

# A Novel Strategy of E-health Care to Achieve Sustainable Development

Alimohamad Ahmadvand<sup>1, \*</sup>, Mahya Abri Lavasani<sup>2</sup>, Sahar Ataee Ashtiani<sup>2</sup>, Elahe Abdoos<sup>2</sup>

<sup>1</sup>Professor of Imam Hossein University, Tehran, Iran

<sup>2</sup>Department of Industrial Engineering, Eyvanekey Nonprofit Institution of Higher Education, Eyvanekey, Iran

## Email address:

Alimohamadahmadvand@gmail.com (A. Ahmadvand), Br\_mhy@yahoo.com (M. A. Lavasani), sahar.ataie@yahoo.com (S. A. Ashtiani), elaheabdous@gmail.com (E. Abdoos)

## To cite this article:

Alimohamad Ahmadvand, Mahya Abri Lavasani, Sahar Ataee Ashtiani, Elahe Abdoos. A Novel Strategy of E-health Care to Achieve Sustainable Development. *International Journal of Management and Fuzzy Systems*. Vol. 1, No. 3, 2015, pp. 21-26.

doi: 10.11648/j.ijmfs.20150103.11

---

**Abstract:** E-health is the single most important revolution which is the use of digital information and communication technologies to improve people's healthcare. Obtain sustainability and meet the needs of patients are the greatest global challenge facing the world today therefore we need new strategy to achieve sustainable development in E- healthcare. In this paper, first we define some important concepts, then we propose a new strategy of E-health to achieve sustainable development. Finally, we present a new model for E-health to achieve sustainable development.

**Keywords:** Strategic Management, E-health Care, Sustainable Development, Economic, Environmental, Social

---

## 1. Introduction

Everybody talks about e-health care these days, e-health care provides a new method for using health resources such as information, money, medicines and in time should help to improve efficient use of these resources. Health services had an important role to play in sustainable development by reducing the diseases. Sustainable Development for health, public health and social care have developed a programmed to provide a network for health sector leaders internationally so it is the key to improve e-health care.

E-health care is an application strategy to Communicating between all professionals (hospitals, health insurers, practitioners, dentists, family doctors), Cross-linking of all professionals and exchange of all relevant medical documents and data also in electronic patient records with a lifelong medical history for every patient.

In considering ideas for a declaration on health and sustainable development, Professor Buch said: "this should be aimed at reinvigorating sustainable development, and focusing on ways to bequeath a healthy life for present and future generations."

Sustainable development is maintaining a delicate balance between the human need to improve lifestyles and feeling of well-being on one hand, and preserving natural resources and ecosystems, on which we and future generations depend.

E-health is a relatively recent term for healthcare practice supported by electronic processes and communication, dating back to at least 1999 (Vincenzo, D. M. 2001). U. Jai Ganesh in E-health - drivers, applications, challenges ahead and strategies refers to any use of an electronic information and communication technology to improve health care (Jai Ganesh, 2004). An Architectural Framework for Rural e-Healthcare Information Infrastructure with Web Service-Enabled Middleware Support is written by Oludayo et al. that proposes shared resources solution using emerging utility grid technology as enabler for ubiquitous e-Healthcare service provisioning. (Oludayo, et al., 2007)

Sustainable development has its roots in ideas about sustainable forest management which were developed in Europe during the seventeenth and eighteenth centuries (Grober, 2007).

In 1980 the International Union for the Conservation of Nature published a world conservation strategy that included one of the first references to sustainable development as a global priority (World Conservation Strategy, 1980).

A widely accepted definition of sustainable development comes from 'Our Common Future', the 1987 landmark report of the Brundtland Commission. This states, "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

In 2000 The Millennium Declaration adopted by United Nations General Assembly defines 'respect for nature' as a fundamental value, and commits 'to integrate the principles of sustainable development into country policies'.

Jameton and McGuire (2002) suggest that sustainability involves balancing three factors which are patient care, economic concerns, and environmental cost (Jameton, A., and McGuire, C. 2002).

For over a century, healthcare advances have dramatically improved and extended the lives of citizens across Europe over a century; healthcare advances have dramatically improved and extended the lives of citizens across Europe. In 2010 public spending on healthcare already accounted for almost 15% of all government expenditure (The European Files, 2013).

The first e-Health Action Plan was adopted in 2004. Since then, the European Commission has been developing targeted policy initiatives aimed at fostering widespread adoption of e-Health throughout the EU (eHealth Action Plan 2012-2020).

