

Benefits of Professional Social Networks: Expectations and Design Implications for the Healthcare Domain

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Abstract. Social technologies are increasingly adopted across industries as they incorporate potential business value. Also the healthcare industry could profit from social technologies as the members of healthcare institutions have to be connected and collaborate with each other in order to reach their ambitious efficiency targets. Existing social networking sites like Facebook address the need of communication and information exchange but at the same time they are posing a challenge with regard to medical confidentiality and other privacy concerns. Taking a design science research perspective we identify current challenges of social networks for health professionals by analyzing existing social networking sites. These challenges are discussion points for qualitative in-depth interviews that focus on benefit expectations regarding professional social networks. At the end, seven design propositions for the design of social networks for health professionals are derived.

Keywords

Design science research; Healthcare; IS benefits; Professional social networks

1. Introduction

Social technologies, i.e. products and services that enable groups to virtually connect with each other, are increasingly adopted across industries as businesses understand the value potential inherent in these tools: Using social technologies within and across firms could enhance the productivity of high-skilled knowledge workers by 20 to 25 percent [1].

Therefore, also the healthcare industry that is faced with ambitious efficiency targets considers social technologies as one of its main trends. Only by connecting with each other, healthcare institutions can tap into the experience and knowledge of peers to reduce their costs while at the same time ensuring the quality of their services [2].

Moreover, the quest for lifelong learning, growing medical complexity (e.g. due to high comorbidity rates), and increasing patient mobility stress the need for cooperation among healthcare institutions.

However, far too little attention has been paid to elaborate ways to support and foster their collaboration efforts.

Taking advantage of social technologies suggests itself as it increases the speed of communication: Instead of having a one-to-one conversation social media enables one-to-many (e.g. via tweets) or even many-to-many (e.g. via online forum discussions) communication [3]. Social networks allow their members to exchange information, share photos, and to chat with each other [4]. Reasons for being part of such a network are not only privately motivated, but often have professional purposes, e.g. LinkedIn, a networking site for professionals, has over 225 million members that share CVs, job offerings and contacts [5].

Also with regard to the healthcare industry the importance of social networks is growing: Not only students in medical schools are using Facebook & Co [6]; studies show an increasing trend among healthcare professionals using social networks for job searches, contacting peers or other professional purposes [7].

But even though social networks enjoy popularity, there seems to be no adequate solution for health professionals that support healthcare institutions in providing high quality services as well as reducing their costs.

The reasons seem to be inherent in the characteristics of social networks: These networks are open to everybody and the creation as well as distribution of content is unstructured, i.e. it is unpredictable how a conversation will shape and turn over time and who will read it in the end [1] [4] [8]. Therefore – despite their willingness to participate in social networks – health professionals have concerns in doing so which are mainly related to privacy and confidentiality issues [6] [9]. When posting or discussing health information on social networks, health professionals have to be aware of their ethical as well as legal responsibility to maintain their patients confidentiality [10].

Medical authorities seem to be aware of this situation so that regulations for the appropriate use of social networking sites in medicine are for example provided by the American Medical Association which encourages to safeguard personal information on social networking sites, to maintain appropriate boundaries and confidentiality and to keep in mind that online content can negatively affect the reputation or even the medical career [11]. Analogously, the German equivalent to the American Medical Association, the Bundesärztekammer, publishes guidelines with regard to social media [12]. The British Medical Association even explicitly recommends within its social media guide not to accept friend requests on social networking sites from current or former patients [13].

In spite of the guidelines provided, the inherent openness of social networks constitutes a challenge regarding the appropriate handling of such an online platform [14]. Members of social networking sites may unknowingly fail to appropriately consider issues of professionalism [15].

In order to avoid the risk of overstepping doctor-patient boundaries, some healthcare professionals join a professional social networking site [10].

While extant research on social networks in healthcare rather focuses on websites targeting non-professionals (e.g., [16] [17]), there is still a lack of research regarding social networks for health professionals. In this context, a project has been launched to introduce a social network for health professionals in the German speaking area (Germany, Switzerland, Austria and Liechtenstein) that aims at supporting the inter-organizational collaboration. Collaborating via social networks not only requires certain (technical) functions but also call for (design) implications that usually depend on what users expect from a social network. Hence, before building this professional social network, we need to elaborate how to design such a network in a way that fosters the collaboration among healthcare institutions and meets the expected benefits of health professionals. Therefore, this paper deals with the identification of expected benefits of health professionals and deriving corresponding design propositions. These insights should provide the basis for building a prototype of the network in future which should be tested with health professionals of the German speaking area.

