

2011

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Recommended Citation

Tamburis, Oscar; Mangia, Massimo; and Rossi Mori, Angelo, "The LITIS Initiative: Measuring the Level of eHealth Adoption in the Italian Healthcare Trusts" (2011). *BLED 2011 Proceedings*. 58.

<http://aisel.aisnet.org/bled2011/58>

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**The LITIS Initiative:
Measuring the Level of eHealth Adoption
in the Italian Healthcare Trusts**

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Abstract

The Italian Federation of Healthcare Trusts and Municipalities promoted a national initiative (LITIS, Italian acronym for: Levels of Technological Innovation in Healthcare), to assist its members in the governance of the eHealth phenomenon. The LITIS model spans over the complete spectrum of the eHealth support to care and administrative processes, from two perspectives: the Functions F (services for citizens, social / healthcare operators, managers, administrative staff) and the Enabling Components C (i.e. indirect factors that are prerequisites to deploy the Functions and handle the change). On the basis of a survey on nearly two thirds of the Italian Public Healthcare Trusts, LITIS produced a taxonomy of eHealth adoption indicators (145 micro-indicators in the lower layer; 36 topics, 12 sectors in the intermediate layer; 3 macro-area indexes and the “ICLI index”, acronym for: Global Index of Innovation Level, at the upper layer) as a decisional tool for effective planning of the sector. The Healthcare Trusts were assigned to 5 “Classes of Adoption”, according to their value for ICLI. A proposal for a stepwise “meaningful evolution” of the 5 Classes was produced, with an approach similar to the Capability Maturity Model.

Keywords: eHealth adoption, healthcare trusts, eHealth planning

1 Introduction

In the healthcare sector the technological innovation is propagating disparately among the application areas, and within each area, through the different perspectives related to the dynamics of diffusion, receptivity, adoption and sustainability (Fichman, 1999; Bradley et al., 2004; Greenalgh et al., 2004).

Each HealthCare Organization (HCO) needs instead a coherent development of a continuum of elements that should interact with each other, aligned with the corporate strategies and connected to the revision of their clinical and organizational processes; moreover, today the entire process should be facilitated and coordinated at the level of wide jurisdictions, with a clear definition of the distribution of roles between HCOs and the respective authorities or eHealth consortia, e.g. about common infrastructures for data exchange within the jurisdiction and across jurisdictions.

The ongoing reorganizations of care processes, especially the increasing patient engagement about chronic diseases or frail and dependent subjects (i.e. with citizens becoming more responsible for their health status and lifestyles), asks for a systemic deployment of Information and Communication Technologies, ICTs (e.g.: Berwick & Nolan, 1998; Tsinakis et al., 2002; Anderson & Funnell, 2005).

This phenomenon requires a strong political and managerial support, to enable cultural and environmental changes with a deep involvement of all the stakeholders; a greater effort is therefore requested to develop suitable strategies and models towards a stronger cooperation among the provider organizations and a better governance of care processes by means of detailed indicators for quality and appropriateness.

In the last years, eHealth is expanding the capabilities of the healthcare professionals by providing accurate and timely information and expert support (Seaton, 2007), rising up the idea of “Connecting for Health” (National Health Service of England, 2005), “Health Connect” (Australian Department of Health and Ageing, 2008; Kaiser Permanente, 2008), and “Connected Health” (OECD, 2008). Far from being a “simple” change of name, it represents the natural consequence of a new perspective, whose focus doesn’t lie on the technological solutions, but rather on people’s health: care organizations should “behave as a coherent system” thanks to the integration among all the information resources, designed and centered around the citizen. The main driver should be an economically sustainable evolution of the sector based on the priorities of the healthcare planning, to accomplish the citizen’s welfare.

Federsanità–ANCI (the Italian Federation of Community and Hospital Trusts and of the Municipalities) promoted a research initiative on national scale, to produce and validate a Logical Model about the mechanisms of adoption of ICT components in the HCOs, to assist its members in the governance of the eHealth phenomenon. The initiative is carried out in collaboration with the Department of Innovation of the Italian Council of Ministers and FORUM PA, a major actor in the process of innovation of the Italian Public Administration, with the methodological support provided by the CNR (Italian National Research Council).

In this paper we present the first phase of the research, i.e. the set up of the LITIS Logical Model (Italian acronym for: Levels of Technological Innovation in Healthcare).

LITIS aims, on the one hand, to produce the metrics to measure the level of accomplishment of the eHealth dynamics of the Italian public Community and Hospital

Trusts, together with the actors interacting with them (citizens, healthcare providers covered or not by the insurance, etc.); on the other hand, to produce suitable decisional instruments for a more effective planning of the sector.

