# An insight into E-health programs in Morocco: what is the Realistic Solution?

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## Abstract

*This communication brings into light some theoretical and conceptual aspects on e-health as an ICT application area. Actually, various definitions are successively presented in order to clarify such a concept. By offering an insight into Morocco, the focus is given on a case of a developing country that is more and more interested by this specific project. In fact, from the Government point of view, several strategic orientations have been identified so as to give an e-health orientation to national goals.*

*The main interest lies in the fact that e-health offers to all stakeholders the possibility to access a health network that is efficient and available at different level: information, administration, diagnosis, therapy, medical prescription, monitoring…*

*Before presenting the Moroccan's case, this contribution first gives conceptual aspects on e-health and then considers it in e-Morocco, the global e-government process. Finally, practical and realistic solutions are proposed in order to better apprehend and integrate e-health applications according to human, material and financial available resources.*

## Introduction

E-Health can be defined as a set of processes that ensure the improvement of the quality of the medical care chain. It concerns the use of Information and Communication Technologies (ICT) in order to access in a well-organized way any clinical and business processes related to the health care area. It covers information system solutions supporting administrative tasks, medical diagnosis, medical analysis, management of inhabitants' health data, and any other application handling health information.

E-Heath is a quite recent paradigm leading to a new vision of the health system, including the use of ICT by practitioners, citizens and all healthcare stakeholders. It is a set of computerized systems and methods to get better the healthcare organization in terms of cost reduction, inaccuracy diminution, and information quality improvement. It lets health professionals, especially physicians, handle their performance more efficiently by getting pertinent, applicable and timely up to date information. It makes collaboration and sharing knowledge concerning patients possible between these professionals and makes sure that the best health service is granted.

In 2005, at the e-health conference [7], Member countries of European Economic Area confirmed their commitment to create a European information space for health area to improve healthcare services for European citizens. Members took up the challenge to work in including concrete specific actions in order to make the e-health initiatives happen in their national plans and programs. This will permit efficient healthcare services available to every European patient, support the European healthcare industry, and make these services cost effective for governments.

As any other developing country, according to Achy [1], "Morocco is facing the challenge of providing accessible, efficient, equitable and quality health services to its population". In his compilation of presentations made at the Inter-regional workshop, the author underlines the diverse difficulties of the public health sector in Morocco. These difficulties are reflected mainly in terms of (1) low budget allocated to the health sector, (2) structural weaknesses, regardless of the efforts made lately.

Despite these difficulties, should Morocco follow the model of European countries and consider an e-health program in order to permit efficient healthcare services to every Moroccan? Are there other solutions less expensive, easy to use for all stakeholders involved in the care of patients, and which could be set up quickly?

This brings us to raise the following questions: (1) How is e-health integrated in Morocco's e-government strategy? (2) How can e-Health be conceptualized for Morocco? (3) What alternative solution to set up most quickly? That is the purpose of this communication.

## E-Morocco, Health vision and ICT indicators in Morocco

The e-Morocco 2010 strategy [9], which began in 1997, aims to promote the Information Society in Morocco. It includes e-government programs among 180 targeted projects. The government has budgeted 2.5 billion Dirham (0.22 billion Euros) between 2006 and 2010. In matters of e-government, many applications have been developed in various Moroccan sectors. As a matter of fact, the Moroccan prime ministers' discourse on electronic administration days (2003) clearly mentions and determines ICT objectives as: (1) an effort on information systems so as to improve administrations' efficiency and performance, (2) a reinforcement of the communication among administrations in order to optimize the decision process, (3) to improve services that are provided to citizens and companies, in terms of quality and

proximity, and (4) a better transparency in the Administration's management.

The Moroccan e-government program aims at developing the administration information process and giving the possibility to citizens, professionals, and companies to access, for instance, many services on-line. The global objective lies in the improvement of the service's quality and the diminution of delays.

As far as Internet websites are concerned, many institutions offer on-line services. As an illustration: (1) e-justice allows to follow up judiciary files and to consult commercial registers, (2) e-finance makes it possible to handle with tax operations, to make online employees declarations and online payments, (3) in the Moroccan Office of Industrial and Commercial Property's internet site, researches can be done on legal proceedings for trademark, registered brands.

