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EMPOWERING PATIENTS AND PROFESSIONALS: CASE OF LITHUANIAN E-HEALTH SYSTEM

Abstract:

New technologies change our social – economic everyday life by making considerable impact on its quality. The healthcare in the meantime is becoming more and more dependent on information and communication technologies, which enable the development of high quality healthcare services. The deployment of new ICTs has the potential to increase organisational efficiency of healthcare providers, change the processes of work organisation and create the conditions for electronic patient information exchange between healthcare providers according to the nationally agreed standards. The main idea of the paper is a proposition that the engagement of various stakeholder groups into the process of e-Health development has the potential to pave a more effective way of introducing innovation in healthcare sector and contribute to the greater sustainability of achieved changes. Quantitative research explored the extent and trends of the engagement and participation of stakeholder groups in the process of e-Health development in Lithuania.

Keywords:

e-Health, information technologies, social technologies, stakeholders, healthcare policy, public management,

1 Introduction

Current trends in healthcare include not only safety critical issues, ageing of population or ever increase of costs in health care but also demands by citizens for more and better information. E-Health like other Internet enabled parts of our society (eGovernment, eLearning, eBusiness etc.) is about placing citizens at the center and easing their interaction with the wide range of people responsible for their wellbeing. Calvillo et al. (2013) state, “beyond psychological implications, empowerment of patients in daily practice relies on technology and the way it is used.” Despite numerous benefits of e-Health, developments of such systems are often slow and complicated. Many problems arise in every stage of the process: software development, testing and implementation (Garg et al. 2005). The pace of information and communication technology (ICT) implementation in health care sector is considerably slower when compared to other public services such as finance or education (Shortliffe 2005).

Growing volume of research shifts their focus from technical problems in these processes to human-related issues such as appropriate organizational culture or inclusion of various stakeholders. Following this trend, the main purpose of this paper is exploration of the engagement of stakeholders into the process of e-Health development and it’s potential to pave a more effective way of introducing innovation in healthcare sector and contribute to the greater sustainability of achieved changes. Quantitative research explored the extent and trends of the engagement and participation of patients, employees and executives of private and public hospitals in the process of e-Health development in Lithuania. The paper is structured in the following way: Section 2 draws attention to theoretical considerations of involving patients and employees into e-Health implementation; Section 3 presents methodology used for quantitative research. Section 4 provides results of quantitative research. The final section draws together concluding considerations and recommendations for further research.

2 Empowering Patients and Professionals using E-health Systems: Theoretical Considerations

Development of Information and communication technologies in recent decades and its impact on innovation processes in health care made this sector one of the most competitive and value adding industries in the world. Allegedly, health care sector has huge potential worldwide and is mainly influenced by modernization, use of new technologies. Advanced technological solutions provide considerable opportunities to increase sector’s cost-effectiveness improve management of complex structures, save time of patients and staff and optimize of accounting. Therefore, development of e-Health is long-term and complex process, which involves wide range of interest groups such as government bodies, patients, professionals, etc. Health care sector lagged in terms of investments rather long time, however, the situation is starting to change. For example,

the states of European Union (EU) established appropriate policy priorities and committed to the development of enhanced health care system by creating supporting financial mechanism. Despite the importance of funding, some cases from EU states experiences show that financial support does not guarantee positive long-term outcomes and sustainable benefits (Rotomskiene, 2011).

Diverse factors affect successful implementation of patient oriented health care technological solutions (Tsiknakis & Kouroubali 2009; Kaye et al. 2010; Qureshi & Shah 2013; Koumaditis et al. 2013; The et al. 2011; Wickramasinghe & Schaffer 2009; Maheu et al. 2002; Hartvigsen et al. 2007; Cooke-Davies 2002). However, McGrath & More (2001), Scholl (2004), Mantzana & Themistocleous (2005) were first ones to point out that human parameters and other "soft" issues are usually ignored while developing theoretical frameworks. More recent research by Mantzana et al. (2007) suggests that because healthcare actors and their roles are influenced by organizational environment and time their roles should be identified and managed in any case. That is especially important in public sector, which can be characterized by complex relationships and prevailing need to reconcile different interests in virtually any project or policy decision. In regards to these developments, Juciute (2009) proposed integrated socio-technological approach focusing on analysis of current and potential users of health care information systems. This framework is based on a notion that the process of ICT implementation in healthcare is more socio-organizational process than a technical one, although the later view is predominating among the policy makers. Therefore, patient-focused approaches of healthcare delivery require not only technological changes but also modification of established work organisation and overall delivery of healthcare services.

