

The Cornerstone Role Of Research And Development

A Vehicle of Knowledge and Profit Generation

Summary

This paper examines the role of research and development (R&D) as a driver of knowledge and economic growth across all sectors, with an emphasis on international development and finance institutions. Using data from the World Bank, UNESCO and other official sources, we analyse global and regional R&D spending patterns, evaluate the budgets of major multilateral organisations and synthesise empirical evidence on the economic returns to public research. The findings indicate that global R&D spending has nearly tripled since 2000, reaching over USD 2.75 trillion in 2023, and that R&D intensity (expenditure relative to GDP) has increased from under 1.5 percent to almost 2 percent of global GDP. Developing regions, particularly in Asia, have significantly expanded their R&D footprints, although high-income economies still dominate absolute spending. Evidence from the literature shows that the social returns to public R&D are exceptionally high—Fieldhouse and Mertens (2025) estimate returns of 140–210 percent, while the U.S. National Institutes of Health reports a multiplier of USD 2.56 in economic activity for every dollar spent (Ref.9). Yet public R&D remains underfunded; for example, federal R&D spending in the United States is only 0.75 percent of GDP, down from 1.8 percent in the mid-1960s. Administrative budgets for multilateral development banks are modest relative to their lending volumes; the World Bank’s FY25 budget is USD 3.498 billion (Ref.7), the IMF’s FY25 budget is USD 1.501 billion (Ref.5), and the African Development Bank’s 2024 budget is about USD 579 million after converting Units of Account to U.S. dollars (Ref.1). These results underscore the need for sustained investments in research and knowledge production to support development and policy effectiveness, and highlight the potential economic dividends of stronger R&D funding at both national and multilateral levels.

Introduction

Research is a fundamental driver of technological progress, economic growth and social development. Since the second half of the twentieth century, countries that invest heavily in R&D have consistently outperformed those that do not, both in terms of productivity and living standards. Investment in research generates knowledge that spills over across industries and borders, leading to innovations, new markets and improved public services. For international development and finance institutions, research plays a dual role: it provides the analytical basis for policies, programmes and lending decisions, and it generates public goods such as data, reports and methodologies that benefit the global community.

Global R&D spending has grown rapidly despite economic headwinds. The World Intellectual Property Organization's Global Innovation Tracker reports that real R&D expenditures nearly tripled between 2000 and 2023, climbing from about USD 1 trillion to over USD 2.75 trillion, while R&D intensity increased from under 1.5 percent to nearly 2 percent of world GDP. The distribution of R&D spending is shifting geographically: Asia, driven by China and other East Asian economies, now accounts for approximately 46 percent of global R&D, compared with 25 percent in 2000. North America's share has fallen to 29 percent and Europe's to 21 percent, while contributions from regions such as Northern Africa and Western Asia have grown modestly but remain small. Within Africa, Egypt's R&D spending increased from 0.1 percent of the global total in 2000 to 0.6 percent in 2023.

These macro trends are mirrored by the activities of multilateral development banks and international financial institutions. The World Bank, International Monetary Fund (IMF), Asian Development Bank (ADB) and African Development Bank (AfDB) collectively produce research outputs ranging from global economic forecasts and policy reports to sectoral analyses and data platforms. Their administrative budgets—although modest compared with their lending portfolios—fund research departments, knowledge products and technical expertise. Understanding the returns to research and the adequacy of these budgets is critical for policymakers seeking to maximise the developmental impact of limited resources.

Literature Review

A substantial body of empirical research has explored the economic and social returns to R&D investment. Fieldhouse and Mertens (2025) employ time-series regressions to estimate the causal impact of federal non-defense R&D spending on U.S. productivity growth, finding gross social returns ranging from 140 percent to 210 percent (Ref.3). They argue that future fiscal consolidations that cut non-defense R&D could have significant adverse effects on productivity and growth. These estimates align with earlier studies showing that social returns to private or total R&D exceed the private returns captured by innovators.

Broader macroeconomic analyses underscore the multiplier effects of public research funding. The U.S. National Institutes of Health reports that each dollar of NIH-funded research generates approximately USD 2.56 in economic activity, supporting over 408,000 jobs and producing USD 94.5 billion in fiscal year 2024 (Ref.9). An analysis by the Information Technology & Innovation Foundation warns that cutting U.S. federal R&D spending by 20 percent could reduce GDP by up to USD 1 trillion over a decade (Ref.4). Complementary evidence from the policy literature suggests that public R&D accounts for around 25 percent of U.S. productivity growth and tends to pay for itself through increased tax revenues.