2 Materials and Methods

The public, universal healthcare system in Italy is a Regional competence.

Health care is provided through a number of Community Trusts (which often include hospital facilities) and Hospital Trusts (which usually provide also outpatient services). The regions are gradually merging their Trusts; in the period covered by the initiative the total number of Trusts was about 230.

Social care is mostly in charge of Municipalities, although in some regions it is managed by the Community Trusts.

The work has developed so far as follows:

- Production of a taxonomy of the potential functions within a HCO that can be supported by ICT solutions and of the related enabling ICT components, considering the widest spectrum of needs of citizens, healthcare professionals and managers;
- Data gathering about the current levels of innovation of the HCOs. A survey has been conducted on all Italian Community and Hospital Trusts; by the first half of 2010, 147 questionnaires have been retrieved (64 from community trusts and 83 from hospital trusts), covering all the range of innovation levels; the sample is comprised therefore by nearly two thirds of the Italian HCOs;
- Definition of a taxonomy of adoption indicators, and design of a dashboard for the presentation of the data.

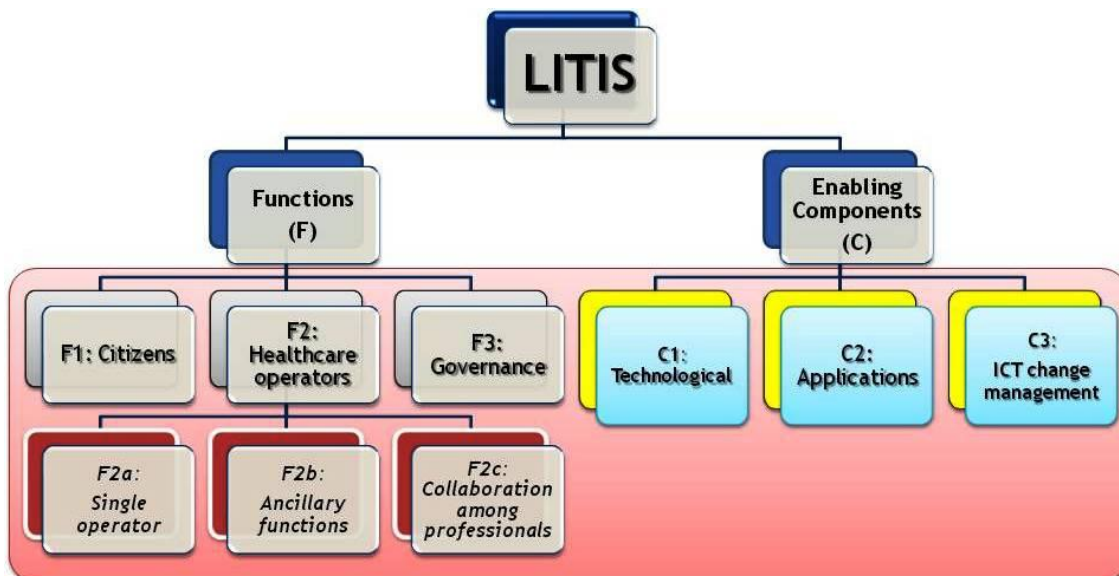


Figure 1: The LITIS framework (see text).

The LITIS model spans over the complete spectrum of the eHealth scenarios, from two complementary perspectives:

- the Functions (F), meant as services of which different kinds of actors (citizens, social / healthcare operators, managers, administrative staff) can take advantage;
- the Enabling Components (C) that are not providing direct services to the different actors, but stand as the qualifying prerequisites to deploy the Functions and handle the change (Figure 1).

The Functions were categorized into three macro-areas, depending on the typologies of users and their activities:

- F1: Functions about citizens, as participation and access to the healthcare services;
- F2: Functions about operators, related to prevention, assistance and care;
- F3: Functions about healthcare management and governance.

In particular, the F2 macro-area was in turn divided into three sub-categories:

- F2a: Functions about the single healthcare operator (including the EMR systems);
- F2b: Ancillary functions (e.g. prescriptions, laboratory reports, certificates);
- F2c: Functions about the clinical collaboration among professionals (including the EHR systems)

The Enabling Components feature as well three macro-areas:

- C1: Technological infrastructures;
- C2: Application infrastructures;
- C3: Organizational elements for the eHealth governance.

The C1 and C2 macro-areas are the prerequisites to support most of the functions. The C3 macro-area concerns the readiness of each HCO towards an effective governance of the eHealth phenomenon; it is adapted from the structural parameters panel elaborated for the Information Policy Unit of the English National Healthcare System, about the readiness of the NHS towards the ICT innovation (Protti, 1999). In particular, the study focused on the eHealth Local Implementation Strategies (LIS) arranged by the HCOs, within the campaign of adoption named as “Information for Health”.