3 Methodology

This quantitative study is part of scientific research project "Integrated Transformations of e-Health Development: the Perspective of Stakeholder Networks" conducted by research group at Mykolas Romeris university. The main purpose of the research project is to assess the process of e-Health development from the stakeholder network perspective, as one of the main factors for a successful e-Health development to achieve innovation and sustainability in health sector. Quantitative research aims to explore the extent and trends of the engagement and participation of executives of health care institutions (HCI) in the process of e-Health development. Three large-scale surveys were conducted in 2013 in order to receive input from patients (N = 1000, 37 questions), employees (N = 400, 53 questions) and executives (N=77, 53 questions) of health care institutions. Surveys were carried out using standard questionnaires developed for respondent groups separately based on theoretical socio-technical approach concept, stakeholders' management tools offered by Friedman and Miles and logic dictated by the current e-Health development problems in Lithuania identified in qualitative studies of the project. In depth analysis of mentioned theoretical sources is provided in the publications by

Rotomskienė & Tamošiūnaitė (2013), Pitrėnaitė-Žilėnienė et al. (2014), Jankauskienė (2014). Data collection was performed by Public Opinion and Market Research Company. Method of combined (face-to-face, telephone, e-mail) selection was applied. Respondents were selected proportionally from region of Lithuania. After collecting the survey data, authors carried out statistical study using SPSS for Windows (version 15.0) and analysis of the data received. Statistical relationships between attributes were calculated by using chi-square ($\chi 2$) tests. Significance level of $p < 0.05$ was chosen to calculate statistical reliability.

It should be noted, that following discussion on results includes analysis of responses to questions related to patients and employees empowerment in terms of e-Health development only. Patient and employee inclusion analysis is performed on several dimensions. First, we will discuss responses of information system end-consumers and end-users, i.e. patients and employees, on their awareness, use and participation in e-Health processes. Then, we will determine links with responses of HCI's executives on the same issues.

4 Empirical Results

Awareness of patients and employees. It was determined that the majority of patients in Lithuania (65.30%) were aware of e-Health services. 29.5% responded that they've never heard about e-Health services, while 5.20% indicated that it was hard for them to tell what that is. In order to get more in-depth view, patients were asked a question "Has anyone inquired/ asked your opinion about e-Health services in your health care institution?" The majority (96 %) of respondents claimed that nobody examined their views on e-Health services (see Fig 1). Another open-ended section of the questionnaire required respondents to give information on e-Health services missing in their facilities. The most striking result to emerge from the data is that greater part of patients (83.7%) could not answer the question and most of those who could answer the question identified lack of general information on e-Health services (N = 56).

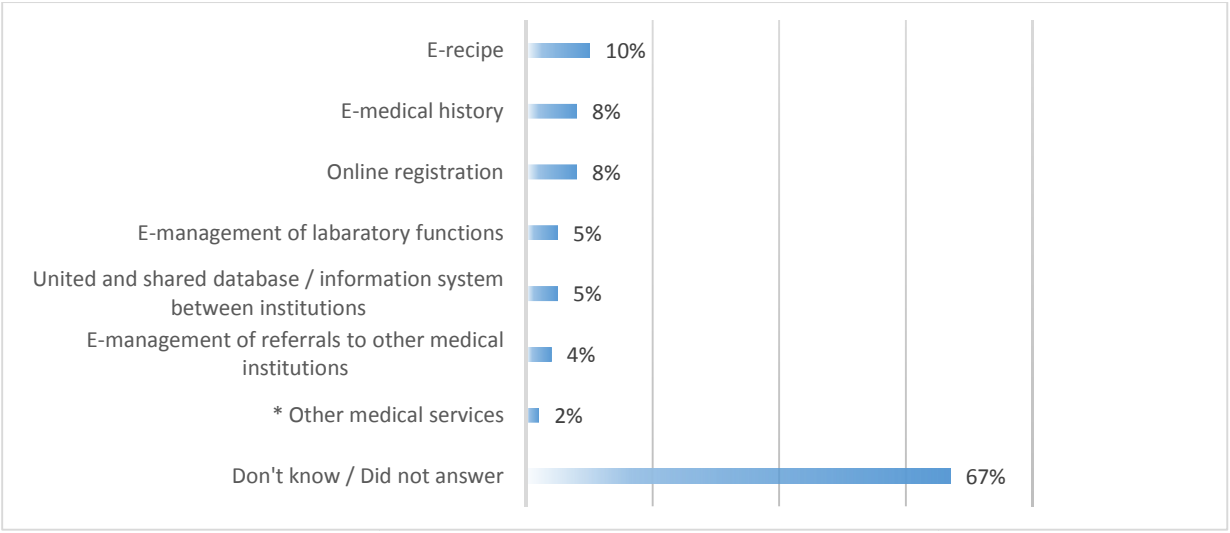
Table 1: "What e-Health services are missing in your health care institution?", number of patients and percentage of respondents

