# Transforming Healthcare through IoT

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According to a latest report from International Data Corporation (IDC), the worldwide Internet of Things (IoT) market will grow from $655.8 billion in 2014 to $1.7 trillion in 2020 with a compound annual growth rate (CAGR) of 16.9 percent. This technology offers a lot of prospects across different industries. "The healthcare sector is a fast growing IoT market with a host of new tools and technologies. It is expected to improve the quality and efficiency of various healthcare services, but at reduced costs," said Dr Prasant Misra, Senior MTS (Member Technical Staff), Robert Bosch Centre for Cyber Physical Systems, (RBCCPS). Here's a look on how it can do that. Read on...

**IoT for Healthcare**

The visible and most widespread application of IoT seems to be in the wearable devices, but there are other numerous uses of this technology in the healthcare sector.

IoT can transform healthcare through connecting various equipment, communication systems and software applications that help monitor patient health in real-time. Apart from Remote health monitoring, it can also be of utmost help in assisting elderly in smart homes.

Proactive health monitoring by care givers is another application of IoT says Mr Vinay Nathan, CEO and Co-Founder Altizon Systems, a Pune-based IoT start-up. He added, "Today healthcare equipment providers can monitor their equipment across the globe and diagnose device and patient health through embedded sensors. This goes a long way in increasing detecting anomalies and improving quality of life and health outcomes for patients."

Mr Nathan further highlights another important aspect, revolutionizing surgical procedures. He added, "Multiple channels of data from equipment is integrated and routed wirelessly. All the vital data pertaining to the surgery flows to the operating team, the control room as well as to remote observers. This data is used to setup alerting mechanisms, remote consultation during operating procedures and many other applications."

The technology also has a widespread applicability for pharmaceutical companies in maintaining clean rooms. "Pharma

Companies' need to maintain an absolute clean room without manual intervention at places where certain drugs are kept or getting manufactured. Monitoring of air quality, ambience temperature and pollutant levels through sensors and alerts based on any violations help them the pharma companies, maintain quality levels," said Ms Shalini Kapoor, Chief Architect-Internet of Things Cloud, IBM Analytics, IBM India.

Monitoring effectiveness and downtime of IoT-enabled medical devices is another area which is of extreme important in healthcare sector. Ms Kapoor continued, "Imagine a scenario where manufacturer of a medical infusion pump can charge hospitals based on the no. of patients that infusion pump serves. This is possible only if the medical infusion pump is instrumented and is sending data to IoT cloud where it is being analyzed."

### Transforming Healthcare through IoT: Present scenario

The healthcare sector is slowly embracing this new technology. With new technology advancements, healthcare and treatment is becoming cheaper and more accessible. "With IoT, it will be easier to monitor patients 24/7. There are numerous start-ups, who are focusing on developing IoT products and technologies in the healthcare domain. All this started recently and is expected to fly high with significant potential," said Mr M.N. Vidyashankar, President, India Electronics & Semiconductor Association (IESA).

The companies are leveraging the power of IoT to provide patient care. Mr Nathan added, "With the usage of mobile devices, wearables and electronic records healthcare providers have access to information in real time which improves the health care provision. With IoT it is easier to collect and integrate data from these devices resulting in quick and better services."

Hospital management is another area where this technology is of great help. Mr Nathan enlightened, "Implementing IoT solutions for managing equipment using cloud technology gives real time usage data of the equipment. This equips hospitals to optimally utilize its equipment for providing adequate care when required."
He further added, "IoT is providing with the intelligence to capture and analyze data that was not impossible earlier. This data is giving insights into previously incurable conditions and also facilitating high end and personalized services."

### IoT in Manufacturing

Market research reports predicts that close to 50 billion devices will be connected by the year 2020. Everybody want a piece of this space. Investors and tech companies are ramping up the IoT space to leverage the opportunities it presents.
"Electronics hardware play a major role in the revenue generation for IoT industry. With this huge scope we see in developing the Hardware side, there also lies a huge opportunity for IoT in the manufacturing side," said Mr Vidyashankar.

