E-HEALTH IN INDIA: MARKET POTENTIAL AND ITS CHALLENGES

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ABSTRACT

As healthcare enterprises seek to move towards an integrated, sustainable healthcare delivery model an IT enabled or online healthcare strategy is being increasingly adopted. In this study we identified the critical success factors influencing the effectiveness of an e-Healthcare strategy in India. The performance assessment criteria used to measure effectiveness were increasing reach and reducing cost of healthcare delivery. It involves the speedy transmission of patient data related to consultations, diagnostic and therapeutic services, patient education and rehabilitative services among the providers, the consumers, the planners and researchers. E-Health, broadly defined as the use of Information and Communication Technology (ICT) in health, can make a world of difference in all developed and developing countries. Most notable attribute of e-Health is that it is enabling the transformation of the health system from one that is narrowly focused on curing diseases in hospitals by health professionals, to a system focused on keeping citizens healthy by providing them with information to take care of their health whenever the need arises, and wherever they may be. The present paper discusses the challenges and opportunities in ICT implementation in health care specific to Indian scenario.

KEYWORDS: e-health, e-health challenges, healthcare, ICT, IT, online healthcare.

INTRODUCTION

Nowadays, everybody talks about e-health, but few people have come up with a clear definition of this comparatively new term. Barely in use before 1999, has this term now seemed to serve as a common "buzzword," used to characterize not only "Online

Pharmacies", but also virtually everything related to computer technology and medicine.[1] The term was apparently first used by industry pioneers and marketing people rather than academics. They created and used this term in line with other "e-words" such as e-commerce, e-business, e-solutions, and so on. In an attempt to carry the promises, principles, fervor (and hype) around e-commerce (electronic commerce) to the health arena, and to give an account of the new potential the Internet is opening up to the area of healthcare. Intel, for instance, referred to e-health as "a concerted effort undertaken by leaders in healthcare and hi-tech industries to fully harness the benefits available through concurrence of the Internet and health care." Because the Internet created new opportunities and challenges to the conventional healthcare information technology industry, the use of another term to address these issues seemed appropriate.[2]

These "new" challenges for the healthcare information technology industry were mainly:
(1) The capacity of consumers to interface with their online systems (B2C = "business to consumer");
(2) Improved potential outcomes for institution-to-institution transmissions of information (B2B = "business to business");
(3) New potential outcomes for peer-to-peer communication of consumers (C2C = "consumer to consumer").[1,3]

It appears quite clear that e-health encompasses more than a mere technological innovative development. I would define the term and concept as follows:

E-healthcare is a rising field in the intersection of medical informatics, people health and business, referring to health services and information delivered or conveyed through the Internet and related technologies advancements. In a more extensive sense, the term describes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, territorially, and globally by using information and communication technology.[1,4]

This definition hopefully is sufficiently expensive to apply to a dynamic environment, such as the Internet and at the mean time acknowledges that e-healthcare encompasses more than just "Web and Medicine".

Definitions of E-Health (Online Health)
The World Health Organization defines e-health as follows:

"E-Health is the cost-effective and secure utilization of information and communications technologies in support of wellbeing and health-related fields, also including health-care services, health surveillance, health-related literature, and health education, information and research".[5,6,7]

The European Commission defines e-Health generally as
"The use of present day information and communication technologies to address needs of people, patients, healthcare professionals, healthcare providers, as well as policy makers".[8]

Claudia Pagliari and their colleagues, in a detailed discussion of the field of e-Health, offer the accompanying broad definition which also covers human and organizational factors:

"E-health is an emerging field of medical informatics, referring to the organization and conveyance of health services and information using the Internet and related technologies. In a more extensive sense, the term portrays not only a technical development, but also a new way of working, an attitude, and a commitment for networked, global thinking, to improve healthcare services locally, territorially, and globally by using information and communication technology".[5,6]

Gunther Eysenbach offers the following compact definition:
"eHealth = Medicine + Communication + Data/Information + Society".[8]

The 10 essential E's in "E-health (Online Healthcare Platform)"
As such, the "E" in E-health does not only stand for "electronic," but implies a number of other "e's," which together perhaps best define what e-health is all about (or what it should be). Here, these are as follows:[3,1,9]

1. *Efficiency*
One of the promises of e-health is to enhance efficiency in health care, thereby diminishing costs. One possible way of diminishing costs would be by avoiding duplicity or unnecessary diagnostic or therapeutic interventions, through improved communication possibilities between healthcare foundations, and through patient engagement.