Answers of respondents	**N**	%
Lack of general information and clarity on services	56	5,6
Online registration	36	3,6
E-recipe	34	3,4
Online access to medical history	29	2,9
E-management of referrals to other medical institutions	20	2,0
E-management of laboratory functions	18	1,8
E-management of referrals to other medical offices in health care institution	17	1,7

Mobile reminder (sms) about doctor's appointment	15	1,5
Other (<1%)	*46*	*4,6*
Do not know / no answer	*837*	*83,7*
Total	1000	100,0

Analysis of employees' responses revealed that they were well aware of various e-Health services provided by their institutions and on national level. However, in response to the question „Do you believe HCIs in Lithuania have a sufficient range of e-Health information system/ technologic solutions?" the majority (44%) responded that the range of e-Health information systems in Lithuania is insufficient. 16% of respondents agreed with the statement, while 40% of them had no opinion on the question asked. Analysis revealed not only the scope of perception of technologic solutions, but also apparent a lack of employees' interest in e-Health development – when asked which technological solutions should be implemented in nationally, majority of respondents (67%) could not answer the question.

Figure 1: Answers to question, "Which technological solutions should be implemented in Lithuania" by employees (%).



** Other services were mentioned by less than 2% of respondents and include but are not limited to preventive programs, e-management of hospitalization, storage and retrieval of digital images, e-management of preventive programs.*

This brings us to proposition that patient awareness in Lithuania is limited mainly due to lack of general information about e-Health services. HCI employees, on the other hand, have comprehensive awareness of e-Health information systems but are generally not interested in development of such technological solutions.

The use of e-Health solutions by patients and employees. Less than half (42%) of patients reported that they used e-Health services over the period of two years. This result shows that albeit patients are mostly aware of the services but are reluctant to use them, for example – the most known service is online registration (66 %) but it used by 45% of patients only. It should be noted, that positive responses depend greatly on level of education, place of residence and age ($p < 0.05$). E-Health services were used most often by residents of Vilnius (capital of Lithuania) holding a higher education degree and younger than 50 years ($p < 0.05$).

Table 2: Patients' awareness and use of e-Health services.

E-Health service	**Part of the population that knows the service**		**Part of the population that knows and uses the service**	
	N	%	N	%
Online registration	660	66,0	294	45,0
Mobile (sms) or e-mail reminder about doctor's appointment	353	35,3	167	47,4
E-management of referrals to other medical offices in health care institution	334	33,4	157	47,0
E-management of referrals to other medical institutions	273	27,3	93	34,1
E-management of medical information about patient's hospitalization (e.g. medical history, complaints)	237	23,7	76	32,2
E-management of labaratory functions	283	28,3	140	49,5
Storage and review of digital images (e.g. radiological)	289	28,9	147	50,9
E-recipe	129	12,9	21	16,3
E-management of hospitalization (e.g. surgical or therapeutic treatment)	152	15,2	36	23,7
E-management of immuno-prophylaxis (vaccination) and/or it's records	114	11,4	19	16,7
Telemedicine (e.g. telemonotoring, teleservices)	108	10,8	27	25,0
Monitoring progress of pregnancy electronically	107	10,7	17	15,9
Online access to medical history	137	13,7	24	17,5
E-management of sick leave documentation	428	42,8	191	44,6

Respondents were asked to indicate main advantages of e-Health solutions: 57% of those who used e-Health services at least once named convenience, 53% - time saving feature, other options were less relevant. Key reasons hindering the use of e-Health services identified by patients were related to low levels of computer literacy: computer illiteracy - 21%, absence of a PC - 20% and lack of knowledge about such services - 17%.