E-health plays a clear role in the European Union's eEurope strategy, and is key to achieving stronger growth and creating highly qualified jobs in a dynamic, knowledge-based economy the vision set out by the Lisbon European Council in March 2000 (European Council, 2000).

The e-health Strategies study analyses policy development and planning, implementation measures as well as progress achieved with respect to national and regional e-health solutions in EU and EEA Member States, with emphasis on barriers and enablers beyond technology. The focus is on infrastructure elements and selected solutions emphasized in the European e-health Action Plan of 2004 (Whitehouse et al., 2010).

The idea of „sustainable development“ was born in 1713 when Carlowitz edited the first book on forest sciences. He argued that timber would be „as important as our daily bread“ and that it should be used with caution in a way, that there is a balance between timber growth and lumber-ing“. This would allow forever a continuous, perpetual use (Keiner, 2005).

In the last two decades, the concept of 'Sustainable Development' has made a steep career as a political and ethical guideline for dealing with the planet's ecological and social crisis.

The roots of this concept can be traced back to the era of early 'European Enlightenment', when German Kameralists, inspired by the English author John Evelyn and the French statesman Jean Baptist Colbert, began to plan their dynasties' woodlands 'nachhaltig' – in order to hand them along undiminished to future generation (Grober, 2007).

In this paper, first we define some important concepts, then we propose a new strategy of E-health to achieve sustainable development. Finally, we present a new model for E-health to achieve sustainable development.

The rest of the paper is organized as follows:

Section 2 contains the basic definitions and notations that will be used in the remaining parts of the paper. In Section 3,

we proposed a new strategy of E-health to achieve sustainable development. Section 4 we present a new model for E-health to achieve sustainable development. The paper is concluded in Section 5.

## 2. Definition

### 2.1. Strategy

Strategy is perspective, position, plan, and pattern. It is the bridge between policy or high-order goals on the one hand and tactics or concrete actions on the other, then it has no existence apart from the ends sought. It is a general framework that provides guidance for actions to be taken and at the same time, is shaped by the actions taken. Strategy is concerned with how you will achieve your aims, not with what those aims are or ought to be, or how they are established. If strategy has any meaning at all, it is only in relation to some aim or end in view (Fred Nickols, 2012).

Professor Richard P. Rumelt described strategy as a type of problem solving in 2011. He wrote that good strategy has an underlying structure he called a *kernel*. The kernel has three parts: 1) A *diagnosis* that defines or explains the nature of the challenge; 2) A *guiding policy* for dealing with the challenge; and 3) Coherent *actions* designed to carry out the guiding policy (Rumelt, P. 2011).

### 2.2. Health Care

Health care is conventionally regarded as an important determinant in promoting the general physical and mental health and well-being of people around the world. It's services provided to people or communities by agents of the health services or professions for the purpose of promoting, maintaining, monitoring, or restoring health (khan, N. 2014).

E-Health can help reorganize care delivery with tools to enhance prevention, diagnosis, treatment and management of health and lifestyle so new technologies can be used to find innovative ways of delivering and organizing the provision of health services and goods for maximum efficiency.

There is several way we think about e-Health: a way forward to ensure better health and safer care for citizens, more transparency and empowerment, more skilled workforce, more efficient, sustainable health and care systems enabled and catalyzed by ICT (information and communication technologies).

### 2.3. E-health Care

E-health care is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies (Shortliffe, Cimino, 2014).

E-health care encompasses a whole range of purposes from purely administrative through to health care delivery, such as:

- Hospital care setting: electronic patient administration systems; laboratory and radiology information systems;

electronic messaging systems.

- Home care setting: remote vital signs monitoring systems used for diabetes medicine and home dialysis systems.
- Primary care setting: use of computer systems by general practitioners and pharmacists for patient management, medical records and electronic prescribing.

E-health care is functionally available to the patient who needs. It is possible to get an appointment without undue delay, without having to travel far and the cost will be more affordable for patients, therefore sustainable.

E-health care could help to provide basic needs, improve the quality of human life, better protection of ecosystems and secure future.

#### 2.4. Sustainable

Pertaining to a system that maintains its own viability by using techniques that allow for continual reuse. It's involving the use of natural products and energy in a way that does not harm the environment.

Capable of being maintained at a steady level without exhausting natural resources or causing severe ecological damage.