As a matter of fact, many e-government projects are now proposed to users. Actually, this reflects a global national orientation that is in a growing trend.

As a public sector, Healthcare is well-known by the high use of people's health information. This is why the use of ICT should not be confined only to the existence of an Internet website.

The 2020 health vision described in the report produced recently by the Ministry of Health of Morocco (Appendix 1 shows the Central Administration's structure), with the World Health Organization (WHO) support [4], involving all stakeholders and partners concerned in the health area, identified eight areas of action. Even if the report highlights the weakness of health information systems and proposes the establishment of information tools, none of the eight domains goes with the e-health defined by the WHO as the use of Information and Communication Technologies for health. It is recognised as one of the most rapidly growing areas in health today. Also, despite the WHO resolution adopted on 2005 that urged member countries to plan for appropriate e-health [11], the Ministry report did not mention it. The latter stresses that the WHO classifies Morocco among the 57 understaffed countries. In 2006, the number of medical and paramedical staff providing direct care to patients remains largely under the threshold minimum required to guarantee the entire population an adequate services offer for a sustainable improvement of healthcare. Physicians, dentists, pharmacists, nurses, midwives and other paramedical personnel represent 56,615 professionals. The ratio of personal care per 1,000 inhabitants is 1.86, classifying Morocco among the countries with a low density of human resources. The number of physicians is 17,188 which are divided almost equally between generalists and specialists. Medical density remains deficient in relation to the needs of the country. Despite the graduation of 800 physicians per year, this density is below 1 physician per 1,775 inhabitants, the level reached by countries with equivalent income.

According to WHO, Morocco dedicates 1.1% of its GDP to public health expenditure, versus 2% to 25% in countries with similar per capita income [4], while the 2020 health vision report mentioned 1.3% of GDP and a budget of nearly 7.4 billion Dirhams (0.65 billion Euros) in 2007 corresponding to 5.5% of the general country budget, or less than 239 Dirhams per capita. Payroll absorbed 63% of the funds allocated to the Ministry of Health. Also, expenditures were divided in 2007, between approximately 82% for the operating budget and 18% for the investment budget that we believe not adequate.

The national survey initiated by Morocco's National Telecommunications Agency, ANRT, carried out in 2007 [2], showed that personal computer penetration still very low in households, aggregating 920,000 units. Only 1.8% of people living in rural areas were equipped compare to 24% in urban areas. Also, 55% of interviewed people claimed never to have access to computer. In addition to illiteracy, the main reason for non-equipment is the price. As far as Internet connections are concerned, only 120,000 homes seemed to have an Internet connection, i.e. a penetration rate of 0.4%. Again, the cost is the main reason for this low rate. But, nearly 60% of households are equipped with mobile phone. This leads to believe that the cost even if it's an important factor it cannot be the main reason for the low penetration rate when it comes to Internet connection.

## E-Health: which concept for Morocco?

In recent years, many different types of e-government projects have been implemented around the world, as well in developing countries. One important application area, especially following the Millennium Development Goals, is the introduction of health information systems based on ICT to improve the management and the quality of health care for development. In fact, the restructuring of health information systems has become an important trend in the entire developing world since the adoption of primary health care as a global strategy for achieving the 'health for all' goals [3].

According to Eysenbach [8], "everybody talks about e-health these days, but few people have come up with a clear definition of this comparatively new term": barely in use before 1999, this term "now seemed to serve as a general buzzword, used to characterize not only Internet medicine, but also virtually everything related to computers and medicine".

As a matter of fact, e-health is the use of emerging information and communications technology, especially the Internet, to improve or enable health and healthcare [6]. According to Dixon [5] e-health refers to the delivery of health care with support

from various information and communication technologies, such as electronic health records, telemedicine, clinical decision support, and computerized provider order entry. E-Health is considered by government, providers, and payers as a primary method of improving quality, safety, and costs associated with the delivery of health care.