Internationally, the World Intellectual Property Organization notes that global R&D growth slowed to 2.9 percent in 2024 and is projected to fall to 2.3 percent in 2025—the weakest expansion in over a decade (Ref.10). R&D spending among top global firms grew by only 3 percent in nominal terms in 2024, well below the decade average of 8 percent. While the information and communication technology and pharmaceutical sectors maintain robust R&D growth, traditional industries such as automotive and consumer goods face declining R&D budgets.

In the development finance sphere, budgets for research and knowledge operations have grown slowly. The World Bank's FY25 administrative budget (excluding trust funds) is USD 3.498 billion (Ref.7), a modest increase relative to its lending volume and only slightly above levels from two decades ago. The IMF's FY25 net administrative budget is USD 1.501 billion, including a one-off increase to restore staffing and a capital budget of USD 122 million for facilities and IT investments (Ref.5). The ADB's internal administrative budget rose from USD 675 million in 2019 to USD 889 million in 2024 (Ref.2). The AfDB's 2024 administrative budget is UA 434.37 million (about USD 579 million), increasing to UA 447.14 million in 2025 and UA 460.29 million in 2026 (Ref.1). These figures highlight the constrained fiscal environment facing multilateral institutions and underscore the need to understand the efficacy and returns of their research spending.

Data & Methodology

This study combines quantitative data on R&D expenditure with budget information from multilateral development banks and empirical estimates of R&D returns. Economy-wide R&D expenditure data were extracted from the World Bank's World Development Indicators (indicator GB.XPD.RSDV.GD.ZS) via the Bank's open API. The dataset covers more than 150 countries from 1990 to 2023 and measures gross domestic R&D spending as a percentage of GDP. To examine cross-country patterns, we calculated simple arithmetic averages of R&D intensity for all countries and for World Bank income groups (high, upper-middle, lower-middle, and low). We recognise that a weighted average (based on GDP) would better reflect global spending patterns; however, GDP weights were unavailable for all years, and simple averages nonetheless offer insights into relative differences across groups.

Budget figures for the World Bank and IMF were obtained from official press releases and publications for fiscal year 2025 (Ref.7) (Ref.5). ADB budget data were drawn from the MOPAN 2025 assessment, which reports internal administrative budgets for 2019–2024 and explains drivers of budget growth (Ref.2). AfDB budget projections (2024–2026) were obtained from the Bank's work programme and budget document and converted from Units of Account to U.S. dollars using the 2023 conversion rate of 1 UA = USD 1.33367 (Ref.1).

Qualitative evidence on the returns to research comes from peer-reviewed studies and authoritative reports. Fieldhouse and Mertens (2025) provide estimates of social returns to

public R&D; the Harvard Gazette reports multiplier effects of NIH funding; and WIPO’s Global Innovation Tracker and year-end update supply context on global R&D trends.

Results

This section presents empirical results on R&D expenditure patterns, institutional budgets and estimated returns to research. Figures are numbered sequentially, titled and accompanied by brief discussions.

