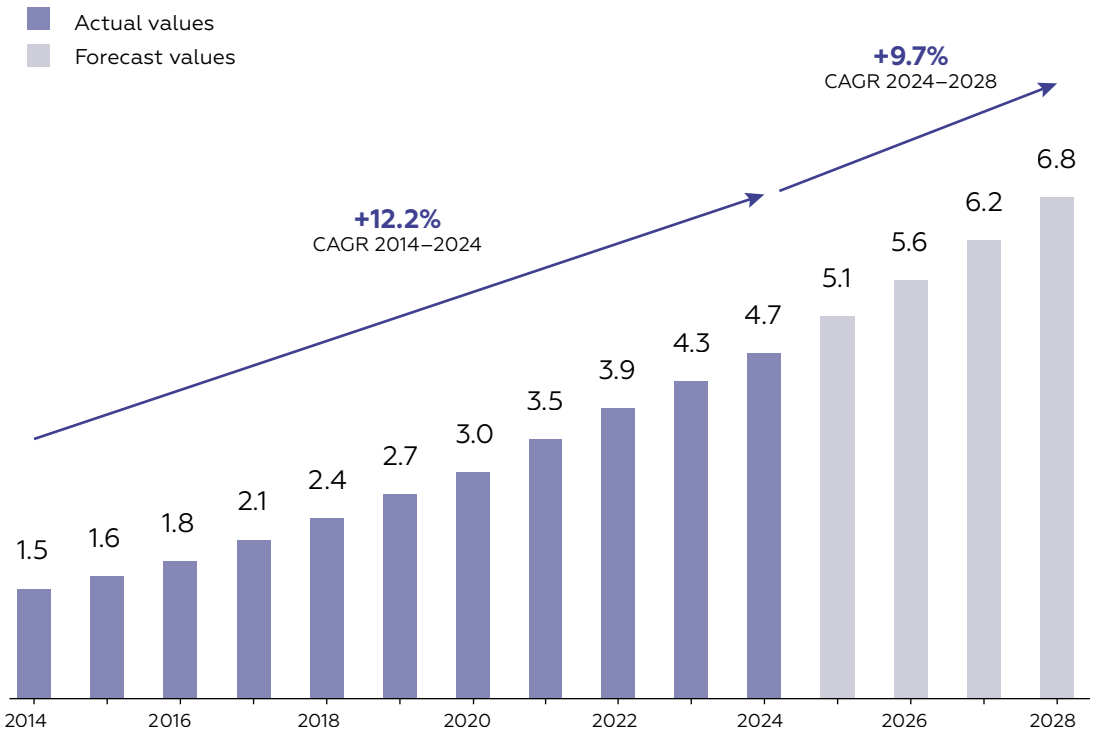
« Investing in technology is not an investment in hardware, but in a country's capacity to direct its own development. »

As the transition moves from individual tasks to a full-fledged "low-altitude economy," **airspace becomes a new economic layer.** It is comparable in importance to ground transport infrastructure. In this context, the key issue is the safe integration of unmanned aircraft into shared airspace and, above all, the technological solution to this challenge. The economies that can provide such integration will gain a significant advantage.

Industrial Robotics

By 2024, almost 4.7 mn industrial robots were in operation worldwide[217] (Figure 60). The annual volume of new installations reached 542,000 units. This is more than twice the level recorded a decade earlier. **At the same time, automation is concentrated in leading centers:** the five largest markets—China, Japan, the United States, South Korea, and Germany—account for 80% of industrial robot installations. China is the undisputed leader. In 2024, it accounted for 54% of all new robot installations[218].

Figure 60
Number of industrial robots in operation, mn units

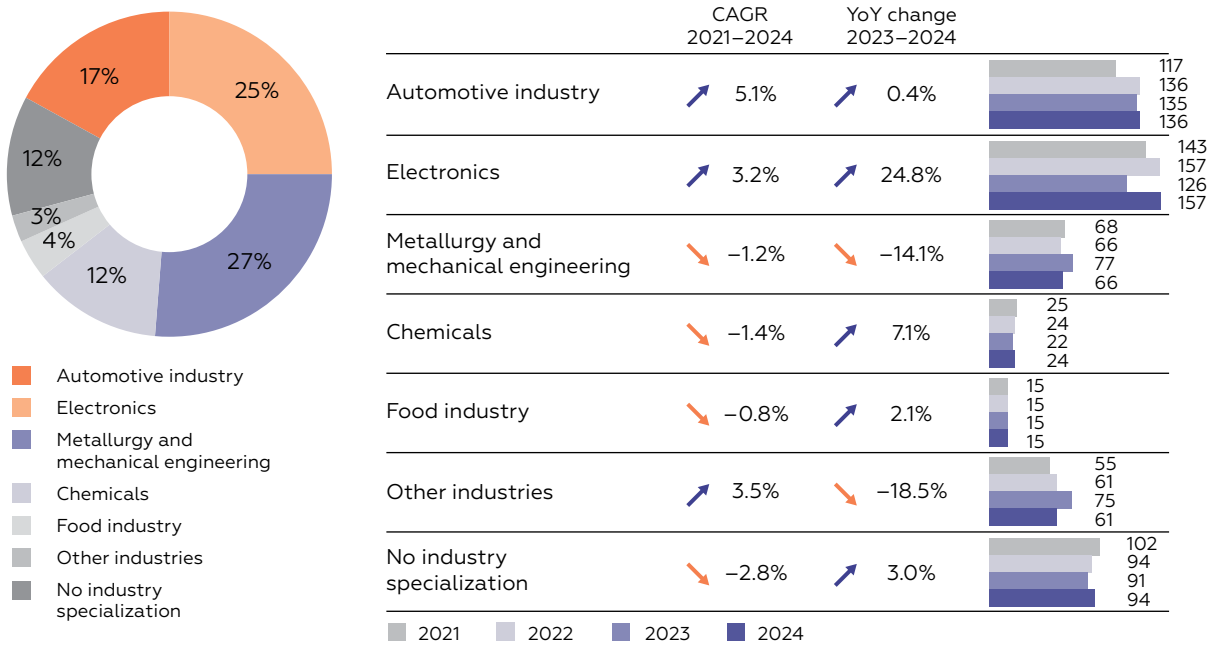


Source: TRIM based on materials from the International Federation of Robotics[219].

[217] International Federation of Robotics. (2025). World Robotics 2025 report. https://ifr.org/ifr-press-releases/news/global-robot-demand-in-factories-doubles-over-10-years
[218] See Footnote 217.
[219] See Footnote 217.

Figure 61

Share of industrial robot installations by industry, % and thousand units



Source: compiled by TRIM based on materials from the International Federation of Robotics and the World Intellectual Property Organization[220].

Although China, India, and Mexico were among the top ten countries by the number of new industrial robot installations in 2024, **the countries of the Global Majority remain in a catching-up position in terms of robot density**[221]**.** This situation is partly due to limited access to technology. However, the main reason lies in the structure of these economies. A substantial share of industrial robot installations is concentrated in manufacturing sectors (Figure 61), which have historically been less developed in the countries of the Global Majority. At the same time, for a number of countries that have been actively developing these sectors in recent years, including Thailand, Vietnam, Indonesia, and Turkey, increased robotization could become a driver of productivity growth and global competitiveness.

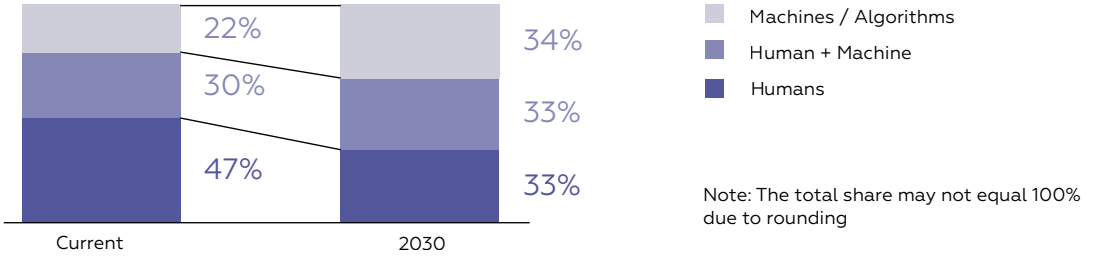
The key technological trend in robotization is a gradual transition from rigidly programmed machines to flexible systems. These systems can independently perceive their environment and act autonomously when solving complex tasks. They can work with unknown objects, perform flexible assembly, manipulate unfixed parts, sort mixed flows, and carry out other operations that previously required human involvement. **This shift, which radically expands the boundaries of automation, is defined by the concept of physical AI.**

The observed transition is also transforming the role of humans. The next stage of robotization is the redesign of the production process around hybrid interaction among humans, AI agents, and robots. **In this model, humans shift from the role of executors to the roles of supervisors, process architects, decision validators, system trainers, and exception operators**[222]**.** As the hybrid interaction model develops, **the share of tasks performed entirely independently by humans will decline from 47% to 33% by 2030**[223] (Figure 62). New challenges go far beyond

[220] World Intellectual Property Organization. (2024). Robotics industry doubles since 2015. https://www.wipo.int/en/web/global-innovation-index/w/blogs/2024/robotics-industry
[221] International Federation of Robotics. (2026). Robot density surges in Europe, Asia, and Americas. https://ifr.org/ifr-press-releases/news/robot-density-surges-in-europe-asia-and-americas
[222] McKinsey Global Institute. (2025). Agents, robots, and us: Skill partnerships in the age of AI. https://www.mckinsey.com/mgi/our-research/agents-robots-and-us-skill-partnerships-in-the-age-of-ai
[223] World Economic Forum. (2025). The Future of Jobs Report 2025. https://www.weforum.org/publications/the-future-of-jobs-report-2025/

technology and its implementation. The resilience of labor markets and economies as a whole will depend on how educational, regulatory, and social institutions adapt to these changes.

Figure 62
Predicted redistribution of work tasks between humans and machines / algorithms



Source: World Economic Forum[224].