Hence, this paper has on the one hand theoretical implications as it reveals expected benefits and gives design propositions to build a professional social network that can serve as a reference in future research. On the other hand, our research provides important implications for practice as the design propositions are a guideline to really build such a network which offers the advantages of social technologies while at the same time considering the specific needs of health professionals.

The remainder of this paper is structured as follows: First, we present the research method which follows the design science research (DSR) methodology. Next, existing solutions of social networking sites in the healthcare context are analyzed. This analysis is then validated and extended by

qualitative interviews with health professionals focusing on their benefit expectations regarding professional social networks. On the basis of these interviews design propositions are formulated. At the end, implications and an outlook for future research are presented.

2. Research Method

Since this paper aims at giving guidance on how to design a professional social network that considers the requirements of health professionals, we chose DSR as our primary research approach whereas we focus on identifying challenges and providing propositions. As a science, design science is concerned with “the systematic creation of knowledge about, and with, design” [18]. The objective is to build artifacts that solve relevant problems and to evaluate those artifacts with regard to their usefulness to tackle the respective problems [19].

The design science research methodology is further developed by Peffers et al. [20] who distinguish six process steps: (1) identify problem & motivate, (2) define objectives of a solution, (3) design & development, (4) demonstration, (5) evaluation, and (6) communication.

These 6 steps are usually not performed in a sequence but rather in an iterative and parallel way. However, the main idea behind the process steps is that before designing a solution one should have a clear idea what the problem is and what goals are pursued by the intended solution. After designing a solution, it needs to be demonstrated (e.g. to potential users) and evaluated regarding its usefulness to solve the identified problem. The resulting knowledge should be communicated afterwards to direct attention to the problem at hand as well as to the provided solution.

In order to figure out how a professional social network needs to be designed to foster inter-organizational collaboration, as well as to get a deeper understanding of health professionals' cognitive beliefs, perceptions, and day-to-day experiences with social media networks, an explorative research approach had to be taken.

At first we analyzed existing social networks in the healthcare field with regard to their functionalities (i.e. openness/closeness and key features). This analysis led to discussion points indicating the major drawbacks in the design of the existing social networks (step 1 of the DSR process). These discussion points were the starting point for nine semi-structured in-depth interviews which should reveal expected benefits of a social network for health professionals as well as give insights what a new solution should accomplish in order to support collaboration (step 2 of the DSR process). These interviews were conducted with selected experts from distinct areas of medicine and healthcare management in the German speaking area. We used purposeful sampling [21] in order to select relevant stakeholders from different countries in the German speaking area to account for different regulatory backgrounds while at the same time including medical staff as well as managers from healthcare institutions (cf. Table 1): one general practitioner, three assistant medical directors, one medical director, one chief information officer and three chief executive officers of health institutions. A total of 16 hours of interview recordings were collected.

All interviews were journalized and verbatim responses to the major questions were transcribed.

In order to understand what health professionals expect from a professional social network, and to derive design propositions in a structured way, we used the framework provided by Mirani and Lederer [22]. This framework is deemed to be suitable as it is an instrument to recognize and structure benefit expectations of potential users and can also serve as an evaluation tool at a later stage of our research to assess the performance of the professional network by comparing anticipated and realized benefits. The framework distinguishes strategic, informational and transactional benefits of IS whereas each dimension is again divided into three subdimensions: Strategic benefits include competitive advantage, alignment, and customer relations; informational benefits are subdivided into information access, information quality, and information flexibility; and transactional benefits contain communications efficiency; systems development efficiency, and business efficiency.

Table 1 Interview series (note: h = hours)

<i>Organization</i>	<i>Interviewees</i>	<i>Interview duration</i>
Hospital holding (Switzerland)	Chief information officer	2h
Regional general hospital (Austria)	Assistant medical director	2h
Regional general hospital (Austria)	Assistant medical director	2h
Regional general hospital (Germany)	Medical director	1.5h
Regional general hospital (Germany)	Chief executive officer	2h
Regional general hospital (Switzerland)	General practitioner	2h
Regional general hospital (Switzerland)	Assistant medical director	1.5h
Regional general hospital (Switzerland)	Chief executive officer	1.5h
Regional general hospital (Switzerland)	Chief executive officer	1.5h

3. Analysis of Existing Social Networks in Healthcare

To get an overview of existing solutions, social networking sites in the healthcare domain were analyzed with regard to their design features, whereas we identified major drawbacks and used them as a basis for formulating discussion points for the interviews.

We consulted Internet sites discussing various social networks in healthcare [23], [24] and examined the mentioned social networks regarding their target group: In case the social network was targeting health professionals – whereas health professionals include physicians, nurses, medical students as well as managers of health institutions – it was included in our research base, if not, it was excluded.

