The Role of Research Institutions in Health IT:

Health IT Research Institutions vs. Health IT Companies

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Abstract

Health information technology is often presented as a solution to increase the efficiency and cost-effectiveness of health care providers. However, health IT is still far from meeting the stakeholders' expectations. The aim of this paper is to discuss the role of research, in particular of research institutions, in the field of health IT. The differences in the roles of health IT research institutions and health IT companies is discussed according to a framework on the determinants of successful health IT implementations. It is argued that it is necessary to understand that health IT research institutions and health IT companies are two different players with different focus. As health IT companies have their focus on the product, the production of new knowledge should be the main focus of health IT research. In this sense, the two should not be evaluated in the same manner.

Keywords:

Health Information Technology, Research, Successful Implementations

Introduction

Global trends, as the progressive increase in the proportion of elderly people in the society, often with a high prevalence of chronical conditions, and the decrease in the number of health care personnel, call for changes in the way health care is delivered [1-3]. Hence, healthcare providers are pressured to become more efficient and cost-effective. In this context, health information technology (IT) is often presented as a problem solver [4, 5].

Despite being considered as a solution for the problems in the health care sector, health IT is still far from meeting the stakeholders' expectations [6-18]. Why do promising research projects continue to fail to be turned into current practice? The aim of this paper is to discuss the role of research, in particular of research institutions, in the field of health IT. It is argued the necessity to understand that health IT research institutions and health IT companies are two different players with different focus. Therefore, their production should not be evaluated in the same manner, as their goals and scale of deployment are disparate.

This paper is divided into three sections. In the first section, the problem is introduced, and a brief literature review is provided. In the second section, the demand on health IT research is described, and a framework on the determinants of successful health IT implementations is presented. In the last section the role of research in health IT development is discussed.

Background

In the preface of a recent, large scale reform in the Norwegian health care, the Coordination Reform. the Minister of Health and Care Services stated that: "*Norway ranks among the highest of all OECD nations – but we have not achieved a corresponding high level of health in return*" [19]. The Minister wanted to change this: "*With smart solutions, patients will receive proper treatment at the right place and at the right time. We will achieve this through the Coordination Reform*" [19]. A clear goal on the use of IT in the Reform, as stated on page 135, is that "*electronic communication should be the standard way of communicating*" [19]. In line with this vision, an extensive IT investment is currently taking place in Norwegian health care. In the northern health region of Norway, The Northern Norway Regional Health Authority is investing € 62.5 million in the FIKS project (from the Norwegian "*Felles innføring kliniske systemer*") to develop the electronic health record for the future – a fundamental tool for high-quality patient treatment [20]. This is the largest IT investment in the region ever.

In an attempt to answer this eagerness from the government to improve the public health services, more research on health IT has been called for [21, 22]. However, as mentioned in the Introduction section, a substantial amount of the literature in the field of health IT, reports on unsuccessful implementation projects, challenges and unforeseen consequences of IT in health care [6-18]. Health IT has been failing to fulfill in real production settings the expectations drawn during research. This leads to the question: What is a successful implementation project, and what is a successful implementation in a research project?

Broens et al. [22] have identified the determinants of successful health IT implementations. These determinants are classified in five major categories: (1) *Technology*; this category encompasses four sub-categories, namely support, training, usability and quality. These sub-categories refer to the robustness of the health IT solution and its adequacy to the users' needs. It also highlighted the necessity to train the user in the handling of the health IT solution and support him/her in problem situations that might occur during its operation; (2) *Acceptance*; this category describes the key factors for health IT to have a persistent usage in everyday practice. This concept is described in three sub-categories: attitude and usability, evidence-based medicine and, diffusion and dissemination. (3) *Financial*; this category evidences the cost-effectiveness need of the health IT solution and the importance of such studies to ensure future financing structures; (4) *Organization*; emphasizes the lack of working protocols for health IT. The implementation of health IT often

requires changes in the existing organizational structure (intra-mural) and/or how institutions relate to each other (extramural); (5) *Policy and Legislation*; this category consists of three sub-categories: legislation and policy, standardization, and security. The three topics describe, respectively, the health IT solution conformance to the existing legislation and policy, the use of standards to ensure uniform practice and interoperability, and the patients' physical safety and patient information security.

The following section will discuss the role of research institutions in this setting.

Discussion and Conclusions

It is the authors' opinion, that health IT research institutions and health IT companies are two different players with very different focus. However, the trend nowadays is for health IT research institutions and health IT companies to aim for the same handovers (i.e. full-scale deployment solutions). Additionally, they are also being evaluated in the same manner. This being said, in what ways are they different?

Health IT companies do not have the obligation to generate new knowledge, their focus is to generate a new product. On the other hand, the focus of research institutions should be on generating new knowledge and not on delivering a solution in the full-scale deployment state. However, the duration of a research project does not allow researchers to approach all the determinants identified in the framework presented in the Background, with the same depth. When the team involved in the research project is interdisciplinary, as argued in [23], it is possible to approach all the topics referred to in the framework during research. That being said, the question arises as to which depth can, or should, this topics be approached in research?

Hereafter, the differences in the roles of health IT research institutions and health IT companies will be discussed according to the framework by Broen et al. [22] on the determinants of successful health IT implementations, and summarized in Table 1.

