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Review article

# Futuristic approach for health care technology development as innovation

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## ABSTRACT

Covid-19 had forced many industries to make lightning-fast changes. The Healthcare sector is one among them. Even before 2020, the healthcare industry has been embracing technology at various levels, but the pandemic made it rely on technologies even more. The global health app market is supposed to hit a whopping $125 billion by 2028, which was only about $2.4 billion in 2017. According to the WHO report, 80% of the healthcare providers are willing to invest more in new technologies and digital solutions, over traditional methods. Apart from Covid-19 related technology advancements in healthcare, ingestion of technology in other fields of healthcare like a diagnosis of diseases, early detection of genetic diseases and more are evolving fast. It's important that we consider how those systems can integrate with newer technologies or how they may eventually be replaced with more reliable systems. The focus should be on improving performance, productivity, efficiency, and security without sacrificing reliability or accessibility.

**Keywords:** Technology, Health improvement, Medical data, Virtual healthcare, Regulatory approval

## INTRODUCTION

In times of crisis, immense creativity often comes to the fore, precipitating major changes. Keep up with the latest trends in healthcare While our healthcare system has come a long way thanks to the litany of benefits enabled by technology, it's clear that this is only the beginning of what's in store for technology in healthcare. From streamlining the patient care process and cutting costs to developing ground breaking medical capabilities and breakthrough treatment opportunities, our digital age has an array of possibilities that await within the medical world [1].

Healthcare is changing. The drivers of reform include increased incidence of illnesses common to an aging global population, including cancer, diabetes, and heart disease. They also include the increased access and use of digital information, from portable patient health monitoring systems to new ways of sharing and learning from healthcare data. These changes must take place with a focus on value-based care, particularly as therapies move into emerging economies. And these benefits are now demanded by patients who increasingly feel empowered to request treatment that they consider best meets their needs [2].

Research and development in medical technology is responding to these changes with new products: but also by finding new approaches to innovation, through looking widely for ideas and insights that can be incorporated into healthcare solutions. Most of these new approaches involve increased collaboration among companies, universities, government, investors, and clinicians. A survey by

Forbes found that 80 percent of executives in Medical Technology expect innovation to happen through partnerships, rather than in-house, with increasing emphasis on open innovation, in which firms from diverse industries cooperate in some areas of research and development.

Innovation goes beyond creating a new version of an existing product. It is about identifying needs and problems and trying to come up with unique ways to address them. In healthcare, it can also involve figuring out how a new product, say a diagnostic test or a digital source of information, fits into the patient care workflow and makes it better. "Innovation is really about the mind, it's about seeing a problem with a new perspective, having an insight.

**Key healthcare predictions for 2040 are:**

Health information from traditional annual physical check-ups and other tests previously only available in a surgery or lab will be replaced by data from sensors on/around our 'smart' bodies (including in our clothing and, eventually, skin and blood). This will be immediately accessible to us, in real time

A new field of 'predictive medical data mining' will provide early warnings of physiological trouble ahead or indications of disease as it develops. Physicians will have 24/7 real-time reports of their patients' wellbeing and will be alerted to any change in patients' data that requires urgent attention

Stem-cell medicine will be a powerful tool in mainstream medicine. For example, replacement human organs for transplant will be grown on demand from stem cells in the lab, with minimal risk of rejection

Nano-medicine (in its infancy in 2019) may eventually outperform all other branches of medical science, as scientists create 'unique drug formulation' that are far more effective than today's medicines.

Artificial Intelligence (AI) 'chatbots coading' equipped with deep learning algorithms could relieve emergency room personnel of tending to large numbers of walk-in patients with non-emergencies (e.g. sore throats, UTIs)

**Futuristic approach**

Nanomedicine

Nanomedicine is defined as the use of nanoparticles or nano-objects like nanorobots or any other nanoscale materials in the medical industry. Nanomedicine is one of the most promising medical fields in future. Nanomedicine is so helpful in target drug injection and cancer treatment. Organisations use Nanopill cameras to study the inner parts of the body. In the coming years, the use of nanotechnology in the medical field will only increase. The nanomedicine industry is predicted to hit a market of over 125 billion dollars by 2024.