2. *Enhancing quality of care*
Expanding effectiveness includes not only reducing costs, but at the mean time improving quality. E-health may improve the quality of health care for instance by permitting

comparisons between different providers, involving consumers as additional power for quality assurance, and guiding patient streams to the best quality providers.

3. *Evidence based*

E-health interventions ought to be evidence-based in a sense that their effectiveness and efficiency should not be expected but demonstrated by rigorous scientific evaluation. Much work still must be done around there.

4. *Empowerment of consumers and patients*

By making the knowledge bases of medicine and personal electronic records accessible to consumers over the Internet, e-health opens new doors for patient-centered medicine, and empowers evidence-based patient choice.

5. *Encouragement* of a new relationship between the patient and health professional, towards a genuine partnership, where decisions are made in a shared manner.

6. *Education* of physicians through online sources (continuing medical education) and consumers (health education, tailored preventive data & information for consumers).

7. *Enabling* information exchange and communication in a standardized way between healthcare establishments.

8. *Extending* the scope of healthcare beyond its traditional boundaries. This is meant in both a topographical sense as well as in a conceptual sense. E-health empowers consumers to easily obtain health services online from worldwide providers. These services can range from simple advice to more complex interventions or products such a pharmaceuticals.

9. *Ethics* - e-health includes a new form of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues.

10. *Equity* - to make healthcare services more impartial is one of the guarantees of e-health, however at the interim, there is a considerable threat that e-health may deepen the gap between the "wealthy" and "poor". Individual, who do not have the money, skills, and access to computers and networks, cannot operate computers effectively. Subsequently, these patient populations (which would really profit the most from health wellbeing data)

are those who are the least likely to benefit from advances in information technology, unless political measures ensure equitable access for all. The digital divide currently runs between rural vs. urban populations, rich vs. poor, young vs. old, male vs. female people, and between neglected/rare vs. common diseases.

In addition to these 10 essential e's, e-health should also be

- easy-to-access,
- entertaining (no-one will use something that is boring!), and
- exciting

Pros and Cons of Online Healthcare (E-Health)

E-Health aids overstretched health framework in accomplishing efficiencies and cost reductions in the allocation of staff and resources but it can also, as the report contends, enhance the quality of service and provide more prominent equity in patients' access to care, with patients who may already have had difficulty issues with a doctor face-to-face now able to receive care in their home or community at the time that suits them. Categories of eHealth incorporate virtual health (v-Health), in which health care providers work together and deliver health care services remotely, and mobile health (m-Health), where patients themselves can access services remotely by using a wireless network through the standard functions of their device or through a specially designed mobile application.[3]

The most exciting and useful opportunities eHealth technologies advancement offer medical professionals are in the territories of communication and data collection. Tablets and smartphones double as medical monitoring gadgets as well as tools for sharing information. Video conferencing is used for both collaborative meetings and data or information collection. Always connected to their hospital's information or date base systems, health care professionals are able to consult and exchange data or information at their point of need.[10]

The issues which emerge for all information systems regarding the security of data, data integrity and privacy are particularly acute in the case of intense medical information. Nevertheless, these issues do not appear to be a deterrent to many prospective patients. Although the study found that few respondents had utilized v-Health or m-Health services, there was solid enthusiasm in accessing these online services when they become more available, particularly for other people in the respondents' care. In addition, the overwhelming majority of respondents were willing to utilize email for non-urgent issues, for

example, prescription refilling, their confidence bolstered by a secure system and a record of the communications. As the study points out, similar services already exist in the US, where they have diminished visits to the doctor by 25% and doctors report that patients develop more prominent trust in practices willing to employ the new technology innovation.[11,10]

The concept of v-Health or m-Health and then posed a series of scenarios to see if concrete details would dampen the enthusiasm. In spite of the fact that the majority of respondents were willing to utilize the services described, they were "cautiously optimistic", their main concerns being the quality of care and privacy. There was also significant concern about losing an individual relationship with a doctor, keeping the framework secure and about the potential for patient abuse in the case of online prescription renewals.

