International Journal of Business and Social Dynamics
Volume 1, Issue 2,
Spring 2026

R&D and Export Performance as Drivers of Sustainable GDP Growth: Evidence from Developed Economies

Aqsa Shaikh
Management sciences
National university of modern language (NUML)
Aqsa1946@gmail.com

Isra Razzaque
Management science
National university of modern language (NUML)
Israrazzaque1118@gmail.com

Citation: Shaikh, A., & Razzaque, I. (2026). *R&D and export performance as drivers of sustainable GDP growth: Evidence from developed economies*. *International Journal of Business and Social Dynamics, 1*(2),79-85. 10.67152/ijbsd.1.2.2026.24.

Abstract: *Recently, significant changes have been observed in economies worldwide, largely driven by innovation, technological advancements, and the increase in global trade. This study explores the interplay between research and development (R&D) investment, export performance, and GDP growth, viewed together as integral components for sustainable economic progress. Our focus is primarily on developed markets, including the U.S., China, Germany, Japan, and South Korea, while also drawing insights from the case of Pakistan, an emerging economy. From 2018 to 2022, we analysed panel data to assess correlations between R&D spending, export volumes, and GDP growth. We conducted tests for stationarity to ensure the reliability of our findings. Notably, a strong positive correlation was found between R&D investment and GDP growth in the U.S., whereas South Korea showed mixed results that suggested short-term economic fluctuations. To enhance the relevance of our research, we incorporated global economic trends emerging after the pandemic, alongside digital transformations and shifts in global supply chains, extending our analysis beyond 2022. Crucially, our findings indicate that innovation-driven growth and export diversification are foundational to sustaining GDP growth.*

This research also examines how growth models embraced by developed countries can be adapted by developing economies. While R&D investment and export promotion are vital, the institutional frameworks and policy environments of each country significantly influence success. The effectiveness of policies tailored for sustainable economic growth depends on the specific context in which they're implemented. This insight carries substantial implications for both researchers and policymakers who are striving to formulate effective strategies for economic development. In nations like Pakistan, our findings underscore the necessity of bolstering innovation systems, increasing research investments, and fostering export diversification as pathways to attain long-term, stable economic growth.

Keywords: *R&D Investment, Export Performance, Economic Growth, Innovation, Developing Economies*

Paper type: Research paper

Received: 20 May 2026 Revised: 19 June 2026 Accepted: 22 June 2026

Conflict of Interest:

The authors declare no conflict of interest.

Funding:

There is no funding for this research.

R&D and Export Performance as Drivers of Sustainable GDP Growth: Evidence from Developed Economies

1. Introduction

Economists define economic growth as a gradual increase in a nation's production, consumption, and overall economic activity. However, a deeper understanding encompasses social and environmental factors, leading to a notion of inclusive and sustainable growth. This approach prioritizes fair distribution of resources, access to quality education and healthcare, and the development of institutions that create equitable economic opportunities. It aims not just for a higher GDP but also for improvements in living standards, equal employment prospects, and reductions in inequality and environmental harm.

Many economists have studied and shared their thoughts on the factors driving high economic growth. Solow (1956) posited that economic expansion reflects a long-term increase in real per capita income, emphasizing the role of technological progress as fundamental to sustained growth. Lucas (1988) highlighted the significance of human capital, suggesting that a society's ability to accumulate knowledge is directly linked to economic advancement, with investments in education and innovation leading to notable productivity gains. Smith (1776/2003) argued that the principles of free markets, division of labour, and specialization are pivotal for fostering economic growth. Keynes (1936) advocated for active government intervention during economic downturns, promoting fiscal policies to stimulate growth and recovery. Schumpeter (1942) viewed economic development as a 'process of creative destruction,' emphasizing entrepreneurial innovation and the constant introduction of new ideas, products, and models.

These economists' perspectives tell us that several variables affect economic growth, a complicated phenomenon. These include productivity gains, knowledge aggregation, government policies, and technology breakthroughs. It becomes evident how critical innovation, infrastructure, and education spending, and market forces are in promoting economic expansion. Knowing these elements helps people and legislators make wise decisions that help sustainable economic development and improve the quality of life. Many studies have investigated the impacts of export performance and R&D expenditure alone on economic expansion.