Figure 2: Reasons why patients use e-Health services (N=417)

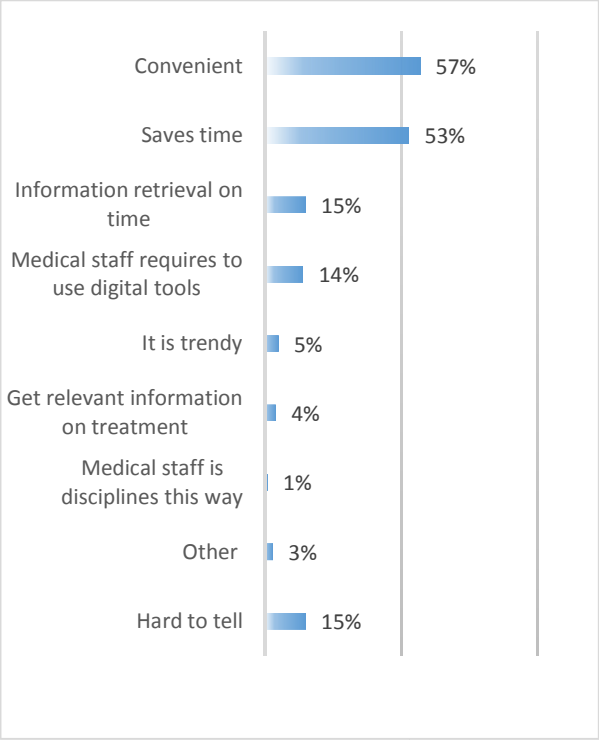
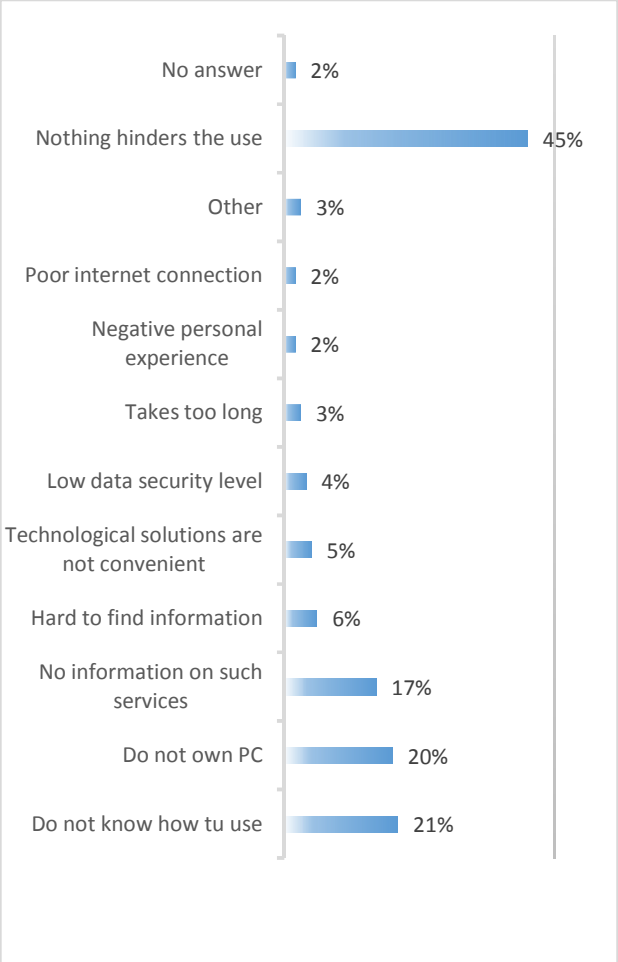


Figure 3: Reasons hindering use of e-Health by patients (N=1000)

