Improving S&T infrastructure

1-5-95 The News

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Infrastructure is a sine qua non for development. America's rise to greatness can be attributed to its vision to implement infrastructure policies and projects. Without government commitment to the development of science and technology and the absence of a framework within which this development can take place, neither businesses nor individuals would take the personal and financial risks necessary to make it a reality.

Defining a standard infrastructure development approach is not possible. In fact, there is none. Nations following different strategies have achieved varying degrees of success. What must be studied is the mechanisms through which the technologically advanced nations have achieved an astonishing level of success and apply them to our setup.

Pakistan, due to financial constraints, cannot undertake major infrastructure development projects that pay off in the long run. Unfortunately, most such projects require this sort of long-term commitment. Our emphasis, therefore, should be on the bare minimum to start with, and try to improve the productivity of the existing network. This can be achieved through a change in our attitudes. A start can be made through the development of an efficient Science and Technology Policy catering to the changing times. Once such a document is prepared, it should be followed religiously to the letter, with the belief that it is the blueprint for our survival in this era of cut-throat economic competition.

An infrastructure development programme requires a central planning, monitoring and promotional agency. S&T ministries normally cater to this requirement. The most successful and promising example in this regard is that of the Japanese Ministry of International Trade and Industry (MITI), which is famous in Japanese industrial circles as a "Kyoiku Mana" or Ambitious Mother who pushes her child to study, study and study.

Japanese progress in the industrial world can be attributed to the timely, and at times strategic, decisions taken by MITI. What makes MITI so successful is the way it works. The masters of MITI come from Japan's major conglomerates such as Mitsubishi, Fujitsu, Sumitomo and Mitsui. They assess the general needs of Japan's industry to preserve its economic growth and make strategic decisions regarding the future line of action. MITI brings together and co-ordinates working groups, advisory councils and think-tanks relevant to the implementation of the plan and later directs necessary financial, fiscal and legislative resources towards the new projects.

By the nature of the task assigned to it, such a ministry has to be a central planning agency with substantial command over other departments like industry, finance, law and education. Our Ministry of Science and Technology has no such authority or resources to perform such a task.

Of the newly emerging economies, the Korean approach to infrastructure development is the most popular. The Koreans entered the race for industrialisation as late-comers but through a comprehensive and highly effective infrastructure and a commitment to get it implemented, cashed in on this technical advantage. They formed a very effective institutional network to start with. This included a Ministry of Science and Technology (MOST) and Korea Institute of Science and Technology. We have similar institutions in the form of MOST and PCSIR. The only requirement is that of a little upgradation and efficient functioning.

In order to make up for the shortage of technically trained manpower, Korea established a Korea Advanced Institute of Science and a Changwon Technician's College. We have various Centres of Excellence along with the GIK Institute of Science and Technology (GIKI), which with little effort can cater to the need of high calibre scientists and engineers. It is recommended that a state-of-the-art institution patterned on GIKI be established for technicians as well. This would go a long way in getting rid of the shyness attached with blue-collarism and would guarantee a new social status based on professional pride in the skilled worker's career.

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In order to promote the cause of technology, a Technology Development Corporation on the pattern of PIDC and PMDC should also be established. Another intermediatory organisation which brings inventors/scientists close to industrialists and entrepreneurs can also be envisioned. Such an organisation can be made more effective by letting it share the fruits of success and risks of failure in all the technology ventures that it undertakes. Thus it could be made to justify its existence after a specified time period.

On the financial side, the formation of a Technology Development Investment Corporation, a Technology Bank and a Technology Finance Corporation can go a long way in guaranteeing a special focus on providing necessary financial incentives like long-term loans, conditional loans and equity investment for technological entrepreneurship and commercialisation of R&D results.

In order to establish a sound foundation for our S&T structure, it must have an adequate legislative support. The Japanese miracle in autos and computers/microelectronics was partly a result of a strong legislative backup. In late 1950s, as automobiles became the highest priority of MITI, it pushed the Machinery Development Law, followed in the 1970s by a Machinery and Computer Promotion Law. The Korean S&T structure, too, is fully backed by effective legislation. Science and Technology Advancement Law (1967) established a basic commitment of government towards science and technology, Law for the Promotion of Technology Development (1972) provides fiscal and financial incentives to private industries for technology development. Engineering Services Promotion Law (1973) promotes local engineering industry by assuring markets on one hand and performance standards on the other. These and many others form a sound basis for the development of science and technology.

Another strategy worth emulating is the formation of Technology Development Consortia like Sematech, the famous consortium of American semiconductor manufacturers. Government can act as a catalyst in this regard. We also direly need an efficient Patent Service which can reduce pirating, while at the same time help in commercialisation of R&D results in the form of new technologies.

Technological entrepreneurship is another area which needs a lot of government emphasis. A few years back, the Indian government established a Center for Electronic design and Technology (CEDT) at Mohali (Punjab). It was a part of a programme to develop Mohali as the ELTOP, the Electronic Town of Punjab. The main idea was to develop entrepreneurship in the field of electronics in order to increase India's share in the $648bn worth of the world's total output of electronic production. Today, CEDT has performed a miracle by producing over 2,000 professionals who have either created new companies in the field of electronics or are self-employed with great success. The same miracle can be repeated on this side of the border in a host of other industries as well.

Setting up a Centre for Science and Technology Policy Studies, inducing universities and institutes like GIK, LUMS and IBA to offer special courses in science and technology management and technological business administration, setting up goal-oriented research institutes equipped with the latest equipment, creating a National Library Service and a National Information Network are some of the hundreds of steps that could make up the bare necessities for the unhindered development of science and technology in Pakistan.

All this requires huge investments in terms of time, energy and money. Implementation, too, is a key factor in our success. Without it the whole plan, along with costly infrastructure, would come down like a crumbling wall. We must have irrevocable commitment to the scientific and technological development.