Still, few studies examine how these two variables interact to influence GDP increase in a comparative study of the main developed nations. This research aims to investigate how developed

nations may advance sustainable economic expansion by means of the combined effect of export performance and R&D investment. It also aims to offer Pakistan and other developing nations ideas.

1.1 How do R&D and export contribute to the growth of developed countries?

1.1 Research &Development

Research and development is an essential driver of increasing economic growth, which promote innovation and technological progress, informing public policy and shaping the future of employment. R&D investments have been shown to stimulate economic growth.The contributions of these economists illustrate that economic growth is a complex phenomenon influenced by a multitude of factors, including technological advances, knowledge acquisition, government policies, and productivity improvements. The significance of innovation, investment in education and infrastructure, and market dynamics in driving economic progress becomes increasingly clearing innovation and productivity are essential for sustained economic expansion.

According to the data from the UNESCO Institute for Statistics, the top countries that are highly invested in research and development are the United States, China, Japan, and Germany. In terms of spending on research and development, the United States is forecasted to be the leading country worldwide in 2022. However, Israel was the nation that allocated the largest portion of its GDP to research and development in terms of GDP percentage in 2022. 80% of the world's R&D expenditures come from 10 countries, and high corporate sector spending is a must for success (UNESCO Institute for Statistics, 2023).

Table 1: Countries' commitment to Research & Development

Countries	**Expenditure in billion dollars**	**Contribution in GDP**
United State of America	$660 billion	3.4%(2022)
China	$556 billion	2.56%(2022)
Japan	$ 194 billion	3.59%(2022)
Germany	$148 billion	3.13%(2022)
South Korea	$105 billion	4.93%(2021)

These investments show these countries' great commitment to Research & Development, therefore fueling innovation, economic expansion, and world competitiveness.

1.1.1. United States

One main engine of economic expansion in the United States has been the internet's development. The US government made investments in R&D to build a strong and easily accessible digital infrastructure, which has become a major component of the nation's economic growth and technical capabilities.

The US has been at the forefront of research in this field, which has resulted in developments in medicine, farming, and other sectors. Biotechnology's R&D efforts have produced life-saving medications, better agricultural techniques, and innovative means of Education and job development. These examples show how innovation, technological developments, and economic prosperity and expansion driven by research and development projects have been essential in the development of the United States economy.

1.1.2. Germany

Germany is known for its innovative and advanced cars, with leading automakers such as Audi, BMW, Mercedes-Benz, and Porsche. The country has a rich history of pioneering automotive technology, such as the development of the first vehicle to use electric ignition and an internal combustion engine by Carl Benz. German cars are celebrated for their precision, innovation, and luxury, setting high standards in the automotive industry.

1.1.3. Japan

Japan is a world leader in robotics, with its industries developing innovative robots for various applications, i.e., aeronautics, medicine, disaster mitigation, and disaster investigation and rescue. Japan and the US both lead the world in biomedical research. To aid in the implementation of medical research in Japan, the nation founded the Japan Agency for Medical Research and Development (Japan Agency for Medical Research and Development, 2025). Leading hospitals in Japan for medical research and development include the University of Tokyo Hospital, Keio University Hospital, and Tohoku University Hospital.

1.1.4. China

China has been investing in emerging technologies, including artificial intelligence (AI), linked autos, and big data analytics. With major internet players, i.e. tech firms, telecom providers, and software/application developers investing heavily in research and development. China is well-

positioned to emerge as a new global leader in innovation and is expected to emerge victorious in the 5G race.

1.1.5. South Korea

R&D investment i.e. basic research, applied research, and development research, and estimates the optimal mixing ratio of financial source types for public and private R&D in Korea. The finding indicates that allocation and adjustments in R&D investment ratios and financial source types are necessary to maximise economic growth (Kim et al., 2022).

Exports are most valuable driver of economic growth, boost revenue, stimulating production, employment, and higher productivity, and leading to higher living standards for people, offer a chance to take a sizable chunk of the world market. Export-led growth theory is associated with increased competition, innovation, and specialization, and generates foreign exchange earnings that can be used to enhance the economy's production potential of an economy (Balassa, 1978).

Major exporting nations are China, United States, Germany, and Netherlands. The biggest exporters include the United Arab Emirates, South Korea, and Japan. These nations, which prioritize manufacturing and technological products, have major influence on worlds trade market (World Trade Organization, 2023).