#### 2.5. Sustainability

Sustainability could be defined as an ability or capacity of something to be maintained or to sustain itself. It's about taking what we need to live now, without jeopardizing the potential for people in the future to meet their needs.

Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations. It is important to making sure that we have and will continue to have.

There are six principles of sustainability that can help a community ensure that its social, economic, and environmental systems are well integrated and will endure. (Chukwudi, 2016).

1. Maintain and, if possible, enhance, its residents' quality of life
2. Enhance local economic vitality
3. Promote social and intergenerational equity.
4. Maintain and, if possible, enhance, the quality of the environment.
5. Incorporate disaster resilience and mitigation into its decisions and actions.
6. Use a consensus-building, participatory process when making decisions.

#### 2.6. Sustainable Development

It is development which meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987).

In the extensive discussion and use of the concept since then, there has generally been a recognition of three aspects of sustainable development (See, E. G., Holmberg, E. D. 1992).

- Economic: An economically sustainable system must be able to produce goods and services on a continuing basis, to maintain manageable levels of government and external debt, and to avoid extreme sectorial imbalances which damage agricultural or industrial production.
- Environmental: An environmentally sustainable system must maintain a stable resource base, avoiding over-exploitation of renewable resource systems or environmental sink functions, and depleting non-renewable resources only to the extent that investment is made in adequate substitutes. This includes maintenance of biodiversity, atmospheric stability, and other ecosystem functions not ordinarily classed as economic resources.
- Social: A socially sustainable system must achieve distributional equity, adequate provision of social services including health and education, gender equity, and political accountability and participation.

Clearly, these three elements of sustainability introduce many potential complications to the original simple definition.

### 3. A New Strategy of E-health to Achieve Sustainable Development

In this section we use the e-health of sustainability and thus to achieve sustainable development, as mentioned sustainability has three overall sector therefore we will review e-health in three parts and in this regard describe new strategy.

It is generally accepted that sustainable development calls for a convergence between the three pillars of economic development, social equity, and environmental protection.

It should be considered that because of the extent in sub sustainability topics we describe it in detail.

#### 3.1. Economic Impact of E-health

A positive economic impact of e Health is shown by applying its evaluation method in ten proven e Health settings, two cases are described:

Institute Curie, a combined research and treatment hospital in Paris, France, specializes in oncology. Eliosis their comprehensive Electronic Patient Record (EPR) system, allowing for access to patient data by all members of the healthcare team involved in the treatment, including external partners such as other hospitals. Eliosis and Prométhée together fundamentally trans-formed healthcare processes, improved the quality of care, supported the change towards a paperless hospital, and led to considerable economic gains.

There are several main beneficiaries:

- Doctors save time and, at the same time, can collaborate better in the care of a specific patient.

- Simultaneously, doctors are better informed, facilitating better decision making about treatment.
- Medical secretaries and archivists at the institute can make better use of their time because they need to invest less effort in compiling and retrieving comprehensive patient records.

Economic results are shown that in comparison with previous years, present values of benefits has increased.

Kind en Gezin (K&G) has developed and used the Flemish Vaccination Database (FVD). The applications provide an electronic vaccination record for each child; an effective means of vaccination stock control and supply; a rapid, reliable channel of communication to healthcare professionals about changes to vaccination policies, practices and vaccines; a source of data for performance monitoring, and policy and strategy development. After the database was implemented in 1999, K&G developed a complementary application to support the automated supply, ordering and stock management of vaccines - Vaccinnet. Continuous developments of the FVD have several dimensions.

The main advantages are as follows:

- Substantially more children are now vaccinated against infectious diseases
- Parents have improved transparency of vaccination cover for their families
- Citizens are less exposed to infectious diseases (with concomitant savings to be expected in coming years)
- Health professionals have instant access to data to support higher quality services.

Reduction of cost with e-health and increasing the benefit are indicative of good economic performance.

### 3.2. *Environment Impact of E-health*

Enterprise wide use of e-health records has a neutral to slightly positive impact on the environment, according to a new report released by Kaiser Permanente, that he said electronic patient record and medical imaging systems consume more electricity, but reduce paper use, patient travel, reliance on plastics used in traditional X-ray films and other waste. The environmental study of KP Health Connect, which contains records for 8.7 million patients and is used by thousands of clinicians in 454 KP medical offices and 36 hospitals in nine states found that the digital records eliminated about 1,000 tons of paper records while KP's digital medical imaging saved about 68 tons of X-ray film. In addition, gasoline consumption by patients was reduced by about 3 million gallons per year through individuals avoiding non-urgent medical office visits and instead using KP Health Connect's services to securely message requests for prescription refills, ask clinicians questions, and conduct other virtual activities.