**Artificial intelligence**

Now a day's artificial intelligence technology used for diagnosis of new and existing disease, it also provide a customized treatment. For instance, it is being used to drive systems that process computed tomography scans by the thousands, in a mass detection scenario, as in COVID-19. This spares radiographers and physicians to attend to patients, besides providing supplementary information and thus improving the accuracy of diagnosis and monitoring.

**Artificial technology & augmented reality**

In many cases, the combination of two evolving technologies will only open up more possibilities when it comes to medical treatment. "Artificial intelligence is on a crash course with augmented reality, especially in the healthcare space [3].

For example, these complementary technological capabilities could equip medical personnel with advanced features, such as X-ray vision and heat-sensing abilities. "Rather than replacing humans with machines, these technologies provide a new way to enhance the ways that machines and humans work together," he says. "They can improve design speeds and reduce the amount of time it takes for a product to get to market by erasing the need for a physical prototype. It also improves safety and compliance efforts."

Existing tools that use **artificial intelligence** and **augmented reality**, such as **AccuVein**—a handheld device used by nurses and doctors to scan a patient's body to make veins visible. Such a tool can greatly improve accuracy when it comes to blood draws or IV insertions, minimizing the likelihood of having to stick a patient multiple times. "After decades of slow progress, **artificial intelligence and machine learning** have found their true calling for large-scale success in the fields of healthcare science and advanced research. "The massive scale needed for the algorithms that drive medical and pharmaceutical research not to mention the big budgets behind them is the perfect environment for growth."

**Mobile health (mHealth)**

Information about the patient health via health record and sensing technology called as mHealth, this is a tool which have the ability to collect and distribute healthcare information at affordable cost with pleasant result.

This technology is beneficial for more number of patient at a same time it means that one network technology record and distribute health data from individual to population level at a same time.

mHealth is promote a positive behaviours for prevention of acute and chronic disease, with self-awareness, providing training, decrease the number of visit to doctor [4].

mHealth is simply learning platform through mobile device, small gadgets, easy to handle equipment's that can connect to the smart phone. Health is a technique which help the people to improve their health without disturbing daily routine or necessary work at all over the world. mHealth is a strong network technology to store a large number of data for record of past, present and future (prediction) create a research based data to promote healthy peoples.

Many organisations like Mckinsey, Roche, thermo Fischer, Apple, Samsung, 1mg, to facilitate the development of healthcare App, tools, equipment with connecting technology [5].

**Tele-health**

Tele-health, which includes virtual healthcare, uses technology to improve the efficiency of communications between healthcare providers, clinics and patients. "Technology in the form of electronic communication methods allow clinics, clinicians and patients to exchange information, monitor and track adherence to plan of care and ensure optimal engagement throughout the healthcare process [6].

This use of digital communications modernizes the healthcare experience by enabling access to healthcare services remotely, whether it be a patient contacting a clinician in a different area or multiple healthcare providers collaborating with one another from a distance.

"Technology like telemedicine is transforming healthcare by bridging the divide between providers and their patients. "It's no longer necessary to sit in an Urgent Care waiting room for hours on the weekend—tele-health solutions are improving accessibility and convenience."

But the benefits of telemedicine can stretch far beyond efficiency and convenience for the average patient experience it can also cut costs and may someday be able to take preventative care to the next level. "Quick communication between patients and providers via an app streamlines the patient experience and saves clinicians and their office staff time. In the future, expect to see tech identifying and assisting at-risk patients for earlier interventions.

**Electronic health records**

"Over the years, advancements in technology have improved the way healthcare professionals approach medical treatment in several key ways. Among the most prominent, he points out, is the introduction of electronic health records (EHRs).

The now-antiquated process of using paper filing systems to log patient records made it difficult for clinicians practicing in different facilities to collaborate when it came to patient care. While the healthcare system at large is still working through existing roadblocks related to interoperability, EHRs enable providers to streamline many aspects of patient care.