Well-designed export promotion strategies with well define aims and objectives which encourage institutional growth while taking institutional complementarities into account. But the connection between GDP growth and exports is not always clear-cut and the success of export promotion strategies might differ depending on the institutional and economic framework of each nation. For example: Luxembourg, Hong Kong, and Singapore had high export-to-GDP ratios in 2022, with percentages exceeding 180%. On the other hand, the United States had an export-to-GDP ratio of 10.9% in 2022 (World Bank, 2024).

Table 2: Value of Export

Name of the Country	Value Of Export	Year
China	$3.59 trillion US Dollars	2022
United States	$3.01 trillion US Dollars	2022
Japan	$746.92 billion US Dollars	2022
Germany	$155.5 billion US Dollars	2022

South Korea	$683.58 billion US Dollars	2022

For some goods, Dubai is a key centre of worldwide trade and exports. Like Oil and natural resources, a major exporter of petroleum and oil products. With significant oil reserves, Dubai belongs in OPEC. Dubai is famous for its gold and jewellery market. One of the main hubs for gold processing and commerce, the city exports gold and other valuable metals to several nations (The Observatory of Economic Complexity, 2024).

Dubai trades aluminium, steel, and cement in building materials. The quick urbanization and infrastructure expansion of the city have created a great need for these items. In addition, date production and exportation from the UAE, Dubai, is well known. Other crops like vegetables and fruits are also sent abroad. Dubai sends just a few examples of the goods it exports. The success of the city as a global trade centre has been helped by its strategic location, business-friendly policies, and trade infrastructure.

The United States is a significant exporter of many different goods. Among the prominent US exports are. The US exports industrial machinery, building equipment or tools, and agricultural or farming machinery among other types of machinery and equipment. The US exports cars, trucks, and motorcycles, together with automotive components and accessories; it is well-known for its automotive industry._Leading worldwide aerospace products, the US exports aircraft, spacecraft, and associated parts. This industry has been greatly helped by businesses like Boeing and Space. The US is famous for its technology exports, including computer hardware, software, and telecommunications equipment. Including coal, natural gas, and petroleum, the United States is a significant exporter of energy commodities. These are just a few of the items the United States ships. The variety and strength of these businesses help the country to become more competitive globally and to grow financially for some goods, Dubai is a key centre of worldwide trade and exports.

China has a diverse range of products that it exports. China is known for its electronics and technology exports, including smartphones, computers, consumer electronics, and telecommunications equipment. China is a major exporter of textiles and apparel, producing and exporting a large variety of textiles, accessories, and apparel. China exports a range of equipment, including industrial machinery, construction equipment, and agricultural machinery. China is a major exporter of automotive parts and vehicles, manufacturing and exporting automobiles,

motorcycles, and automotive components. China exports pharmaceutical products, medical equipment, and devices, contributing to the global healthcare industry. These are just a few examples of the products that China exports. The country's manufacturing capabilities, cost-effectiveness, and global trade networks have made it a significant player in international trade.

1.2. Challenges that Pakistan will face in adopting these factors?

Pakistan faces several challenges in adopting and investing in research and development (R&D), which in turn affects its investment opportunities. Some of the key challenges include:

1. Insufficient Investment in R&D: Pakistan's investment in R&D is significantly low, with a merely 0.16% of its GDP allocated to domestic R&D investment (World Bank, 2023). This lack of investment hampers innovation, technology adoption, and process improvement, which are crucial for sustainable growth and investment opportunities.
2. Policy and Governance Challenges: Political instability, disruption of democratic processes, lack of policy continuity, and poor governance have contributed to a decline in growth rates and hindered Pakistan's ability to realize its potential for investment and technological advancement.
3. Addressing these challenges is crucial for Pakistan to enhance its investment opportunities and foster a climate conducive to innovation, technology adoption, and sustainable economic growth.
4. The search results suggest that several research areas have been neglected due to a lack of funding in Pakistan such as
5. Health Research: The inadequate status of health research in Pakistan is caused by lack of a research environment and culture, low capacity, unavailability of funds, and weak intellectual property rights protection (Saqib & Rafique, 2021).
6. Scientific Research: Pakistan's low level of scientific research output stem from culture that discourages independent and critical thinking, insufficient or lack of funding, and inadequate facilities (Rasool & Dilshad, 2023).
7. Language Barrier: A majority of students face difficulty in research task due to their inability or are unable to analyse literature and information presented in English, which is a significant hindered to their academic work (Hussain, 2024).