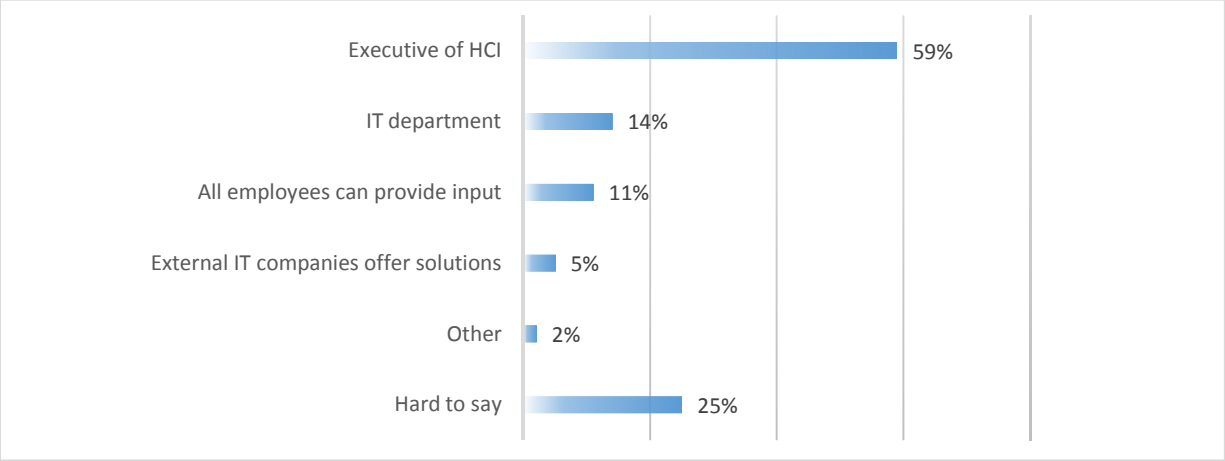


Similar insights can be drawn from HCI employees' respondents – awareness of e-Health solutions was higher than the use. Solutions used most frequently by staff include – administration of sick leave (59%), outpatient reporting (53%) and tracking patient's insurance status (53%). 67% of those who were interviewed indicated that use e-Health information systems every day. So, one of the greatest challenges in the nearest future is the reduction of the HCI employees who use e-Health solutions rarely (13% of respondents of current research) and (or) never (8% of respondents of current research). To sum it all up, the use of e-Health solutions as compared to the awareness of e-Health solutions in both instances is lower. However, a positive trend can be observed with younger people being keener to use IT-enabled services.

Participation of patients and employees in decision-making. When analyzing research data on the participation of patients in decision-making, the first question that patients were asked was on the involvement of patients by making offers on e-Health services at

their own initiative. Majority of respondents (N = 979) indicated that they never submitted ideas on e-Health services by their own initiative. Given low initiative levels of patients in the process of improvement of e-Health solutions in addition to limited number of surveys targeted at patient opinion on e-Health in HCI's, lead us to conclusion that patients do not take part in e-Health decision-making and, among all other things, do not feel as an integral part of e-Health services. A similar situation has also been determined in the outcome of the staff survey. As previously mentioned, HCI employees in Lithuania are well aware of the range of e-Health services. According to research data, the range of e-Health services in their institutions was evaluated positively by 20% and negatively by 49% of the respondents. It was also determined that younger medical employees evaluate e-Health systems positively more often ($p < 0.05$). However, less than half (48%) employees indicated that their managers have discussed/presented the impact of e-health information systems/ technologic solutions and their place in the organization of work in HCIs. In the opinion of staff, decisions on e-Health solutions were mostly made by executives of institutions (59%). Other stakeholders made decisions or offers much less often: IT department of an institution - 14%, each employee can make offers - 11%, external IT companies - 5%.

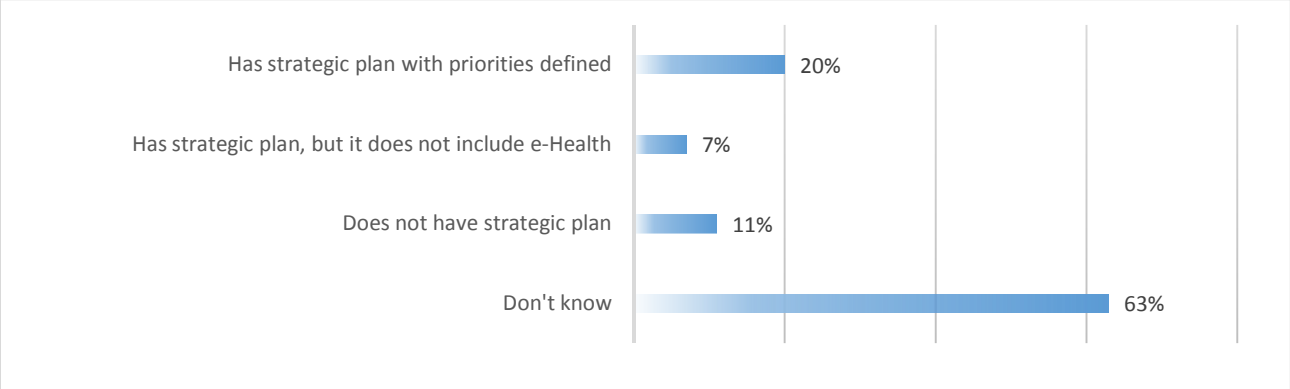
Figure 4: Decision makers on e-Health development, answers by employees



When the participants were asked identify ways they learned about new e-Health solutions implemented in their HCI, they commented that it happens after the implementation of a technologic e-health solution (21%), after selection of a specific product by executives (21%), during trainings (21%) and when determining the need for e-Health information systems in institutions (19%). HCI employees not only participate rarely in the adoption of e-Health solutions, they are also passively involved in the development of HCI strategies and future projections. The majority (71%) of respondents did not know which e-Health modules were to be implemented in their institution in the nearest future. 19% of specialists indicated that they were asked about the

implementation of new modules in their institution and only 7% of them made offers on which modules should be implemented in the future.