Service and Humanoid Robots

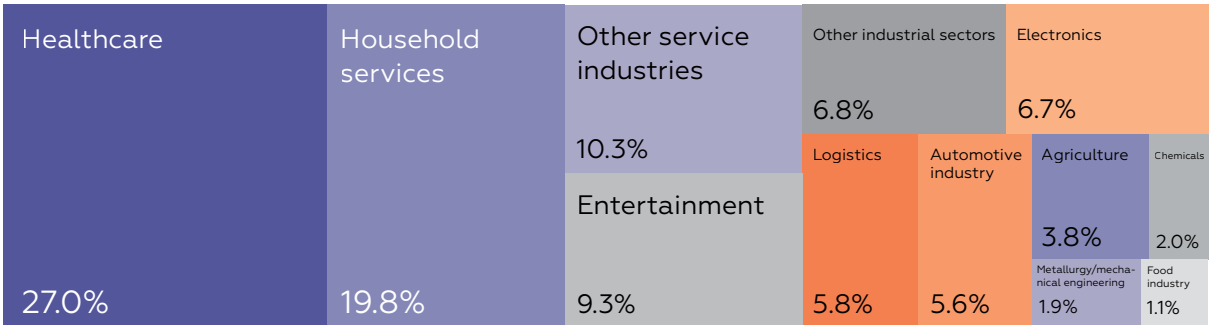
The robotics market can be divided into 12 main industries, in which industrial and service robots are represented in different proportions. The largest are healthcare, household services, other service industries, and entertainment (Figure 63). It is noteworthy that all these areas belong primarily to the class of service robots. Together, they account for 66% of the global market.

Sergei Kondratiev
Russia

« For BRICS nations, home to over 45% of the world's population and grappling with unprecedented demographic pressures, this technology offers a once-in-a-history opportunity. [...] Humanoid robotics signals a labor economics revolution, not mere tech hype. »

According to forecasts, t**he most active market growth over the next decade will be seen in China,** with a CAGR of 23.1% in 2025–2035, and India, with a CAGR of 21.4% in 2025–2035[225]. Asian firms already play an important role in this market. Of the 944 companies included in the 2025 study by the International Federation of Robotics, almost one-third were companies from Asia[226].

Figure 63
Segmentation of the robotics market size by Industry in 2025



Source: AIPRM and Statista[227].

[224] See Footnote 223.
[225] Future Markets Insights. (2025). Service robotics market. https://www.futuremarketinsights.com/reports/service-robotics-market
[226] International Federation of Robotics. (2025). World Robotics 2025 – Service Robots. https://ifr.org/img/worldrobotics/Sources___Methods_WR_2025_Service_Robots.pdf
[227] AIPRM. (2025). 100+ must-know robotics statistics 2025. https://www.aiprm.com/robotics-statistics/

Unlike industrial robots, **service systems are designed from the outset to operate in open and variable environments.** These environments require not only precision, but also the ability to adapt, interact with humans, and make decisions under uncertainty. This is why their development is directly linked to progress in physical AI.

Healthcare is the most dynamic area of development. In 2024, about 16,700 new medical robots were installed worldwide[228], almost twice the previous year's level. Growth is driven not only by the development of robotic surgery, but also by the active automation of laboratory and diagnostic processes. In these areas, robots ensure round-the-clock operations with high precision and reproducibility. **Amid population aging and shortages of medical personnel, such solutions are becoming an element of healthcare system resilience,** not merely a tool for improving efficiency. According to WHO estimates, the global shortage of health workers will reach 11 mn by 2030[229]. Robotization may become one of the key mechanisms for compensating for this shortage.

The emergence of humanoid robots marks a qualitative leap in the development of service robotics. Humanoid robots are being developed as universal executors capable of operating in human environments without requiring significant adaptation of those environments. Today, of the 60 companies represented in the global market, more than half are based in China[230]. By the end of 2025, China's Unitree had supplied over 5,500 humanoid robots to the global market, far outpacing its American competitors: Tesla, Figure AI, and Agility Robotics shipped only around 150 units each[231].

In the long term, the scale of the market may be comparable to the largest sectors of the global economy. According to a number of forecasts[232], by 2050, **the total humanoid robotics market, including related services, may exceed USD 5 tn.** The total number of humanoid robots may surpass 1 bn units. Around 90% of them will be used in industry and the commercial sector to perform repetitive and structured tasks. In household settings, adoption will be more limited, reaching approximately 80 mn devices.

Patrizia Boi
Italy

« To address this systemic shortage of care and assistance, technology, and in particular humanoid robotics, emerges not as a futuristic solution, but as an immediate social and demographic necessity. The answer to this crisis lies in the ability to delegate daily operations. A reliable humanoid assistant could take charge of therapy monitoring and reminders, with assisted dispensing and oversight by authorized personnel for medication administration (reducing issues of forgetfulness), as well as cleaning, cooking, and providing essential support to new mothers (diaper changes, bottle preparation, and housekeeping), in order to restore the time and energy needed for affective care, with the awareness that robotic assistance does not replace human affection but liberates it. »

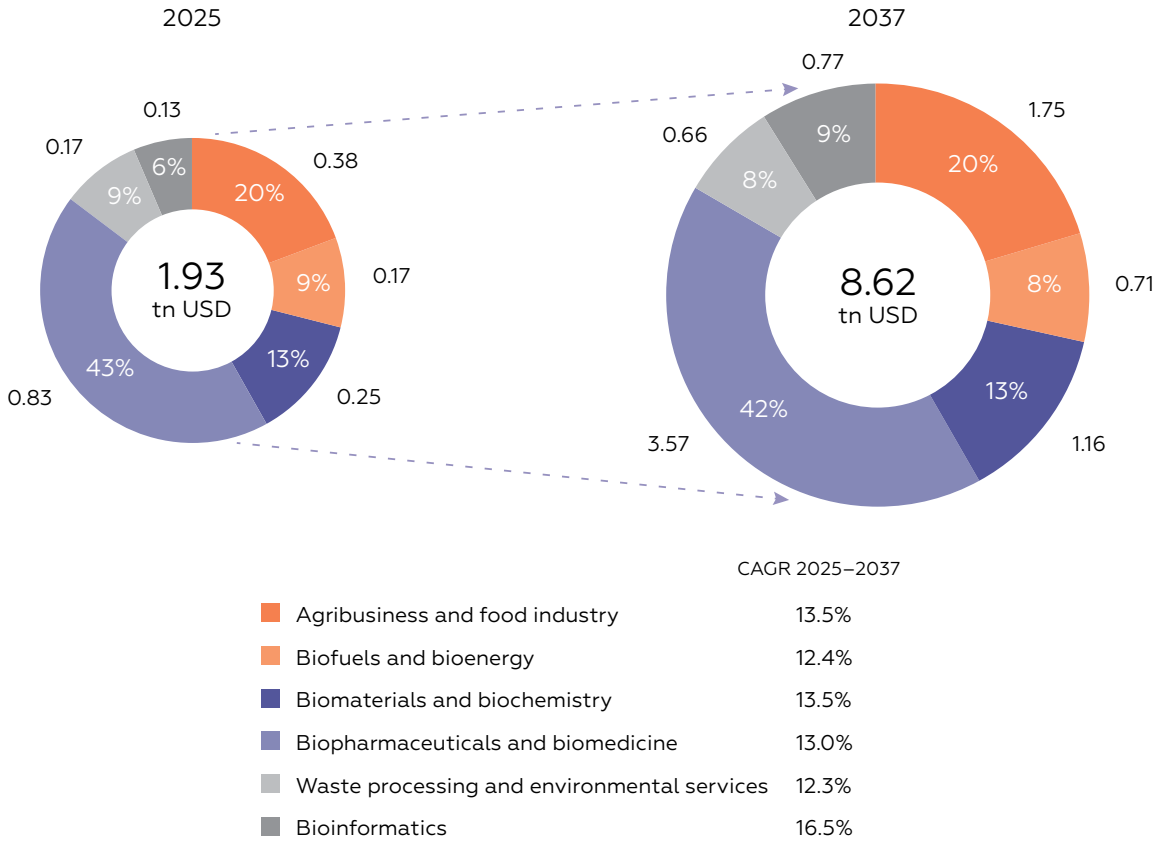
The current stage in the development of robotics is setting the parameters for the next technological revolution. In this revolution, AI acquires a physical embodiment and begins to participate directly in economic activity. **This is what turns robotization and automation from a separate technological field into one of the basic elements of the new economic order.**

[228] International Federation of Robotics. (2025). World Robotics 2025 report. https://ifr.org/ifr-press-releases/news/global-robot-demand-in-factories-doubles-over-10-years
[229] World Health Organization. (2026). Health workforce. https://www.who.int/health-topics/health-workforce#tab=tab_1
[230] Edge AI + Vision Alliance. (2025). Humanoid Robots 2025: The race to useful intelligence. https://www.edge-ai-vision.com/2025/11/humanoid-robots-2025-the-race-to-useful-intelligence/
[231] South China Morning Post (2026). China's Unitree ships more than 5,500 humanoid robots in 2025, surpassing US peers. https://www.scmp.com/tech/tech-trends/article/3340446/chinas-unitree-ships-more-5500-humanoid-robots-2025-surpassing-us-peers
[232] Humanoids: A $5 trillion market. https://www.morganstanley.com/insights/articles/humanoid-robot-market-5-trillion-by-2050

4.4 Biotechnology: Toward the transformation of healthcare, agriculture, and materials science

Biotechnology is becoming one of the key areas of economic development. It makes it possible not only to study biological processes, but also to modify them deliberately. **Biology is gradually becoming an engineering field,** where solutions can be developed and scaled in the same way as in other technology sectors. At the level of public policy, this is reflected in the development and approval of dedicated frameworks aimed at accelerating the sector's growth. In recent years, strategies and programs in bioeconomy and biotechnology have been launched in several dozen countries, including countries of the Global Majority such as China, India, Brazil, and countries of East Africa.

