

# STUDY ON THE COMPUTERIZATION MANAGEMENT OF THE ROMANIAN MEDICAL SYSTEM

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## Abstract

*This paper emphasizes the benefits of a modern medical system called ICT and also the need to improve this system. Another important aspect is the training and development of human resources, their motivation and evolving contributing to the improvement of the individual professional abilities. We reached the conclusion outlining that the computerization of the medical system is a highly important project that needs financial support and for its achieving, certain essential requirements must be met.*

**Keywords: computerization, health, development, training, human resources, research-development.**

The 21st century was monopolized and dominated, almost entirely by the computerization of all fields. Also called the *Internet century*, we almost cannot talk about modernization without making reference to the information flow generated by the communication over the Internet, according to the latest technologies, that were conceived to facilitate the access to the communication and to the information means.

With the '90s there were technological changes in the computerization field, which at the very beginning appeared mainly when new equipment was bound to be purchased. The access to information, for a rapid communication mediated through the access to the Internet became a *mus in* all the fields of activity in 2000 and the following years.

## The Benefits Of A Modern System Ict In The Medical Field

Entering a new technological era, Romania has always made a great and tenacious effort to catch up with the developed countries concerning the endowment of hardware equipment, so that during the period 1999-2003, the total number of PCs increased by 31% per year, in comparison with the European average which is 34%.

If in the year 2001 Romania had an average of 36 PCs/1000 inhabitants, in 2009 it reached the average of 133 PCs per 1000 inhabitants, but, in comparison with the E.U. member countries, the statistic data for the same period show the existence of an unfavorable gap, which is still significant (see the table below):

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Table no. 1.1 *The evolution of the number of PCs / 1000 inhabitants in Romania compared with other European countries, during the period 2001-2009*

| COUNTRY | 2001 | 2002 | 2003 | 2004 | 2005 | 2009 |
|---------|------|------|------|------|------|------|
| Romania | 36   | 69   | 83   | 110  | 113  | 133  |
| France  | 337  | 347  | 347  | 487  | 575  | 652  |
| Germany | 382  | 431  | 485  | 561  | 545  | 656  |
| Greece  | 81   | 82   | 82   | 89   | 89   | 94   |
| Italy   | 195  | 231  | 231  | 315  | 367  | 412  |
| Spain   | 168  | 196  | 196  | 257  | 277  | 393  |

Source: The Romanian Statistic Yearbook, INS, Bucharest, 2010.

Regarding the number of Internet users per 1000 inhabitants, the situation is given by the figures in the table below:

Table no. 2.14 *The evolution of the number of Internet users / 1000 inhabitants in Romania compared with other European countries, during the period 2001-2009*

| COUNTRY | 2001 | 2002 | 2003 | 2004 | 2005 | 2009 |
|---------|------|------|------|------|------|------|
| Romania | 45   | 83   | 191  | 202  | 208  | 366  |
| France  | 264  | 314  | 366  | 414  | 430  | 716  |
| Germany | 379  | 412  | 473  | 500  | 455  | 793  |
| Greece  | 140  | 155  | 150  | 177  | 180  | 445  |
| Italy   | 283  | 352  | 337  | 501  | 478  | 539  |
| Spain   | 183  | 156  | 239  | 336  | 348  | 626  |

Source: The Romanian Statistic Yearbook, INS, Bucharest, 2010.

Since 2005, the services market for the field of informatics has been developing and diversifying continually, so that in Romania computers could be used in each field of activity. At international level, in 2003, the international e-commerce type "business-to-business" reached the value 844 billion euros, developing year by year in a backed rhythm, so that in 2007, it rose by 73% in comparison with the percentage of the year 2003.

The information technology was used in the medical field, starting with the primary medicine (the family doctor), continuing with the activity specific to the system of monitoring the information concerning the quality of medical act, the organization, improvement and control of the expenses for the medical services in hospitals and the e-prescription services.

The system ICT – Information and Communications Technology is the generic term which mainly refers to the calculation equipment, communication equipment, software and other IT services.

According to the report of The European Commission for Health, the Romanian doctors, compared with the European ones, do not use sufficiently the advantages offered by the information technology; only 22% of the family doctors use the computer to make medical examinations and 11% use electronic means for diagnoses or medical prescriptions. At the same time, 87% of the European doctors use the computer, while in

Denmark 60% of the family doctors are in touch with their patients through electronic mail.

The comparative analysis concerning the use of the ICT system by the European specialized doctors ranked Romania in 2008 on the 28th position from 31 European countries that were analyzed. Moreover, 66 % of the total number of doctors that use the computer, as compared to the 87% representing the community average, from which 48% benefit from Internet bandwidth, whereas in Romania only 5% benefit from this facility, and regarding the purchase of proper equipment, one out of three doctors is insufficiently integrated in the information system.