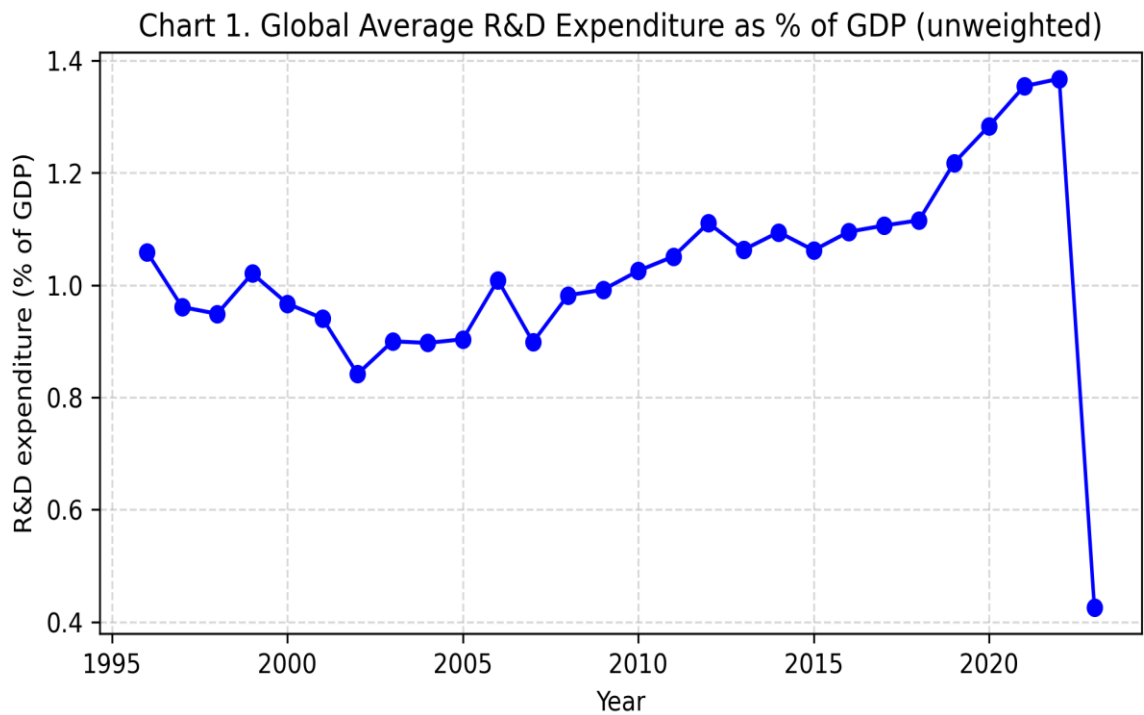


Chart 1. Global average R&D expenditure as a percentage of GDP (unweighted). This line chart shows the simple average of national R&D intensity across all countries from 1996 to 2023. The global average fluctuated around 1 percent of GDP in the 1990s, dipped below 1 percent in the early 2000s and remained between 0.6 percent and 0.8 percent thereafter.

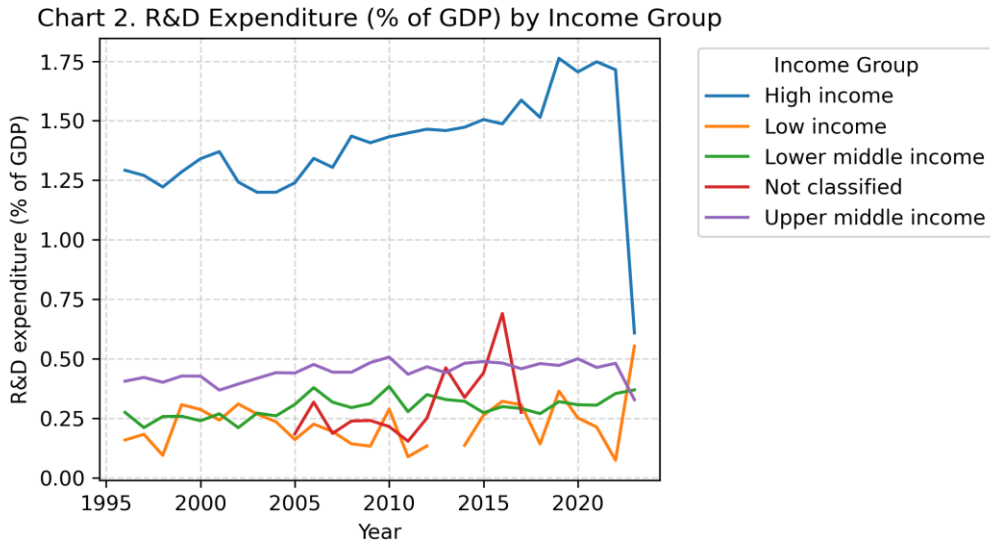


Chart 2. R&D expenditure (% of GDP) by income group. High-income economies consistently invest more than 0.6 percent of GDP in R&D, whereas lower-middle-income and upper-middle-income groups spend around 0.37 percent and 0.33 percent, respectively. Low-income countries invest approximately 0.55 percent on average.