Figure 64
Segmentation of the bioeconomy market size in 2025 vs. 2037, tn USD



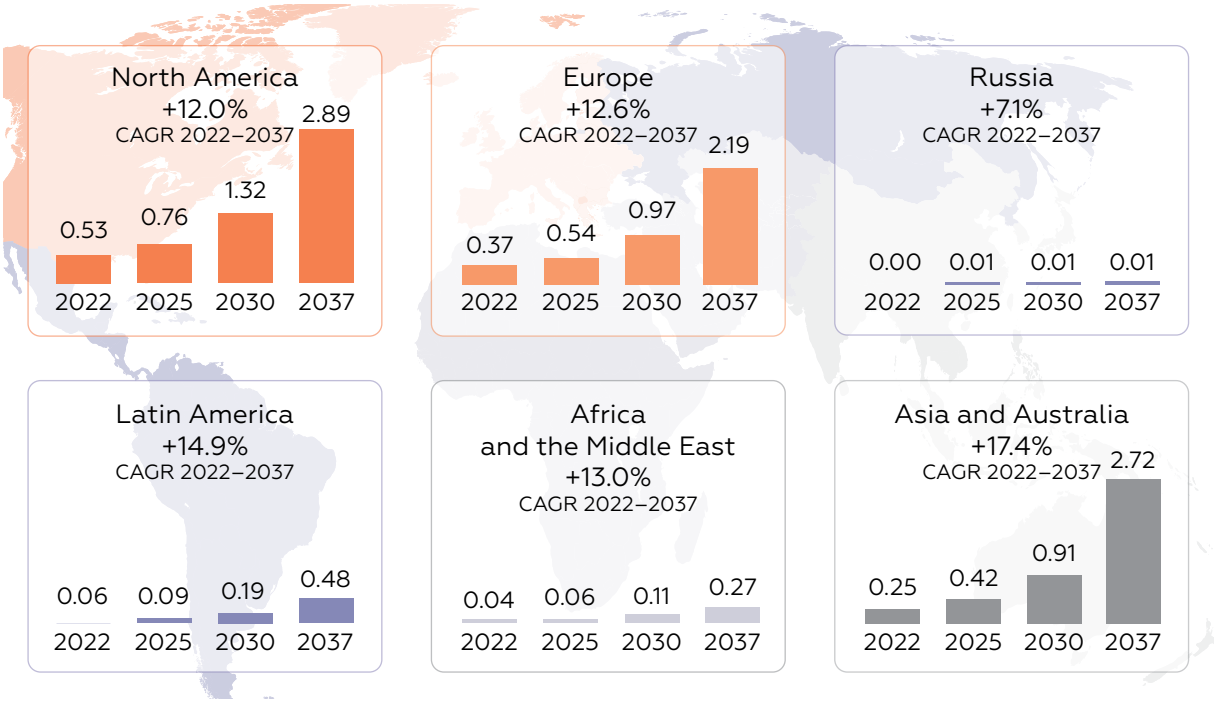
Source: TRIM, based on data from Grand View Research[233] and Precedence Research[234].

By scale of impact, several areas can be identified: medical biotechnology, agricultural biotechnology, biomaterials, and biochemistry. Across all of these areas, the market is projected to grow four- to fivefold over the next 10–15 years[235,236] (Figure 64). **The highest growth rates are expected in Asia and Latin America** (Figure 65).

[233] Grand View Research. (n.d.). https://www.grandviewresearch.com
[234] Precedence Research. (n.d.). https://www.precedenceresearch.com
[235] Precedence Research. (2026). Biotechnology market size, share and trends 2026 to 2035. https://www.precedenceresearch.com/biotechnology-market
[236] Grand View Research. (2023). Global biotechnology market size & outlook, 2024–2030. https://www.grandviewresearch.com/horizon/outlook/biotechnology-market-size/global

Figure 65

Bioeconomy market size by macro-regions in 2022–2037, tn USD



Source: TRIM, based on data from Grand View Research[237] and Towards Healthcare[238].

Biotechnology for Healthcare

The development of medical biotechnology is creating a new paradigm in healthcare. Treatment is becoming high-tech, predictive, and personalized. **The main technological shift is the transition from chemical molecules that act on symptoms to "living medicines" and genome-editing tools.** These tools address the root cause of disease at the level of DNA or the cell.

Artur Zakharov
Russia

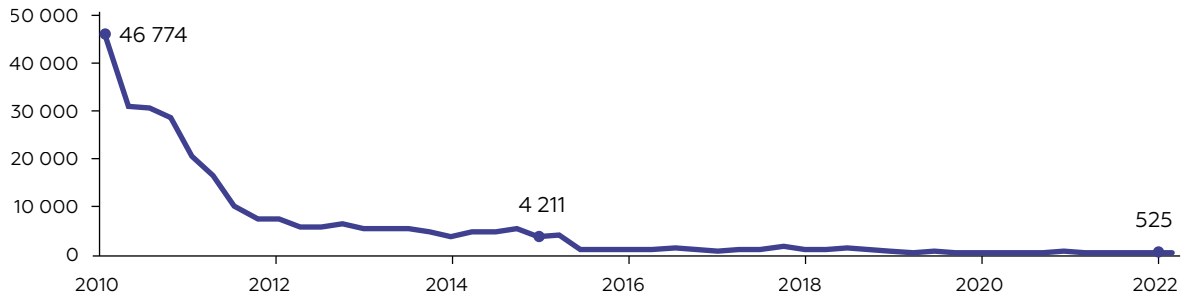
« Investment is needed to create networks of accessible preventive medicine centers equipped with genetic screening and biomarker analysis, and supported by AI-based platforms for interpreting data. The development of telemedicine will allow coverage of remote regions. The focus is shifting from the treatment of diseases to prediction and prevention. »

The cost of sequencing the human genome has collapsed by almost five orders of magnitude. In the early 2000s, it was almost USD 100 mn. By 2010, it had fallen to USD 47,000; by 2015, to USD 4,200; and by 2022, to just USD 525[239] (Figure 66).

[237] Grand View Research. (n.d.). https://www.grandviewresearch.com
[238] Towards Healthcare. (n.d.). https://www.towardshealthcare.com
[239] NIH National Human Genome Research Institute. (2023). DNA sequencing costs: Data. https://www.genome.gov/about-genomics/fact-sheets/DNA-Sequencing-Costs-Data

Figure 66

Cost of human genome sequencing, USD



Source: NIH National Human Genome Research Institute[240].

Anna Kraevskaya
Russia

« Existing state-owned genome databases concentrate on fundamental research, but do not provide feedback to people. Consequently, massive investments into the genomic infrastructure do not result in substantially improved public health. »

The greatest potential of biotechnology is concentrated at the research and early drug development stage. Generative AI can accelerate the design of complex molecules by three times or more. It can also increase the performance of chemical compound activity models by 2.5 times, radically reducing the cost of failures in the development process[241]. **In 2025, a clinically validated drug concept was created for the first time in which both the biological target and the molecule were fully discovered by generative AI.** The drug is intended to treat idiopathic pulmonary fibrosis and was created on Insilico Medicine's Pharma.AI platform[242].

At the same time, countries in North America and Europe continue to hold dominant positions in medical biotechnology markets. In 2025, these economies accounted for approximately 75% of the gene and cell therapy market[243]. The long-term structural challenge for the countries of the Global Majority is **the gap between their ability to consume the results of the biotechnology revolution and their ability to participate in creating it.** Cell and gene therapies, AI-based drug development platforms, and tissue and organ bioprinting require not only capital, but also mature basic science ecosystems, regulatory capacity, and a critical mass of specialists. Building these capabilities takes decades.

Viktoria Zhadik
Belarus

« What is required is not merely developing individual bioprinting technologies, but creating an international platform that would be both technological and regulatory, i.e., an operating system for modular biology. »

[240] See Footnote 239.
[241] McKinsey & Company. (2024). Generative AI in the pharmaceutical industry: Moving from hype to reality. https://www.mckinsey.com/industries/life-sciences/our-insights/generative-ai-in-the-pharmaceutical-industry-moving-from-hype-to-reality#/
[242] Insilico. (2025). Insilico announces Nature Medicine publication of Phase IIa results of Rentosertib, the novel TNIK inhibitor for idiopathic pulmonary fibrosis discovered and designed with a pioneering AI approach. https://insilico.com/news/tnrecuxsc1-insilico-announces-nature-medicine-publi
[243] Towards Healthcare. (2026). Cell and gene therapy market unlocks high-value opportunities in precision medicine era. https://www.towardshealthcare.com/insights/cell-and-gene-therapy-market

Among the countries of the Global Majority, only China has managed to close this gap. **About one-quarter of innovative drug candidates currently in active development were created in China**[244].

Agricultural Biotechnology

Biotechnology is changing the development paradigm of agriculture. For thousands of years, agricultural outcomes were determined by land, water, and labor inputs. Over the past half-century, they have also depended on access to mineral fertilizers, chemical pesticides, and machinery. Today, this extensive model is being replaced by managed bioproduction. **The key resource is no longer the area of arable land, but the ability to program biological parameters**—from the crop genome to the soil microbiome and plant responses to stress.

The key technological shift in agricultural biotechnology is driven by the convergence of several areas. On the one hand, genome editing, including CRISPR, makes it possible to modify the DNA of agricultural crops with precision, without introducing foreign genes. On the other hand, markets are actively emerging for agricultural biologicals, including biofertilizers, biopesticides, and biostimulants, as well as precision fermentation, which enables the production of alternative proteins and food ingredients. At the same time, **all these processes are being integrated into a single digital precision agriculture loop** that combines sensors, drones, satellite data, and AI analytics.

The global agricultural biotechnology market was valued at USD 151 bn in 2024. It is projected to reach USD 213 bn by 2030, with a compound annual growth rate of 7.1%[245]. The Asia-Pacific market already accounts for the largest share of revenue, at 31.5%. Countries of the Global Majority also lead in the area planted with biotech and genetically modified crops. In 2024, alongside the United States and Canada, the world's top five by this indicator included Brazil, Argentina, and India[246]. New developments are also emerging and being deployed in African countries. For example, drought-resistant TELA maize was created in Nigeria. It made it possible to increase yields by 54% without the use of pesticides[247].

As populations continue to grow in these countries, the need for innovative solutions that increase crop productivity and resilience remains acute. **Control over agricultural biotechnology is becoming not only an economic advantage, but also a key to food security and sovereignty.**

Biomaterials and Biochemistry

Alongside the transformation of the agricultural sector, production is expanding for new biologically based materials and chemical products. These range from biopolymers and biodegradable packaging to specialized chemical compounds. **The key shift is the transition from the extraction and processing of fossil raw materials to bioproduction,** where living systems become the source of both processes and products. The scale of this shift is confirmed quantitatively. The market for ingredients created through precision fermentation alone, across specialty chemicals, food products, and chemical precursors, could grow sevenfold and reach USD 200 bn by 2040[248].