3 Results

The organization and clustering of raw data to produce a multi-layered taxonomy of indicators was performed by an incremental and adaptive approach. At the lower layer, an initial series of 165 “micro-indicators” (145 for the Functions, plus 20 for the Enabling Components) was directly built from the raw data.

The 145 functional micro-indicators were then aggregated at an intermediate layer, according to different criteria, to satisfy specific goals; actually the presentation in the LITIS report was performed arranging the functional micro-indicators into either 36

topics or 12 sectors (Federsanità-ANCI et al., 2010). Table 1 shows synthetically the 12 functional sectors, together with the correspondent reference macro-areas.

Table 1: The 12 functional sectors and the corresponding macro-areas

Reference macro-area	Sector
F1	Information about healthcare services, for the citizen
F1	Administrative streamlining and booking procedures
F1	Support to the citizen for assistance processes
F2a	Information and knowledge for the professionals
F2a	Support to each healthcare professional
F2b	Dematerialization of prescriptions, medical reports, certificates
F2b	Dematerialization prearrangement
F2c	Support to cooperation in assistance processes
F2c	Diffusion of Electronic Healthcare Record (EHR) systems
F2c	EHR prerequisites (infrastructures and settlements)
F3	Administration/Finance & Control
F3	Supplying and Logistics (Warehouses)

At the upper layer, data were aggregated to yield three “macro-area indexes”, ranking from 0 to 100, designed to summarize the statistics about wide clusters of similar functions. These macro-area indexes eventually gave origin to a synthetic global index, named as “ICLI” index (Italian acronym for: Global Index of Innovation Level). The ICLI index, ranking as well from 0 to 100, summarizes in a single number the status of eHealth adoption for each HCO (Figure 2).



Figure 2: The multi-layered taxonomy of the LITIS functional indicators

For each micro-indicator, at least one HCO in our sample reached the maximum value; it means that all the corresponding elementary functions, as defined in the questionnaire, are affordable today in our country. However, no HCO declared to have deployed all the functions: the maximum value registered for ICLI is 41,5/100. Only nine HCOs (corresponding to the 6,1% of the sample) show a final rank exceeding 30/100.

The HCOs were assigned to 5 “Classes of Adoption”, according to their value for ICLI. Figure 3 shows the geographical distribution of these 5 Classes along the 4 macro-regions of the country, where each Class has been assigned with a colour (ascending order: black, red, yellow, green, blue).

As an example of presentation, the figure gives a compact, quantitative assessment to a well-known situation in the Italian eHealth milieu; a non homogeneous scene can be recognized between northern and center-southern Regions: the formers are more advanced in terms of definition and implementation of paths of technological

innovation, and about half of them appear among the two upper classes; almost three fourths of the latters stand instead in the two lower classes.

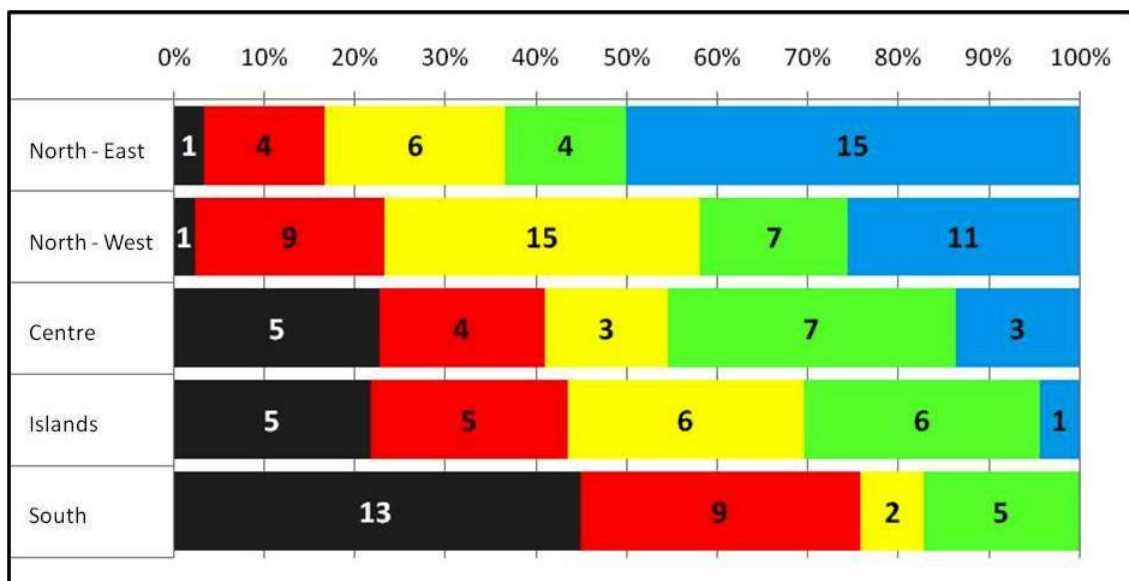


Figure 3: Geographical distribution of the “Classes of Adoption” in Italy. The numbers represent the count of Healthcare Trusts within each Class in our sample.