In the *Technology* category, research institutions are often a step ahead of health IT companies. Researchers tend to monitor *in loco* the pilot phase of the project. By doing so, they interact in a larger extent with the health workers in their daily work than developing teams in companies. Hence, researchers are in a better position to provide personalized training and support to the user. Even though research institutions, due to their multi-disciplinarity, are in a privileged position to provide this type of service as part of multi-faceted implementation projects, this strategy is seldom applied. Projects using multi-faceted implementation strategies, i.e. that provide a pluralistic research approach that does not focus in one particularity but instead aims to provide an overview of the research case, are extremely complex and costly. Companies aim for multi-faceted implementation strategies, which often fall short in meeting the needs of the organization due to the lack of relevant knowledge, as discussed below. Another issue is the health IT solution adequacy to the users' needs. Research project applications are funded according to how well they fit the topics of grant calls, which in principle meet users' necessities. However, health IT companies have an extensive knowledge of the market they operate in. This doesn't mean that research projects are more suitable than corporate projects. Again, this strengthens the claim that each player has a different focus.

Acceptance is probably the determinant in which research has contributed more in the last years. An increasing number of research projects are devoted to study the effects of health IT in the environment it is integrated. Research projects focusing on patients' experiences, impact on the organization, slow diffusion and dissemination, have contributed with great knowledge to this field. On the other hand, health IT companies develop new solutions upon request, or based on market opportunities. Their focus on having a product on the market leaves very little space for extensive contribution of new knowledge in this field.

The cost-effectiveness of a health IT solution is of great importance. Either coming from research or from a company, a solution will not survive in daily practice if it is too costly for the health care provider. A number of research projects fail in the *Financial* category. This happens for two main reasons: (1) the subject is not approached; and this may occur because the researchers' vision is out of the scope of the project, or, even if the researchers acknowledge the need of a financial study in the project, the limited time of the project leads for this study to be one of the first parts to be left out; (2) the study is not carried out with sufficient depth; this may also happen as a result of limited time, that might not allow for the required data to be collected. A company project has a different nature. Companies finance themselves, therefore a project will not survive, even before deployment, if it is not cost-effective. They are ready and willing to adopt strategies that make them more competitive.

In the authors' opinion, the *Organization* category is closely related to the *Acceptance*. The lack of working protocols that have been comprehensively described to support the development of health IT often leads to the need to perform changes in the organization. To change an organizational structure requires an extensive knowledge of the organization and the people that work in it. Health care organizations are recognized to have a high level of resistance to change [24]. Therefore, to make the changes required for health IT implementation it is necessary for the organization to accept the solution and recognize its usefulness. For the reasons already outlined above, research has provided the biggest part of the knowledge required to accomplish this work.

Policy and Legislation might be the most controversial category. Considering the scale of deployment of the final solution, in principle, research projects should not have the necessity to approach this category to the same depth as companies. However, to ensure a possible implementation for pilot purposes, research often diverges from its aim in an attempt to tackle the problem in the policy level described in the framework. One of the reasons for this may be found by the inexistence of research platforms provided by the healthcare provider and the involved health institutions [25]. The inexistence of platforms capable to support research pilots means that research implementations have to take place in production settings. As much as it is wanted, this process is extremely time-consuming for research projects. In companies, most of the required platforms and IT infrastructures already exist, and/or the connections and networks required to have them in place are already established.

It has been shown that health IT research institutions and health IT companies have different roles in the field of health IT. As health IT companies have their focus on the product, the production of new knowledge should be the main focus of health IT research. In this sense, the two should not be evaluated in the same manner. For research, consideration of what is a successful research project, and the successful implementation of a pilot, should be separated. Even if a research project does not reach the deployment phase, the knowledge generated might be of great importance, and a major contribution to the field of health IT.

Table 1 – Role of Health IT research institutions and Health IT companies applied to the determinants of successful health IT implementations in Broen et al. framework

Category	Health IT research institutions	Health IT companies

Technology	• Extended interaction with health workers
	  - *In loco* monitoring of the project
	  - Personalized training and support to the user
	• Adjusted to the topics of grant calls
		• Extensive knowledge on the market
		• Reasons for development
		  - Customer request
		  - Market opportunity

Acceptance	• Contribution with new knowledge to the field
	  - Studies on the effects of health IT, patients' experiences impact on the organization, slow diffusion and dissemination
		• Focus on the product
		  - Very little space for extensive contribution of new knowledge to the field

Financial	• Most project fail to approach the solution cost-effectiveness, because:
	  - The subject is not approached either because it is considered to be out of the project scope or, the limited time of the project leads for this subject to be one of the first parts to be left out
	  - The subject is not approached with the sufficient depth; this may be due to the project limited time and lack of data
		• Self-financing
		  - Projects do not survive, even before deployment, if they're not cost effective
		• Ready and willing to adopt strategies that make them more competitive

Organization	• Extensive knowledge on the organization needed to
	  - Accomplish the organizational changes required for health IT implementation
	  - Accept the solution and recognize its usefulness
		• Customer focus
		  - Constrain the problem with tailored solutions in continuous adaption to the user

Policy and Legislation	• Deployment: Pilot
	• Attempt to tackle the research subject in the policy level aiming a possible implementation
	  - Inexistence of research platforms
	  - Extremely costly and time consuming for research projects
		• Deployment: Full-scale
		• Most IT infrastructures and platforms already exist
		• Established connection network

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