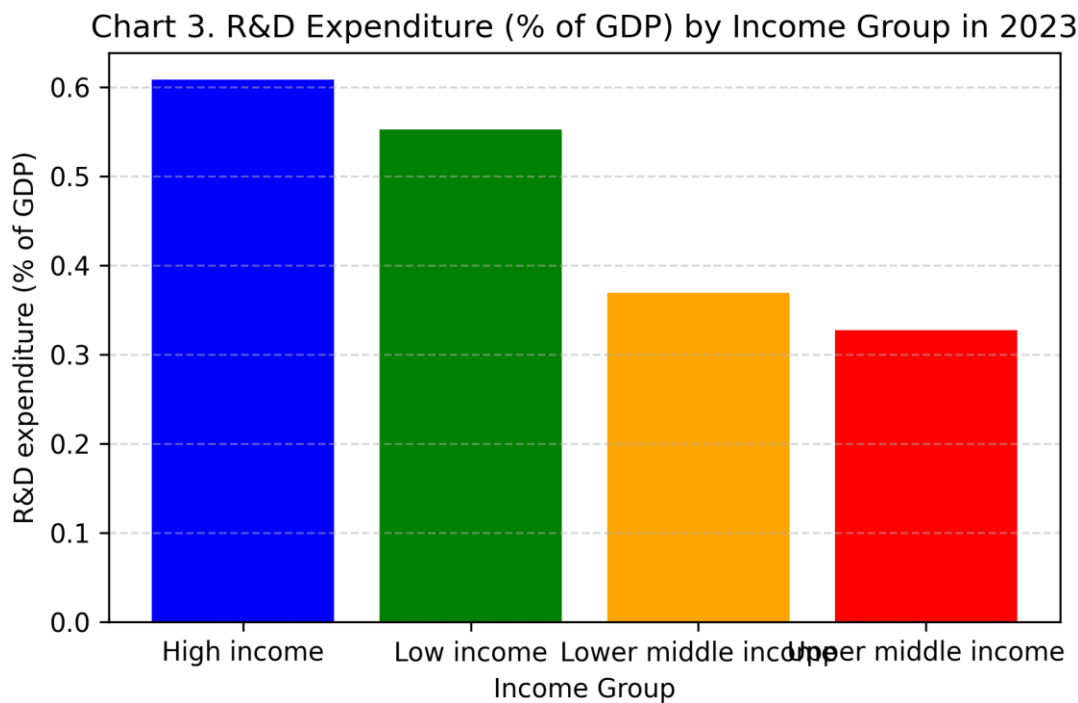


Chart 3. R&D intensity by income group in 2023. High-income countries spent about 0.61 percent of GDP on R&D in 2023, nearly twice the level of upper-middle-income economies and more than the global average.

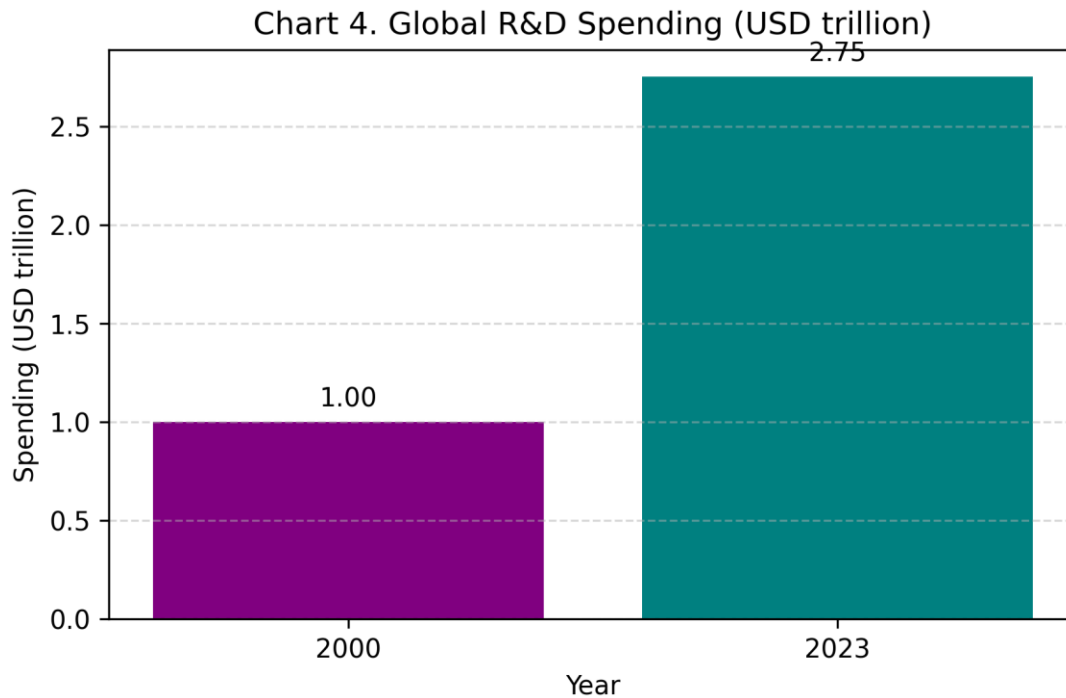


Chart 4. Global R&D spending in 2000 vs 2023. Real global R&D expenditure increased from roughly USD 1 trillion in 2000 to over USD 2.75 trillion in 2023, indicating a substantial expansion despite economic crises.