Still the most used means of communication is the mobile phone, the Romanian doctors have not adopted the communication system with patients through e-mail, yet. But there are reasons that justify these discrepancies, such as:

- The lack of the necessary finance for investments in the needed medical equipment at the workplace;
- The lack of spaces available to this activity, most of the times, the family doctors or the specialized doctors carry out their activities in small rooms, working in two shifts in the same surgery in which there is no space to keep the apparel or the needed medical equipment;
- The small number of computer owners and Internet users as compared to the Romanian population;
- The lack of training in using the computer, regarding especially the doctors that are over 50 (about 45% of the total number of family doctors) and the lack of interest to acquire the minimum knowledge of informatics, invoking as reason the great number of patients and the multitude of administrative problems it faces.
- To prevent such situations, it was taken the measure to include the informatics course in the curriculum of the medicine faculties, the course being compulsory beginning with the 2nd year of study.

*"In Romania, there are 11 230 family doctors that benefit from portable computers, printers, Internet connections and software licences, having 23 billion euros as the total value of the investment"* stated the former Minister of Health Eugen Nicolăescu, following his participation in the seminar organized in Sibiu, in May 2007, having the topic **"The informatization of the medical system"**. This statement did not come true, owing to the difficult procedures regarding the organization of public auctions, and shortly after, the Minister of Health was replaced according to a Government reshuffling.

The new Minister, Ion Bazac, together with his *new* team, continued the informatization process of the medical system, improving its functional side, so that during 2009, it was signed a far-reaching project in this field, financed by The Operational Sectorial Program (**POS DRU**) that aims at the *professional formation and the training of the medical assistants*. The project called **e-health**, consists of *"The implementation of the national system for e-prescription"* which consists of the optimization of the expenses for the medical services and the electronic data transfer, to facilitate the information flow which takes place between the doctor who prescribes the treatment, CNAS and the chemist who gives the medicines, having as potential consumers besides the *12 million insured people*

*in the system of health insurance, 44 Insurance Offices, 5350 drug stores and about 30 000 doctors, declared the health minister in 2008.*

The collaboration between The Health Minister and The Minister of Communications and Information Technology will give the necessary support to implement the program by improving the communication network, for the population access to the online public services in all the areas of the country and the achievement of a local *broadband*, where necessary.

The Report of the European Commission, presented at Bruxelles on the occasion of the communication session in March 2009, having the topic *"An European strategy for research – development and innovation in the field of the medical information technology"*, bringing up the measure of Europe as leader in developing the electronic medical systems, based on TIC, thus making a better diagnosis, prescribing adequate treatment in case of chronic diseases and prolonging the population life.

The European Commission expressed its availability to support and finance far-reaching projects that aim to develop the information infrastructure of the medical services, in the community countries.

### **The Need To Develop The Ict System In The Medical Field**

One of the objectives of the medical system reform was *the improvement of the quality for medical services*, as difficult to be defined, quantified and achieved, whose final output is given by the indexes that reflect the population's health condition.

Mainly, the quality of the health services refers to efficiency and efficacy, to the satisfaction degree of both patients and medical personnel, the provision of continuity for the medical practice and last but not least to the achievement of efficient information systems, in order to improve the citizens' access to medical cares.

The knowledge and information opportunities offered by the sudden development of the communication means are used by the *"medical world"*, also from the perspective of professional development, in the working process of documentation, of collecting the latest information in the medical field, as considered an activity needed for the theory development and the medical practice.

The takeover, processing and distribution of information is a circuit that is frequently met in the medical activity, the most often used term being Continuous Medical Education (CME). Developing a national strategy and elaborating a continuing investment program to provide the ongoing medical computerization will lead to a substantial improvement of all types of medical services and supply means, thus facilitating rapid access to information to ensure the consistency and continuity of the medical care. The implementation and adaptation of the information systems to the Romanian healthcare, by introducing the ICT system in hospital units, offers a multitude of collateral advantages, such as:

- access to very significant data of the hospital by posting on its site information about the hospital structure and its existing departments,

the types of medical services that may be granted, the number, the specialty and competences of the medical staff;

- achieve a transparent management system through the online reporting system for additional information required by higher hierarchical institutions;
- broaden the scope and means of communication between units and medical clinics to carry out the interdisciplinary medical consultation and the exchange of information;
- direct communication with patients through the online system, even in more isolated areas;
- create a more effective, continuing medical education by improving the means of transmitting information;
- create an appropriate framework for educational activities and medical research by presenting the works of national interest, thus achieving thematic discussions; promote the events from the medical field, having the possibility of presenting the latest developments or trends in the medical field;
- transmit in due time the information concerning the organization of events or announcements regarding job competitions for occupying certain positions, etc.