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[244] Goldman Sachs. (2025). China is increasing its share of global drug development. https://www.goldmansachs.com/insights/articles/china-is-increasing-its-share-of-global-drug-development
[245] Grand View Research. (2024). Agricultural biotechnology market (2025–2030). https://www.grandviewresearch.com/industry-analysis/agricultural-biotechnology-market
[246] International Service for the Acquisition of Agri-biotech Applications. (2026). ISAAA report presents top producers of biotech/GM crops in 2024. https://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=21764
[247] African Agricultural Technology Foundation. (2025). A Nigerian farmer finds success with TELA maize. https://www.aatf-africa.org/a-nigerian-farmer-finds-success-with-tela-maize/
[248] BCG. (2024). Breaking the cost barrier on biomanufacturing. https://www.bcg.com/publications/2024/breaking-the-cost-barrier-on-biomanufacturing

At the same time, the role of the circular model is increasing. Traditional industry is built as a linear chain: extraction, processing, consumption, and waste. By contrast, biomaterials and biochemistry close production cycles. They turn waste from agriculture and other industries into high-value-added raw materials. They also create opportunities to produce fully biodegradable materials. **This not only reduces the environmental burden, but also creates new sources of revenue within existing value chains.**

Apeksha Janashantha
Sri Lanka

« The circular economy lies beyond merely managing waste to being a full-blown economic framework that delivers significant value. [...] For developing countries, this is a route to bypass conventional industrialization patterns and create advantages in new industries. »

For the countries of the Global Majority, this opens a window of opportunity. Today, this area is developing actively not only in the major BRICS economies, including China, India, and Brazil, but also in other countries. A telling example is the Kenyan startup HyaPak Ecotech, which turns invasive water hyacinth into biodegradable packaging. **The company is simultaneously addressing an environmental problem and creating a high-value-added product**[249]**.** For countries with surplus biomass, the development of biomaterials and biochemistry opens a path to a new type of industrial sovereignty. **This means the ability to produce materials, chemicals, and packaging from domestic renewable resources,** based on national competencies and technologies.

Conclusion to Chapter 4

Technological transformation is shaping a new architecture of the economy. In this architecture, data, computing infrastructure, and the ability to manage complex systems become key factors. AI, digital platforms, autonomous solutions, and biotechnology do not merely increase the efficiency of individual processes. They change the very logic of value creation by reducing transaction costs, accelerating innovation, and blurring the boundaries between industries. The economy is gradually moving from a model based on labor and capital to one in which algorithms, networks, and access to the technology stack play a decisive role.

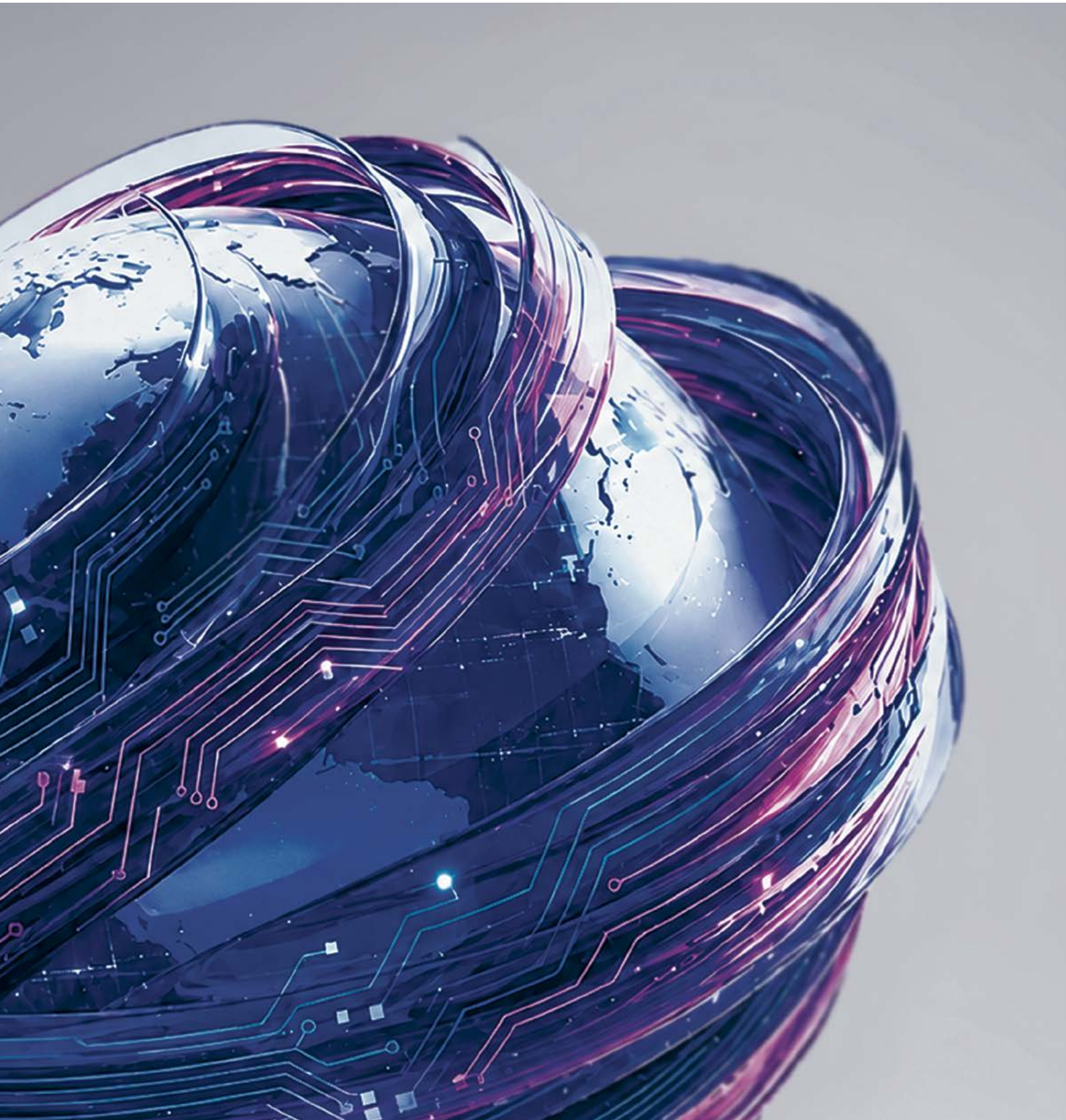
Under these conditions, technological sovereignty and control over critical infrastructure are becoming more important. This infrastructure ranges from computing capacity and data to platforms and biotechnology solutions. **Competition is increasingly unfolding not between individual companies or countries, but between ecosystems capable of building integrated technological circuits.**

At the same time, the place of the human being in the economy is changing. Automation is covering not only physical labor, but also intellectual labor. AI systems are beginning to perform decision-making and coordination functions. **This raises questions not only about efficiency, but also about the role of human beings in the new economic reality.** The next chapter examines how the ongoing changes are transforming the position of the human being, human functions, and the requirements for human participation in the economy and society.

[249] HyaPak. (n.d.). https://hyapak.com/

CHAPTER 5

HUMAN CAPITAL DEVELOPMENT IN THE NEW TECHNOLOGICAL ERA



5. HUMAN CAPITAL DEVELOPMENT IN THE NEW TECHNOLOGICAL ERA

Changes in demographic trends and technological development are restructuring all stages of the human life cycle. Education is becoming a continuous process. Systems of flexible micro-credentials are replacing rigid academic degrees.

In the labor market, AI is taking over routine cognitive functions. As a result, the main economic asset of the human being becomes the ability to reconfigure skills, manage intelligent systems, and preserve intellectual agency in an environment of ready-made algorithmic scenarios. The system of corporate relations is also changing. The number of entry-level positions is shrinking, while requirements for newcomers are rising to the level of today's mid-level specialists. Against the backdrop of global population aging, the care economy is becoming a dominant factor in government budget planning. Traditional healthcare is being replaced by a system of continuous health management.

5.1 Learning and career: Reconfiguration of competencies

Learning and career as a single continuous process

Career trajectories are increasingly less dependent on conventional education. **Individuals need constant upskilling, reassessment of competencies, and adaptation to changing conditions.**

The traditional education system already fails to provide graduates with the skills they need in the labor market. More than 40% of university graduates in the countries of the Organization for Economic Cooperation and Development (OECD) work outside their field of study during the first five years after graduation[250]. At a time when institutional curricula are updated much more slowly than the technology stack, a diploma is no longer a guarantee of competence. **Academic degrees are being devalued and are giving way to a system of micro-credentials and digital profiles with verified real-time skills**[251]**.**

Ksenia Aleksandrova
Russia

« [...] the key challenge of the future will be the persistent lapse between the rapidly changing demand for competencies and the lagging response of the education systems. »

Previously, education was aimed at forming a stable professional identity. Today, it is becoming an instrument for its continuous reconfiguration. People are less likely to follow a predetermined trajectory. They increasingly move through several professional roles, mastering different fields and combining different types of activity. **A career is losing its linear character and becoming a sequence of transitions,** where each new point requires not only new knowledge, but also the ability to integrate it quickly into practice.

[250] OECD. (2021). OECD skills outlook 2021: Learning for life. https://www.oecd.org/en/publications/oecd-skills-outlook-2021_0ae365b4-en.html
[251] Coursera. (2025). Micro-credentials impact report 2025. https://www.luminafoundation.org/wp-content/uploads/2025/05/Micro-Credentials-Impact-Report-25.pdf

Lubinda Haabazoka
Zambia

« The opportunities lie in access to specialized skills, exposure to scientific research, and the strengthening of tertiary education systems through academic mobility and joint degree programs. However, challenges persist in areas such as limited funding for outbound students, inadequate credit recognition, weak alumni networks, and bureaucratic obstacles affecting student placement and post-study integration. »

Learning is becoming modular, flexible, and adaptive. Its content, pace, and format will be tailored to the individual. These changes are already reflected in the dynamics of the EdTech market. According to forecasts, it will reach USD 348.4 bn by 2030, with Asia-Pacific countries, Latin America, and the Middle East accounting for more than 40% (Figure 67). **Education is shifting toward personalized and flexible learning architectures.**

At the same time, corporate universities are growing. The global corporate learning market has already reached USD 413 bn[252]. Businesses are forced to invest in their own educational systems, because only these systems can quickly supply personnel who meet current requirements. **As a result, a single "norm" of education is disappearing.** Each individual forms a personal combination of skills and competencies based on the requirements of the environment and their own strategy.

The development of AI plays a key role in this process. According to surveys[253], more than 80% of U.S. high school and college students use AI in their studies. Thanks to the availability of AI models, every learner can receive support that was previously available only through individual tutoring. **AI radically reduces the cost of learning,** making access to knowledge and skills almost instantaneous. This significantly accelerates entry into a profession and expands opportunities for horizontal mobility.

