Global trade in services has grown more than 60 percent faster that of goods trade over the past decade and given its relatively higher rate of growth it is conceivable that services trade may catch up or even surpass global goods trade in the next decade or so.

We have to discard the old notion that it is only industrialization and goods exports that would lead us to the path of economic wellbeing and strive hard to promote services trade led by digital technology. Services create almost one-third to one-half of the value that goes into traded manufactured goods in the form of R&D, design, engineering, sales and marketing, finance and human resources. An added advantage would be that, unlike goods where subsidies and concessions from the government loom large, the services trade is driven by higher efficiency, cost effectiveness, customer satisfaction and rapid turnaround time.

Efficiency-driven economies require modern machinery, better technical and managerial skills, promotion of a culture of firm level learning, innovation and knowledge. Human capital development, training of scientists and engineers, R&D, and lifelong learning practices are the foundations of the new knowledge economy.

An impetus to the human-capital-technology nexus was received by the endogenous growth theory. Paul Romer, Nobel Prize winner for this theory, opened a new vista in the exploration of economic growth. He argued that traditional inputs like capital and labour which have diminishing rates of return account for only half the differences in countries' output – and suggested that ideas, knowledge and technology which have increasing rates of return account for the remaining half.

The explosive growth of technology companies due to network effects where the more users the company has, the more it expands and increases market shares validates Romer's theory. Startups have turned into unicorns just on the basis of an idea the founders had seized upon. The existing antitrust laws in advanced countries are unable to cope with the growing influence of the big five companies.

The conundrum is that innovation should not be stifled by excessive control and regulation while at the same time the concentration of market power is curbed. Ideas have to be embodied in customs, laws and institutions – rules, patent law, competition law, bankruptcy law and softer norms that govern people's behaviour. Without following the rules, an economy cannot ever make profitable use of technologies. What should be the boundaries of these rules and laws for the tech companies is still an unresolved question.

By now, it has become abundantly obvious that digital technology would no longer be a driver of marginal efficiency but an enabler of fundamental innovation and disruption. According to a study by McKinsey, one of the disruptive technologies – Big Data – has changed the landscape significantly. Over a decade data flows collectively have raised the world's GDP by approximately 10 percent and contributed $2.8 billion to annual trade – a larger share of the increase in global GDP compared to the worldwide trade of physical goods.

Data is being leveraged for efficiency, productivity, supply chain and innovation. A US Bureau of Economic Analysis study found that employees working in the digital economy earned $132,223 as average compensation compared to $68,506 per worker for the total US economy .To illustrate, the health sector has thousands of doctors linked with millions of patients in remote areas who did not have access to basic medical care. Pakistani female doctors, after getting degrees, were not actively participating in their professions for a variety of social and cultural inhibitory factors. For the past few years, some of them have begun using telehealth tools to reach out to patients, thus reviving their professional prowess and contributing productively to the economy.

Where do we stand in our state of preparedness to embark on this journey? UNCTAD has developed a Country Readiness Index that assesses national capabilities to equitably use, adopt and adapt these innovative technologies. The index comprises five building blocks: (a) ICT deployment – internet users, speed; (b) Skills – expected years of schooling; (c) R&D activity – publications, patents; (d) Industry activity – hi-technology; and (e) Access to finance – domestic credit provided.

Pakistan's score on this index for 2020 is 0.20 and it is ranked 123 out of 158 countries, placing it in the Low category of readiness. By contrast, India, although ranked 43, is an over-performer in relation to its GDP per capita because of its impressive human resources.

Pakistan with a young population of 60 percent below the age of 30 is in an advantageous position to fill in these gaps in advanced countries with ageing populations and shrinking labour force. Japan, one of the most purist countries in terms of cultural and linguistic homogeneity, has finally opened up its doors to foreign workers – albeit in skilled and ICT related jobs. The UK has also revised its immigration policy by introducing points systems on the lines of Canada and Australia so as to attract skilled manpower in short supply.

Although there is too much rhetoric and talk in this country about the demographic dividend, very little has been done so far to create the ecosystem which can nurture, develop and respond to these emerging needs. Incremental and partial steps in the form of technical and vocational training courses or establishing some expensive high-sounding centers of excellence, built on the weak foundations of an inadequate educational system, are hardly going to make any substantive difference.

How do we go about setting the supportive and enabling ecosystem for innovation and a knowledge economy in Pakistan? This will be a long-drawn process, but a beginning has to be made now without any delays or the usual excuses of shortages of financial resources. It should start with education right from childhood and extend to all tiers, leading to a lifelong learning process.

An AKU study shows that "more than 90 percent of primary and lower secondary school students have only a weak or basic understanding of science and mathematics. The average maths score of 15000 students in grades 5, 6, and 8 in 153 public and private schools across the country was 27 out of 100 and the science score was 34 out of 100. Only 1 percent of the students scored over 80 in either subject.

"The study found that high quality teaching practices of nearly 9 out of 10 were graded weak and roughly 1 in 10 were mediocre. The teachers read and explained words from the textbooks instead of encouraging students to ask questions or participate in activities that bring concepts to life. Professional development opportunities to improve subject matter knowledge and pedagogical tools were wanting in the teachers."

We have to rethink curriculum and pedagogy to make students more comfortable with critical thinking, collaboration, ability to continuously learn and adapt, and be prone to picking up the other necessary soft skills along the way

By Grades XI and XII they should have grasped theory, concepts, terminology and applications. They would then branch off in different fields but this basic grounding would keep them in good stead. It has been observed even at the university level teachers use threats of bad grades to crush critical inquiry and challenge those who spend most of the class session spouting textbook definitions and material. Students are simply asked to take notes from the teachers' monologues. The outcome of such an academic environment is bound to be deleterious.

A PIPS report about university students in Khyber Pakhtunkhwa had this to say: "The majority of the Pakistani youth lack basic critical thinking and reasoning skills even at the higher studies level such as the universities. Many lacked the ability to apply basic reasoning while processing given information. There

was a tendency amongst them to fall for pre-established narratives and overused and obsolete conspiracy theories."

To be continued