Following a survey conducted in 2008 by the National Center for Organization and Provision of the Information and Computerization System in Health (CNOASIIDS), subordinated to the Ministry of Health, it was presented the situation regarding the endowment of hospitals, the computer users, the computerized fields and the operators of applications<sup>1</sup>.

According to the survey and analysis conducted at national level, for a sample of 383 hospitals, the established and resulted data can be noticed in the table below:

Table no. 2.15 Statistic data regarding the technical equipment of hospitals, the users of the calculation techniques, the informatized fields and the operators of applications in certain counties, in 2008

| County   | No. of blankets | No. of servers | No. of PCs | Percentage of computers connected to Internet | No. of computer users | Percentage of doctors who use computers | No. of users per PC |
|----------|-----------------|----------------|------------|-----------------------------------------------|-----------------------|-----------------------------------------|---------------------|
| Arad     | 2373            | 10             | 322        | 63,90                                         | 486                   | 39,49                                   | 1,51                |
| Bacău    | 3022            | 7              | 417        | 50,17                                         | 723                   | 28,94                                   | 4,18                |
| Botoșani | 2609            | 3              | 146        | 56,82                                         | 320                   | 49,06                                   | 2,19                |
| Brașov   | 3255            | 16             | 469        | 42,20                                         | 679                   | 47,36                                   | 4,79                |
| Buzău    | 2680            | 9              | 249        | 43,78                                         | 386                   | 28,96                                   | 1,55                |
| Cluj     | 7053            | 28             | 1142       | 56,85                                         | 2547                  | 60,27                                   | 2,23                |

<sup>1)</sup> D. Farcaș, Eugenia Crăciunescu, , The situation of the Romanian hospitals informatization in 2008, CNOASIIDS, Ministry of Health, 2009.

|           |              |            |             |              |             |              |             |
|-----------|--------------|------------|-------------|--------------|-------------|--------------|-------------|
| Dolj      | 4153         | 16         | 293         | 43,25        | 1155        | 18,86        | 3,94        |
| Hunedoara | 3359         | 12         | 325         | 44,62        | 469         | 26,70        | 1,44        |
| Iași      | 6085         | 18         | 952         | 37,98        | 1217        | 45,89        | 1,28        |
| Mehedinți | 1557         | 2          | 121         | 25,46        | 117         | 22,28        | 0,97        |
| Olt       | 2227         | 3          | 161         | 14,53        | 396         | 8,43         | 2,46        |
| Suceava   | 3272         | 14         | 312         | 79,79        | 1205        | 83,39        | 3,86        |
| BUCHAREST | <b>20294</b> | <b>103</b> | <b>2993</b> | <b>48.14</b> | <b>4849</b> | <b>74.43</b> | <b>1.62</b> |

Source: [http://www.ccss.ro/public\\_html/info-healthcare-2010.html](http://www.ccss.ro/public_html/info-healthcare-2010.html)

As one can see in certain counties – Botoșani, Buzău, Olt, Iași or Mehedinți – the number of PCs per number of beds is very reduced. The most acute problem concerns the number of computer users and, above all, the doctors that use the computer taking into account that in certain counties it reaches worrying values, for instance the case of the Olt county with 8.43% of the total number of users. Therefore, the growing number of users is a highly important aspect, because at the end of the informatization process, the doctors who refuse to use the software applications from the system will not be able to get the information from the patient's electronic medical file/record.

According to a feasibility study conducted in Austria in 2007, the utility of electronic records in health services and the importance of having a national health card called **eCard**, concluded that there are some advantages for the benefit of patients and doctors, namely:

- holders of an **eCard** are registered in a database, that is unique at national level, updated after each medical visit, thus completing the electronic medical file that includes the patient's health history. The Health Card is secured and it can be accessed online only by inserting a password;
- doctors have access to patients' portal, thus getting the information about the evolution of the patient's state of health, diagnosis and prescribed medication, etc.

The presented study caught the attention of decision makers in health issues, considering that such a system could have beneficial effects on the efficiency of the healthcare, being attached to the working agenda of the Ministry of Health, as a logical sequence.

The Computerization of the health system by introducing the National Health Card is a means of reducing bureaucracy in the system, because on one hand, the insured will not need certificates to prove the quality of being insured, and on the other hand, the card will display both the patient's identification data and all the necessary data relating to his/her health history.

The structural reform of the health system has as a starting point the primary care/medicine and it focuses on the reorganization of the family doctor's activities in each county by implementing a system of emergency call-center type, through which the patient can directly call his/her family doctor, or whenever he/she needs an emergency appointment. At his/her turn, the family doctor must have a card that will be introduced in the integrated system when going to the patient's home, in order to make a record of all the medical visits at home and the correct payment of the medical services.