It seems that e-health encompasses more than a mere technological development. Eysenbach [8] defines the term and concept as follows: "e-health 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. In a broader sense, the term characterizes 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, regionally, and worldwide by using information and communication technology."

This more complete definition of e-health can be considered in application of the e-health in Morocco since it covers many interesting aspects of the concept. In addition to that, Eysenbach [8] considers that the "e" in e-health does not only stand for "electronic," but implies a number of other "e's," as shown in the following table (Table 1)

Table 1: E-health's

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|---|---|
| **Efficiency** | One of the promises of e-health is to increase efficiency in health care, thereby decreasing costs. One possible way of decreasing costs would be by avoiding duplicative or unnecessary diagnostic or therapeutic interventions, through enhanced communication possibilities between health care establishments, and through patient involvement. |
| **Enhancing quality of care** | E-health may enhance the quality of health care for example by allowing comparisons between different providers, involving consumers as additional power for quality assurance, and directing patient streams to the best quality providers. |
| **Evidence based** | E-health interventions should be evidence-based in a sense that their effectiveness and efficiency should not be assumed but proven by rigorous scientific evaluation |
| **Empowerment** | Empowerment of consumers and patients by making the knowledge bases of medicine and personal electronic records accessible to |
| | consumers over the Internet |
| **Encouragement** | Encouragement of a new relationship between the patient and health professional, towards a true partnership, where decisions are made in a shared manner |
| **Education** | Education of physicians through online sources (continuing medical education) and consumers (health education, tailored preventive information for consumers) |
| **Enabling** | Enabling information exchange and communication in a standardized way between health care establishments |
| **Extending** | Extending the scope of health care beyond its conventional boundaries. This is meant in both a geographical sense as well as in a conceptual sense. These services can range from simple advice to more complex interventions or products such a pharmaceutical |
| **Ethics** | E-health involves new forms of patient-physician interaction and poses new challenges and threats to ethical issues such as online professional practice, informed consent, privacy and equity issues |
| **Equity** | People, who do not have the money, skills, and access to computers and networks, cannot use computers effectively: these patient populations (which would actually benefit the most from health information) are those who are the least likely to benefit from advances in information technology. |

In fact, these ten fundamentals can be interesting to integrate and combine in any e-health research.

Applied to the Moroccan's context, some of these elements can be interesting to take into consideration:

- **Evidence based**: project team and partners must demonstrate skills, knowledge and experience. A multi-disciplinary approach can also be envisaged including physicians, ICT experts, communication experts, professional project managers

- **Empowerment**: people could gain greater control over decisions and actions affecting their health by having access to specific information. In fact, the Moroccan patients could access to information

about diagnosis, treatment and best practice so they can be better informed. They could also interact with healthcare services that can provide consumer-oriented services available.

- **Encouragement**: this leads to extend medical awareness by influencing patients' attitude and behaviour. Interactive communication between physicians and patients results could bring, for instance, a better insight in the patient's perception of a treatment.

- **Education**: for physicians, trainings, national and international cooperation are part of Education so as to be, not only familiar with e-health process, but definitely expert. For example, this could help them to develop new clinical applications to improve their workflow. For patients, Internet has the potential to be a very powerful educational tool. Education is a fundamental aspect of e-health program.

- **Enabling**: networking between institutions is capital. E-health allows physicians to access information (about best practice, treatment profiles and drug interactions) to support clinical activity and to use valuable supporting information outside their own environment without increasing administrative workload.

- **Equity:** those with better education, better health insurance and higher incomes are in a better position to make choices than those who lack these benefits. E-health program may need to be targeted at those in a lower position. The digital divide currently runs between rural vs. urban populations, rich vs. poor, young vs. old, neglected/rare vs. common diseases [8].

## A concrete solution that makes sense for Morocco

In general, comparing to other industries, ICT employ in the healthcare is still low [10]. For the time being, according to our knowledge, Morocco does not have up till now a specific e-health or a policy regarding ICT usage in medicine practice.