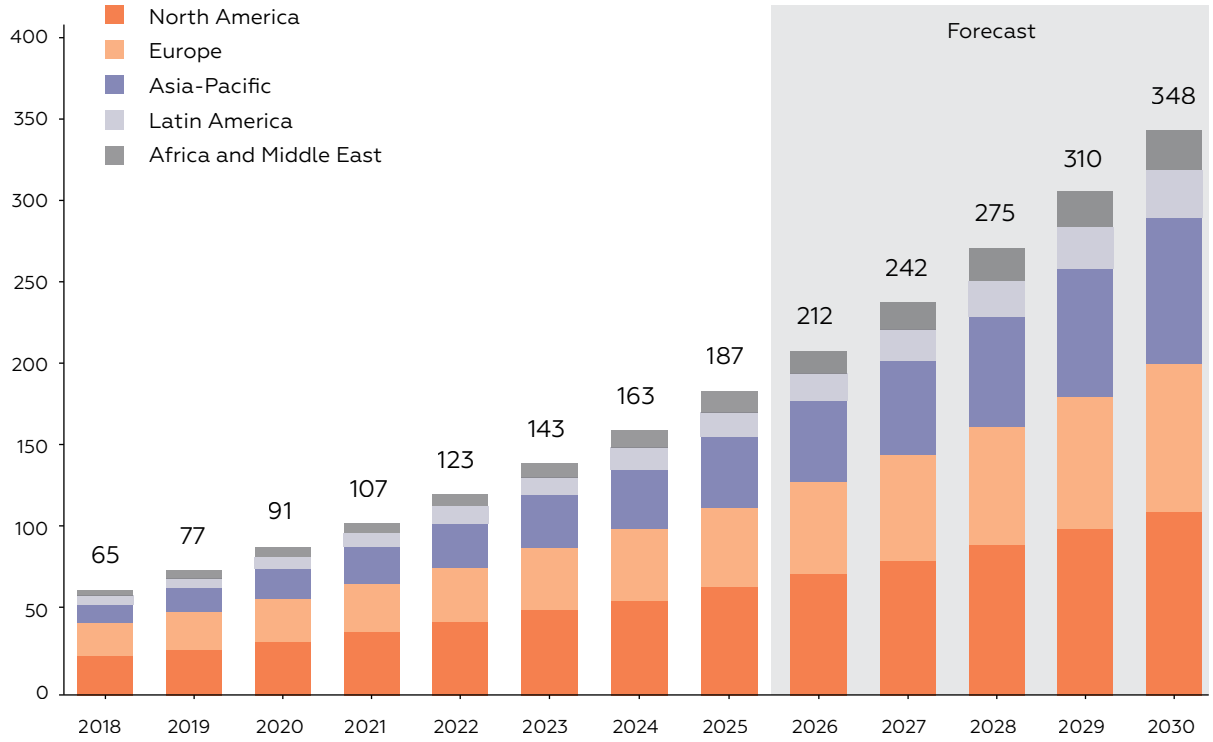
This process also frees teachers from routine grading, lesson planning, and the transmission of factual material. **The teacher becomes an architect of the educational experience and a guide to meaning.** Their task shifts from providing information to orchestrating the process of its interpretation.

AI education is becoming mandatory in a number of countries. The UAE[254] and three regions of China—Beijing, Guangdong, and Hangzhou[255]—introduced AI education at all levels of school education starting in the 2025/2026 academic year. **AI literacy is becoming part of the basic educational standard.**

[252] SkyQuest. (2025). Corporate training market size, share, and growth analysis. https://www.skyquestt.com/report/corporate-training-market
[253] Adair, A., et al. (2025). U.S. high school students' use of generative artificial intelligence: New evidence from high school students, parents, and educators. College Board Research. https://research.collegeboard.org/media/pdf/ai-research-brief-1_vf.pdf
[254] Elmourad, T., et al. (2026). AI adoption in K–12 education: A model of skills transformation, productivity, and institutional readiness. Education Sciences, 2(16), 337.
[255] NPR. (2026). In China, AI is no longer optional for some kids. It's part of the curriculum. https://www.npr.org/2026/01/27/nx-s1-5683821/china-ai-schools-curriculum

Figure 67

Dynamics and forecast of the global EdTech market size, bn USD



Source: Grand View Research[256].

Svetlana Kiseleva
Russia

« Transforming education goes beyond gadgets in classrooms. It's a fundamental shift—from solo memorization to collaborative creation, textbook theory to lab-and-workshop practice, and anxiety about the future to hands-on confidence in shaping it. »

The flexibility and accessibility of learning reinforce another, less obvious trend: the accelerated obsolescence of skills. Technological change is occurring so quickly that competencies in demand today may lose relevance within several years, or even months[257]. **This creates a situation of permanent professional instability,** in which the ability to learn will become more important than knowledge itself.

This development contains an internal contradiction. By expanding access to knowledge and making it easier to apply, AI also reduces the need for independent cognitive effort. If a system can offer a ready-made answer, explain a solution, and even perform a task, people may be tempted to delegate not only routine operations, but the thinking process itself. **Studies already show that excessive reliance on generative AI when completing tasks leads to weaker critical thinking skills[258].**

[256] Grand View Research. (2023). Education technology market (2026–2033). https://www.grandviewresearch.com/industry-analysis/education-technology-market/methodology
[257] IBM. (2020). Skills transformation for the 2021 workplace. https://www.ibm.com/new/training/skills-transformation-2021-workplace
[258] Lee, H.-P., et al. (2025). The impact of generative AI on critical thinking: Self-reported reductions in cognitive effort and confidence effects from a survey of knowledge workers. Microsoft. https://www.microsoft.com/en-us/research/wp-content/uploads/2025/01/lee_2025_ai_critical_thinking_survey.pdf

Eojin Kim
South Korea

« In and of themselves, technologies do not automatically effect an educational reform. Unless innovations in education move beyond efficiency and result-oriented competition, and help make the teaching process meaningful again, AI is running the risk of remaining merely a new exam tool. »

Under these conditions, the hierarchy of skills is gradually changing. What was previously classified as "soft" or supplementary competencies will become the foundation of professional resilience. These include critical thinking, the ability to verify and interpret algorithmic outputs, the ability to distinguish reliable information, and the capacity to form independent judgments. **Intellectual agency is becoming a core professional competency.**

Mahmood Anwar
Pakistan

« There is a critical need to promote AI Literacy, enabling students to differentiate between authentic information and AI-generated disinformation. »

Restructuring the organization of labor

The current transition in the labor market is not primarily about the disappearance or creation of jobs. It is about redefining roles, functions, and the logic of task allocation between humans and technological systems. Even in segments previously dominated by routine cognitive or physical labor, the human being does not "disappear." **The human role shifts from direct execution to control, verification, and management of complex systems**[259]**.**

Selina Neri[260]**, CEO, Dean & Co-Founder, Future Readiness Academy**
UAE

« Careers are no longer linear—they are becoming portfolios. We are no longer in the world of 'I am born, I get educated, I have a career, I retire.' People are increasingly working for multiple employers, projects or fields at the same time—these are the famous portfolio careers—rather than following a single 20 to 30-year trajectory. What matters now is the ability to assemble teams around tasks, to enable learning and to push decision-making to the ground, rather than enforcing execution through hierarchy. »

A key feature of this process is not the elimination of professional experience, but its fundamental "reassembly." More than 70% of skills in demand today can be adapted and used in new, technologically enhanced tasks[261]. The labor market is becoming a more dynamic system based on the continuous transformation of roles and competencies.

[259] Anthropic. (n.d.). What does AI mean for education? [Video]. YouTube. https://www.youtube.com/watch?v=Uh98_aGhAuY&list=TLGGllSRvtks0fEyNjEyMjAyNQ
[260] National Centre "Russia." (2026). "OD on Air" | Maxim Oreshkin and Selina Neri [Video]. YouTube. https://youtu.be/GODyyyKh4QQ?si=o1vL0vbu_dI8P8es
[261] McKinsey Global Institute. (2025). Agents, robots, and us: Skill partnerships in the age of AI. https://www.mckinsey.com/mgi/our-research/agents-robots-and-us-skill-partnerships-in-the-age-of-ai

Professions in which a significant share of routine tasks can be automated without human involvement are gradually disappearing or becoming functions performed by AI and robots (Table 1).

Table 1
The main archetypes of professions and their future transformation

ARCHETYPE	THE FUTURE OF WORK	EXAMPLES OF PROFESSIONS
People-centric	Work performed primarily by humans	Nurses, psychologists, firefighters
People-Agent	Work performed primarily by humans with the active support of AI agents	Sales representatives, high school teachers, HR specialists
Agent-centric	Work performed primarily by AI agents under human supervision	Accountants, software developers, lawyers
Robot-centric	Work performed primarily by robots	Order pickers, welders, cooks
People-Agent-Robot	Hybrid work involving humans, agents, and robots	Receptionists, physician assistants, correctional officers
Agent-Robot	Work performed primarily by agents and robots	Machine setters, bakers, library assistants
People-Robot	Work performed primarily by humans paired with robots	Insulators, drywall and ceiling tile installers

Note: Highlighting indicates occupational archetypes that are expected to be most affected by workforce reductions as a result of automation and robotics.
Source: McKinsey Global Institute[262].

The disappearance of traditional "launchpads" for young specialists is becoming a challenge of the new technological reality. The number of entry-level vacancies in U.S. companies has declined by approximately 35% since 2023. This is happening in parallel with the active adoption of AI tools in corporate processes[263].

In the classical industrial model, a career began with routine, linear tasks at the base of the corporate pyramid. Today, however, this functionality is performed more efficiently and cheaply by AI agents. **As a result, the familiar hierarchical organizational pyramid is transforming into a "diamond-shaped" structure**[264] (Figure 68).

