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"Technology and innovation to stay game changers"

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Of late, the term "disruptive innovation" has come into extensive use, along with the phrase "out-of-the-box thinking." I came to the healthcare sector as an engineer at a time when even the word "healthcare" was not in use. Instead, the contemporary buzzwords were medical, medical technology, patient care, and so on. This was three decades ago. From then till now, I cannot find any single year when medical technology has not gone through radically disruptive and game-changing innovations. This is a result of the world's best clinical and engineering minds working together to create the most breath-taking evolution (or is it revolution?) that any industry or sector has ever witnessed, except maybe space technology.

Before Rontgen and after Rontgen - this almost sounds like BC and AD, but the discovery of X-rays was the kind of disruptive innovation which in its impact could possibly be compared only to Edison's discovery of the incandescent bulb. It is hard to believe that in the pre-Rontgen days, doctors had to diagnose and treat diseases without having any clue about how the internal organs within the body looked like.

Did the average longevity and mortality rates of humans have anything to do with inadequacy of technology? I am afraid they had. X-rays revealed an amazing world to the clinicians. They could "see" the insides of the human body and make much better judgments about what was happening and prescribe more effective treatment.

But then the clinicians got more demanding and pushed the envelope of innovation to limits beyond imagination. They wanted to see each layer within a volumetric organ, and thus came "tomography," thanks to one more in the chain of brilliant scientists who have made this revolution possible. Hounsfield's discovery led to "layer radiography" or "tomography," coinciding with the invention of computers. It was probably one of the most sensational landmark "dual discoveries" in the history of mankind.

Imagine that, today, a millimetric lesion's exact location can be detected within seconds on a screen and radio-therapy planning done based on that, such that the linear accelerator can deliver unbelievably focused and controlled radiation to make oncology a possibility without damaging good tissues surrounding a cancerous lesion! If this is not disruptive innovation, what is?

Still, the clinicians were not content and wanted more. They started pointing at the damaging effect of X-rays as an ionizing radiation, especially in Gynecology where a foetus could be negatively impacted. And, anyway, X-ray images were not too good for soft tissues, such as in abdomen.

So the technologists looked at bats and started wondering how could those creatures of the night "see" in the darkness. That out-of-the-box thinking gave birth to another path-breaking technology called ultrasound diagnostics. Amazing new vistas opened up and examination of abdominal soft tissue and gynecology studies saw great diagnostic improvements. Trans-oesophageal echo-cardiography became the new protocol of cardiac surgery. Before putting a cardiac patient on angio, cardiologists could use this non-invasive, much-easier-to-use diagnostic imaging method to draw a fairly accurate conclusion. Decision-making became easier and quicker.

The series of disruptive innovation didn't stop there. MRI (Magnetic Resonance Imaging) was the outcome of another out-of-the-box 'Eureka' moment. The fact that a very large percentage of human body is water and the fact that water molecules have magnetic properties was effectively capitalized by scientists and technologists. They brought out another path-breaking modality without which today's superior studies and diagnosis of diseases and deformations in the brain, spinal cord and other organs like knees and eyes would have been a far cry. As the years progressed, MRI's strength gathered momentum and from 0.5 Tesla, we now have 7 Tesla MRIs with astounding diagnostic capabilities, resulting in diagnosis and therapy hitherto unimagined.

Along with all these structural imaging techniques came functional studies through nuclear medicine, using the strength of modern-day radio-isotopes which made functional mapping possible. The sum of all these complementary studies today provide a holistic picture of human body to clinicians with hardly any invasiveness.

Clearly, technology that has evolved in many areas of medicine has become one of the strongest pillars of modern healthcare. Endoscopy has radicalized surgery, including dramatically shortening the duration of patients' stay in the hospital and reducing discomfort. Robotic surgery has allowed cross-border, even cross-continent, treatments, thus enhancing accessibility of quality healthcare. Point-of-care diagnostics using remote transmission technology has triggered a paradigm shift in logistics management in pathology.

Probably the next big technology revolution is going to come in the symbiotic marriage between IT and healthcare. This offers tremendous possibilities, considering the deliverables from all-pervasive mobile telephony, cloud computing, analytics and so many other areas where the already available technology can be used to make quality healthcare more accessible in an affordable manner. This will also help in addressing the skill gaps that exist in every segment in Indian healthcare today.

Database management can create an effective electronic health record of a patient which can be used pan-India across various Institutions and platforms. The possibilities are never-ending in seeking and getting the benefits of innovative information technology for better healthcare. Keeping this in view, NATHEALTH and NASSCOM have signed a MoU recently to leverage the potential of IT for improving healthcare further.

The coming decades will see many more changing and breakthrough technological innovations in healthcare. That will indeed be a key dynamic milestone of the future of healthcare.

About the Author: Anjan Bose is secretary general, Healthcare Federation of India (NATHEALTH) and a contributor to The Healthcare Alliance, which recently submitted recommendations to secure the future of healthcare to The President of India, Mr Pranab Mukherjee.