

Exponential Technologies

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The major discoveries from pre-historic ages to recent times, have allowed nations to describe themselves and their treasures. These major discoveries include, the first use of tools, shifting from hunting to agriculture, the invention of the wheel, steam engine, computer and many other groundbreaking discoveries. These features defined the future direction and provided the basis for greater innovations through advanced technologies. The above technological revolutions were adopted by various countries in Europe and North America. The rapid progress was mainly due to the development through discovery of new products and manufacturing processes. The economic development of the Europe was mainly due to the industrial revolution which later shifted to the United States. The second wave of this technology witnessed Japan and other countries immerse in to the industrial status. Korea and surrounding countries captured the power of information communication technology to reshape their economies and to compete in the global arena.

Are we ready to face the new wave of exponential technologies which will allow the planet to grow in the exponential curve as opposed to the linear curve during last few centuries? This exponential behaviour was easily observed in last two decades due to the great inventions which disrupted many industries. What are exponential technologies? Exponential technologies are those which are rapidly accelerating and influencing major industries and all aspects of our lives. Exponential technologies include artificial intelligence (AI), augmented and virtual reality (AR, VR), biotechnology, nanotechnology, digital fabrication, networks and robotics.

It is believed that the solutions to the major challenges such as energy crisis, water crisis, food shortage, computer power and cancer therapy, lie in the intersection of these exponential technologies. Therefore, the possibility of developing a sustainable solution becomes much more likely when two or more of these technologies are used in combination to attack the challenge. For example, consider a potential health care solution that exploits nanotechnology based sensor to monitor the heart rate, individual health records and genetic profiles to help prevent heart disease. Further, smart phones can be used to gather data through

biosensors to predict the presence of cancer.

The usual feature of an exponential behavior is that the power or the speed doubles each year and the cost drops by half. Humans are well capable of overestimating what can be accomplished in the short term and immensely underestimate what we can achieve in the long run. Humans are not programmed to judge or process the exponential growth and we assume a constant rate of change due to our linear thinking rather than exponential. Exponential thinking is the key to great innovative solutions to many challenges. Sri Lanka, despite a remarkable history of excellent engineering and medical knowledge, was late to adopt any of the technological revolutions. However, Sri Lanka is among the early adopters of nanotechnology through a national initiative. The other technologies are also being captured through national initiatives. An exponential mindset should be created among the researchers to exploit exponential technologies to inculcate the innovative ways of thinking. Thinking linearly can prove costly to every aspect of our lives including research, business and government. We should, as a nation, be aware of the disruption happening at the hands of emerging technologies and should take necessary precautions to adopt these technologies. If we can plan for the accelerating pace we can ease the paradigm shift and embrace the future in style.