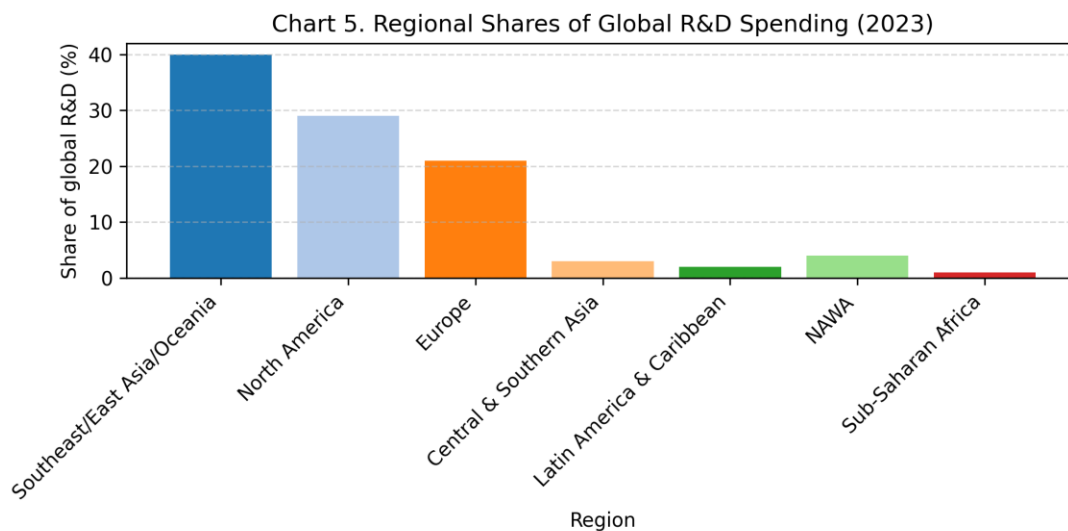


Chart 5. Regional shares of global R&D spending in 2023. Southeast/East Asia and Oceania account for about 40 percent of global R&D, North America for 29 percent and Europe for 21 percent. Other regions – Central & Southern Asia, Latin America & Caribbean, Northern Africa & Western Asia and Sub-Saharan Africa – collectively account for the remaining share.

