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## Internet of Things (IoT) – World Scenario



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Nerul, Navi Mumbai - 400708

**Two-Day Multidisciplinary  
International Conference**

On

**Internet of Things (IoT)  
World Scenario**



Organized by  
Department Of Information Technology  
and Computer Science

On

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## TELEMEDICINE: A NEW HORIZON IN BUILDING SUSTAINABLE HEALTH CARE

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### Abstract:

*The paper presents an overview about the concept of Telemedicine as a sustainability practice in health care sector . The Indian healthcare industry is at a very interesting position, delicately poised to grow exponentially for the next decade. Access, equity, quality, and cost-effectiveness are key issues facing health care in both developed and less economically developed countries. Modern information and communication technologies (ICTs), such as computers, the Internet, and cell phones, are revolutionizing how individuals communicate with each other, seek and exchange information, and enriching their lives. These technologies have great potential to help address contemporary global health problems. This growth in combination with technologically advanced practices is relevant to adapt with changing times. The paper attempts to present the concept of Telemedicine as a sustainable practice in health care sector which uses digital technologies to deliver medical care, health education, and public health services by connecting multiple users in separate locations.*

**Key words:** *Telemedicine, Sustainability, Health care sector, digital technologies*

**Objectives of the Study:** The main objectives of the study are as follows:

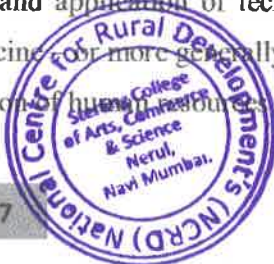
1. To give an overview on the concept of Telemedicine
2. To give an overview of India's health care sector and highlight the importance of Telemedicine practices for sustainability in health care sector.
3. To present the utility, scope and progress of Telemedicine in India.

**Limitations of the study:** The present study is based on the information gathered from secondary data only.

**Introduction:** With changing times sustainability has to be one of the key strategies which every sector needs to imbibe. Recent advancements in, and increasing availability and utilization of, ICTs by the general population have been the biggest drivers of telemedicine over the past decade, rapidly creating new possibilities for health care service and delivery. This has been true for developing countries and underserved areas of industrialized nations. Adoption of information and communication technologies is equally important to achieve sustainability to adapt with changing times. The relevance and application of technology in health care sector is possible

through the concept of Telemedicine. Telemedicine, or more generally: telehealth – services are increasingly established as a means to facilitate the distribution of human resources and professional competences. More

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particularly, these services can speed up diagnosis and therapeutic care delivery for emergencies, support virtual hospitals in patients' homes and allow primary healthcare providers in geographically dispersed locations to receive continuous assistance from specialized coordination centers.

**Concept of Telemedicine:** Telemedicine is an emerging field in healthcare arising out of the synergistic convergence of Information Technology with Medical Science having enormous potential in meeting the challenges of healthcare delivery to rural and remote areas besides several other applications in education, training and management in health sector. It may be as simple as two health professionals discussing medical problems of a patient and seeking advice over a simple telephone to as complex as transmission of electronic medical records of clinical information, diagnostic tests such as E.C.G., radiological images etc. and carrying out real time interactive medical video conference with the help of IT based hardware and software, video-conference using broadband telecommunication media provided by satellite and terrestrial network. Telemedicine in India is at a nascent stage and AIIMS has taken a lead to take it to higher glory. The World Health Organisation (WHO) stated in 1998: "Telemedicine is the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities.