The biggest hurdle to e-Health is the difficulty for consumers to find accurate and reliable information or data. The two critical indicators of e-Health, quality of information are source credibility and information completeness. According to Medical experts' suggestion, health information provided by a source that is not credible is detrimental to consumer outcomes. Also, unless health data or information is complete, it is likely to mislead the consumer into making incorrect decisions. The completeness of health information is only considered the single most important criterion in healthcare decision making.

The most vulnerable people in our society may be the least able to get benefited from e-Health because of cognitive, social, and cultural hurdles. These hurdles include literacy level, cultural differences, language differences, access to technology and educational deficiencies. Only through conscious efforts to address these barriers, e-Health initiatives can be expanded to meet a broad range of society's need and want.[3,10,11]

Online Healthcare Industry (E-health)

E-Health refers to that technology used for clinical, educational, research, and administrative purposes, both at the local site and across wide geographic regions. The use of e-Health has increased networking, facilitated global thinking, and improved healthcare on local, regional, and national levels.

The focus of e-Health can be summarized to include enhanced efficiency in healthcare, improved quality of care, increased commitment to evidence-based medicine, empowerment of patients and consumers, and the development of new relationships among patients and

healthcare professionals. From a global perspective, e-Health can be used to circulate health information as well as ensure that the most updated information is used to improve people's health. Rural areas may be the biggest benefactors of e-Health by having easier access to information and access to e-pharmacies services. The use of e-Health in rural areas is important because 95% of respondents have used the Internet and many have access to scanners, digital cameras, and video conferencing. E-Health networks can remove the barriers of time and distance to the flow of health information and can help to ensure that collective information is brought to bear effectively on health problems throughout the world.[1,6,12–14]

Four areas of e-Health

e-Business, consumer marketing, organizational management, and clinical customer service. Some of these are accessed via the public Internet, while others are restricted by passwords on Internets or local area networks. These are as follows[12,15,16]

E-business includes online acquisition processing between health care providers and suppliers, online electronic claims processing, eligibility authorization from insurance companies, and consumer purchase of prescription drugs and health insurance.

Consumer marketing includes the use of Websites to display organizational information to attract new patients and provide information on wellness and disease-specific information to existing patients.

Organizational management includes posting employee information on a company Internet Website, delivering programs related education, listing job announcements, and announcing employee health benefit programs. It also includes administrative processes such as billing management and strategic planning.

Clinical customer service includes patient access to medical information via electronic health records (EHR) allowing them to conduct risk assessments of their own health and include patient-physician interaction using e-mail. E-mail communication can provide an opportunity for patients with Internet access to e-mail their queries and receive responses from their physicians. This form of electronic contact shows promise as a means of enhancing level of communication and facilitating interactions between patients and the healthcare delivery system.
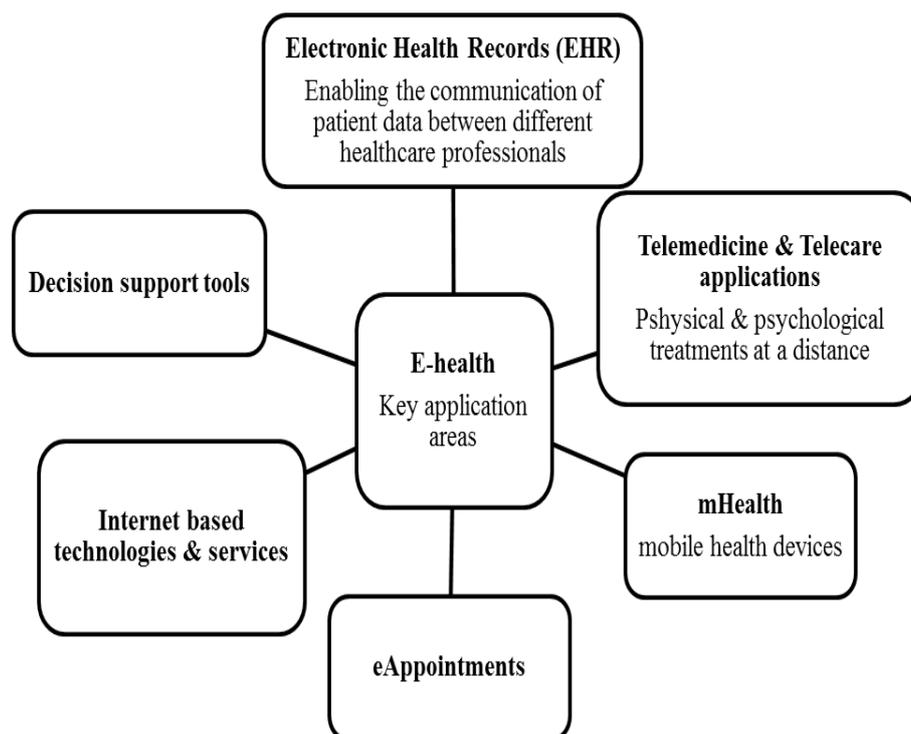
Source: E-health for the regions, AER e-health Network