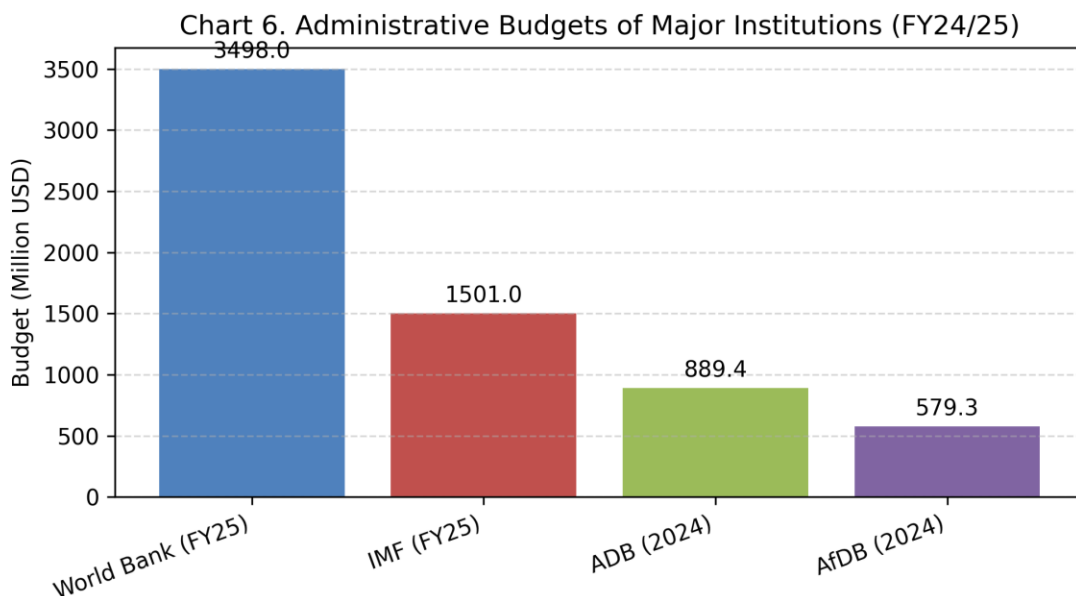


Chart 6. Administrative budgets of major international financial institutions (FY24/25). The World Bank's FY25 administrative budget is USD 3.498 billion (Ref.7), the IMF's is USD 1.501 billion (Ref.5), the ADB's internal administrative budget for 2024 is USD 889 million (Ref.2), and the AfDB's 2024 budget converts to approximately USD 579 million (Ref.1).

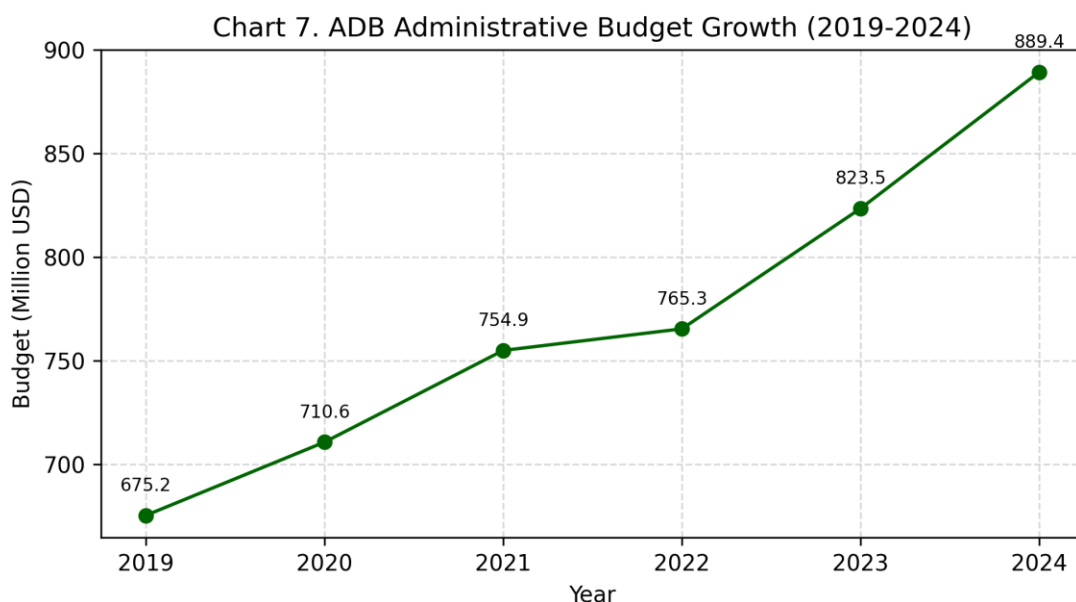


Chart 7. ADB administrative budget growth, 2019–2024. The ADB's internal administrative budget grew from USD 675 million in 2019 to USD 889 million in 2024, reflecting an average annual growth rate of about 6.3 percent (Ref.2).

