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**Innovative development**

In order for Pakistan to emerge from the quagmire of poverty, hunger, and foreign debt, we need to migrate to a strong knowledge economy. About 67 percent of our population of 220 million is below the age of 30 which gives us a huge demographic advantage. To move forward, we must declare a National Education Emergency and invest massively in education, science, technology and innovation

In such an effort, the government has a pivotal role to play by ensuring universal literacy, establishing good technical and vocational schools, and setting up world class universities with Centers of Excellence in selected fields. We must also establish a strong national network of technology parks to allow new technologies to be promoted through business and technology incubators. Such an effort will require access to venture capital funds to promote innovation and entrepreneurship through new start-up companies. We will also need to establish industrial clusters in such key fields as biotechnology, engineering goods, electronics, pharmaceuticals and other high-tech areas.

The private sector has to play a pivotal role in the development of a strong innovation driven and technology-based knowledge economy by undertaking R&D in carefully selected focused fields. Indeed, it is through such private sector R&D that most companies in the US, Canada, Europe, Japan and Korea invent new products, improve the quality of existing products and enhance exports.

This is where Pakistan and the other OIC members have failed miserably – except for Malaysia which today remarkably contributes about 87 percent of the total high-technology exports of the 57 OIC member countries, the balance of 13 percent being contributed by the remaining 56 OIC member countries including Turkey, Indonesia, Egypt, and Iran, Pakistan, Saudi Arabia etc.

The country which spends the most in the world in terms of percentage of its GDP is Israel. In 2018, Israel spent 4.95 percent of GDP on R&D, with the tech sector being its most important focus area. The large supply of skilled, educated engineers and technicians that were attracted to Israel from the West since the 1990s has triggered huge progress. It has also allowed Israel to dominate the entire Middle East which has much richer nations but who lack the visionary leadership to invest in science and innovation.

South Korea comes next , spending 4.81 percent of GDP on R&D in 2018. Investments in R&D by Korea have paid rich dividends; between 1960 and 2019, South Korea recorded GDP growth averaging 7.3 percent per year. Like Israel, the country has a booming tech industry. South Korea’s exports grew by an average of an impressive 16 percent per year between 1961 and 2019. In terms of patents worldwide, China today stands at first place in the world with 452,804 patents granted to resident and non-resident companies or organizations in 2019. The US comes second with 354,430 granted patents the same year.

To gain a competitive edge, countries such as Korea, Japan, Singapore, and Taiwan have focused on selected high technology industries instead of low technology items such as textiles. These countries are now world leaders in the manufacture and export of such items as automobiles, engineering goods, ship building, electronics and computers. The development of these industries was supported by the governments by giving incentives and helping companies to develop capabilities in design and engineering.

Semi-government bridging institutions were established to help private industries to enhance their capabilities. These included engineering centers, technology parks, industrial parks and incubation centers. Incentives were also given to establish links with diaspora abroad that facilitated the transfer of cutting-edge technologies. These are all lessons that we can learn from in Pakistan.

All this cannot happen without putting robust innovation policies in place to promote capability for developing indigenous technologies and creating demand for innovation. University-industry linkages need to be developed and ideas translated into products and processes through protection of intellectual property rights, access to venture capital and establishment of pilot plant development facilities. The knowledge generated in universities and research centers needs to be commercialized, and proper mechanisms to make this happen need to be introduced.

China, India and some East Asian countries have stimulated demand for innovation by promoting firm-level learning. Incentives were given to private companies for hiring skilled engineers and researchers, tax incentives were made available for establishment of high-tech industries, and inter-firm collaboration promoted in order to achieve economies of scale and for establishing linkages with global production networks. Measures to promote innovation were backed by regulations that ensure the quality of products and minimum productivity standards. Fast commercial courts were established for rapid dispute resolution. The proper formulation and implementation of competition laws helped foster innovation and encourage competition for both exports and import substitution programs.

It is important that innovation policies should be directed to help the poor and lower middle-class sections of our society. We can learn from China in this respect. In 1998, China was producing only 56,000 motorbikes annually, and there were only a dozen manufacturers. Due to a determined effort by the Chinese government to promote this sector and to facilitate the lower strata of society, the number of manufacturers of motorbikes rose from only 12 to over 2,000 by the year 2010. The number of units being manufactured grew to 30 million units annually, over 80 percent of which was for the domestic market.

We in Pakistan need to have a dynamic innovation policy, strategy and implementation plan so that we can emerge from the poverty trap that engulfs us. The Knowledge Economy Task Force established by the prime minister is working hard for this to happen. If we are to develop a strong knowledge economy, it must be through unleashing the huge creative potential that lies hidden in our young men and women.

This can only be achieved by investing in a high-quality education system and linking the process of education with socio-economic development plans. This will allow us to prepare the required number of top professionals in areas of national need and utilize them in national projects geared to achieve self-reliance and enhance exports, particularly of high-technology products.

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