Legal and Regulatory Framework in India for E-Health

The laws that broadly cover e-Health services are discussed below.[13,17,18]

1.   The Information Technology Act, 2000 ("IT Act"), The Information Technology (Reasonable security practices and procedures and sensitive personal data or information) Rules, 2011 ("Data Protection Rules") and the Information Technology (Intermediaries Guidelines) Rules, 2011 ("Intermediary Guidelines")[13]

E-Health involves a constant exchange of information between the patient and the service provider. The patient's personal information, such as medical history and physiological conditions, are considered Sensitive Personal Data or Information ("SPDI") under the Data Protection Rules. When a body corporate collects, stores, transfers or processes such information, certain requirements under the Data Protection Rules are triggered.

Consent is one of the major requirements under the Data Protection Rules. Before a doctor or an institution does anything with a patient's data, they are required by law to obtain the recipient's consent in writing. The patient must be informed about the fact that the data is being collected, what it will be used for and whether it would be transferred to any third parties, along with the contact details of the agency collecting the information. There is also a requirement for body corporates to have a privacy policy in place and published on its

website. This consent is usually obtained by having the patient accept the terms of the body corporate's privacy policy, which is also required to have such information, in addition to the security practices the body corporate has adopted to keep the information safe.

2. Other Service Providers Regulations under the New Telecom Policy 1999 ("OSP Regulations")

Service providers who render "Application Services" - which includes telemedicine services – using telecom resources provided by telecom service providers, are required to be registered as an 'Other Service Provider' ("OSP") with the Department of Telecommunications.

3. The Drugs and Cosmetics Act, 1940 ("D&C Act") and Drugs and Cosmetics Rules, 1945 ("D&C Rules")[19]

The D&C Act and D&C Rules regulate the manufacture, sale, import and distribution of drugs in India. In many overseas jurisdictions, there is a clear notice between a drug that must be sold under the supervision of a registered pharmacist on the generation of a valid prescription (signed by a registered medical practitioner) and those that can be sold by retail chemists over-the-counter ("OTC"). OTC medicines have a different sense in the context of Indian laws. The D&C Act requires that all drugs must be sold under a license.

The D&C Rules obviously set down which medications can be sold just on the generation of a prescription issued by a registered doctor, which infers that there is a refinement amongst prescription and non-prescription drugs. Drugs which can be sold only on prescription are listed in Schedules H, H1, and X of the D&C Rules.

The D&C Act expresses that no individual can offer any medication without a permit issued by the authorizing specialist. Be that as it may, it accommodates certain medications, in particular those falling under schedule K of the D&C Rules, to be sold by persons who do not have such a license. Henceforth, OTC medications in the Indian setting would mean just those medications that are determined under schedule K. These broadly include drugs not intended for medical use, quinine and other antimalarial drugs, magnesium sulfate, substances intended to be used for destruction of vermin or insects that cause disease in humans or animals and household remedies, among others.