According to Kwankam (2004), E-Health systems are essential to keeping pace with the exponential growth of health information and to applying this knowledge to resolving world health problems. E-Health technology has already demonstrated the ability to provide access to information that

will result in improved quality of care for patients. It will also allow for more efficient use of medical resources, a reduction in administrative costs, and facilitate collaboration across the continuum of care (Kirshenbaum, 2002).

E-Health has the ability to reduce health care errors by providing the most appropriate disease-specific clinical care protocols. Additionally, it supports evidence based medicine as a mechanism to increase the quality and efficiency of the health care system by providing the information technology necessary for communication within provider networks (Jeffrey, P. 2007:288).

### 3.3. *Social Impact of E-health*

By social impact we mean the consequences to human populations of any public or private actions or alter the way in which people live, work, work, play, relate to one another, organize to meet their needs and generally act as a member of society.

E-Health Social Impact domains includes four categories:

**Rationalization:** Influence in terms of efficiency, effectiveness & innovation. The focus here is on effects such as speed, reach and flexibility of interactions, or exchanges, between societal stakeholders. Telehealth will support the social innovation that will change the landscape of healthcare, by connecting the unconnected the patients.

**Networking:** Changes in the patterns of links and communications that occur or are enabled as a result of e-health, it also touches upon the quantity and quality of relationships between people. Internet has provided unprecedented possibilities for patients to get in touch with and share experiences with others who have similar health conditions, even the rarest.

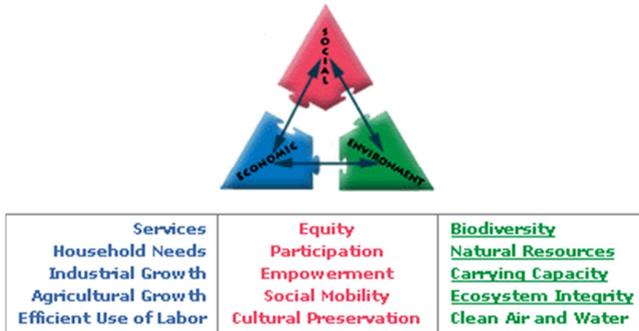
**Empowerment:** Changes in the balance of power and the nature of relationship between societal stakeholders. It studies the evidence of individual empowerment in term of choice & control. Most patients who look for health information online report being better informed, and this can be brought to bear when making healthcare decisions and in interacting with doctors. There is the risk that online patients become easier to target by health related advertising or marketing activities and there is the 'grey' area of online marketing and purchasing of medications.

**Lifelong Learning:** Opportunities for new learning and health knowledge development. ICTs offer important possibilities, such as SMS text messaging and other push applications to distribute targeted health information and education. The quality may be variable and there can be risks of information overload or disinformation, so good 'e-health literacy' skills are needed. (Integrated Health Innovations Conference Dubai, United Arab Emirates, 2013)

## 4. Present a New Model for E-health to Achieve Sustainable Development

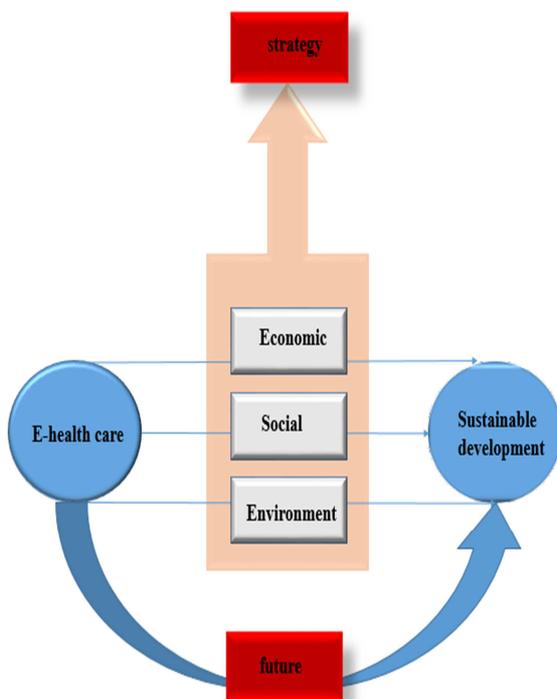
In this section we want an overall strategy to reach sustainable development. Due to the above, we can gain

economic, social and environmental stability via E-health .we could make the following model with three sub-sections and present it as a strategy to achieve sustainable development. People concerned about sustainable development suggest that meeting the needs of the future depends on how well we balance social, economic, and environmental objectives--or needs--when making decisions today. Some of these needs are itemized around the puzzle diagram.



