

The tale on innovation and growth

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Whenever we see the word innovation, we instantly recall Joseph Schumpeter who popularized the word in economics through his business cycle theory. Joseph Schumpeter explained the fluctuations of economic output through the concept of innovation which was a pet word in those days and also today as an important instrument to spur growth. Economic activities over time actually trace like a serpent; the amplitude is neither even or nor symmetric. A constant linear growth is a rare occurrence though we have a glimpse when we observe the growth pattern of China from 1978 to 2012. Schumpeter's four-phase cycle; prosperity, recession, depression and recovery manifests that innovations are discontinuous over time. An innovation embodies the discovery of a new process, product or services by the technocrats when the existing one is at the stage of obsolescence or dysfunctional. The entrepreneurs with business acumen who take risks are at the forefront to initiate innovation that yields extraordinary profit. These extraordinary profits attract a swarm of imitators and thus "display a flood of investment." The expansion phase sets in. However, the boom ends at the climax because of the "lopsided, discontinuous by nature... the disharmony is inherent in the very modus operandi of the factors of progress." The upswing starts when the more courageous entrepreneurs once again start to innovate.

The business cycle phenomena explained by Schumpeter as an endogenous force *sui generis* need to be considered with some grain of salt. The exogenous forces such as war, rates of population growth, the weather, globalization and the interdependent nature of the economy, ICT, political and economic unification and the evolution and role of multilateral institutions are more appealing in today's world in explaining fluctuations though innovation and its dissemination constitute a major contributing factor in this whole spectrum. The operation of the exogenous forces explains the growth miracle in many countries of the world. The growth of China and also Taiwan is an example. The open door policy of mainland China helped in the assimilation of innovative technologies of the Western origin and its adoption in domestic environment provides necessary buoyancy in growth. The miracle of Taiwan's postwar economic growth rests mainly on factor accumulation and innovation, both domestic and worldwide.

The novelties in the gadgets that we observe now such as in smartphones, supercomputers, nanotechnologies and stem-cell transplants revolutionized the world. In a short span of time, the diffusion of technology and consequent economic growth upgraded the economic status of many countries around the world and resulted in the efficiency of production embedded in the idea of total factor productivity that goes beyond the contribution of conventional factor inputs such as capital and labor.

Do innovation has a limit or where do we exactly stands on the innovation scale? Does the current pace of innovation outpace the previous innovation rays? There are many dimensions to look critically into the odious. An answer to this intriguing question was advanced through a seminal research by Robert J. Gordon from the Department of Economics; Northwestern University who claims that growth is not a continuous process and growth might not persists forever. The world economy did not experience any growth before 1750 but the growth that we

observe during the last 250 years in USA “could turn out to be unique episode in human history”. He depicted the growth trend in the background of three regimes of industrial revolution that portrayed uneven growth; slow vs. rapid growth. The growth reached a peak in the middle of the 20th century and now the trend is rather crampy. The most spectacular innovation that has perceptible impact on growth was during 1870-1960 but once the spin-off inventions from regime II [1870-1960] had run their course, productivity growth during 1972-96 was much slower than before. In contrast regime III [1960 to date] created only a short-lived growth revival between 1996 and 2004. The most striking findings on the link between innovation and growth is that even if the innovation retains its current momentum, the USA faces six headwinds that could derail the sustainable long-term growth to half or less of the 1.9 percent annual rate experienced between 1860 and 2007. “These include demography, education, inequality, globalization, energy/environment, and the overhang of consumer and government debt”.

The tepid economic outlook for a few years goads the multilateral institutions to urge member countries to increase expenditure on R & D that could have a salutary effect on the growth of the domestic and global economy through the spillover effects of technological diffusion. An IMF report emphasizes that fiscal policy can be an effective tool in stimulating innovation through its effects on R&D, entrepreneurship and technology transfer and underscore the necessity of augmenting the spending on R& D by member countries. However, the past experience of the developed world on growth during the past six years poses the most intriguing question on the increased expenditure on R & D- whether only innovation can lead to sustain growth. The prescription probably misses the idea of the six determinants prescribed by Robert J. Gordon. Moreover, looking into the social and physical environment and on the quality of life, the growth failed to take care of delicate social fabric.

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