With this approach we selected the following nine social networking sites: Allnurses.com [25], DoctorsHangout.com [26], Medical Mingle [27], medXcentral [28], Mymedport.com [29], Neuros [30], Nurse.com [31], Ozmosis [32], and Sermo [33]. Having in mind the privacy concerns discussed in the literature as well as the research objective to develop design propositions, the social networking sites were analyzed with regard to their closeness (target group) and key features. Table 2 summarizes the main findings.

Table 2 Social networks addressing health professionals

<i>Social network</i>	<i>Closeness (target group)</i>	<i>Key features</i>
Allnurses.com	Not closed (nurses and nursing students)	Basic functions: chat, forum discussion, etc. Additional functions: job searches; career advice
DoctorsHangout.com	Not closed (doctors and medical students worldwide)	Basic functions: member page, posts, forum discussion, sharing of photos / videos, search functions, etc. Additional functions: medical library, job searches; event calendar
Medical Mingle	Not closed (people interested in, working in, servicing, or studying for a career in the healthcare and medical field)	Basic functions: member page, blogs, posts, forum discussion, sharing of photos / videos, search functions, etc. Additional functions: links to free professional journals, job searches, shopping sites
medXcentral	Not closed (for those in healthcare and those who need them)	Basic functions: member page, blogs, posts, forum discussion, sharing of photos / videos, search functions, etc. Additional functions: event calendar
Mymedport.com	Not closed (healthcare professionals)	Basic functions: member page, forum discussion, sharing of photos / videos, search functions, etc. Additional functions: links to related sites; marketplace for equipment, job searches
Neuros	Not closed (medical students, doctors and all health related professionals)	Basic functions: chat, forum discussion, sharing of photos, etc. Additional functions: -
Nurse.com	Not closed (nurses)	Basic functions: news and blogs Additional functions: job searches, store for nursing related shopping items, event calendar, link to webinar courses
Ozmosis	Closed (U.S. physicians)	Basic functions: chat, forum discussion, sharing of photos, etc. Additional functions: bookmarking tool e.g. to highlight e-journal articles
Sermo	Closed (U.S. physicians)	Basic functions: chat, forum discussion, sharing of photos, etc. Additional functions: polls regarding the latest trends in healthcare

3.1. Closeness (Target Group)

Among the nine examined social networking sites only two tackle the problem of openness: Only Sermo and Ozmosis require a doctor's license to successfully register as a community member. DoctorsHangout.com states that it is an exclusive network for doctors and medical students worldwide, but it is not evident how they verify this prerequisite. Also the six other social networking sites do not ask for verification or have a very broad target group, e.g. Medical Mingle addresses all people interested in healthcare. These sites are targeted at health professionals but they are not restricted to them. Hence, the issue of openness of social networking sites for health professionals persists.

Interview discussion point A: *Where is the benefit in having a social network with access regulation mechanisms for health professionals?*

With regard to their target group the examined networks can not only be distinguished according to the profession of their targeted users, but also according to their regional focus. Only Osmosis and Sermo are social networks with a clear regional focus as they are only targeted at U.S. physicians. The other seven social networking sites do not restrict their site to a specific region.

However, in many ways the healthcare industry is characterized by regional conditions: The job accreditations as well as industry regulations are country specific. This has also an impact on certain functions of a social network for health professionals: In chat or forum discussions involving specific regulations a regional focus would ensure that country specific terms are considered. Also for functions like job searches a focus on a specific area or region might be desirable.

Interview discussion point B: *Where is the benefit in having a social network with a regional focus?*

3.2. Key Features

Regarding the key features of the analyzed social networks it becomes obvious that all examined social networking sites have some kind of basic functionality which focuses mainly on communication, e.g. a member page, forum and chat functions. With the exception of Neuros, all examined social networking sites have additional functions: An event calendar for announcing specific trainings or conferences (DoctorsHangout.com, medXcentral or Nurse.com), access to professional journals (Medical Mingle), bookmarking tools to highlight interesting parts of electronic journals (Ozmosis), an integrated online store (Nurse.com), a marketplace to trade equipment (Mymedport.com) or job search functions (Allnurses.com, Mymedport.com or Nurse.com). The fact that all examined social networking sites provide basic communication functions and all but one of these sites have additional functions suggests the following discussion point.

Interview discussion point C: *Where is the benefit in having a social network with more than just basic functions which mainly focus on communication?*

4. Design Propositions for Social Health Networks

The mere existence of social networks in the healthcare domain confirms what is also stated on various websites: health professionals (like other professionals) like to be part of social networks, e.g. in order to stay in contact with peers. They leverage social media sites by sharing health information, by communicating with colleagues or by disseminating their research [34].