Implementing a global and national e-health solution in Morocco needs time and funds. Important ICT investment in clinical department is needed to sustain activities related to care field. A global information system is necessary to ensure the flow of information regarding the chain of care and monitoring of the health of people. This would support all care performance (radiology, laboratory, clinical, etc.). To participate to the emergence of a new paradigm for healthcare [12], Morocco should consider a solution quickly. Instead of waiting until all conditions are met for use in the healthcare area of the possibilities offered by ICT, we illustrate how these ones can be implemented without delay, according to the human, material and financial resources available to Morocco.

Indeed, nowadays practicing medicine requires only a personal computer connected to Internet to support some aspects such as clinical care, health services, administration, and information research.

This relatively inexpensive solution could help Moroccan physicians in their daily work. Thus, they can access to updated and complete information, especially the patient's medical history, his current situation, as well as the ongoing medical treatment and the latest medical acts. Following a short period of familiarization with the use of this effortless solution, practitioners optimize their time and reliability and efficiency of the medical record are improved compared to recordings based on paper. One more important reason for adopting this solution is that it offers the opportunity to share patient's medical information between all involved physicians in the examining and cure of the patient. Also, it allows the link via Internet to other healthcare services such as laboratories. This way the laboratory analytical result can be transferred in a straight line to the prescribing physician.

This solution supposes of course a 100% rate of computerisation. All practitioners involved must be equipped with a personal computer with an Internet connection. Only word processor, spreadsheets software applications, and electronic mailing software are required.

Considering the 17,118 physicians in Morocco and assuming that each solution costs 600 Euros, at the beginning, roughly, 11.5 million Dirhams (10 million Euros) budget is needed to fund the proposed solution. This represents less than 10% of the 1.3 billion investments forecasted in 2020 health vision program. To equip the 800 new graduates physicians, we need yearly a budget of 0.6 million Dirhams (0.5 million Euros). To train the new graduates, an additional budget more or less 100,000 Dirhams (87,000 Euros) is needed too.

## Conclusion

E-health project improves knowledge sharing by linking all healthcare stakeholders[1] and thus reduces the existing gap in communication between them. Obviously, e-health does make sense for Morocco because such strategic orientation reflects a need from a national perspective by both users and patients. Moreover, Government has clearly shown interest to e-health and ICT projects. Nevertheless, a certain number of conditions have to be met: with a rather low budget dedicated to health sector and structural difficulties, Morocco should consider solutions in order to propose, from now on, more efficient healthcare services to every Moroccan. Suggestions focusing on education and equipment (computer and internet connection) have been made. But these requirements represent a first level for any e-health program, a start up phase that has to be rapidly achieved. In fact, these conditions have to be quickly fulfilled before dealing with the core e-health effective applications. Only then can Morocco face e-health challenge and improve

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1 Healthcare stakeholders are: patients, citizens, physicians, administrators, nurses, midwives, etc.

healthcare by ensuring a program with real additional value.

Further researches can develop factors affecting the behavior of Moroccan healthcare stakeholders so as to more deeply understand their right needs in this mechanism and to determine which actions can be envisaged specifically.

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Appendix 1

- The Central Administration's structure -
  Moroccan Ministry of Health

**Hospitals and Ambulatory**
Emergencies and rescues
Hospitals
Ambulatory cares
Haematology and Blood
Transfusion National Centre

**Population**
Family Planning
Scholar and university health
Maternal and infantile health

**Epidemiology and Disease**
Background's hygiene
Non transmissible diseases
Transmissible diseases

**Supply and Provision**
Supplying Division
Markets Division
Stock control

**Regulation and Contentious**
Regulation
Contentious and professional
Affairs

**Central Administration - Moroccan Ministry of Health**

**Planning and financial resources**
Planning and studies
Financial Division
Cooperation Division

**Information and Methods**
Studies and coordination
Operating and support service

**Drugs and Pharmacy**
Drug Control National
Laboratory
Pharmacy Division

**Human resources**
Management
Education
Officers' health control

**Equipments**
Buildings and architecture
Material and biomedical
equipments
Holdings and programming
Markets service