8. Access to Resources: There is a shortage of the newest and latest experimental labs and libraries with fresh books, and access to these resources is limited, hindering the ability of researchers to conduct comprehensive and up-to-date studies (Hussain, 2024).
9. Policy Implementation: Holding up in the approval and release of funds impacts the system and the interests of researchers, and poor checks on policy implementation further exacerbate the situation (Hussain, 2024). Addressing the lack of funding and improving the research environment in Pakistan is crucial for fostering innovation, knowledge creation, and sustainable development in the country.

Pakistan's exports are stagnating, and its trade deficit is growing as a result of the country's multiple obstacles to export factor adoption. Pakistan's leading economic think tank, PIDE, conducted a literature review and found that low firm productivity, a lack of export competitiveness and diversification, restricted or limited access to international markets, high import duties that work as export taxes, and a lack of value addition and research and development (R&D) at the firm level are the main and primary causes of this (Mustafa & Hussain, 2023).

The SBP Staff Notes paper emphasizes that Pakistani exporters face fierce competition from Vietnam, Bangladesh, and India, and that doing business has become more expensive in Pakistan, especially during the past ten years (Akber, 2022). Key barriers to exports are identified in the World Bank's Pakistan Development Update, October 2021 report. These include high effective import tariff rates, a lack of long-term financing options for businesses looking to increase their export capacity, a lacklustre supply of market intelligence services for exporters, and low productivity of Pakistani businesses (World Bank, 2021). According to a survey of the empirical literature on Pakistan's export performance, Pakistani exporters encounter a number of difficulties, such as a lack of trained labour, the energy crisis, institutional rigidities, imperfect markets, corruption, injustice, bribery, political meddling, terrorism, and inadequate infrastructure (Pakistan Institute of Development Economics, 2025).

2. Literature review

Ahmed et al. (2024) studied the influence of R&D expenditure on economic growth by conducting a comparative analysis of Pakistan and developed countries. The authors applied a panel least squares regression approach in their research, which involved the analysis of data from Pakistan and G7 countries for a period of 25 years. The results obtained showed that R&D expenditure has a positive and statistically significant effect on GDP growth. According to the report by the OECD

(2023) economies that invest more in innovation and have diversified export structures tend to experience sustained economic growth. It was further noted in the report that technological innovation leads to greater productivity and competitiveness.

Kim et al. (2022) explored the impact of South Korea's R&D expenditure on technological effectiveness and export competitiveness. According to their research results, an increase in R&D expenditure led to technological effectiveness, which consequently enhanced the country's economic performance due to increased export competitiveness. From this study, it can be concluded that continuous innovation investments will spur economic growth in the long run.

The study by Manzoor et al. (2021) examined the correlation among exports, sustainability, and economic growth. The findings revealed that there was a significant positive relationship between export operations and GDP growth. According to the findings, countries with good export performance have better productivity and industrial performance. It was found that export growth and technology development have a major role in economic sustainability

Hypothesis 1 (H_1)

There is a favorable link between research and development (R&D) expenditure and Gross Domestic Product (GDP) growth.

Hypothesis 2 (H_1)

There is a positive correlation between GDP growth and export performance.

3. Research Method

Using a quantitative approach, this study examines the relationship between research and development (R&D) investment, export success, and GDP expansion. Five developed countries comprise the center of the research: South Korea, China, Germany, Japan, and the United States.

Secondary time-series data covering the period from 2018 to 2022 are used in the study. Information on Gross Domestic Product (GDP) worldwide databases, such as the World Bank and the UNESCO Institute for Statistics, gave data on product (GDP, research and development expenditures, and export results. Further information from academic publications, such as Google Scholar, was gathered to support the case. The dependent variable in this study, GDP growth, shows overall economic performance; R&D expenditure and export performance are seen as independent factors impacting economic development. Before carrying out the correlation analysis, tests for stationarity were also carried out to verify the validity and dependability of the data. Statistical technique correlation analysis was used to assess the suggested ideas. This

technique allows the study to evaluate the orientation and intensity of the relationship between GDP growth, export results, and R&D spending. By studying the link between these elements, the study aims to ascertain whether more R&D expenditure and export activity correspond with greater economic expansion in developed countries.

