



Policy Brief

**Exploring the Development, Environment,
Trade, and Technology (DETT) Nexus in the
CAREC Region:**

**A Path Analysis from Technology to
Sustainable Development**

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Introduction

The advent of the information and communication revolution has played a pivotal role in enabling the process of global economic integration, hence creating a conducive environment for enterprises and individuals to engage in collaborative endeavors. The rising apprehension surrounding the ecological consequences of digital consumption and the disposal of electronic waste has underscored the imperative for the adoption of sustainable practices. The interdependence among nations facilitated by digital platforms and global trade has engendered a mutually beneficial association between economic expansion and environmental preservation. Technological progress has played a pivotal role in enabling businesses to adopt more efficient and ecologically sustainable practices. The countries within the CAREC region encounter various economic, environmental, and trade obstacles, which call for the implementation of sustainable growth strategies. The utilization of digital platforms and the adoption of sustainable practices have the potential to address these challenges effectively.

The incorporation of information and communication technology (ICT) into the realm of economic development has the potential to augment efficiency and production while also encouraging the adoption of ecologically sustainable corporate practices. This, in turn, can cultivate a mutually beneficial association between economic growth and environmental preservation within the CAREC region. Comprehending the interrelated factors that contribute to economic growth, such as ICT, commerce, environmental considerations, and overall economic expansion, is crucial for achieving sustainable economic development. The drivers in question exhibit interdependence and rely on one another. The identification and utilization of these factors can assist policymakers and businesses in establishing an environment that is conducive to sustained growth and development.

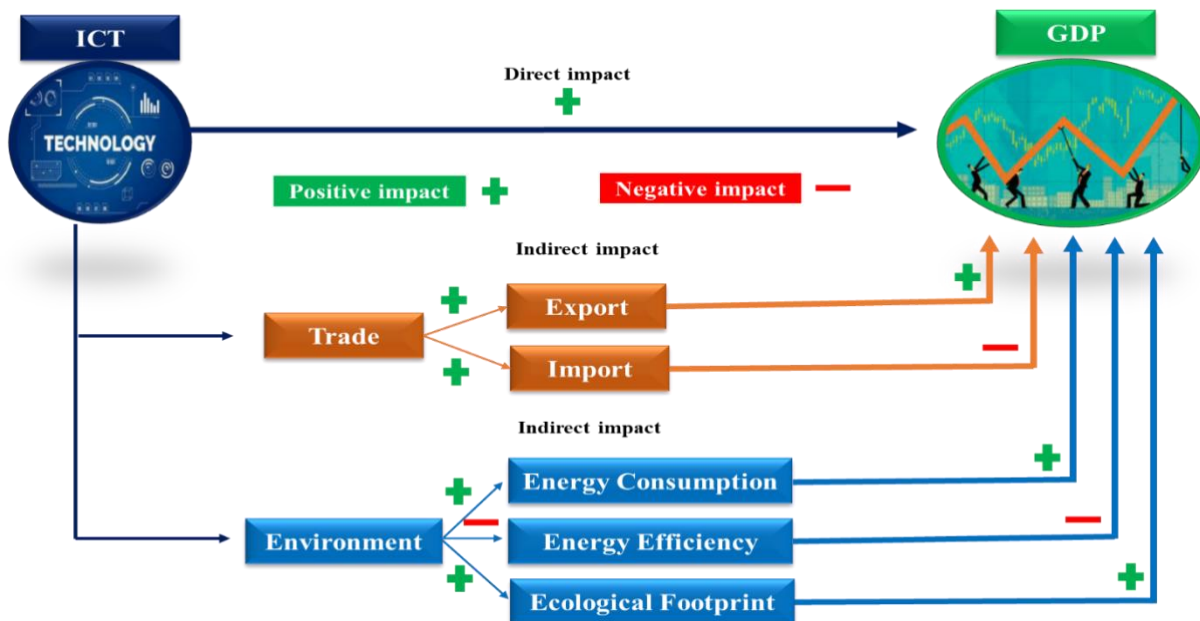
How and what this study portrays regarding DETT nexus

A recent study by the CAREC Institute¹ explores the relationship between technology and economic growth in CAREC countries. It investigates if technology enhances trade and environmental quality and how these factors affect economic growth in these countries. The study focuses on three key questions: (1) how technology affects sustainable growth in CAREC countries, (2) how technology indirectly affects regional sustainability through environmental quality, and (3) how technology indirectly affects regional sustainable growth through trade channels. The study uses data from 10 CAREC economies from 2000 to 2022 and SEM models to quantify and answer these questions. The results show that e-governance significantly impacts GDP, with exports having a positive impact and imports having a negative impact. Exports contribute to a country's GDP by creating income, necessitating firm productivity and efficiency in export-oriented sectors, which in turn drive technical progress and innovation. In addition, they enhance economic diversification by curbing domestic consumption, thus bolstering the economy's resilience to economic downturns and volatility. Consequently, this stimulates economic growth and augments the GDP. On the other hand, imports have an adverse effect on GDP as they reduce domestic production and employment prospects, resulting in a decline in output and revenue. Imports can contribute to a trade deficit when the monetary value of imported goods surpasses the economic value of exported goods. Excessive dependence on imports can render a country exposed to swings in the global market, hence

¹ Nazir, R, (2024). Exploring the Development, Environment, Trade, and Technology (DETT) Nexus in the CAREC Region: A Path Analysis from Technology to Sustainable Development. Visiting Fellow Program, CAREC Institute. URL: <https://www.carecinstitute.org/publications/visiting-fellow-paper-exploring-the-development-environment-trade-and-technology-nexus-in-the-carec-region-a-path-analysis-from-technology-to-sustainable-development/> (Accessed on February 14, 2024).

increasing its susceptibility to external shocks and diminishing overall economic stability. The CAREC region is experiencing higher energy consumption and ecological footprint (EFP) which contributes to its GDP. Countries like China, Kazakhstan and Uzbekistan have a very high ICT penetration while other central Asian countries have lower levels of ICT integration, but natural resource extraction is making these countries' environment highly vulnerable. The region in general depicts a lower energy efficiency score. Inefficient energy consumption leads to higher costs and reduced business profitability, further affecting GDP growth.