As an example of the dashboard for the presentation of the detailed data, Figure 4 presents an overview of level of adoption of the HCOs by means of the 12 intermediate indicators about the sectors. The range from 0 to 100 has been divided into five intervals; each interval has been associated in turn with a colour (ascending order: black, red, yellow, green, blue), yielding a vivid “Mosaic”. In this version, the rows feature the mentioned 12 sectors; the columns feature the HCOs involved in the survey, organized from left to right by decreasing ICLI values.

As remarked above, within all the sections there are green and blue cells (high scores) also among the less computerized HCOs: this anomaly may be interpreted saying that the specific interest and know-how are actually present somewhere in the country, but disorderly spread out along all the classes and for almost any functionality. Similarly, black and red cells occur also for the most advanced HCOs: substantial room for improvement is therefore possible for them, too.

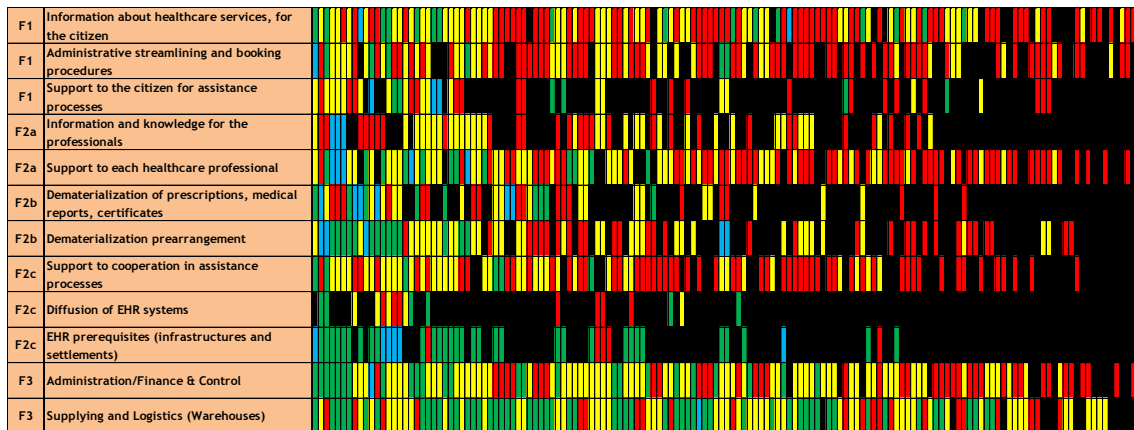


Figure 4: The LITIS “Mosaic” in the version with 12 sectors (see text).

In general, the Mosaic – normally presented in the version with 36 topics, or as a piece-wise representation of all the micro-indicators – resulted a means able to make extremely manifest the lack of common vision and know-how sharing across the country. It is a tool aimed at providing the (national) scenarios for local in-depth discussions, perhaps in a version based on the most detailed micro-indicators. In fact, it can be read in two main ways, one looking at each Functional macro-area, one at the features of the HCOs within each Class of Adoption. As an example of a possible interpretation, let us first consider the horizontal bands of the Functional macro-areas.

- The F1 macro–area (direct services for the citizens) shows an overall mediocre rate of diffusion (highlighted by a strong presence of red or black cells, but also several green or blue cells); some topics (e.g.: telemedicine services directly involving the patient) appear still as underdeveloped, not representing yet a common (systemic) practice for patients’ home care. As for instead the access to “useful information”, especially via HCOs’ web portals, a moderately slow adoption is still registered, so that a wide range of services turns out as still unavailable for the citizens.
- As for the F2 macro–area (services for the professionals), a poor level of adoption is registered for a wide range of services linked to the access to clinical knowledge. In addition, the lack of connections (especially in clinical data sharing) among healthcare operators hampers the coordination for performing integrated management plans. Moreover, it emerges that – besides isolated cases – HCOs lack any advanced form of Electronic Health Record to integrate local clinical records in a single web–accessed tool, able to share citizen’s clinical data, both during each single care episode or, more in general, during his/her lifetime.
- The F3 macro–area (services for the management, including logistics and administration) shows instead a relatively wide deployment. In this sector, the efforts carried out towards the adoption are very clear, confirming that the awareness of the decision makers about the usefulness of ICT solutions in their sector is well established.