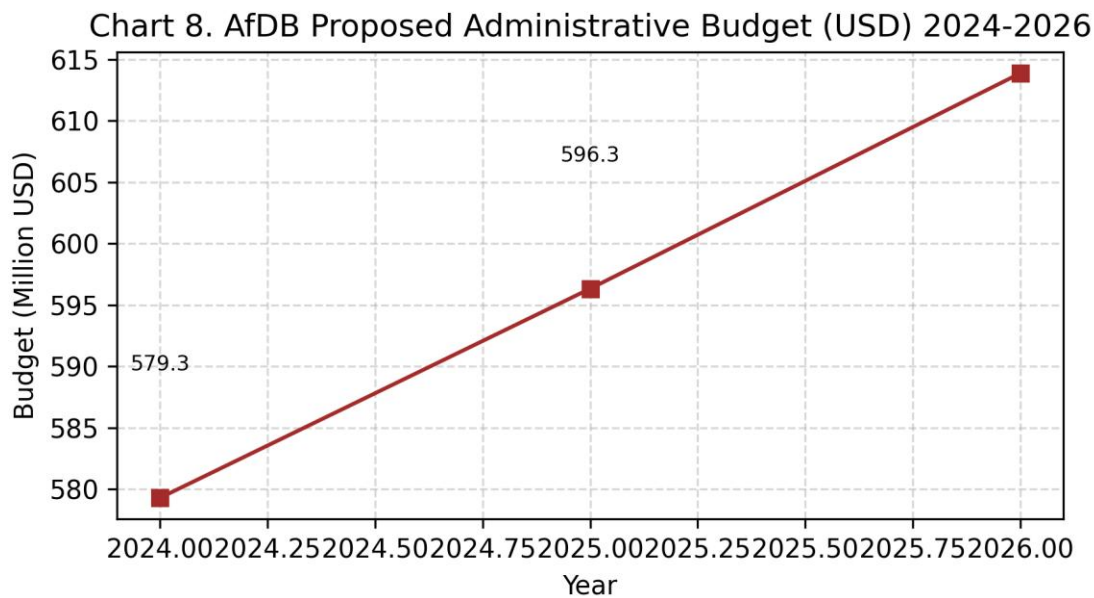


Chart 8. AfDB proposed administrative budget, 2024–2026. Converting Units of Account to U.S. dollars (1 UA \approx USD 1.33367 (Ref.1)) yields projected budgets of roughly USD 579 million in 2024, USD 597 million in 2025 and USD 615 million in 2026.

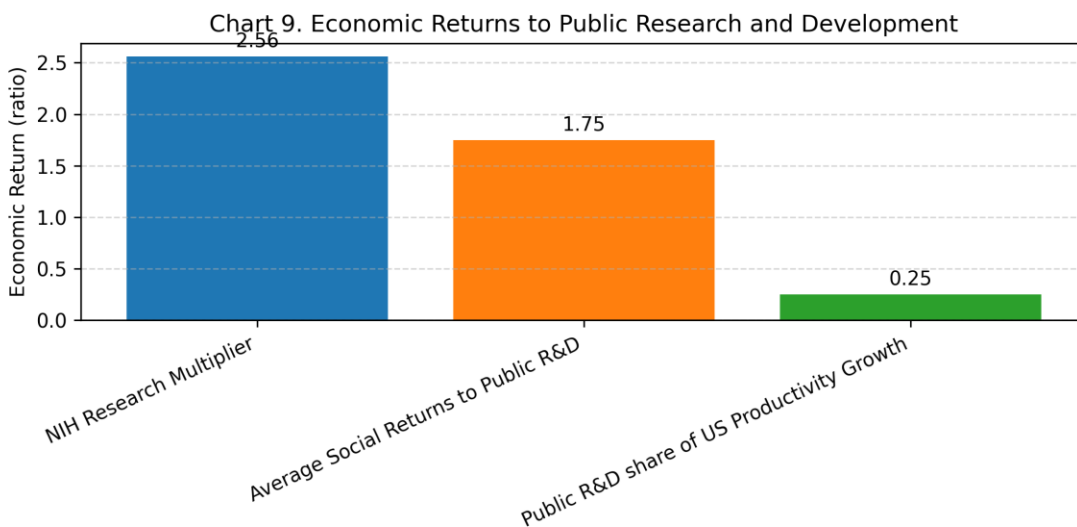


Chart 9. Economic returns to public research and development. NIH-funded research generates an estimated USD 2.56 in economic activity for every dollar invested (Ref.9). Fieldhouse and Mertens (2025) report average social returns to public R&D of about 175 percent, while public R&D contributes roughly 25 percent to U.S. productivity growth.

Discussion and Policy Implications

The results underscore the importance of research investment as a catalyst for economic growth and development. Global R&D intensity has remained relatively low in absolute terms, with the simple average hovering below 1 percent of GDP. However, the distribution across income groups reveals pronounced disparities: high-income economies invest roughly twice as much (relative to GDP) as middle-income countries and far more than low-income countries. This gap suggests that developing countries face significant barriers—such as limited fiscal space, weak innovation systems and brain drain—that constrain their ability to undertake research.

From a regional perspective, Asia's ascent as the world's largest R&D spender highlights the effectiveness of sustained industrial and innovation policies. China, Japan, the Republic of Korea and Southeast Asian economies collectively account for about 40 percent of global R&D. North America and Europe still contribute sizable shares, but their relative decline reflects slower growth and, in some cases, policy uncertainty around R&D funding.