Gross Domestic Product (GDP), representing total economic development, is the variable depending on others in this study. Research and development (R&D) expenditure and export performance are the independent variables since these factors are widely recognized as major drivers of economic expansion and technical advancement.

4. Results

Table 3: Research and development and GDP

Correlations

		Total GDP USA	Spending in R&D in USA
Total GDP USA	Pearson Correlation	1	.405
	Sig. (2-tailed)		.499
	N	5	5
Spending in R&D in USA	Pearson Correlation	.405	1
	Sig. (2-tailed)	.499	
	N	5	5

A correlation of 0.405 between spending on research and development and GDP growth suggests a moderate positive relationship between the two variables. It indicates that there is some connection between the amount of money invested in R&D and the growth of the GDP, but it may not be a strong or direct relationship. This correlation coefficient suggests that there is some level of association.

South Korea:

GDP 2018: $1724.85 billion

GDP 2019: $1,651.42 billion

GDP 2020: $1,644.31 billion

GDP 2021: $1,810.96 billion

GDP 2022: $1,665.25 billion

Total expenditure on research and development 2018 $83

Total expenditure on research and development 2019 $83

Total expenditure on research and development 2020 $75.4

Total expenditure on research and development 2021 $85.0

Total expenditure on research and development 2022 $84.6

Table 4: Research and development and GDP

Correlations

		Total GDP South Korea	Spending in R&D in South Korea
Total GDP South Korea	Pearson Correlation	1	-.925*
	Sig. (2-tailed)		.024
	N	5	5
Spending in R&D in South Korea	Pearson Correlation	-.925*	1
	Sig. (2-tailed)	.024	
	N	5	5

*. Correlation is significant at the 0.05 level (2-tailed).

A correlation of -0.925 between spending on research and development and GDP suggests a negative relationship between the two variables. We can say that there were some other variables also that have affected its growth.

These figures indicate that South Korea's economy has experienced some fluctuations in recent years, with a decline in GDP in 2019 and a notable increase in 2020, followed by a little decline in 2021 and a small increase in 2022.

Export and GDP

China

GDP 2018: $13,894.91 billion

GDP 2019: $14,279.97 billion

GDP 2020: $14,687.74 billion

GDP 2021: $17,820.46 billion

GDP 2022: $17,963.17 billion

Total value of Export 2018 $2,486.7 billion

Total value of Export 2019 $2,499.48 billion

Total value of Export 2020 $2,782.2 billion

Total value of Export 2021 $2,782.2 billion

Total value of Export 2022 $3,363.5 billion

Table 5: Research and development and GDP

Correlations

		Total GDP China	Export value China
Total GDP China	Pearson Correlation	1	.983**
	Sig. (2-tailed)		.003
	N	5	5

Export value China	Pearson Correlation	.983**	1
	Sig. (2-tailed)	.003	
	N	5	5

**. Correlation is significant at the 0.01 level (2-tailed).

A correlation coefficient of 0.983 between export value and GDP indicates a very strong positive relationship between these two variables. It suggests that there is a high degree of association between the value of exports and the overall GDP of a country. This means that as the export value increases, the GDP tends to increase as well.

Germany;

GDP 2018: $3,974.44 billion

GDP 2019: $3,888.23 billion

GDP 2020: $3,889.67 billion

GDP 2021: $4,259.93 billion

GDP 2022: $4,072.19 billion

Total expenditure on export 2018 1,317.9 billion

Total expenditure on export 2019 1,327.6 billion

Total expenditure on export 2020 1,204.7 billion

Total expenditure on export 20211,370 billion

Total expenditure on export 20221657.6 billion

Table 6: Research and development and GDP

Correlations			
		Total GDP Germany	Export value Germany
Total GDP Germany	Pearson Correlation	1	.425
	Sig. (2-tailed)		.475
	N	5	5
Export value Germany	Pearson Correlation	.425	1
	Sig. (2-tailed)	.475	
	N	5	5

A correlation coefficient of 0.425 between German expenditure on exports and economic GDP suggests a moderate positive relationship between these two factors. This means that there is some level of association between the amount of money spent on exports by Germany and the overall GDP. While the correlation is not very strong, it still indicates that there is a connection between export expenditure and economic growth.