Another way to use the Mosaic could be to consider vertically the set of contiguous columns for the HCOs that belong to the same Class of Adoption.

- Class 1 (on the extreme right of Fig.4) includes those HCOs where ICT exploitation is minimal, decisions are isolated and a true strategy is actually missing. Such organizations may be guided to identify and adopt already widely implemented technologies, in order to arrange the smallest, coherent backbone suitable for a subsequent gradual development plan; this requires the completion of basic infrastructures, such as intranet frameworks and internal electronic mailing systems.
- Class 2 features HCOs that already deploy some ICT functions to cope with important issues concerning both business and care management. They need anyway to be supported by central and regional institutions, to get to a vision to complete a further block of basic functionalities.
- Class 3 contains the HCOs where appropriate functions are implemented not only for the business administration, but also for the management of clinical and organizational assets, featuring a partial integration among heterogeneous information subsystems. However, even if they deployed perhaps some advanced features, the missing overall design or strategy may cause these features to remain isolated and not coherent with other decisions. Nevertheless the achievements done may make them able to support important organizational change, by activating or strengthening some meaningful clinical services (e.g., integrated management, pathology networks, telemedicine), with positive outcomes on care processes.
- Class 4 takes into account the HCOs where eHealth is more involved in the redefinition of healthcare processes and organizational models. Their features are similar to the ones from Class 3, but they reached higher scores thanks to a wider range of services provided.
- Class 5 consists of the HCOs on the extreme left of the Mosaic, which provide most basic services and a reasonable number of advanced functions, even if some gaps still remain. A debate is needed, to clarify which of the missing functions are really worthwhile to be deployed, with respect to spend the resources to improve some already existing services.

As another outcome of the LITIS initiative, it was possible to envisage a consensus-based process for a regional plan for a meaningful, stepwise adoption of eHealth, with an approach similar to the CMMI model (SEI, 2010). The data and the Mosaic allow to highlight specific set of functions, to be taken as the reference for negotiations between the regional authority and the Trust managers, with a systematic analysis of the respective objectives and roles adapted to the local context. For each topic, the first level is given as implied, since it concerns the “default state” of the HCOs. An example of a likely scenario to test the planning modalities on regional scale is summarized in Table 2 below.

4 Discussion

The first phase of the LITIS experience is now closed. It brought a vision on a set of generic methodological issues, as well as a better understanding of the eHealth phenomenon in Italy.

The experimental data gathered within the LITIS survey are reasonably compatible with other sources and fit the goals of the initiative, i.e. to envisage a broad-spectrum Logical Model to measure and assess the levels of adoption of ICT solutions, for the governance of the “Connected Health” phenomenon.

The current data actually represent the perception about eHealth functions by the Chief Executive Officers of the Community and Hospital Trusts (that does not necessarily match with the perception by other institutions, e.g. Regions or Regional Healthcare Agencies).

In this paragraph we first discuss the goals of the LITIS initiative, and we compare it with some other initiatives to measure adoption levels. Then we consider the suitability of the subdivision of HCOs in Classes of Adoption and finally we outline the possible evolution of the LITIS initiative.

Table 2: An example of possible agreements, to be consensually adapted to local contexts, on the milestones to be satisfied by a Trust in order to pass to the specified upper class.