4. The Indian Medical Council Act, 1956 ("MCI Act") and The Indian Medical Council (Professional conduct, Etiquette and Ethics) Regulations, 2002 ("MCI Code")

The MCI Act provides authority to individuals that only those persons who have a certified degree in medicine and are registered with one of state medical councils have the authorized right to practice medicine in India. The MCI Code lays down healthcare professional and ethical standards of interaction of medical practitioner with patients. The MCI Code also specifies that efforts are to be made to digitalize medical records so that they can be retrieved quickly. Doctors are bound by the MCI Code and have to submit a declaration to that effect. The apex body currently regulating the practice of medicine is the Medical Council of India. However, the proposed National Medical Commission Bill, 2016, which has been drafted by the National Institution for Transforming India ("NITI Aayog"), intends to replace the current Medical Council of India with a 'National Medical Commission'. The passing of the National Medical Commission Bill would see a change in the current regulatory framework regulating medical practitioners.

5. The Drugs and Magic Remedies (Objectionable Advertisements) Act, 1954 and Drugs and Magic Remedies (Objectionable Advertisements) Rules, 1955 ("DMRA")

The DMRA makes it punishable, with imprisonment or fine or both, to participate in any advertisements in reference to a medicine which:

a. directly or indirectly gives a false impression regarding the true character of the medicine covered in the advertisement; or

b. make a false claim regarding a drug; or

c. Is otherwise false or misleading in any material particular regarding a drug.

Advertisements are, however, permitted to be sent confidentially to registered medical practitioners and chemists, so long as such communication bears the words 'For the use only of registered medical practitioners or a hospital or a laboratory' at the top of the document in indelible ink and in a conspicuous manner.

6. Unsolicited Commercial Communications Regulations, 2007 ("UCC Regulations") and Telecom Commercial Communication Customer Preference Regulations, 2010 ("TCCP Regulations")[17]

Sending unsolicited commercial communications over voice or SMS are prohibited under the TCCP Regulations and UCC Regulations. However, there is no legal bar over sending transaction messages. For example, any information sent by any company pertaining to

delivery of services to be delivered to such customers would be identified as a transactional message.

7. *The Clinical Establishments (Registration and Regulation) Act, 2010 ("Clinical Establishments Act")*[17]

Establishments falling under the definition of a 'clinical establishment' under the Clinical Establishments Act would be required to register with the relevant authority and conform to the minimum standards as prescribed under the act. The Clinical Establishments Act is appropriate in Arunachal Pradesh, Uttar Pradesh, Uttarakhand, Rajasthan, Bihar, Jharkhand, Himachal Pradesh, Mizoram, Sikkim and all Union Territories with the exception of the NCT of Delhi. Certain states such as Maharashtra and Karnataka have their own state clinical establishment legislations.

Market Potential of E-health in India

The Indian health care services are highly skewed in favor of urban population which is 28% of Indian population. Nearly one million Indians die every year due to inadequate healthcare facilities and 700 million people have no access to specialist care and 80% of specialists live in urban areas.[14,20]

There has been undue delay in implementing e-governance and e-healthcare in India due to following reasons.[14,20]

- Absence of competition in health sector for long time healthcare is handled by Public Health System (PHS) with no competition.
- Weak customer with low bargaining power.
- Non-existence of funding system like insurance or social security agency.
- Strong professional culture among doctors hostile to new ICT applications.
- Doctors and nurses believe on their skill than on computer.
- Lack of computer-aid in medical and nursing education.

The E-health services market in India has witnessed a growth in recent years on account of rising demand for good healthcare services fueled by increase in number of patients and unavailability of healthcare services in rural areas. The surge in growth is majorly originated from growth in internet connectivity and innovations in healthcare IT segment in India. The growth in this segment has been largely led by the factors such as increase in number of telemedicine centers, availability of angel investors who are ready to invest in e-health

services market in India. The e-Health market in India is comprised of large companies such as Apollo Networking Foundation, Narayana Health and e-health marketplace consists of companies such as Practo, Mediangels, Medical Second Opinions whereas, on-call home healthcare services market encompasses Portea Medical, India Home Healthcare and healthcare IT includes companies such as TCS, Wipro which possess a large share of the market.