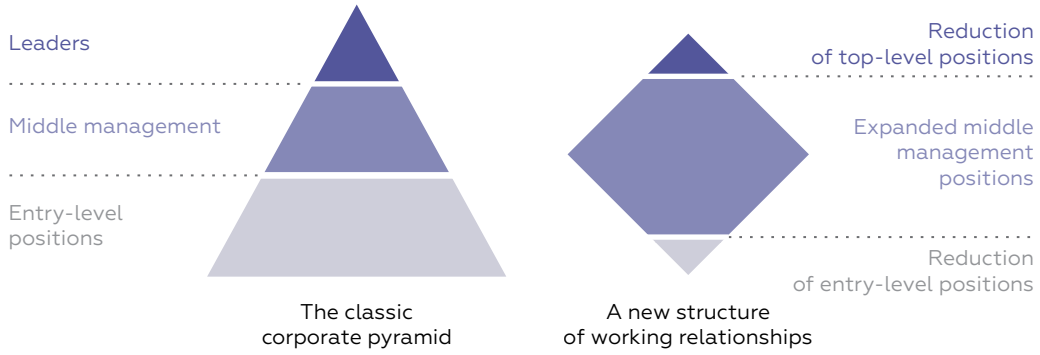
At the same time, mid-level specialists are becoming more in demand. Their main function is not to perform tasks directly, but to manage, configure, and coordinate intelligent systems. These specialists will act as operators of complex technological circuits. They will formulate tasks, interpret results, adjust algorithmic performance, and make decisions based on options proposed by the system. **The middle layer becomes the key interface between human judgment and intelligent systems.**

[262] McKinsey Global Institute. (2025). Agents, robots, and us: Skill partnerships in the age of AI. https://www.mckinsey.com/mgi/our-research/agents-robots-and-us-skill-partnerships-in-the-age-of-ai
[263] Metaintro. (2026). Entry-level jobs are vanishing for 2026 grads: How AI is reshaping the hiring ladder. https://www.metaintro.com/blog/entry-level-jobs-ai-2026-college-graduates
[264] National Centre "Russia." (2026). Lecture by Dr Selina Neri [Video]. YouTube. https://www.youtube.com/watch?v=bYhVO-M89iY

Selina Neri[265], CEO, Dean & Co-Founder, Future Readiness Academy
UAE

« AI is taking on a share of entry-level tasks—routine analytics, preparing materials, basic data processing—and as a result, entering the labour market now requires a higher starting level of competence. The traditional pyramid is being replaced by a diamond shape: fewer junior roles at the bottom, an expanded middle where most of the work takes place, and a smaller number of leaders at the top. »

Figure 68
Change in the hierarchical structure of jobs in organizations



Source: Open Dialogue podcast "OD on Air" [266].

The upper level, associated with strategy, key decision-making, and leadership, will remain limited and exclusive in the traditional sense. This makes the labor market more fragmented and less predictable. **Transitions between levels now depend less on tenure and more on a person's ability to quickly master new roles** and work in a changing environment.

Muhammad Bilal
Pakistan

« The future demands a fundamental re-engineering, a shift from viewing education as a linear pipeline to managing human capital as a dynamic, intelligent, and globally integrated supply chain. »

Extending and rethinking the human life cycle

In the new reality, age will no longer be an unambiguous marker of professional status, productivity, or a person's place in the economy.

Thanks to advances in medicine, improvements in quality of life, and technological support, people are maintaining both physical and cognitive capacity for longer[267]. As a result, the structure of interaction within organizations is changing. People from different generations work in the same team with comparable competencies, but with fundamentally different career trajectories. **Status is determined not by age, but by the relevance of skills and the ability to**

[265] National Centre "Russia." (2026). "OD on Air" | Maxim Oreshkin and Selina Neri [Video]. YouTube. https://youtu.be/GODyyyKh4QQ?si=o1vL0vbu_dI8P8es.
[266] See Footnote 265.
[267] Nature. (2025). Could humans live to 150? Why some researchers think we're on the cusp of a major longevity breakthrough. https://www.nature.com/articles/d41586-025-03524-4

solve specific tasks. Older employees do not necessarily hold leadership positions, and younger employees do not necessarily occupy subordinate roles.

Jelena Milicevic-Prorokovic
Serbia

« Active aging policies should encourage older adults to remain socially engaged, healthy and economically active. Key measures include lifelong learning, age-friendly workplaces, and preventive healthcare systems. »

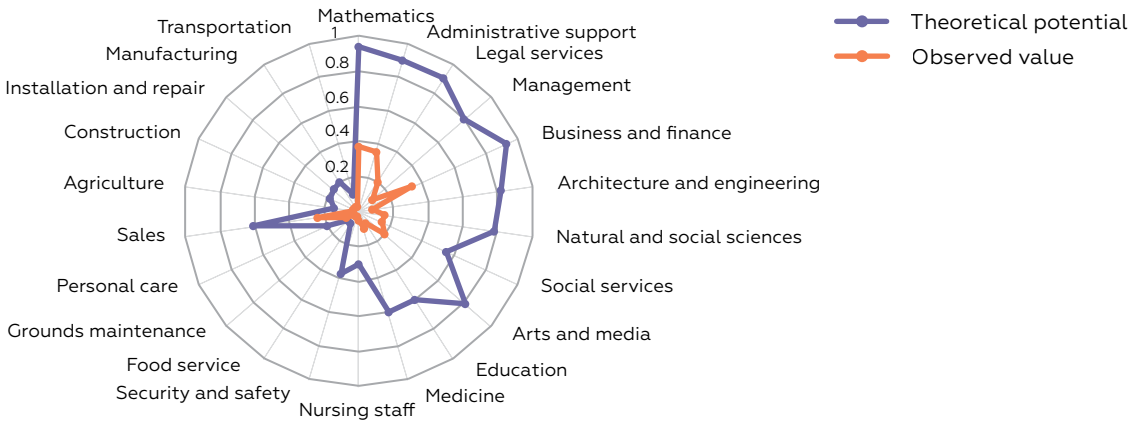
Automation and robotization reduce physical strain, allowing people to remain productive for longer even with age-related limitations. AI, in turn, partially compensates for cognitive changes associated with aging. It supports the ability to analyze information, make decisions, and learn. **As a result, the technological environment becomes a factor that smooths age differences and expands opportunities for participation in the economy.**

Tatiana Pecherkina
Russia

« Inclusion underpins social stability and economic edge—far from charity, it's a strategic imperative. [...] Universal design in workplaces and schools should be viewed not as expenses, but as lifelong human capital investments. [...] [Inclusion] positions accessibility as a strategic investment in human capital, with trackable returns. »

However, recent data show that the real potential of AI as a productivity-enhancing tool is still distributed unevenly across professional fields. **It is already delivering strong results in mathematics, administration, sales, and finance.** In management, architecture, engineering, medicine, and education, the actual potential of the technology remains lower than its theoretical potential (Figure 69).

Figure 69
Theoretical potential and observed share of tasks that can be performed by AI, %



Source: Anthropic, 2026[268]; T. Eloundou et al., 2023[269].

[268] Anthropic. (2026). Labor market impacts of AI: A new measure and early evidence. https://www.anthropic.com/research/labor-market-impacts
[269] Eloundou, T., et al. (2023). GPTs are GPTs: An early look at the labor market impact potential of large language models. arXiv. https://doi.org/10.48550/arXiv.2303.10130

Homar Sánchez-Olguín
Mexico

« The future labor market demands a paradigm shift from 'skills acquisition' to 'cognitive capital cultivation'—a dynamic, lifelong process of human-AI co-evolution. »

5.2 Healthcare: A new architecture of medical care

Reprioritization toward healthcare and care systems

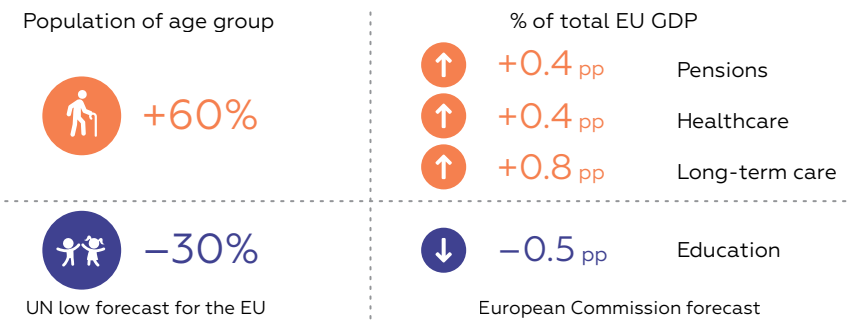
Population aging is leading to a reassessment of budget priorities. The healthcare and long-term care sector is gradually becoming a dominant expenditure category. It absorbs a growing share of GDP as demand for medical services from older generations increases[270]. In this situation, the education system risks being pushed into a secondary role compared with the "care economy." **A declining number of children formally makes it possible to reduce education budgets and redirect the freed-up funds toward supporting older populations.**

Tolou Babadi
Iran

« Population ageing can become a productivity lever in BRICS if the 'care economy' is treated as human-capital infrastructure, much like roads or broadband, linking preventive health, skills, and decent work. »

For example, in the EU, spending on pensions, healthcare, and long-term care will increase by 1.6 percentage points of aggregate GDP by 2070. Public investment in education, by contrast, will decline by an average of 0.5 percentage points (Figure 70). **The direct crowding-out effect on development investment will be most visible in countries with traditionally strong human capital.** The largest reductions in public education spending are projected in Norway, at 1.4 percentage points, and Finland, at 1.1 percentage points[271].

Figure 70
Projected EU expenditure on social infrastructure, 2022 vs. 2070



Source: European Commission[272].

[270] Clements, B., et al. (2015). The fiscal consequences of shrinking populations. IMF. https://www.imf.org/external/pubs/ft/sdn/2015/sdn1521.pdf
[271] European Commission. (2024). 2024 Ageing Report: Economic and budgetary projections for the EU member states (2022–2070). https://economy-finance.ec.europa.eu/publications/2024-ageing-report-economic-and-budgetary-projections-eu-member-states-2022-2070_en
[272] See Footnote 271.

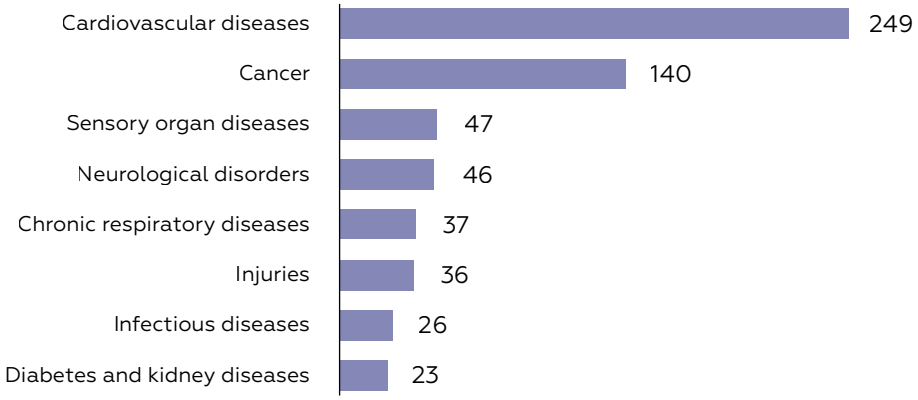
Soumya Bhowmick
India

« We count income flows, but we do not account for the depreciation of the asset base—forests, aquifers, soils, wetlands, and the skills and health of people—that sustains those flows. »

From medicine to health management

A significant shift in healthcare is the transition from a model based on responding to disease to the systematic management of health[273]. Biomedical development is shifting the focus from treating individual diseases to influencing the fundamental mechanisms of aging. **The economic potential of these changes is enormous:** reducing the global disease burden by 50% could free up to USD 2 tn in annual GDP through higher productivity and longer active life[274]. This is because age-associated diseases account for one-third of the global burden of disease[275] (Figure 71).