Figure: Graphical Depiction of DETT nexus in CAREC



Source: prepared by the author.

ICT is a key player in boosting economic development

ICT plays a crucial role in enhancing the financial performance and expansion of companies through the augmentation of productivity, efficiency, and transparency. It facilitates manufacturers in the manufacturing of goods and services with augmented value, hence raising workplace efficiency and promoting production in diverse areas. The use of ICT across diverse industries facilitates the advancement of novel ideas and enhances competitiveness within a rapidly evolving global marketplace. Policymakers ought to formulate policies aimed at enhancing the integration of technology within the corporate sector. These strategies encompass the provision of incentives to encourage investments in novel technologies, as well as the implementation of training programs. The establishment of collaborative relationships between businesses and technology providers has the potential to drive the creation of novel solutions and facilitate product development. Emphasizing the integration of technology can foster an atmosphere conducive to economic expansion and enable enterprises to thrive in the era of digitalization.

International trade mediates the ICT-development nexus

The global value chain can be significantly influenced by the adoption of ICT, as it facilitates the dispersion of industrial operations across several nations, enhances the immediacy of customer and supplier connectivity, and expedites trade processes. Organizations have the capacity to leverage this technology in order to offer remote technical assistance, collect and evaluate data, and make

informed decisions. Moreover, the utilization of ICT not only facilitates the expansion of the export business and reduces the expenses associated with entering new markets, but it also enables swift acquisition and dissemination of information. The utilization of real-time tracking and monitoring solutions in the shipping industry enhances accountability and facilitates the dissemination of more information to the public. The incorporation of these evolving technologies has had a profound impact on the field of international trade, enabling companies to achieve improved operational efficiency, speed, and cost-efficiency.

The phenomenon of international trade plays a significant role in the growth of a nation's Gross Domestic Product (GDP) through its facilitation of resource acquisition and foreign currency accumulation. Furthermore, this technique effectively promotes the development of a nation's export capacities, so enabling them to take advantage of economies of scale and offset potential risks in the market. If policymakers aim to enhance trade and foster economic growth, it is imperative for them to prioritize the improvement of ICT utilization in commerce and exports.

Environmental quality mediates the ICT-development nexus

ICT has the potential to influence economic growth through environmental channels. However, it is important to note that ICT also contributes to heightened energy consumption as a result of factors such as data centers, device usage, and network infrastructure. The ICT within the CAREC region has been found to have a detrimental effect on energy efficiency, hence impacting the GDP. The aforementioned circumstances provide difficulties in attaining the desired GDP objectives. The widespread adoption of ICT in developing nations has the potential to exacerbate ecological consequences, which may result in environmental degradation. The observed positive correlation between ecological footprint and GDP in the CAREC region could potentially be attributed to inadequacies in industrial support systems and public services. Local governments are employing a strategic approach in selecting energy-intensive companies as a means to address and reduce emissions.

In order to effectively attain both sustainable environmental objectives and GDP targets, the economies of the CAREC region must implement policies that encompass the integration of ICT, reduction of ecological footprint, and optimization of energy usage. Some examples of strategies that can be pursued include making investments in renewable energy, establishing smart grid technologies, and improving resource efficiency. By advocating for environmentally friendly methods, these economies can achieve a harmonious equilibrium between economic expansion and the safeguarding of the environment, guaranteeing a viable and enduring future for their populace. Nevertheless, the monitoring and evaluation of these regulations play a pivotal role in guaranteeing measurable enhancements in GDP growth and the preservation of the environment.

Policy recommendations:

1. The integration of trade liberalization, environmental sustainability, and economic growth plans with digitization is imperative for the CAREC region. It is recommended that governments allocate resources towards the implementation of ICT broadcasting in order to enhance the resilience of supply chains, foster the growth of electronic commerce, and enhance digital governance, hence facilitating fair and inclusive trade practices.
2. The over utilization of ICT inside economies has the potential to negatively impact the environment. In order to attain sustainable economic expansion and foster an environmentally conscious ecosystem, it is imperative for economies to advocate for the adoption of ICT, diminish reliance on non-renewable resources, and allocate resources towards research and development (R&D) endeavors aimed at creating sustainable products.

3. The study proposes that countries within the CAREC region should adopt trade policies that are based on fair rules in order to enhance their economic growth. Additionally, it proposes the implementation of an export promotion strategy as a means to enhance global competitiveness. The research findings also indicate the need of developing ICT infrastructure to facilitate trade and foster innovation.
4. The gap in ICT penetration within the CAREC area highlights the necessity for actions led by policy. Developed nations should prioritize the promotion of sustainable practices, including the adoption of renewable energy sources and the utilization of energy-efficient technologies. Conversely, less developed countries should focus their resources towards the development of infrastructure and the ease of commerce.