By implementing such a service, similar to that consisting of three shifts in hospitals, will definitely improve the activity of receiving emergencies in hospital and the activity of the specialized personnel from other emergency networks that will take over only serious cases. Another benefit of the computerized medical system is the possibility of achieving interdisciplinary medical consultation between the family doctor and the specialized doctor, this benefit being provided by the telemedicine system. The implementation of such a complex system can be a reliable alternative for improving the Romanian health system.

There are still major deficiencies in equipping hospitals and family doctors with appropriate equipment and the users, respectively the doctors are not trained to effectively use such a system and, last but not least, the number of computer specialists to provide maintenance and operation services is insufficient.

### **Human Resources Training And Development - Methods And Techniques**

The training and development of the organization personnel, both the administration staff and the operation staff and specialists, is a continuing process during which new theoretical and practical knowledge is acquired in order to make efficiently the current activities required by jobs and professions. *One should establish a specific difference between training and development: training concerns the development of new abilities while development concerns the improving of the existing abilities<sup>1)</sup>*. So, professional training mainly aims to acquire theoretical knowledge and practical skills, while development aims to improve and update knowledge according to new techniques and technologies generated by the scientific and the technological development.

The *development* can be achieved in higher education institutions, after the high school graduation or within professional organizations, but the employees' participation in training and classes is provided, most often at the expense of the employer.

Therefore, regardless of the undertaken activity, training and development are particularly important in using, motivating and developing human resources, by improving individual professional skills and by acquiring new skills, enhancing the knowledge horizon and the information of employees, during the technological changes and renewals, in an accelerated pace, triggered by the modern science and the latest technology.

According to the established objectives, their specific and the location they operate, the employees' training and development programs must have some common features such as:

- they must be designed to match human resource development policies and overall strategies of the organization;
- they must have a continuing aspect, by providing correlations with other related programs to meet certain requirements of the organization;

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<sup>1)</sup> P. H. Giscard, *La formation et le perfectionnement du personnel d'encadrement*, Presses Universitaires de France, Paris, 1958, p. 1-2.

- the training guidelines and the training plan must be included in the structure of programs.

*The training and development plans are of various kinds: individual training on short, medium and long term; collective training<sup>1)</sup>, and methods and techniques used for the programs' achievement include: training at the workplace, participation in collective projects ; support the direct chief or his temporary replacement, training courses, attending lectures, conferences, congresses and other scientific meetings, distance learning, Master Degree, Ph.D. Schools, etc. The large organizations must be structured according to the socio-professional categories and their specific activities.*

## **Conclusions**

The computerization of the Romanian medical system is a major project that requires financial support as to meet the next three requirements<sup>2)</sup>:

- 1) achieve a national health strategy through a consensus of all the involved institutions (Ministry of Health, CNAS, MCSI, and other providers), taking into account the existing e-health applications or those in the process of achievement, also considering other national information projects and strategies and projects in other European countries, as well. The strategy should include codes and standards to provide interoperability on a large scale;
- 2) provide the legal framework to allow public funding only for those projects that meet the requirements of the adopted e-health strategy, which is certified by the permanent body of experts that elaborate strategies;
- 3) organize a permanent body of experts, subordinated to the Ministry of Health, representing the major concerned departments and institutions.

This body should benefit from the resources needed to develop and update the strategy, according to requirements, technological needs and innovations and to monitor the compliance of e-health public services with the adopted strategy. Therefore, the implementation of the national medical system computerization is a complex process that requires close collaboration with other ministries - Ministry of Domestic Affairs for the population record, The Ministry of Communications. On the other hand, attracting IT specialists to provide the implementation of the national computerized system and to maintain its operation, turns into an issue as difficult as the number of required doctors, because the current pay system does not allow the granting of motivating remunerations to attract such specialists.

The major changes in recent years, regarding the evolution of the information technology have led to the boom of computerization, communications and digital content production. The adoption of new technologies due to the strengthening and the modernizing of the national information infrastructure required a new vision approach in all the areas that involve human activities, offering new opportunities for access to information for all

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<sup>1)</sup> O. Gélénier, *Fonctions et tâches de la Direction Générale*, Ed. Hommes et Techniques, Paris, 1967.

<sup>2)</sup> D. Farcaș, Eugenia Crăciunescu, *The situation of the Romanian hospitals informatization in 2008*, CNOASIIDS, Ministry of Health, 2009.

walks of life, regardless of age or geographical location. Creating ways of access to the new international development model has led to the appearance of new requirements and priorities for the human benefit. It remains to be seen to what extent the Romanian health system will benefit from a complex and complete computerization, so that to make a step forward in achieving the health reform.

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