a. Functions F1 related to the citizen				
Topic	LEVEL 2 Milestones	LEVEL 3 Milestones	LEVEL 4 Milestones	LEVEL 5 Milestones
<i>Information about healthcare services, for the citizen</i>	Portal – static information	Portal - news and dynamic information; forms for administrative procedures		Portal - Advanced information services
<i>Administrative streamlining and booking procedures</i>	Co-payments and visits/exams booking at any distributed Trusts' front offices	Co-payments and booking at chemists, banks, postal offices. Access to lab reports, via web	Co-payments and booking, checking state of administrative procedures, via web	Management of administrative procedures, via web/Portal
<i>Support to the citizen for assistance processes</i>		Consultation of the EHR, telemedicine services, reminders	Management of the PHR, advanced telemedicine services with home-based devices	Towards a Virtual tutor (integrated PHR and clinical / administrative services)
b. Functions F2 related to the professionals				
Topic	LEVEL 2 Milestones	LEVEL 3 Milestones	LEVEL 4 Milestones	LEVEL 5 Milestones
<i>Information and knowledge for the professionals</i>	Portal with basic care protocols, clinical paths	Portal with several care protocols, clinical paths, medication management		cooperation tools (wiki, forums) concerning care protocols, clinical paths
<i>Support to each healthcare professional</i>	Infrastructures for consultation of local clinical documents (lan/wi-fi). Support to GP for screening management	Digital signature. Documents with HL7/CDA2 standard.	Infrastructures to support therapy management (bar code, RFID, robotized delivery)	
<i>Dematerialization of prescriptions, medical reports, certificates</i>	General Practitioners (GP) connected via pc to the regional network	GP generating electronic prescriptions and digital certificates	Complete e-prescribing cycle	
<i>Support to cooperation in assistance processes</i>	E-mail, instant messaging, audio/video conference, VOIP. EMR shared within GP teams	Teleconsultation between specialists, teleradiology, EHR to share ancillary documents	EHR to share clinical documents, including patient summary	Chronic diseases management
c. Functions F3 related to the management and the administration				
Topic	LEVEL 2 Milestones	LEVEL 3 Milestones	LEVEL 4 Milestones	LEVEL 5 Milestones
<i>Administration/Finance & Control</i>	Management Accounting	Data archives for relations and costs analysis and control (Datawarehouse).	Tools for translating government strategies in performances measures (Balanced ScoreCard)	Quality and appropriateness indicators from clinical routine data
<i>Supplying and Logistics (Warehouses)</i>	Warehouse Management	Handling and valorisations of central, peripheral, ward and pharmaceutical warehouses	e-procurement and e-supply	

In Italy and abroad, the healthcare system is not always capable of coping with an over-accelerated and “over-technological” approach to the eHealth topics. Achieving an effective alignment of the strategies, on a national and regional level, is strictly linked to the critical dynamics of interrelation existing between the main drivers of ICT penetration in the healthcare sector, namely: the e-government plans, the drift velocity within spontaneous markets, and the constraints introduced by healthcare planning (e.g.: Spanjers, 2001; Tamburis, 2006; Rossi Mori et al., 2007).

The phenomenon is adequately shown by fig. 3 above: it is the first consequence of the unbalanced growth of the ICT adoption dynamics in Italy, where regional evaluations prevail over systematic national level assessments. In fact, in contrast to the national level, fully-fledged regional eHealth policies are in advanced stages of realization only in those few “Blue-labeled” regions, already effectively aimed at pursuing the three main strategic goals of the healthcare field: (i) high quality assistance processes and safer clinical decisions; (ii) supporting a sustainable evolution of the sector (i.e.: high quality / low expenses); (iii) effective and appropriate access to the services for the citizen. Further in-depth examinations with the single Regions are therefore expected for the next phases of the initiative.

Too centralized eHealth action plans, and the lack of explicit and detailed common strategies proactively involving all the stakeholders, may bring two main consequences:

- healthcare professionals may feel reluctant towards informatics solutions conflicting with the organization of care processes, showing scarce interest and cooperation, and providing incomplete and poor quality clinical data;
- HCOs may have a passive attitude towards the innovation, giving up any proactive behaviour (especially for what concerns the care processes) and defusing the internal qualified personnel competences.

Therefore the LITIS initiative was aiming at the overall goal to assist a collaborative and balanced evolution of the eHealth sector, through two ways:

- a metrics (i.e.: a method and a set of criteria) to assess the progress of each HCO over time towards explicit eHealth targets and strategic action plans, in order to contribute in the evaluation of the impact of the different organizational and information solutions (both on the citizens and the healthcare system), and to compare appropriate benchmarks across the different HCOs;
- a common vision about eHealth topics and issues, based on a model to facilitate the detailed negotiations between a regional authority and its HCOs, describing mutual roles and expected achievements. For each topic, the potential tasks of each stakeholder (Regions, Ministries, Municipalities, business management, social and healthcare professionals, information systems services providers, scientific societies, standardization organizations, service suppliers, and other actors) may be consensually defined.

