

DOI: [10.20472/BM.2015.3.1.005](https://doi.org/10.20472/BM.2015.3.1.005)

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

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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,

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Citation:

AELITA SKARZAUSKIENE, VIKTORIJA STOKAITE, MONIKA MACIULIENE (2015). Empowering patients and professionals: case of Lithuanian e-health system. International Journal of Business and Management, Vol. III(1), pp. 75-89., 10.20472/BM.2015.3.1.005

1 Introduction

Current trends in healthcare include not only safety critical issues, ageing population or ever increasing costs in health care, but also citizen demand for more and better information. E-Health like other Internet-enabled components of our society (eGovernment, eLearning, eBusiness etc.) is about placing citizens at the centre and easing their interaction with a 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).

A 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 its potential to pave a more effective way of introducing innovation in the healthcare sector and contribute to a 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, the healthcare sector has a huge potential worldwide and is mainly influenced by modernization and the 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 accounting. Therefore, development of e-Health is a long-term and complex process, which involves a wide range of interest groups, such as government bodies, patients, professionals, etc. Health care sector lagged in terms of investments for quite a long time, however, the situation is starting to change. For example, the European Union (EU) countries established appropriate policy priorities and committed to the development of enhanced healthcare system by creating a supporting financial mechanism.

Despite the importance of funding, some cases from the experience of the EU countries 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 the 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. With regard to these developments, Juciute (2009) proposed an integrated socio-technological approach focusing on the 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 a socio-organizational process than the 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 a part of scientific research project “Integrated Transformations of e-Health Development: the Perspective of Stakeholder Networks” conducted by a 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), Pitrenaitė-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 regions 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 (χ^2) tests. Significance level of $p < 0.05$ was chosen to calculate statistical reliability.

It should be noted that the following discussion on results includes analysis of responses to questions related to patients and employee 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.

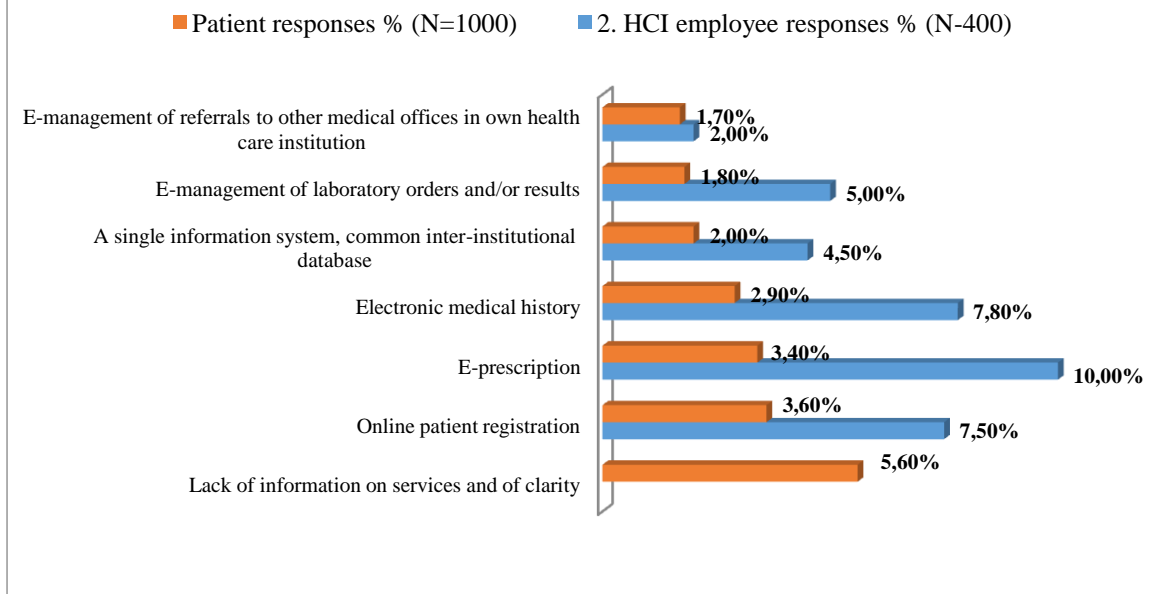
4 Empirical Results

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 have 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. Only a half of respondents (1.1%) who were inquired on e-Health services (2.1%), made offers on the improvement of e-Health services. Respondents were asked open-ended questions to indicate the exact questions they were asked by healthcare institutions. Having examined the responses of 13 respondents, two main categories of most frequently asked questions were distinguished:

- Questions related to the satisfaction with provided e-Health services;
- Questions related to the convenience of use of e-Health services.

Another open-ended section of the questionnaire required both patients and HCI employees to provide information on lacking e-Health technological solutions in health care institutions. Having compared responses of patients and HCI employees, it was determined that both groups of respondents identified the need for online patient registration, electronic completion of a prescription forms and electronic health records. It should be emphasized that patients indicated the lack of the dissemination of general information about e-Health services as the most important shortcoming (5.6% of patients agreed with this statement).

Figure 1: Comparison of main e-Health technological solutions identified by patients and employees that are lacking in healthcare institutions, %



Analysis revealed not only the scope of perception of technologic solutions, but also an apparent lack of employees' interest in e-Health development – when asked which technologic solutions should be implemented nationally, the majority of respondents (67%) could not answer the question. 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. This brings us to a proposition that patient awareness in Lithuania is limited mainly due to the 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 the development of such technologic solutions.

The use of e-Health solutions by patients and employees. Less than a 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 is used by 45% of patients only. It should be noted that positive responses depend greatly on the 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 ($p < 0.05$).

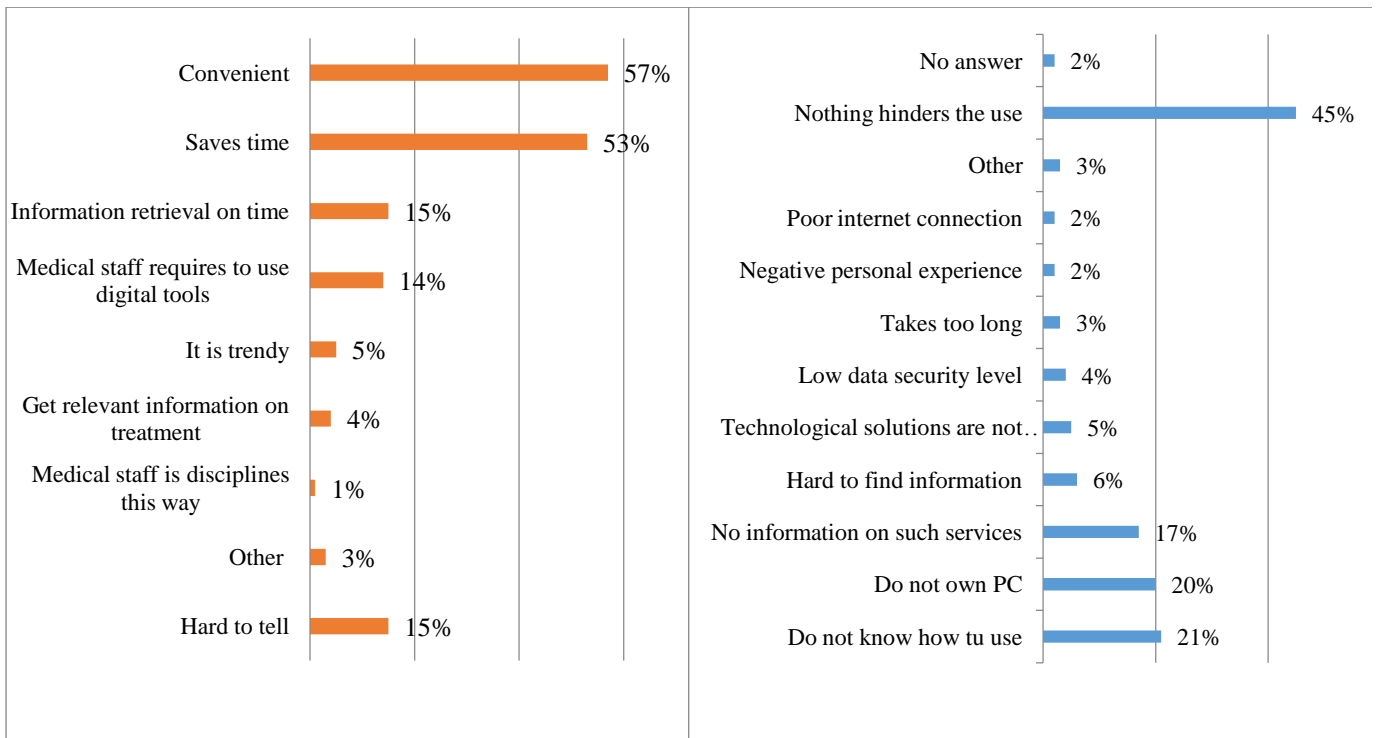
Table 1: Patients' awareness and use of e-Health services