Figure 4: Answers by employees "Does your institution have strategic plan which includes development of e-Health solutions?"



The need for increasing the involvement of employees not only in decision-making, but also in the strategy development is obvious, as the majority (63%) of respondents indicated that they did not know whether their HCI had a strategic plan providing for e-Health module implementation in the nearest future.

Links with responses of HCI executives. Given the assumption that the success of e-Health development process is closely related inclusion of various stakeholders and greatly depends on efforts made by HCI itself, opinions of HCI executives were examined too. Only 11.7% of managers answered that regular (3.9%) or one-time (7.8%) research was conducted in their institutions. This proposes that the research on IT-enabled solutions use is a rare phenomenon and is not considered an integral part of e-Health. Executives were asked to provide reasons of scarce research on the use of e-Health. Answers to this question can be categorized into four groups: huge workload and limited human resources; employees should not be included in early stages of implementation in presence of large workload there is no time for research and not enough human resources; negative attitude towards the e-Health development and limited usage of implemented system; limited funding. Further questions revealed limited comprehension of managers on the role of patients and their needs. When the participants were asked, "Are patients of your HCI satisfied with e-services provided in your HCI?", the majority (66.2%) claimed that it was difficult for them to tell. 31.2% of respondents indicated that patients are satisfied, 2.6% - dissatisfied. This leads us to proposition that the executives did not know what patients thought about the provided e-health services, while having failed to identify evolving needs.

5. Conclusions and recommendations for further research

Advancements in health technologies and data management could help to solve such contemporary issues as aging population, chronic diseases, rising prices and uneven access to care. Thus, the issue of e-Health innovations has received considerable critical

attention combining the interdisciplinary research fields and political agendas. In a broader sense, this term refers not only to technological developments, but also to level of awareness, mindset, network thinking and activities dedicated to substantial improvements of health care services on local and more global levels while using ICT. As numbers of national e-Health systems of limited effectiveness grow, it is obvious that supervision of such projects is very complex and involves managing issues beyond technological innovations. Change sustainability depends greatly on the ability to mediate interests of various stakeholders. This is especially relevant in health care systems where variety of interests and influences is even greater than in other sectors.

This paper has investigated inclusion of patients and employees in e-Health initiatives using data collected during quantitative study. Findings of the research suggest that in general patients and employees are aware of e-Health services in Lithuania but are rarely included in decision-making processes. This happens for several reasons. First, staff and patients themselves are generally not interested to provide input or feedback for improvement of health services. The need for increasing the involvement of employees not only in decision-making, but also in the strategy development is obvious, as the majority of respondents indicated that they did not know whether their HCI had a strategic plan providing for e-Health module implementation in the nearest future. Second, executives of HCI's usually do not feel the need to include stakeholders in neither present decision-making, nor in future projections. Limited number of surveys is conducted in HCI's in order to research the needs of stakeholders and analyze satisfaction with the implemented e-Health solutions. This leads to non-compliance with expectations of end-users (patients and staff) and limited use of e-Health services.

Given the assumption that the success of e-Health development process is closely related inclusion of various stakeholders, results of this research suggest important alterations of political, organizational and managerial tools and techniques used in e-Health development and implementation. Further development of e-Health requires better delivery of services to citizens, providing simpler processes and greater convenience, improved interactions, citizen empowerment through access to information, efficient management, increased transparency, new sources of information when shaping policies. The implications that derive from this research are important not only for practice but for further scientific considerations too. It is clear that the successful introduction of new technologies in e-Health sector would depend on many factors, including social and attitudinal factors. Following scientific questions could be formulated: how different E-Health projects could become a possibility to effect positive changes in health care system, how to increase engagement of passive stakeholders into decision making process, what technologies would help to structure the information, purify the positions, reconcile different opinions and create efficient e-services system. The insights designed in this research could be used with further studies to examine e-Health adoption in other countries to sustain the required generalizability of findings.

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