

Paper ID: IT-11**How Science and Technology Will Revolutionize the 21st Century****Invited Talk**N Rajmuhon Singh

Chairman, Research Institute of Science and Technology (RIST), Imphal, India
 Former Vice-Chancellor, Dhanamanjuri University, Imphal, Manipur, India

Abstract

It was 20th Century that split the atom, probe the psyche, spliced the genes and cloned a sheep. It invented plastics, radar and the silicon chip. It built aeroplanes, rockets, satellites, televisions, computers and atom bombs.

We all heard about Wright brothers' aeroplanes, Albert Einstein's theory of relativity & $E = mc^2$, Edwin Hubble's telescope, Alexander Fleming's penicillin, Marie Curie's Radioactivity, J. L. Baird's television, Alan Turing's 'electronic brains', Stephen Hawkins's black body, James Watson and Francis Crick's double helical structure of DNA, Bill Gates Software Computer, Steve Job's Apple Computer, Raymond Tomlinson's e-mail, Chrystiann Barnard's human heart transplant, Ian Wilmot's Dolly & many more.

By the end of the twentieth century science has reached the end of an era, unlocking the secrets of the atom, unravelling the molecules of life, and creating the electronic computer. With the three fundamental discoveries triggered by the quantum revolution, the DNA revolution and the computer revolution, the basic laws of matter, life and computer were, in the main, finally solved.

Klaus Schwab, Founder and Executive Chairman of the World Economic Forum and author of the book "The Fourth industrial Revolution 2016", said: "*Characterized by new technologies fusing the physical, digital and biological worlds, the Fourth Industrial Revolution will impact all disciplines, economics and industries and will do so at an unprecedented rate.*"

Scientific American, June 2010 also highlights twelve events that will change the whole world. They are fusion energy, everyday superconductors, asteroid collision, deadly pandemic, polar meltdown, the big one, synthetic life, self-aware machines, extra dimensions, alien intelligence, human cloning, and nuclear war.

By marking 2025 as a milestone in the history of quantum mechanics, the United States (UN) has recognized the transformative potential of quantum science and technology to develop sustainable solutions in energy, education, communications, human health, climate action, industry and infrastructure, and economic growth.

Some quantum technologies which may influence industries:

1. Drug discovery and development using quantum computers.
2. Medical imaging techniques and diagnosis of diseases using quantum sensors.

3. Genomics dataset analysis using quantum algorithms for understanding genetic disorders.
4. Quantum computers enabling advancements in cryptography, optimization, material science, and artificial intelligence.
5. Quantum information and communication technologies, including Quantum Key Distribution (QKD), quantum cryptography, quantum networks, enhanced bandwidth, and speed.

A thrilling tour through the scientific world of tomorrow examines the ways the great scientific revolutions that have dramatically reshaped the twentieth century—quantum mechanics, biogenetics, and artificial intelligence—will transform the way we live in the 21st century. Some of the breakthroughs will be in the area of Computer Revolution, Biomolecular Revolution, Genetic Therapy, Human Cloning, Designer Genes, Micro Electro Mechanical System (MEMS), Smart Pills, Robot Consciousness, 21st Century Nano Science and Nano Technology, etc.,

Lesser G. Thurow, former dean of MIT's Sloan School of Management, has stressed, in this 21st Century, there will be a historic movement in wealth away from nations with natural resources and capital. He writes:

“In the twenty-first century, brainpower and imagination, invention and the organization of new technologies are the key strategic ingredients.”

He further asserts:

“Today, knowledge and skills stand alone on the only source of comparative advantage.”

The point is that these three scientific revolutions (Quantum Revolution, Computer Revolution and Biological Revolution) are not only the key to scientific breakthroughs in the 21st century, they are also the dynamic engines of wealth and prosperity.

Nations may rise and fall on their ability to master these three revolutions.

In any activity, there are winners and losers. The winners will likely be those nations which fully grasp the vital importance of these three scientific revolutions. Those who would scoff at the power of these revolutions may find themselves marginalized in the global marketplace of the twenty first century.

Keywords: Science and technology, quantum revolution, computer revolution, biological revolution, innovation, 21st century