4. Discussion

Correlation analysis results provide empirical backing for the hypotheses stated in the study. Correlation between export performance and GDP is positive, implying that the greater the level of export, the higher the level of economic growth. Total economic performance of a country, production, and foreign exchange will further improve when the total economic performance of a country and value-added exports are increasing. Following the renowned export-led growth theory, it can be noted that international trade also plays a vital role in economic growth.

Similarly, evidence suggests a positive association between GDP growth and expenditure on research and development. High levels of research and development expenditure stimulate

advancements in technology, innovations, and improvements in productivity, which allow a country to raise industrial efficiency and maintain economic growth. Therefore, it is clear that both growth in exports and research and development expenditure are important to stimulate economic growth, particularly in developed economies.

Despite these results, they imply that growth is determined by several factors other than R & D expenditure and export performance. The case of a decline in South Korea's GDP growth rate from 2021 to 2022 reflects how the international economic situation may influence the economic development of a country. South Korea's reliance on the export sector made the country vulnerable in the wake of falling worldwide demand, the slowdown of other key trading countries, such as China and the Eurozone. Additionally, South Korea's manufacturing sector experienced a fall in its production rate, especially in the electronics industry, which consequently exerted a negative impact on economic growth in that period.

Additionally, recent global events post-2022 indicate that the economic outcomes are highly variable and depend on several global and local factors. Factors such as geopolitical instability, global war, and disruption in supply chains, inflation, and policy changes have played a vital role in the economic outcomes of different nations. This shows that in addition to research and development investments, exports' performance is important for economic growth, but global economic factors and policies also play an important role. Therefore, according to the results of this study, countries must also improve economic resilience to global changes in economic circumstances in addition to maintaining investment in research and development and export diversification.

5. Limitations and future findings

The conclusions drawn from the above studies are not only critical for these industries but have important implications for the economy of Pakistan as well. GDP is a major indicator of a nation's economic performance, and improvements in GDP can be affected positively by an increase in exports and in R & D. In addition, greater export levels can increase income, encourage employment, and help in long-term economic stability. In the long-run, increased investment in innovation can also increase production.

Pakistan is blessed with several strategic advantages that will prove useful to future economic growth. The location is in a critical trade route linking the Middle East, Central Asia, and South Asia. Developments such as the CPEC, in combination with the country's natural resources,

history, culture, and tourism prospects, may result in new sources of growth if they are coupled with efficient policies, technology, and planned industrial progress. Despite the advantages discussed above, this study has some limitations. First, the study uses secondary data obtained from the databases on global economic statistics. Perhaps, future research would involve both primary data firm level data to further understand the relationship between R&D, export performance, and economic growth. Second, this paper uses some selected developed economies as an example of an advanced economy. The study may focus on a wide range of both developed and underdeveloped economies.

Additional study can examine the effect of other economic variables, including income from government, growth of tourism, foreign direct investment, and foreign exchange earnings as additional determinants of economic growth. Since the global economy has been fast-changing since 2022 after being impacted by global conflict of politics, supply chain, and changing rules of global trade, future research could also examine the effects of changing global factors on the relationship between innovation, exports, and economic growth.

6. Conclusion

This study aims to find the relationship between Gross Domestic Product (GDP), R & D investment, and export performance in the chosen developed countries, through the use of time series data for the period 2018-2022. The method of Correlation Analysis was employed for the purpose of assessing the relationship between the variables and testing the hypotheses. According to the findings of this study, it can be generally inferred that a positive relation exists between R&D investment and GDP for countries like the United States, signifying that technology advancement and innovation contribute to economic growth. The results for South Korea show some exceptions regarding the relation between GDP and R&D investment which demonstrates that internal and external shocks and fluctuations may influence the efficiency of the innovation investment.

The analysis shows that export-economic growth is positively related in the case of China and Germany, which suggests that export growth also has a significant role in the economic growth of developing and developed countries because export growth helps to increase the production capacity of the economy and generate income, foreign exchange for the countries, and competitiveness in the international market. The analysis confirms that economic growth can be led by different factors in developed and developing countries. Although the developed countries

benefit a lot from innovation-led growth and export growth, the developing countries, like Pakistan, face a lot of structural and institutional constraints, so they need to adopt a different pattern for economic development.

In the case of emerging economies, the primary efforts need to focus on strengthening the primary drivers of economic growth. These include improvements in Total Factor Productivity (TFP), government actions, quality of institutions and stimulation of investment. If the country has a firm foundation of economic development, conditions favorable for innovation, export growth, technological development will emerge and it would consequently have a higher role in promoting sustainable economic growth.