Figure 71
Distribution of age-related disease burden by therapeutic areas, 2022, mn DALY



Note: DALY (Disability-Adjusted Life Year) is a measure that reflects the number of healthy years of life lost due to disability and premature death. It is calculated by combining the years of life lost as a result of premature mortality with the years lived with reduced quality of life due to illness (measured as the product of the disease's duration and its impact on the patient's quality of life).
Source: McKinsey Health Institute[276].

The integration of large datasets plays a key role in this transition[277]. The development of platform-based solutions makes it possible to combine medical data, behavioral patterns, consumption information, including nutrition and spending, mobility data, and genetic information into a single system. **This creates a fundamentally new level of monitoring of the human condition.**

As a result, **analytical capabilities will expand significantly.** Instead of fragmented assessments, it becomes possible to build a comprehensive profile that accounts for physiological, behavioral, and social factors[278].

[273] De la Torre, K., et al. (2025). The application of preventive medicine in the future digital health era. JMIR Publications. https://www.jmir.org/2025/1/e59165
[274] McKinsey & Company. (2026). What is health span? https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-health-span
[275] McKinsey Health Institute. (2025). Healthspan science may enable healthier lives for all. https://www.mckinsey.com/mhi/our-insights/healthspan-science-may-enable-healthier-lives-for-all
[276] See Footnote 275.
[277] Stoumpos, A. I., Kitsios, F., & Talias, M. A. (2023). Digital transformation in healthcare: Technology acceptance and its applications. International Journal of Environmental Research and Public Health, 20(4), 3407.
[278] BCG. (2025). How AI agents and tech will transform health care in 2026. https://web-assets.bcg.com/0e/37/f2a0b9ea416c939adc7afb4f9f9c/future-of-digital-health-2026-dec2025.pdf

Rafiqul Islam Rayhan
Bangladesh

« In the Global South countries, AI should be treated as a public good. Something closer to clean water or electricity. A shared digital utility that can quietly deliver decent healthcare at scale, which is capable of delivering high-quality healthcare. »

AI will strengthen this effect through the development of predictive analytics[279]. Algorithms will be able not only to assess current health status, but also to forecast the probability of disease, propose prevention scenarios, and generate personalized recommendations. The accuracy of such forecasts will increase as data accumulate and models improve, making prevention more effective and more targeted.

The development of biomedical technologies is turning mass genetic screening from an experimental procedure into an economically justified tool for early risk detection and personalized therapy selection. **This creates the foundation for preventive medicine** and will shift the focus from treating diseases to preventing them[280].

The architecture of the healthcare system itself is changing. The role of the hospital as the central element is declining. It is giving way to a distributed network of services that accompanies people in everyday life. **Increasingly, doctor-patient interaction takes place outside traditional medical institutions,** through digital platforms, wearable devices, and remote consultations.

On this basis, new business models are gradually emerging. They are focused not on episodic medical services, but on long-term health support. Monitoring services, personalized prevention programs, continuous analytical support, and recommendations are becoming an integral part of everyday life. **Health management is replacing traditional healthcare** and is being integrated into human behavioral and consumer practices. It is becoming a continuous process rather than a separate service.

Weilan Xu
China

« Traditional elderly care models struggle to address complex demands, making smart elderly care services a crucial solution. »

New quality of life and healthy longevity

The next key shift is the transition from the traditional medical model, focused on the treatment of disease, to a broader paradigm of improving quality of life, supporting healthy longevity, and expanding human capabilities.

Augmentation technologies that expand human physical and cognitive capabilities are developing significantly. AI, new-generation prosthetics, exoskeletons, and devices that support or enhance

[279] Zafeer, H. M. I., Maqbool, Samra, & Maqbool, S. (2025). Transforming healthcare with AI: A systematic review of predictive modeling for early disease detection and management. International Journal of Pharmaceutical and Healthcare Marketing. https://www.emerald.com/ijphm/article-abstract/doi/10.1108/IJPHM-04-2025-0042/1301305/Transforming-healthcare-with-AI-a-systematic?redirectedFrom=fulltext

[280] World Economic Forum. (2026). Preventive medicine can usher in a new era of longevity. Here's how. https://www.weforum.org/stories/2026/01/preventive-medicine-longevity/

specific bodily functions make it possible to compensate for limitations. In some cases, they also make it possible to go beyond natural human capabilities[281]. **These technologies are used not only for medical purposes, but also as tools for improving the quality and duration of active life.**

Importantly, these changes are not remaining niche. They are gradually moving into the mass segment and creating a new standard of attitudes toward the body and health. **Even at early stages, products are emerging that initially address narrow tasks but will become mainstream and change behavioral norms.** This indicates the beginning of a broader wave in which biotechnology is integrated into everyday life.

The economic factor reinforces this process. As the population ages, a significant share of capital is concentrated among older age groups. These groups show a greater willingness to invest in health, extended active life, and improved quality of life. **This creates stable and solvent demand for biotechnology solutions,** stimulating their further development and scaling.

Leonard Landois
Germany

« In an era in which technological efficiency is increasingly regarded as the measure of progress, a central question risks being lost from view: in what, precisely, do societies invest when they speak of the future? In machines, data and algorithms, or in the human being itself? »

5.3 New human agency

Shifting benchmarks and growing complexity of the environment

In education, the labor market, and career trajectories, **previous benchmarks are gradually becoming blurred.** The universal, generally accepted "quality scale" that once made it possible to quickly assess the value of institutions and decisions is disappearing. Previously, relatively universal markers existed, such as prestigious universities or leading employers. Today, their significance is gradually declining.

In a distributed learning environment, access to knowledge becomes widespread. Under these conditions, the individual will bear primary responsibility for the outcome: the depth of learning, the choice of trajectory, and the relevance of their competencies. **Responsibility for educational and professional results is shifting increasingly toward the individual.**

A similar logic will also appear in finance. As distributed systems and instruments develop, **individuals will increasingly need to navigate available opportunities independently,** assess risks, and make decisions. This will expand the space of choice, while also increasing the requirements for the ability to navigate a complex environment.

Platformization as a new organizing principle

Platform solutions are spreading across almost all key spheres of life, from education and employment to finance and everyday consumption. They are becoming new instruments for ordering and systematizing life scenarios. **They structure interactions among economic actors and reduce their costs.**

[281] Acemoglu, D., Autor, D., & Johnson, S. (2026). Building pro-worker artificial intelligence. The Hamilton Project. https://economics.mit.edu/sites/default/files/2026-03/Building%20Pro-Worker%20Artificial%20Intelligence.pdf

Platforms aggregate information, while their algorithms generate recommendations and offer ready-made scenarios for action. This reduces the need for independent analysis and choice. In many situations, from determining the cost of services to choosing routes, products, or educational solutions, key parameters will be set not by the individual, but by the logic of algorithms embedded in the platform. **The platform increasingly determines the framework within which choices are made.**

The individual no longer needs to make a significant share of operational decisions. The platform will offer optimal options while taking into account many factors that are not available for individual analysis. **As a result, time and resources will be freed up** and can be directed toward more complex and creative tasks[282].

However, this process also has a downside. By transferring decision-making authority to platforms, individuals also reduce their control and responsibility for their actions. The algorithms that determine choices will remain largely opaque[283], and the ability to influence their logic will be limited. **This will gradually shift the human role from active participant to user acting within system-defined scenarios.**

Aya Arfaoui
Morocco

« These platforms are no longer merely tools for expression; they have become strategic instruments for directing international public opinion, supported by extensive digital advertising campaigns. »

Dependence on platforms may become a new form of behavior structuring. Despite the formal expansion of access to opportunities, the real space of choice will be determined by how those opportunities are presented and ranked within platform ecosystems. Access will expand, but the architecture of choice will increasingly be controlled by platforms.

Moreover, because platform solutions are cross-border by nature, they extend beyond the state. Together with decentralized financial mechanisms, they allow individuals to exist outside the framework of the traditional economic system and geographic borders. **This weakens the territorial boundaries of economic participation.**

Human agency in an increasingly complex world

The key question defining the position of the human being in the new economic and technological reality is the question of agency. **Will individuals retain the ability to make decisions independently and shape their own trajectory?**

The structure of the environment pushes individuals toward delegation. Platforms offer ready-made solutions by optimizing choice and reducing the need for analysis. AI, in turn, takes over not only task execution, but also a significant share of cognitive work, from information processing to the formulation of recommendations. **Delegation becomes not an exception, but a basic mode of interaction with the environment.**

[282] Parker, G. G., Van Alstyne, M. W., & Choudary, S. P. (2016). Platform revolution: How networked markets are transforming the economy and how to make them work for you. New York: W. W. Norton & Company.
[283] Pasquale, F. (2015). The black box society: The secret algorithms that control money and information. Cambridge; London: Harvard University Press.

Individuals may find themselves in a situation where key decisions, from everyday to strategic ones, are made within a logic set by external systems. **This will lead to the formation of a passive life-course model.** In this model, behavior is determined not by internal choice, but by proposed scenarios optimized by algorithms. Despite its apparent convenience and efficiency, this model reduces the capacity for independent interpretation of what is happening.