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 laboratory 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. telemonitoring, 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

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' responses – 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 analysing 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

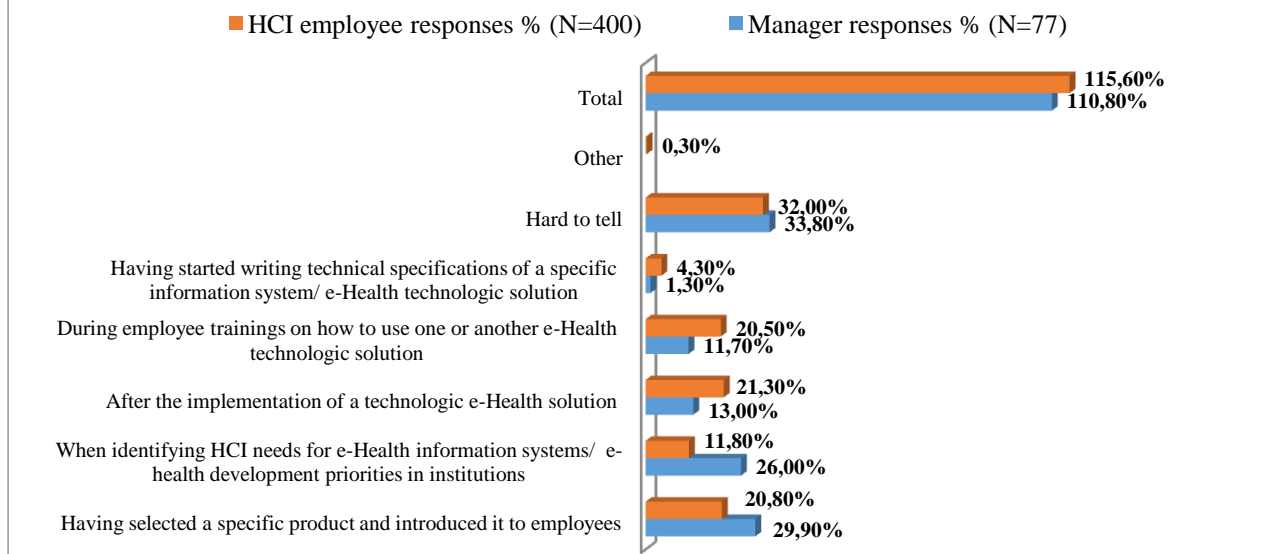
initiative. Majority of respondents (N = 979) indicated that they never submitted ideas on e-Health services at their own initiative. Low initiative levels of patients in the process of improvement of e-Health solutions in addition to a limited number of surveys targeted at patient opinion on e-Health in HCI's led us to the 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. Given the fact that the success of e-Health development process is closely related to everyday activities of HCI employees, it is necessary to analyze their roles, knowledge and evaluations in greater detail. The inclusion of HCI employees into the decision-making processes (related to e-Health solutions) in the Lithuanian e-Health system was examined for this purpose. Research data was analysed in order to identify the correlation between opinions of HCI managers and HCI employees in the decision-making of e-Health development-related solutions in following aspects:

- HCI employee awareness of a planned new e-Health technologic solution;
- Selection and implementation of technologic e-Health solutions;
- E-Health information systems/ other technologic solutions meeting employee expectations.