**Indian Health Care Industry- Overview:** According to an Indian Brand Equity Foundation (IBEF) Report on healthcare (Nov, 2011), the market size of this industry is expected to grow to USD 280 billion by 2020. This would be over 10 times as in 2005, when the market was at USD 23 billion, a spectacular growth in just a short span of 15 years (IBEF, 2011). A shift in policy has also been observed with the Government of India aiming to develop India as a global healthcare hub and a leader in medical treatment and facilities in South Asia. Healthcare sector revenue has also been growing significantly showing potential of also becoming a highly profitable industry for private players. The Indian Brand Equity Foundation (IBEF) has estimated that healthcare sales (across the different components) grew at a compound annual growth rate (CAGR) of over 17% between 2005 and 2010. Even though the industry is so large and expanding, India's healthcare spending is low in comparison to other developed (US and European) or emerging (China and Brazil) economies (KPMG, 2011). A significant number of people in India, especially those living in the rural parts do not have access to health infrastructure or trained healthcare professionals. It is estimated that India has an average of 0.6 doctors for every 1000 people as compared to the global average of 1.23 (CII & Technopak Advisors Ltd, 2011). What is even more appalling is that the rural doctor to population ratio is lower by six times as compared to urban areas, showing a much higher concentration of healthcare institutions available to the urban rich class rather than the poor. A Confederation of Indian Industry (CII) Technopak study also highlights that there is a shortfall of over 900,000 physicians and 250,000 nurses in the country (CII & Technopak, 2012).

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**Utility of Telemedicine:** The utility of Telemedicine is discussed as follows:

- Easy access to remote areas
- Using telemedicine in peripheral health set-ups can significantly reduce the time and costs of patient transportation
- Monitoring home care and ambulatory monitoring
- Improves communications between health providers separated by distance
- Critical care monitoring where it is not possible to transfer the patient
- Continuing medical education and clinical research
- A tool for public awareness
- A tool for disaster management
- Second opinion and complex interpretations
- The greatest hope for use of telemedicine technology is that it can bring the expertise to medical practices once telecommunication has been established.
- Telementored procedures-surgery using hand robots
- Disease surveillance and program tracking
- It provides an opportunity for standardization and equity in provision of healthcare, both within individual countries and across regions and continents.

#### **Scope & Progress of Telemedicine in India:**

Considering the challenges discussed above and in addition to it India has its vast population, of which majority are poor and live in rural areas live in difficult to reach and inhospitable terrain. Along with it inadequate healthcare network faces a daunting challenge of providing quality healthcare to its citizens. Here, the average per capita spend on healthcare is one of the lowest in the world and various healthcare indicators are also lower than the global average. In order to provide quality and affordable healthcare to all, Telemedicine – the use of telecommunications to improve patients health status by exchanging medical information from one site to another, has provided an impetus to the government's vision of quality health for all by helping in delivering quality healthcare and in controlling the increasing medical costs. Telemedicine in India has a market of more than \$500 million and has been implemented in places far and wide under the Public-Private Partnership model. As the reach of Telemedicine increases, the market for medical diagnostic, health care providers, drug manufacturers, telecom equipment, manufacturers, software vendors also increase. Telemedicine, however is not a panacea for Indian Health care problems. It is instead a great facilitator in bridging the health care divide.

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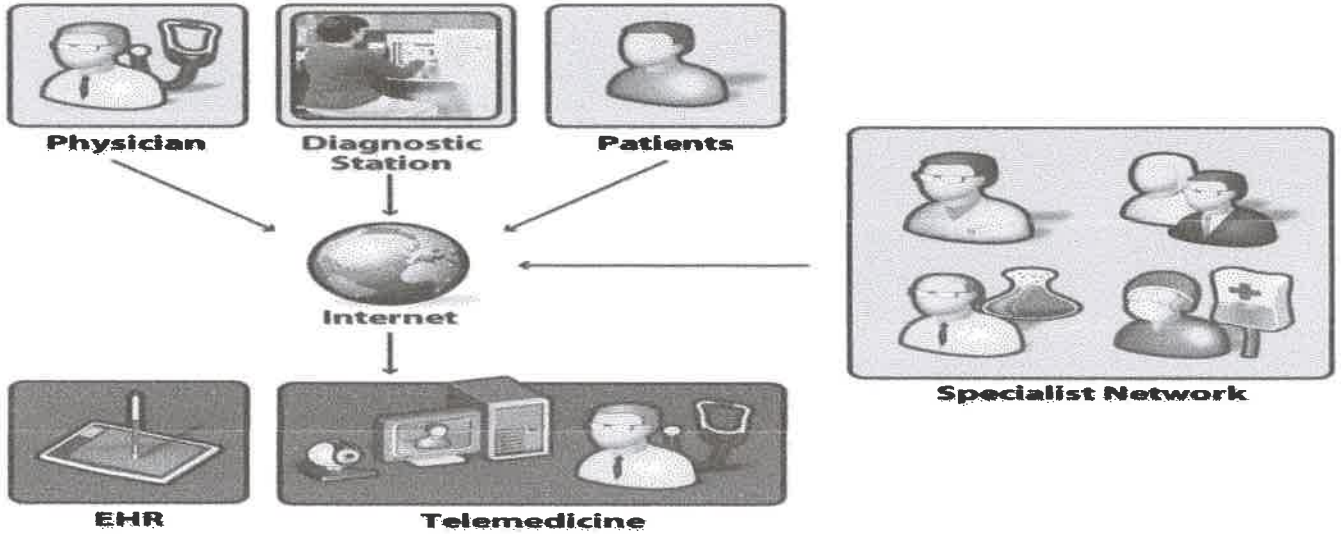