Vladimir Gorokhov
Russia

« In the AI age, any system should be judged not by its automation speed, but by the natural human intellect preservation and development index. »

Increasing inequality amid technological progress

Against the backdrop of these changes, the risk of inequality will grow between workers who are able to adapt to the new reality and those who are not. This divide runs not only within society, but also at the geopolitical level, creating a new digital barrier. In the least developed countries, only 39% of the population has Internet access. This is 2.4 times lower than in high-income countries. **Only 15% of the world's population has access to AI**[284]**.**

In some economies, including the United States and the United Kingdom[285], AI already affects up to 60–70% of jobs. At the same time, in countries of the Global Majority, such as India and the countries of Sub-Saharan Africa, AI technologies still do not affect 70–74% of the labor market. This creates the risk of fatal lag. While leaders increase efficiency through the synergy between humans and algorithms, low-income countries risk losing global competitiveness (Figure 72). **Technological inequality may become a new source of structural divergence between countries.**

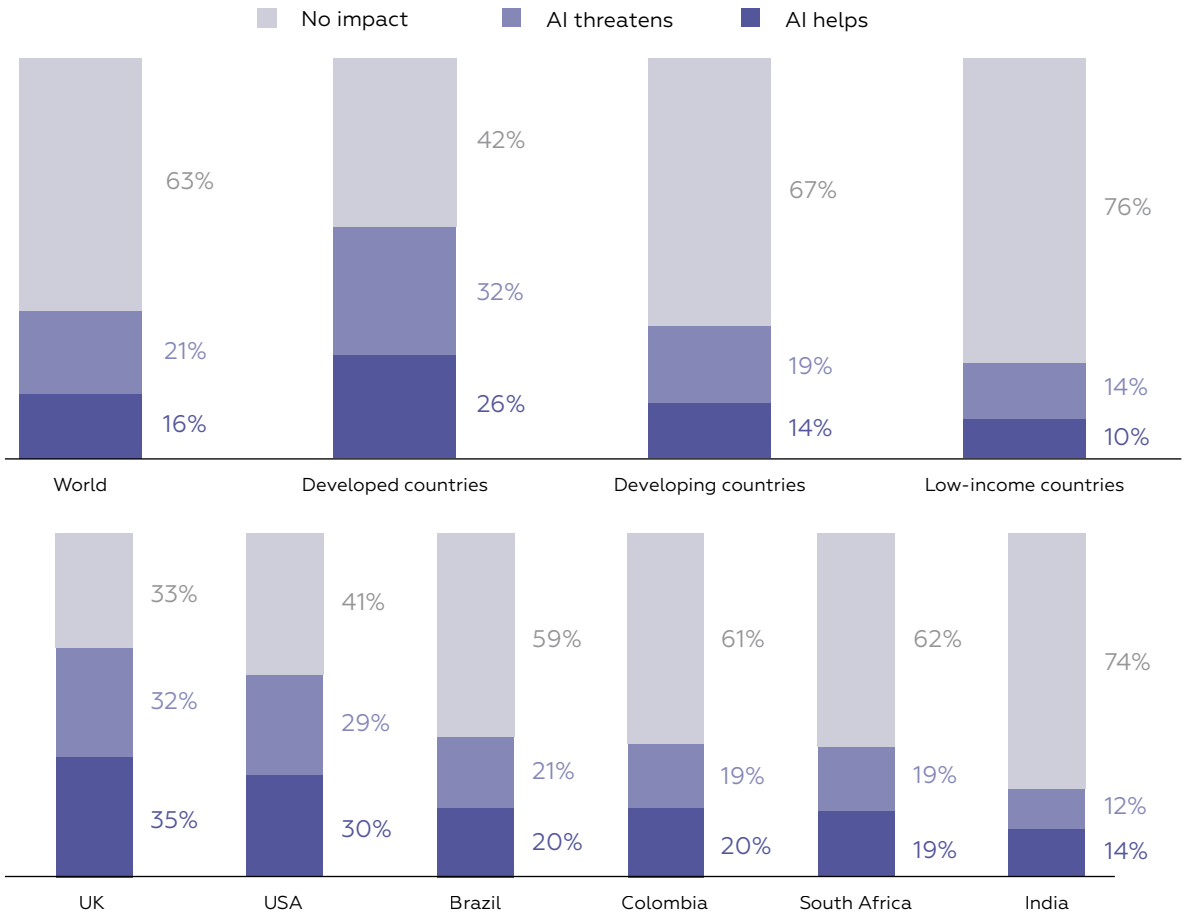
Preserving agency requires active effort. Individuals need not only to continuously update their knowledge and skills, but also to develop their own understanding of the processes in which they participate. **The ability to maintain a "meta-level" of perception becomes critically important:** seeing not only individual decisions, but the system as a whole, and understanding its operating principles and limitations. Interaction with technology requires not passive use, but a conscious attitude toward its logic and consequences.

Veronika Svirgunova
Russia

« True equality comes not from uniform speed, but from intelligent accommodation. »

[284] United Nations Population Division. (2026). Commission on population and development, fifty-ninth session. https://www.un.org/development/desa/pd/events/CPD59
[285] IMF. (2024). Gen-AI: Artificial intelligence and the future of work. https://www.imf.org/en/publications/staff-discussion-notes/issues/2024/01/14/gen-ai-artificial-intelligence-and-the-future-of-work-542379

Figure 72
AI impact on employment



Source: IMF[286].

Conclusion to Chapter 5

The transformation of human capital is becoming a key element of adaptation to the new technological reality. Education is no longer a separate stage. It is becoming a continuous process. Careers are losing their linear character, and the labor market is losing predictability. At the same time, the healthcare system is shifting from the treatment of disease to the management of health and quality of life. This expands the boundaries of active human participation in the economy.

Against this backdrop, the environment is becoming more complex. The fragmentation of the global system and the spread of platforms are changing the ways decisions are made. They reduce transaction costs, but increase dependence on algorithms. This creates a dual effect: access to knowledge, services, and markets expands, while **the risks of losing autonomy and deepening inequality also increase.**

Under these conditions, **the question of human agency becomes decisive.** The human role is determined not only by the level of skills, but also by the ability to interact meaningfully with technological systems. It also depends on the ability to retain control over decisions and shape one's own trajectory in an increasingly complex world. This capacity becomes the foundation of resilience for both individuals and society as a whole.

[286] IMF. (2026). Bridging skill gaps for the future: New jobs creation in the AI age. https://www.imf.org/-/media/files/publications/sdn/2026/english/sdnea2026001.pdf

CONCLUSION

The global economy is entering a period of profound restructuring. Previous models of growth, governance, and international interaction are no longer fully capable of responding to new challenges. Globalization is not ending—it is shifting shape. Instead of a single hierarchical system with a limited number of centers, a more complex, networked, and multipolar architecture is emerging. **In this architecture, the role of the countries of the Global Majority, connector countries, digital platforms, technology ecosystems, and local networks is increasing.** These actors are capable of creating new contours of connectivity.

This transformation affects the basic mechanisms of the global economy. The financial system is facing the limits of the debt-based model, rising transaction costs, and the politicization of settlement infrastructure. Demographic processes are changing the structure of labor markets, consumption, urban development, and social obligations. **Technologies, in turn, are ceasing to be a separate sector of the economy and are becoming a universal environment** in which decisions are made, value is created, and power is redistributed.

The key question of the era is not only access to resources, capital, or markets, but also the ability to manage dependencies. Sovereignty means acquiring practical economic substance. It is expressed in control over critical technologies, data, infrastructure, financial channels, human capital, and institutional rules. At the same time, complete isolation is impossible and is not the goal. **Resilience will be determined not by rejection of interconnectedness, but by the ability to participate in it on one's own terms.**

Technological transformation plays a special role in this system of coordinates. Artificial intelligence, digital platforms, autonomous systems, robotics, and biotechnology create sources of productivity. They also open opportunities to address some demographic, infrastructure, and social constraints. However, these same technologies intensify the risks of power concentration, dependence on external platforms, algorithmic governance, and unequal access to new opportunities. **Technological progress by itself therefore does not guarantee more equitable and sustainable development.** Its effects will depend on the quality of institutions, regulation, and the ability of societies to direct technologies toward expanding human capabilities rather than replacing them.

Against this backdrop, human capital development becomes a central condition for long-term resilience. Education is becoming a continuous process. Healthcare is shifting from the treatment of disease to the management of quality and duration of active life. Careers are no longer linear trajectories. **The individual finds themselves in an environment where previous benchmarks are weakening,** while decision-making is increasingly mediated by platforms and algorithms. This makes agency one of the central questions of the future.

Preserving agency requires a new level of awareness from individuals, organizations, and states. It is necessary not only to use technologies, but also to understand the logic of their operation, their limitations, and their consequences. It is necessary not only to adapt to change, but also to participate in shaping the rules of the environment. **It is necessary not only to increase efficiency, but also to keep the question of development goals in focus:** why financial, technological, and social systems are created, and what place the human being occupies within them.

Thus, **the new platform for global growth cannot be reduced to a single technology, financial instrument, or institutional reform.** It emerges from the ability to connect technological development, economic sovereignty, demographic resilience, and investment in people. It is in this connection that a new system of coordinates takes shape. In this system, growth is determined not only by the scale of production or the speed of transactions, but also by societies' ability to preserve resilience, autonomy, and the human dimension of development.

LIST OF ABBREVIATIONS

- **5G** – fifth-generation mobile network
- **AGI** – artificial general intelligence
- **AI** – artificial intelligence
- **APAC** – Asia-Pacific region
- **API** – application programming interface
- **ASEAN** – Association of Southeast Asian Nations
- **B2B** – business-to-business
- **BRICS** – Intergovernmental association of ten countries: Brazil, Russia, India, China, South Africa, Egypt, Iran, the UAE, Ethiopia, and Indonesia
- **BRICS+** – Expanded BRICS grouping: Brazil, Russia, India, China, South Africa, Egypt, Iran, the UAE, Ethiopia, Indonesia, Belarus, Bolivia, Kazakhstan, Cuba, Malaysia, Thailand, Uganda, and Uzbekistan
- **CAGR** – compound annual growth rate
- **CB** – central bank
- **CBDC** – central bank digital currency
- **CIS** – Commonwealth of Independent States
- **CRISPR** – Clustered Regularly Interspaced Short Palindromic Repeats
- **DALY** – disability-adjusted life year
- **DFA** – digital financial assets
- **DLT** – distributed ledger technology
- **DNA** – deoxyribonucleic acid
- **EBIT** – earnings before interest and taxes
- **EBITDA** – earnings before interest, taxes, depreciation, and amortization
- **EU** – European Union
- **FPS** – fast payment system
- **G7** – Group of Seven: the United Kingdom, Germany, Italy, Canada, the United States, France, and Japan
- **GDP** – gross domestic product
- **GPQA Diamond** – graduate-level Google-proof Q&A diamond benchmark
- **GVA** – gross value added
- **ICLR** – International Conference on Learning Representations
- **IMF** – International Monetary Fund
- **IT** – information technology
- **ITC** – International Transport Corridor
- **LE** – life expectancy
- **MMLU** – massive multitask language understanding
- **OECD** – Organisation for Economic Co-operation and Development
- **ONDC** – Open Network for Digital Commerce
- **PAYG** – pay-as-you-go
- **PPP** – purchasing power parity
- **SWIFT** – Society for Worldwide Interbank Financial Telecommunication
- **TELA** – transgenic early maturing maize for Africa
- **TFR** – total fertility rate
- **UAE** – United Arab Emirates
- **UAS** – unmanned aircraft systems
- **UN** – United Nations
- **UNCTAD** – United Nations Trade and Development
- **UPI** – Unified Payments Interface
- **U.S.** – United States
- **WHO** – World Health Organization
- **WTO** – World Trade Organization

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