Multilateral development banks and international financial institutions play a pivotal role in generating and disseminating knowledge. Although their administrative budgets appear modest relative to their total portfolios, these resources finance research departments, data collection, policy analyses and technical assistance. Charts 6–8 reveal that the World Bank and IMF operate with annual administrative budgets of USD 3.5 billion and USD 1.5 billion respectively, whereas the ADB and AfDB budgets are below USD 1 billion. Given the high social returns to public research and the multiplier effects documented in the literature, there is a strong case for protecting and potentially expanding these budgets.

International development institutions can enhance the impact of research spending by prioritising cross-country knowledge exchanges, supporting local research capacity in developing countries and leveraging digital platforms to disseminate data and analysis widely. Investments in research on climate change, health, digital technologies and social protection are particularly important for achieving the Sustainable Development Goals. Moreover, development banks should coordinate more closely with national governments to ensure that public research investments are aligned with long-term productivity growth and inclusive development.

Limitations

This study has several limitations. First, the R&D expenditure data from the World Bank are incomplete for some countries and years; our reliance on simple averages may obscure the influence of large economies with high R&D intensity. Future research could incorporate GDP-weighted averages or national R&D volumes to better reflect global spending patterns. Second, budget figures for multilateral institutions are reported in different currencies and

fiscal years; despite converting Units of Account to U.S. dollars, variations in exchange rates and accounting practices may affect comparability. Third, while the literature provides compelling evidence of high social returns to public R&D, most studies focus on advanced economies. Little empirical evidence exists on the returns to research spending in developing countries or within multilateral development banks. Finally, the charts presented here do not establish causality. Instead, they offer descriptive insights that should be complemented by econometric analysis or case studies in future work.

Conclusion

Research is both a vehicle for knowledge creation and a driver of economic prosperity. The global expansion of R&D spending since 2000 demonstrates that countries increasingly recognise the importance of innovation for competitiveness and development. At the same time, persistent disparities across income groups and regions reveal structural challenges that impede R&D investment in developing economies.

Empirical evidence reviewed in this paper shows that public research yields substantial social returns, far exceeding private returns, and generates significant multiplier effects in terms of economic activity, job creation and productivity growth (Ref.9). Yet public R&D remains underfunded relative to its potential benefits. International development and finance institutions occupy a unique position in this landscape. By financing research, producing knowledge products and fostering international collaboration, they can catalyse innovation and disseminate best practices. Sustained investment in research—both at national and multilateral levels—is essential for tackling global challenges such as climate change, pandemics and inequality.

Policy reforms should aim to increase public R&D budgets, protect research funding during fiscal consolidations and support the participation of developing countries in global knowledge networks. In doing so, the global community can unlock the full potential of research as a generator of knowledge, economic growth and shared prosperity.

References

1. African Development Bank (AfDB) (2024) *Annual Development Effectiveness Review 2024 – Executive Summary*. AfDB. Conversion rate of 1 UA = 1.33367 USD noted on p. 72 (Ref.1).
2. Asian Development Bank (ADB) (2025) *MOPAN 2025 Assessment: Institutional Analysis*. Table 4 reports internal administrative budgets for 2019–2024 (Ref.2).
3. Fieldhouse, A. J. and Mertens, K. (2025) *The Social Returns to Public R&D*. Federal Reserve Bank of Dallas Working Paper 2519. Social returns estimated at 140–210 percent (Ref.3).
4. Harvard Gazette (2025) “NIH Research Funding Generates USD 2.56 in Economic Activity for Each Dollar Spent.” March 2025 (Ref.9).
5. Information Technology & Innovation Foundation (ITIF) (2025) *How Reducing Federal R&D Reduces GDP Growth*. Washington, DC (Ref.4).
6. International Monetary Fund (2024) “IMF Executive Board Approves FY25–FY27 Medium-Term Budget.” Press release, 9 May 2024 (Ref.5).
7. Our World in Data (2025) “Research & Development Spending as a Share of GDP.” Data retrieved from World Bank/UNESCO dataset (Ref.6).
8. World Bank (2024) “FY25 Budget: Board Approves USD 3.498 Billion for Operational Priorities and Inflation.” 1818 Society blog post (Ref.7).
9. World Intellectual Property Organization (WIPO) (2024) “End-of-Year Edition – Against All Odds, Global R&D Has Grown Close to USD 3 Trillion in 2023.” Global Innovation Index blog (Ref.8).
10. World Intellectual Property Organization (WIPO) (2025) *Global Innovation Tracker 2025*. The tracker reports that global R&D growth slowed to 2.9 percent in 2024 and is projected at 2.3 percent in 2025 (Ref.10).