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**Figure 1:** The following figure represents the Telemedicine model and how it works

(Source : [www.interactivecare.com](http://www.interactivecare.com))



**Applications of Telemedicine:** It is the use of information and communication technology for prevention, promotion and to provide health care facilities across distance. It can be divided in the following Activities, Tele-consultation & Tele-follow up. Tele-Education should be understood as the development of the process of distance education (regulated or unregulated), based on the use of information and telecommunication technologies, that make interactive, flexible and accessible learning possible for any potential recipient.

In India, telemedicine programs are actively supported by:

- Department of Information Technology (DIT)
- Indian Space Research Organization
- NEC Telemedicine program for North-Eastern states
- Apollo Hospitals
- Asia Heart Foundation
- State governments
- Telemedicine technology also supported by some private organizations

DIT as a facilitator with the long-term objective of effective utilization / incorporation of Information Technology (IT) in all major sectors, has taken the following leads in Telemedicine:

- Development of Technology
- Initiation of pilot schemes-Selected Specialties, e.g. Oncology, Tropical Diseases and General telemedicine system covering all specialties
- Standardization

- Framework for building IT Infrastructure in health
- The telemedicine software system has also been developed by the Centre for Development of Advanced Computing, C-DAC which supports Tele-Cardiology, Tele-Radiology and Tele-Pathology etc.
- The telemedicine system has been installed in the School of Tropical Medicine (STM), Kolkata and two District Hospitals. In West Bengal, two hospitals where telemedicine centres have been established are the First Coronary Care Unit inaugurated in Siliguri District Hospital, Siliguri, West Bengal on 24 June, 2001 and Bankura Sammilani Hospital, Bankura, West Bengal inaugurated on 21 July, 2001
- In the past three years, ISRO's telemedicine network has expanded to connect 45 remote and rural hospitals and 15 super specialty hospitals. The remote / rural nodes include the offshore islands of Andaman and Nicobar and Lakshadweep, the mountainous and hilly regions of Jammu and Kashmir including Kargil and Leh, Medical College hospitals in Orissa and some of the rural / district hospitals in the mainland states.
- The Telemedicine project is a "NonProfitable" project sponsored by Rabindranath Tagore International Institute of Cardiac Sciences (RTIICS) Calcutta, Narayana Hrudayalaya (NH) Bangalore, Hewlett Packard, Indian Space Research Organisation (ISRO) and the state governments of the seven North Eastern states of India. The Rabindranath Institute at Kolkata and Narayana Hrudayalaya at Bangalore will be the main Telemedicine linking hub for the seven states. The specialists at both the institutions will offer their services for this project entirely free of charge. A 100 bedded hospital will be identified in each of these seven states and the hospitals will be selected based on distance from the state capital and the lack of a coronary care unit.

#### Conclusion:

Telemedicine will soon be just another way to see a health care professional, just as seeing friends and family while talking to them on the phone is becoming common place. Technology manufacturers and telecommunications companies are already vying with each other to produce the low-cost equipment and bandwidth needed. The Centre for International Rehabilitation recognizes that telecommunication and telemedicine are important technologies to improve and provide rehabilitation services in remote areas. Telemedicine cannot be substitutes for physicians in rural areas especially in developing countries where resources are scarce and public health problems are in plenty. So it is unrealistic to think at this stage of substituting unwilling doctors with this technology. However, it can supplement the current health scenario in a huge way in most countries.

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