According to the research report, the India e-health services market will grow at a considerable rate in the future owing to the introduction of m-health, rise in number of competitors in the market, proliferation of mobile and broadband connectivity in rural areas and more awareness about the different services offered by e-health services market.

"While increase in internet penetration, proliferation of smartphones, increase in computer and smartphone literacy, rise in awareness about healthcare will result in the growth of e-health services market in India, paucity of funding, absence of stringent rules governing e-health services and lack of infrastructure and other technological challenges will affect the growth of this industry in the future", according to Ken Research.

Numerous start-ups

Information Technology has been making strong inroads into the health sector in India over the last decade and the advent of startups in last three to four years has created an interesting dynamics in the market. The Indian market consists of roughly 150 companies in health-tech space, with over 60 percent of health-tech focused start-ups incorporated since 2012. [2,13,14]

Key drivers of growth

The market is expected to show an annual growth rate (CAGR 2017-2020) of 30.9 % resulting in a market volume of US$729m in 2020. Revenue in the "eHealth" market amounts to US$325m in 2017. Key drivers responsible for the growth of this industry include: growing need to effectively store and manage information, need to reduce operational cost and improve efficiency, the evolution of a conscious, educated and a connected consumer with more health awareness together with growing smartphone penetration and dependence on the internet.[2,13,14]

Market Segmentation and Key Players

While administration and management solutions generate almost half of the demand within health-tech companies; mobile health apps, platforms and genomics are emerging as promising areas. According to a recent report by Health Information Management Systems Society, 44 million health care apps were downloaded in 2014 and it is expected that a total of 142 million healthcare apps will be downloaded in 2016. Healthcare platforms are also gaining popularity especially with the advent of e-pharmacies and video consultation. Companies like netmeds and 1mg e-pharmacies provide such services to bridge the gap between patients and doctors, especially in rural parts of India. Healthcare and telecom providers are also getting into partnerships to provide a substitute for traditional care. Some examples include Aircel and Apollo, Airtel and Fortis Hospitals and Idea with Apollo Hospitals.[2,13,14]
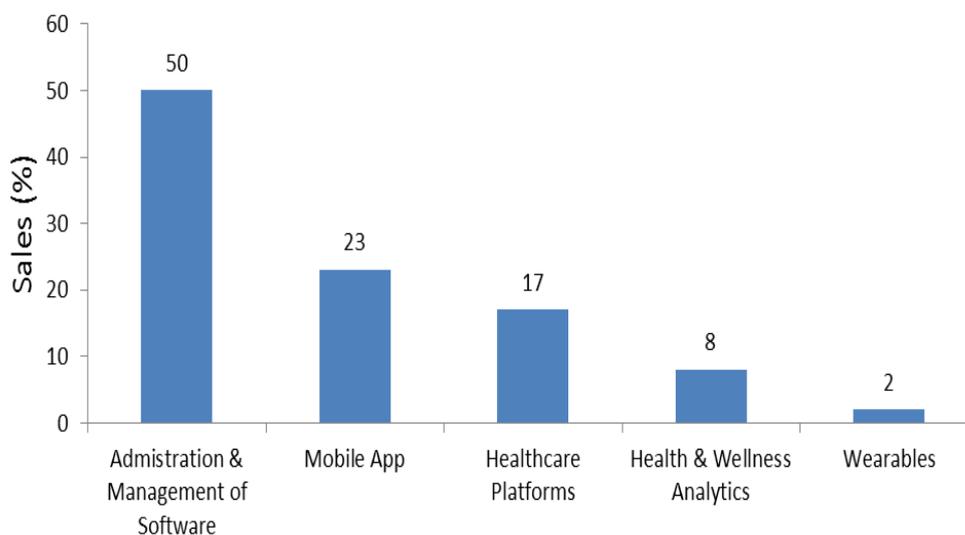
Source: India health-tech product, NASSCOM, February 2016

Challenges for E-Health in India

The challenges for an effective, economical E-Health framework are various.[14,21–23,20]

I. *Incentivisation*

Incentivizing all the stakeholders involved is a major challenge and raises the question of who will pay the bill since the cost of infrastructure, medical drugs, doctors' fees, and other operating costs could be very high. Hence, it is a requirement to distribute these costs among different entities.