**Figure 1.** Relationship between the various sections of sustainable Development.

Many of these objectives may seem to conflict with each other in the short term. For example, industrial growth might conflict with preserving natural resources. Yet, in the long term, responsible use of natural resources now will help ensure that there are resources available for sustained industrial growth far into the future.



**Figure 2.** Proposed Method.

According to the proposed model to achieve sustainable development must to get it in various sectors such as the economy, achieve social and environmental. One of the best ways to achieve the sustainable development is E-health. With

the implementation of E-health and development in various sectors, we can reach the final sustainable development. As a result, in this article the proposed model in order to achieve sustainable development is getting to various sectors of sustainable development with the use of E-health so we introduce it as an overall strategy to meet this goal.

## 5. Conclusion

E-health is the single most important revolution which is the use of digital information and communication technologies to improve people's healthcare. E-health care provides a new method for using health resources such as information, money, medicines and in time should help to improve efficient use of these resources. Health services had an important role to play in sustainable development by reducing the diseases. In this paper, first we defined some important concepts, then we proposed a new strategy of E-health to achieved sustainable development. Finally, we presented a new model for E-health to achieved sustainable development.

## References

- [1] Chukwudi, J. (2016). Challenges and the Results Approach Facing Sustainability in an Unequal World.
- [2] E-health Action Plan 2012-2020 - Innovative healthcare for the 21st century, Brussels, 6.12.2012, COM (2012) 736 final.
- [3] European Council (2000), Presidency Conclusions. Lisbon European Council.
- [4] Grober, U. (2007). A conceptual history of "sustainable development" (Nachhaltigkeit), Wissenschaftszentrum Berlin für Sozialforschung.
- [5] Grober, U., (2007), Deep roots – A conceptual history of 'sustainable development' (Nachhaltigkeit).
- [6] Grober, U., (2007), Deep Roots: A Conceptual History of Sustainable Development (Nachhaltigkeit); Wissenschaftszentrum Berlin für Sozialforschung; Berlin, Germany.
- [7] Jameton, A., and McGuire, C. (2002). Toward sustainable health-care services: principles, challenges, and a process. *International Journal of Sustainability in Higher Education*, 3(2): 113-127.
- [8] Jeffrey, P. (2007). *The Role of E-Health in the Changing Health Care Environment*. HarrisonAngela Lee,: 288.
- [9] Keiner, M. (2005), History, definition(s) and models of sustainable development, ETH, Eidgenössische Technische Hochschule Zürich.
- [10] Khan, N. (2014). An Assessment of Health Care Facilities for Rural Women with Special Reference of District Pulwama. *Global Journal of Medicine Researches and Studies*.
- [11] Oludayo, O. Olugbara, Sunday, O. Ojo, Mathew, O. Adigun, Justice, O. (2007) Emuoyibofarhe and Sibusiso.S. Xulu. An Architectural Framework for Rural e-Healthcare Information Infrastructure with Web Service-Enabled Middleware Support.

- [12] Rumelt, Richard P. (2011). *Good Strategy/Bad Strategy*. Crown Business. ISBN 978-0-307-88623-1.
- [13] See, E. G., Holmberg, E. D. (1992) *Making Development Sustainable*.
- [14] Shortliffe, E. H., Cimino, J. J. (2014), *Computer Applications in Health Care and Biomedicine*, Springer verlag London.
- [15] *The European Files / Les Dossiers Européens* - 19 rue Lincoln, 1180 Brussels - [www.lesdossierseuropeens.fr](http://www.lesdossierseuropeens.fr)- ISSN 1636-6085.
- [16] Vincenzo, D. M. (2001). "What is E-Health: The death of telemedicine?". *Journal of Medical Internet Research*.
- [17] Whitehouse, D., Giest, S., Dumortier, J., Artmann, J., Heywood, J., (2010), *Country Brief: England*, European Commission, DG Information Society and Media, ICT for Health Unit, England.
- [18] *World Conservation Strategy*. (1980). *Living Resource Conservation for Sustainable Development* .International Union for Conservation of Nature and Natural Resources.