"EHRs are changing the face of global healthcare by providing medical professionals with a fuller, more holistic picture of a patient's health history, enabling them to make more nuanced decisions regarding their treatment.

Moving to electronic records elevates our care ecosystem into a cohesive process that can provide a better network of services. Records provide proof of care to support billing without having to fill out forms or faxes. Auditor surveyors can read proof of service details without searching through cumbersome binders. Orderly incident reports can be assessed and, if needed, appropriately and quickly escalated," he elaborates. "Issues are handled quickly, by the right person, at the right time. Results include improved quality and safety within a better network of services."

**Personalized treatment**

Another way technology is driving our healthcare system forward is in its ability to increase patient engagement through the use of devices and wearable technology. Such devices, can provide insight to help create hyper-targeted, personalized health and wellness plans [7].

The personalization can be very precise and can be accomplished through analyzing individuals' data and presenting care, coaching and health recommendations that

precisely address their set of conditions, goals and lifestyle. Instead of offering a canned set of content that fits a broad solution to a health system, it's important to understand the individual and their specific motivations, providing solutions that are particular to their lifestyle in small, manageable steps.

Wilkinson adds that targeted steps can be helpful for people across the range of healthcare needs: whether you're perfectly healthy and want to remain that way; you're positioned between healthy and sick and want to prevent the onset of chronic conditions; or you are currently managing chronic conditions [8].

**Surgical technology**

If a plastic and reconstructive surgeon who is very active in the technology sphere an important factor for a doctor who is often in an operating room in which technology now plays a prominent role. I believe we already live in a world where technology now goes hand-in-hand with medicine, ranging from pre-operative planning to perform surgeries to monitoring outcomes.

few examples: "Perform virtual 3D reconstructions in our trauma patients, which help guide us where to make the most accurate incisions or bony reconstruction with plates. We can review these images beforehand without making a single incision to plan our surgeries," he says. "Another example is using infrared technology to monitor blood flow in our flaps, which are used in breast or head and neck cancer reconstruction. Implantable devices are also available that send real-time blood flow data directly to our phones."

In the wake of the advancements brought on by telemedicine, this as only the beginning of our capabilities with surgical technology, citing the possibility of things like robotics that can be virtually controlled by surgeons who are not directly in the operating room [9].

**Legal Challenges**

Intellectual property is also important aspect of innovation; investors who are pouring large sums of money into creating new products want to keep hold of their ideas. The country provides very strong IP protection. "People who are innovating can feel safe in the Singapore environment. The country is even serving as an example for China, which has long been seen as less protective of IP. As more countries generate IP, governments are starting to see how strong safeguards benefit everyone [10].

Gaining regulatory approval for medical technology is a necessary step for commercialization and Singapore regulators are trying to balance a robust system with one that can be streamlined. Last year, the Health Sciences Authority (HSA) launched a Medical Device Pre-Market Consultation scheme which would enable companies undertaking R&D in Singapore to better understand regulatory requirements at the development and pre-registration stage. This enables companies to incorporate regulatory considerations even at the product design and development phase and accelerate time to market. Often, companies will start by getting approval either from the US Food and Drug Administration., then approach regulators in the country where they wish to introduce the technology. But for a company based in Asia, the extra regulatory steps take away any time-to-market advantage. The Indian Union government on Thursday notified the National Medical Device Policy 2023, aiming to establish India as a global leader in manufacturing and innovation of medical devices by achieving a 10-12% share in the expanding global market over the next 25 years. However, Singapore, being a relatively small country, naturally looks beyond its own market when it comes to introducing products. From day one our approach is to do the innovation here, and do the proof of concept, but we have to have a focus on getting the product to a much bigger market [11].

## CONCLUSION

The healthcare technology which is purely related to the medical wellness should be serve latest technology, standards services and regulations are to assure the people for their safety, guarantee of effectiveness of product. However in the context of unique and personalized medical technology provide a better solution of existing problems through the innovative approach. At the same time it may not change the neutrality of being human In real time. The updated regulatory guideline are more important for such type of technological innovation in medical sector due to the perception of benefit of global population to improve patient health.

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