Mr Nathan adds, "Major equipment manufacturing companies are creating smart connected products that leverage IoT to provide value added services to its customers. These equipment have inbuilt sensors that track and transmit data, which opens up the possibilities of using this data for running analytics on it and building innumerable applications."

However, the manufacturing industry does not seem to be in sync with this new trend. "The onus is on hardware manufacturing companies to understand the scope and need for getting equipment connected. Also, the Indian manufacturing industry is not completely aware of the business value of the data that can be captured from equipment and the right to ownership of data," said Mr Nathan.

### Challenges/Roadblocks

IoT holds great potential for industries and society. However, this potential can be realized only by overcoming the challenges being faced by the industry. Lack of common platform being one. Mr Nathan highlights further, "Existence of multiple platforms and protocols with no common standards make integration of different systems a big challenge. The standards vary based on the industry vertical, kind of devices involved, security concerns and used cases. There is a pressing need for standardization across devices and platforms in order to makes things IoT ready. The industry needs to agree upon and establish common standards for connectivity, discovery and device authentication."

Robust connectivity is another pressing issue faced in the Indian context. Mr Nathan further adds, the basic requirement for IoT is to connect things starting tiny sensors to remotely located machines. There has to be a major push towards creating the infrastructure for IoT to scale.

Dr Misra points out another major roadblock. "The primal problem with IoT solutions is the lack of interoperability at various levels, and more predominately at the device (or 'Things') level. 'Things' or physical modules/ platforms contain the interface to the physical world for measurement of various physical parameters. Due to interoperability constraints, the existing IoT ecosystem does not have provisions for interfacing devices of varying heterogeneity and complexity from multiple

manufacturers that use different proprietary middleware technologies," he said.

## Recommendations/ Push for the prosperity

Reports suggests that the market size for IoT in India will be $10-12 billion by 2020. "This figure can be much higher if proactive steps are taken right now," said Dr Misra.

"R&D should be encouraged. Start-ups in the IoT sector still lack an ecosystem like in China or Silicon Valley whether it is easy access to quality facilities for development/prototyping or funding," said Mr Abhishek Latthe, CEO, SenseGiz, an

## IoT start-up

He added that the Tax breaks to start-ups can be helpful as IoT needs high initial investment before a company can start generating sufficient revenues.

Dr Misra suggests the solution for interoperability highlighted in the previous section. He proposed, "The most effective solution to this problem is the creation of the plug-n-play infrastructure across platforms from multiple vendors, necessary for interoperability and successful deployment of large-scale city wide systems."

He added, "It should abstracts the features, capabilities and controls of the sensors and communication layer to allow higher level services to be developed and interacts with sensors/networks in a generalized manner. This should further be backed up with appropriate policies and standardization efforts. The information governance challenges are also significant in the areas of: Interoperability, Data integrity, Access control, Data quality, Security and compliance."

## Future Forecast

Though IoT is not a new technology, it is certainly an evolving one and presents a lot of opportunities in various sectors. "IoT in critical verticals such as transport, wellness, healthcare, home, agriculture, livestock, water supply networks etc, has the power to transform the country at the grassroots level," said Mr Vidyashankar.

"Going forward, we will see a lot of tailor-made IOT solutions uniquely for India as well as adoption of the IoT products and solutions from the developed countries," said Mr Latthe.

This technology in the coming years will be a boon for both industries and consumers alike believes Ms Kapoor, "IoT, Cloud and Analytics coming together will create powerful scenarios which will help consumers and businesses."

Start-ups are already showing the way for innovators, and large industry players and academic institutes are teaming up. "A range of business models are emerging, along with scalability solutions for hardware products, and global and local applications of IoT platforms," added Mr Vidyashankar.

"Overall these are exciting times for the IoT space and at Altizon we are very bullish on this being the one area, India can emerge as a technology power house," concluded Mr Nathan.

The future looks promising for the IoT industry.