Many experiences, in different countries, aimed at the measurement of eHealth readiness and adoption, as connected to the evaluation of the technological innovation status in the healthcare sector; however most of them focus on the progresses in terms of applications and infrastructures. In fact, among the most important are:

- *Ontario Hospital e-Health Adoption Survey (OHA)*: The OHA and the Hospital eHealth Leadership Council have been gathering information since 2005 to assess the extent to which the hospitals in the Canadian province of Ontario are capturing, using and sharing health information through ICTs. Understanding where hospitals are today on eHealth adoption is valuable toward achieving the promise of eHealth, including the creation of a comprehensive Electronic Health Record (Orchard et al., 2009).
- *US EMR Adoption Model*: HIMSS Analytics collects and analyses healthcare data relating to ICT processes and environments, products, IS department composition, costs and management metrics, healthcare trends and purchasing decisions. HIMSS Analytics has created an 8-staged EMR Adoption Model (EMRAM) that identifies the levels of Electronic Medical Record capabilities ranging from limited ancillary department systems through a paperless EMR environment (HIMSS, 2008). HIMSS Analytics has developed a methodology and algorithms to automatically score more than 4,000 hospitals relatively to their ICT-enabled clinical transformation status, to provide peer comparisons for hospital organizations as they strategize their path to a complete EMR and participation in an Electronic Health Record (Li et al., 2008).
- *USA Meaningful Use*: promoting the adoption and use of health information technology (HIT) is a major priority for U.S. policy makers as a means of managing health care costs and improving quality. The American Recovery and Reinvestment Act (ARRA) authorized incentive payments through Medicare and Medicaid to providers that implement certified electronic health records and demonstrate their “meaningful use” (CMS, 2010; Jha et al., 2010). The U.S. Department of Health and Human Services (HHS) has stated a three-stage incentive program: Stage 1 is supposed to last up to the end of 2011; the accomplishment of Stage 2 and 3 is instead foreseen by the end of 2013 and 2015, respectively.

As for the Italian Public Health System, an effective allocation of responsibility for eHealth strategy development and their implementation collides with a complex scenario, where the presence of decentralised health systems, as well as of several ministries involved, points out the strong need for a concerted official eHealth strategy yet, with common goals that are agreed among all the different institutions (European Commission Information Society, 2011).

Along with this, a number of surveys in Italy in the first decade of the XXI century have been performed concerning the level of innovation in the Healthcare Organizations (e.g. Osiris project: Ricci and Luzi, 2003; OASI Reports: Fattore et al., 2008; Cantù, 2010), as well as the massive “E-Government 2012” Plan launched from the Ministry of Health and the Department for Digitalization and Innovation of the Public Administration from the Ministry of Innovation. Nonetheless, the market of ICT penetration in the health sector in Italy is optimistically valued at the present moment around the 1,5–2% of the National Health Budget, and it is foreseen not to overcome the 2,5–3% mark in the short–middle period (Spandonaro, 2008).

This is why the scope of the LITIS model involves the whole range of potential eHealth functions (i.e. not only the ones related to EHR systems) and the goal of LITIS is oriented towards a collaborative attitude and the production of an assessment tool for

decision makers. Moreover, LITIS emphasizes the engagement of the citizens and the primary care, specially for integrated management of chronic diseases. Most indicators are on the functions and the processes, with less detail on the infrastructures (a necessary prerequisite for delivering the functions).

The LITIS model analyses the overall spectrum of the potential usage of ICT in a HCO, and is aimed at measuring the whole set of functions, according to the main purposes of the eHealth policies, namely: prearranging of enabling factors; improvement of the efficiency of the ancillary processes; management of care processes; supporting the healthcare system governance. Hence LITIS is not oriented as much to recognize the good practices on specific issues, but rather to guarantee an uniform and collaborative development for the whole sector: in other words, it is aimed at finding “what is missing” in order to ensure that all the less reactive HCOs reach at least the minimum common level of innovation – and to make the most active HCOs to improve in a balanced way all their eHealth functionalities.

According to Rogers (1995), “Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system”. Berwick (2003), moving from Rogers’ research, reviewed a number of studies about the “spontaneous” diffusion of innovation in the healthcare field, defining five “behaviour classes”:

- laggards, that carefully assess pros and cons, before performing any change;
- late majority/late adopters, as part of the majority that performs slow change dynamics;
- early majority/early adopters, as part of the majority that quickly learns and adopts the innovation;
- early adopters/opinion leaders, that start the behavioral models, then adopted by the majority;
- innovators, that give origin to new solutions, but are rarely followed by the majority.

This model applies well to the on-off adoption of a particular innovation, while in the case of eHealth a large number of highly independent functions are involved (with a different speed of diffusion), and each function can be deployed at different levels of effectiveness and quality. However the 5 Classes of Adoption described in the previous paragraph appear very close to the ones described by Berwick.

The intrinsic flexibility of the taxonomy of indicators (different layers of aggregation, from the micro-indicators to ICLI) makes it possible to aggregate them by manifold criteria, depending from the specific issues to be analysed. The LITIS model deals with weighted scores applied to the taxonomy of indicators; it could assist the community of HCO managers and eHealth professionals to produce, in future, recommendation to apply a strategy based on a set of milestones, where each milestone involves a coherent and balanced block of functionalities that span over all the macro-areas. A large degree of optionality should be left to local decisions, in selecting the functions within a predefined block according to local priorities, context and history.