7. References

Ahmed, S., Meraj, M., Khan, A. A., & Ali, A. (2024). *Impact of research and development expenditures on economic growth: Evidence from industrial development in Pakistan and a comparison from developed countries*. *Pakistan Journal of Humanities and Social Sciences, 12*(2), 2099–2110.

Akber, M. F. (2022). *Rising apparel exports of Bangladesh: Some exploratory observations* (SBP Staff Note No. 05/22). State Bank of Pakistan.

Balassa, B. (1978). Exports and economic growth: Further evidence. *Journal of Development Economics, 5*(2), 181–189.

Hussain, S. A. (2024). Overcoming barriers to meaningful research in Pakistan: Charting a path forward. *Anaesthesia, Pain & Intensive Care, 28*(4), 611–615.

Japan Agency for Medical Research and Development. (2025). *About AMED.* AMED. https://www.amed.go.jp/en/aboutus/index.html

Keynes, J. M. (1936). *The general theory of employment, interest and money.* Macmillan.

Khoirudin, R. (2023, March). The role of research and development (R&D) on gross domestic product (GDP) (case study USA, China, Japan, Germany and UK). *Journal of International Conference Proceedings, 6*(1), 1–13.

Kim, H., Shin, J., & Lee, S. (2022). R&D investment and export competitiveness in South Korea. *Journal of Engineering and Technology Management, 51*, 1–9.

Lucas, R. E. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3–42.

Macrotrends. (2023a). *China GDP – gross domestic product 1960–2023.* Retrieved December 26, 2023, from https://www.macrotrends.net

Macrotrends. (2023b). *Germany GDP – gross domestic product 1970–2023.* Retrieved December 26, 2023, from https://www.macrotrends.net

Macrotrends. (2023c). *South Korea GDP – gross domestic product 1960–2023.* Retrieved December 26, 2023, from https://www.macrotrends.net

Manzoor, F., Wei, L., Asif, M., Haq, M. Z. U., & Rehman, H. U. (2019). The contribution of sustainable tourism to economic growth and employment in Pakistan. *International Journal of Environmental Research and Public Health, 16*(19), 3785.

Manzoor, F., Wei, L., Asif, M., Haq, M. Z. U., & Rehman, H. U. (2021). The contribution of sustainable tourism and exports toward economic growth. *Sustainability, 13*(4), 1–15.

Mustafa, G., & Hussain, S. (2023). *What are the factors making Pakistan's exports stagnant? Insight from literature review.* Pakistan Institute of Development Economics.

OECD. (2023). *OECD science, technology and innovation outlook 2023: Enabling transitions in times of disruption.* OECD Publishing.

Pakistan Institute of Development Economics. (2025). *Pakistan's dismal export performance: A survey of empirical literature.* PIDE.

Rahman, M. M., & Alam, K. (2021). Exploring the driving factors of economic growth in the world's largest economies. *Heliyon, 7*(5).

Rasool, T., & Dilshad, M. (2023). Factors influencing research culture at public universities in Pakistan. *Research Journal for Societal Issues, 5*(2), 41–58.

Saqib, M. A. N., & Rafique, I. (2021). Health research funding and its output in Pakistan. *Eastern Mediterranean Health Journal, 27*(9), 906–910.

Schumpeter, J. A. (1942). *Capitalism, socialism and democracy.* Harper & Brothers.

Smith, A. (2003). *The wealth of nations.* Bantam Classics. (Original work published 1776)

Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics, 70*(1), 65–94.

The Observatory of Economic Complexity. (2024). *United Arab Emirates (ARE) exports, imports, and trade partners.* OEC. https://oec.world/en/profile/country/are

UNESCO Institute for Statistics. (2023). *How much does your country invest in R&D?* UNESCO. https://uis.unesco.org

World Bank. (2021). *Pakistan development update, October 2021: Reviving exports.* World Bank Group.

World Bank. (2023). *Research and development expenditure (% of GDP) – Pakistan* [Data set]. World Bank Open Data. https://data.worldbank.org

World Bank. (2024). *Exports of goods and services (% of GDP)* [Data set]. World Bank Open Data. https://data.worldbank.org

World Trade Organization. (2023). *World trade statistical review 2023.* WTO Publications.