Having compared responses of HCI managers and employees to the question “When do HCI employees usually find out about a planned new e-Health information system/another technologic e-Health solution planned to be implemented in their workplace?”, it was determined that:

- HCI managers admit to and state the fact that usually employees are informed about a new e-Health information system or another technological e-Health solutions planned to be implemented in their workplace after the decision is already made - having selected a specific product (29.9%) or identified specific HCI needs for e-Health information systems/ technologic solutions and e-Health development priorities in the institution in advance (26.00%). Manager responses allow the assumption that a new e-Health solution usually is not approved with employees beforehand;
- The opinion of HCI employees was quite similar on one aspect. Respondents found out about newly planned e-Health solutions only after the implementation of the technologic solution (21.3%), after the selection of a specific product during the presentation thereof to employees (20.8%) or during employee trainings on how to use one or another new e-Health technologic solution (20.5%), i.e. HCI respondents reassert the fact that they do not participate in discussions or the decision-making process on the planned implementation of a new e-Health solution;

Figure 4 : When do HCI employees usually find out about a planned new e-Health information system/ another technologic e-Health solution planned to be implemented in their workplace? Response distribution of HCI managers and employees, percent

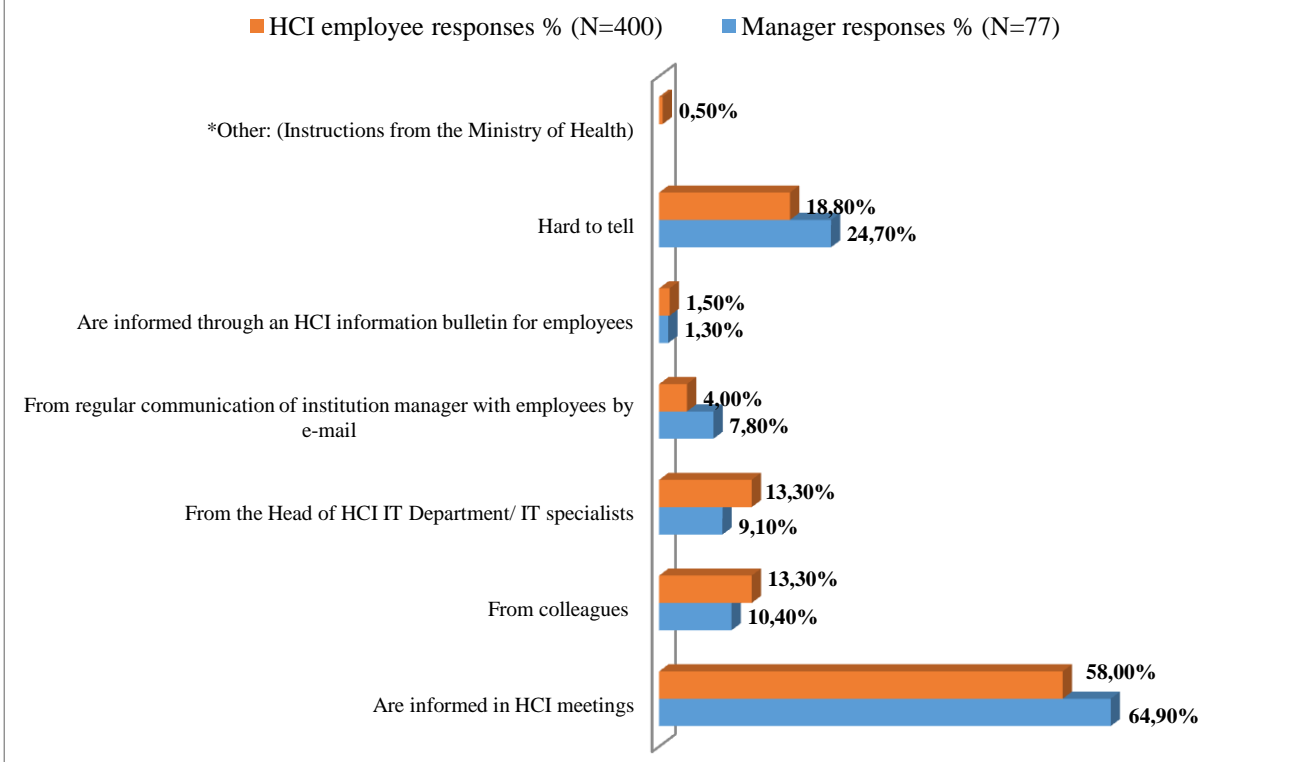


Next question that HCI managers and employees were asked was “How did your HCI employees find out about a new e-Health information system/ another e-Health solution planned to be implemented in your workplace?”. Having compared the responses, distinction between opinions was not significant. Both managers and employees named the following ways:

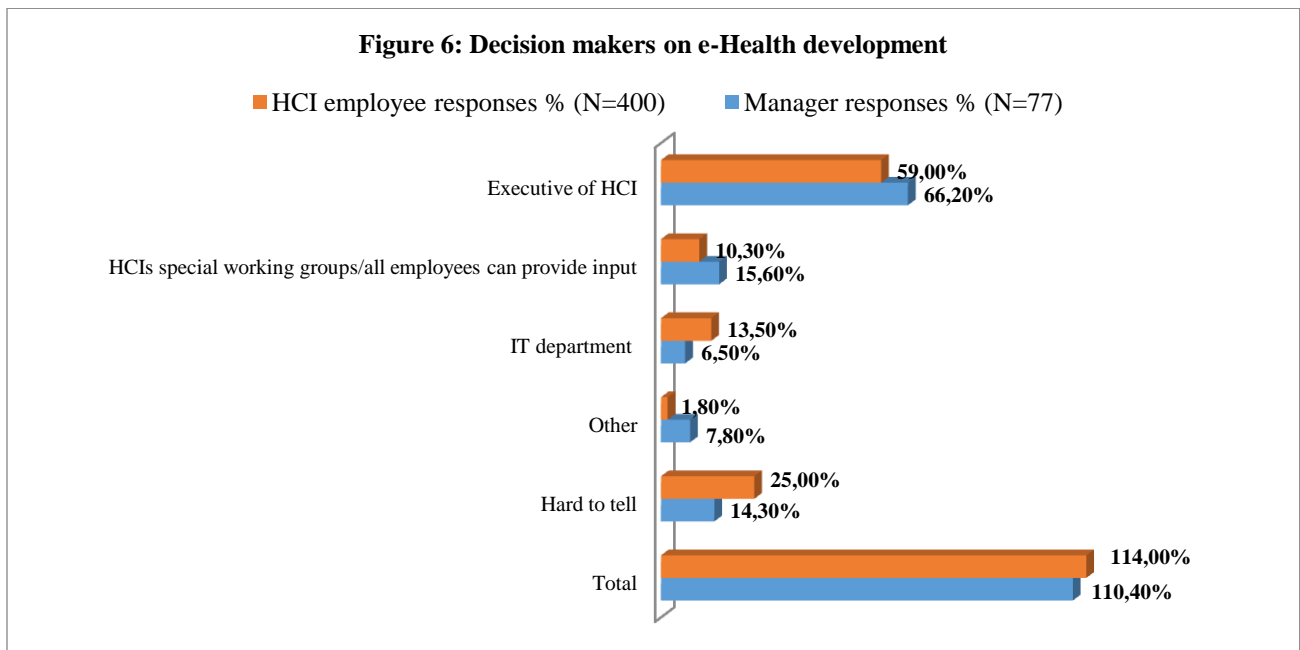
- HCI meetings (64.90 % of managers and 58.00 % of employees agreed with this statement);
- From colleagues (10.40 % of managers and 13.30 % of employees agreed with this statement);
- From the Head of IT Department/ IT specialists (9.10 % of managers and 13.30 % of employees agreed with this statement).