The current main limitations of the study are descending from the Mosaic perspectives of analysis themselves, used to express the potentiality of the LITIS Model: a valid set of explicit and validated criteria, both for assigning the HCOs to the Classes and for correctly defining the threshold values to fix the clusters is under development, to refine the current interim solution based on ICLI.

Anyway, it is important to highlight that the evaluation parameters used to get to final “score” for each macro–area come from an in–depth analysis work, conducted to build suitable weighted indicators to figure out, for the future, any effect at any level of interest from the action plans.

Given therefore the novelty of the approach, the weighted aggregation of the indicators and the criteria to assign HCOs to Classes will undergo future improvements, with the cooperation of all the actors involved, in order to make the criteria even more valid and appropriate.

The motivation of national survey was to get the data to set up the model and to understand the phenomenon; in the next phases the Logical Model will be used locally by the respective decision makers, for negotiations and planning purposes. Therefore, the next research and formative deployment cycles will be likely structured as follows:

- check the potential usages of the Logic Model, on a meaningful sample of HCOs (pretesting / field analysis), as an effective support to analysis, comparison, consensus-building, and planning;
- implement changes and/or integrations to the Model, on the basis of the results of the previous step; build an updated questionnaire to test the resulting Logical Model;
- fill in again the questionnaire and revise the current scores and weights to build the indicators; and perform the next cycle.

5 Conclusion

The emerging scenario points out that the Italian HCOs are predisposing themselves towards eHealth, according to the targets of the National e–government plans, but the massive concrete outcomes not yet occurred for the greater part of the citizens, because of the lack of both regional and national comprehensive innovation strategies. It can be said therefore that, all conditions being equal, eHealth appears as very late for what concerns the deployment of policies of electronic communication with the citizen, if compared with other services typologies (e.g.: mail, tourism, banking).

Many innovation processes stem from the opportunities provided by the new technologies, but no corresponding “osmosis” processes took part between the professional figures involved (ICT, physicians, managers). In addition to this, a remarkable gap still exists in Italy between north regions (more advanced in terms of innovation strategies and policies) and center/south regions.

The HCOs can be assigned to Classes of Adoption; the lower classes are more focussed in the deployment of the infrastructure, the upper classes could be able to use the eHealth services to support quality improvement in the care processes and the reorganization of care services needed to increase the economic sustainability of the healthcare system.

In fact, the lower Classes should adopt a technology-driven attitude, i.e. should be focussed on the deployment of the basic technological infrastructure, as well as of some well-defined and “well-settled” operational processes, by exploiting the opportunities provided by known effective solutions (e.g. booking, e-prescription); this approach provokes local perturbations in the organizational frameworks that can be adequately faced, but is not able to effectively influence neither the care processes, nor the behaviour of citizens and social/healthcare professionals on health promotion. In other words, such approach doesn’t affect the core business of the care system, i.e. the decision processes and the behaviours.

On the contrary, upper Classes may wish to adhere to a care-driven attitude, meant to address the needs of regional and national healthcare planning efforts, and to fulfil the related targeted action programmes. The adoption of currently available technological solutions can perhaps satisfy most of the information management requirements that descend from such action programmes; nonetheless a coordinated and coherent demand dimension is needed, to allow the necessary investments.

In this situation, achieving an optimal dimension of eHealth adoption to support changes in the organizational context requires its time. There are many issues to work out, in order to turn new ideas into practice (adoption); it is difficult to foresee the level of technology readiness – meant as propensity of people to embrace and use new technologies for accomplishing goals in home life and at work (Parasuraman, 2000) – especially for what concerns the healthcare operators.

In their complex, the data coming from the first phase of the LITIS initiative confirm that a general interest towards the Connected Health is rising up: in fact, there are spontaneously spreading functionalities (e.g. booking) and actions depending from government decision (i.e.: support to screening campaigns); even if still there are potentially important functionalities that are not yet adequately developed (i.e.: a structural adoption of telemedicine solutions).

This situation can be summarized saying that “not all the spontaneously developed topics are important, and not all the important topics are spontaneously developed”.

Acknowledgement

The work was partially funded by the Department of Innovation of the Italian Council of Ministers and industry sponsors. The work was performed in collaboration with the Permanent Board of the CEOs of Healthcare Trust and Municipalities by Federsanità–ANCI, with the eHealth Committee of Federsanità–ANCI, and with FORUM PA.

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