II. *Cost Containment*

Providing health care to India's population is costly, and introducing ICT would require extra upfront investment. There is a need to manage the costs in such a way that the overall cost of health care goes down. This could be achieved if the overall health care budget includes more money for ICT. An e-Health program would require to generating large numbers of beneficiaries for prices to be justified.

III. *Information Exchange*

Health information exchange needs to be demand driven, with proper access and control mechanisms in place. The challenge is to motivate and encourage key stakeholders—patients, medical service providers, insurance companies and the government—to pull as well as push the right kind of information from the system.

IV. *Adoption and Resistance*

In India and across the globe, there is reluctance on the part of patients and doctors in fully adopting eHealth. The right kind of technology must be utilized in the right way so patients as well doctors feel comfortable in adopting eHealth practices.   Companies not only have to prepare the best technical systems but also make sure that they are easy to understand and use. Success will require multiple public awareness programmers on the benefits of eHealth.

V. *Staffing at Different Levels*

eHealth is not just about having technology in place. It should also have an identifiable, approachable and well-qualified human interface. Getting the right people to use these technologies in order to provide proper health care services is very important. Hence, there is a need to hire the right people and train them properly so that they are well equipped to carry out the task of providing health care to remote areas.

VI. *Evaluation*

It is the processes needs to be fair and done by an independent third-party observer. There is a need for setting benchmarks in order to track progress. These could be taken from best practices from local projects or from prominent activities in different nations, for example, Sweden, Singapore, and so on. An autonomous body could be worked for this reason which would give appraisals. The subsequent assessment would give a ceaseless learning circle which would likewise illuminate the eHealth system itself.

VII.   *Power Sharing*

The entire system of health care should be such that it can be driven by both the government central and state. Control, duty, responsibility, rewards and dangers must be all around characterized ahead of time in order to maintain a strategic distance from any irreconcilable situation.

VIII.   *Managing Information*

The information collected should be media enrich (containing video, image, text, etc.). This data ought to be appropriately chronicled, available, retrievable, secure, and clear from remote areas utilizing distinctive innovation stages. "One patient, one record" needs to be implemented, so as to avoid duplication of information. Inventive and financially savvy wellbeing informatics arrangements should be made to meet this objective.

IX. *Education*

e-Health is not just about providing health care service when someone is unwell, but it should also be used to promote preventive health care to improvise the standard of living and reduce health care costs in the medium-to-long term. This will also help in improving and enabling higher productivity elsewhere in society. But achieving this requires bringing people into the system and educating them about the different preventive measures to avoid disease outbreaks like H1N1, or other seasonal diseases.

CONCLUSION

Internet today is viewed as a user-friendly medium for communication and information search. Internet or digitalization, as a marketing tool, has opened up new doors to many companies or startups to conduct business, trade shows, market research, advertising and many more with worldwide acceptance and distribution. With a rapidly growing access to the broadband internet services, there's a progressive increase in its awareness and usage levels across all segments of the society, be it students, employees, businessmen or professionals, or homemakers. In this regard it would be right to infer that the new millennium is sure to herald a boom in the internet, thus making internet an integral part of the normal life. Increasing literacy rates, especially in rural India, and growing access to smartphones have also accelerated the use of the internet in all walks of life. This augers well also for the online healthcare portals provided the service providers are well geared to handle the substantial increase in 'traffic' to maintain highly efficient service levels. There is a promising future

waiting for both the marketers and the consumers at large in the online healthcare market as well as in other sectors which harness the virtues of online marketing.

In India, the offline mode or traditional means is still preferred by consumers to buy their products and for them to change is going to take a few years. However, a category of people, especially the young and computer savvy, have already made this transition.

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