HCI managers believed that information about newly planned e-Health information system is disseminated by the institution managers regularly using such tools as e-mail, meanwhile according to employees information received by e-mail is rare and the obtain information while communication with their colleagues much more often.

Figure 5: How do your HCI employees find out about a new e-Health information system/ another technologic e-Health solution planned to be implemented in your workplace?



Further analysis of the results revealed that both managers and employees confirm the fact that the main person deciding which technological solutions should be implemented is the manager of institution. However, it should be emphasized that in some HCIs special working groups are brought together for this purpose. Moreover, employee participation by making offers is encouraged in the decision-making process, but a low response rate leads to a belief that these are exceptions rather than rules, a phenomenon rarely occurring in practice. HCI employees, in contrast to managers, also distinguished the role of HCI IT Department in the decision-making on the implementation of technologic e-Health solutions (Figure 6).



Analysis of responses to the question “How in a decision made on which e-Health information systems should be implemented?” showed that managers made a decision on the implementation of information systems themselves in order to ensure that the implementation within the lines of national e-Health development strategy and action plan. Moreover, some managers (46.8%) claim that responsible state authorities also participate in the decision-making process. A decision-making process not only involves the agreement with respective state authorities, but also here instructions on e-health system implementation-related issues are received. When it comes to this aspect, the need for further research is emphasized in order to determine what is the role of managers of HCIs themselves in the decision-making process. Still, having compared responses of HCI managers and employees, it was determined that in the opinion of managers institution employees are consulted in the decision-making process (45.5 % of managers agreed with the statement), meanwhile HCI employees believe that they are rarely consulted (8.3 % of employees agreed with the statement).

Table 2: How in a decision made on which e-Health information systems should be implemented?

	Manager responses % (N=77)	HCI employee responses % (N=400)
In line with the national e-health development strategy and action plan	50,6%	29,5%
Instructions from the responsible state authorities	46,8%	29,0%
Consultation with employees	45,5%	8,3%
Consultation with IT companies	22,1%	4,5%
Consultation with others HCI	11,7%	7,0%
Hard to tell	14,3%	42,8%
Other		0,3%
Total	190,9%	121,3%

Given the fact that HCI employees rarely participate in the decision-making on e-Health development, the question is posed whether this aspect has any impact on the changing nature of work and behaviour (motivation) of employees. The necessity of identification of the needs of HCI employees is emphasized. According to the research data, employees are satisfied with implemented e-Health information systems/ other technologic solutions (74.5 % of HCI employees indicated that they value implemented e-Health services well/ rather well and 63.6% of HCI managers believed that their HCI employees were satisfied/ rather satisfied), however, the distinction between opinions of HCI managers and employees on the examined aspects raise a question of not only a passive participation of HCI employees in the decision-making process, but also of internal communication, awareness-related issues. This is also confirmed by the fact that HCI employees 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. 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. In order to achieve innovation and sustainability in health care sector, involvement of all stakeholders is very important, which is likely to take place much more rapidly having first assessed the importance of the role of each stakeholder in the implementation of the national e-Health system. The conducted research

reveals the uniqueness of the situation in Lithuania. Even though the development of e-Health system is closely related to both service orientation towards patients' needs and the adaptation of e-Health solutions for the needs of HCI employees, the respective changes in HCIs, search of new work organization and service provision models for the implementation of these goals is happening slowly.

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 analyse 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.

6. Acknowledgments

The research is supported by European Social Fund under the measure Support to Research Activities of Scientists and Other Researchers (Global Grant) administrated by Lithuanian Research Council (grant No. VP1-3.1-ŠMM-07-K-02-029), project "Integrated Transformations of e-Health Development: the Perspective of Stakeholder Networks".

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