To understand how a social network for health professionals needs to be designed in order to support their collaboration efforts, semi-structured in-depth interviews are conducted to discuss which benefits health professionals expect from this kind of network. The interviews include, but are not limited to the discussion points identified in our analysis. The benefits expected from the interviewees as well as the design propositions are structured according to the framework provided by Mirani and Lederer [22]; an overview is provided in Table 3.

At this point the framework serves as an instrument to structure the interviewees' expectations as well as the thereof derived design propositions. At a later stage of our research this framework will be used as an evaluation framework to assess which of the expected benefits could be realized by the network we will build for health professionals.

4.1. Design Propositions Fostering Strategic Benefits

With regard to strategic benefits of a professional social network, the interviewees see the main advantages in the alignment with other health organizations: The network should provide a possibility to compare the own organization to peers as well as to catch up with them. As a consequence, the health organization should benefit from an enhanced competitiveness and an increased ability to respond to changes in the healthcare environment. Basic communication functions are not capable to realize these benefits, hence

Design proposition 1: *Additional functions that provide the basis for cooperation need to be integrated in the design of a social networking site for health professionals.*

One possibility for the interviewees would be to include a benchmarking mechanism in the social network that allows the comparison of health institutions with regard to different criteria.

Since benchmarking data is often strictly confidential, the network needs to provide a secure environment where health professionals can publish sensitive information and communicate and discuss their challenges – a closed social network area is therefore a prerequisite. However, within the closed area the information should be accessible by all registered members to foster networking activities. Thus,

Design proposition 2: *Verification mechanisms should be in place to regulate the access to closed areas of social networks for health professionals.*

This could be attained through organizational or technical measures. One possible organizational option would be to ask for a scan of a health professional card before granting access to closed areas. However, in regions where these kinds of cards do not exist, this would not be a suitable approach. Technically, the access could be controlled by only approving member applications that provide a valid email address of a health institution (e.g. john.public@hospitalx.com).

4.2. Design Propositions Fostering Informational Benefits

On the basis of the interviews the informational benefits expected from a professional social network are mainly information access as well as information quality.

The benefit of information access lies in the fact that the social network bundles the information which otherwise would need to be accessed on various sites (e.g. the different hospital websites) or could not be accessed at all (e.g. information from intranets). To increase the benefit of information access while keeping the initial effort to provide relevant information low, we propose

Design proposition 3: *Relevant information that already exists in the web should be easy to integrate in a professional social network.*

For example, RSS feeds for a special topic or a discussion on a hospital website's blog could easily be linked to a professional social network. Same is true for already existing services, hence:

Design proposition 4: *Relevant services that already exist in the web should be easy to integrate in a professional social network.*

For example, an existing benchmarking logic can be embedded in the professional social networking site and thereby provide the expected functionality while requiring minimal initial effort. This also

facilitates the continuous development of the network, since the service portfolio provided can be flexibly extended and adapted to the health professionals' needs.

To increase information quality, the interviewees ask for a mechanism that ensures that only professionals can provide information. This confirms design proposition 2: The social network should be closed for health professionals only. However, the interviewees see a risk to information accuracy when health professionals have different regulatory guidelines, as information that is valid in one region might not be applicable to another one. Even within one region there can be discrepancies, e.g. semantic differences like the job or organization nomenclature. Thus,

Design proposition 5: The network should have a regional focus and provide a translation of the different terminologies used within that region.

The regional focus could be ensured by only approving member applications that provide an email address belonging to a certain region. For example, if the social network would be targeting German speaking countries, only members with an email addresses ending with ".de" (Germany), ".ch" (Switzerland), ".at" (Austria), and ".li" (Liechtenstein) could register.

4.3. Design Propositions Fostering Transactional Benefits

According to the interviewees transactional benefits could be realized through an increase in communications and business efficiency. The professional social network should facilitate to identify and contact all potentially relevant cooperation partners. Thus, we propose

Design proposition 6: Besides additional functions that provide the basis for cooperation, a social network needs to include basic search and communication functions.

With the help of adequate search algorithms, relevant information can be accessed (e.g. benchmarks, best practices), and potential cooperation partners can easily be identified and contacted. With this functionality, also job searches could be supported, which would have a positive effect on the efficiency of resource management.

Communication efficiency could also be increased by a functionality that facilitates the organization of joint events, e.g. a calendar function. Having a network with a regional focus would make it even easier to use the network as a trigger for a collaboration that might be further developed face to face.

Regarding business efficiency benefits, the interviewees point out that the design of a social network platform is not only dependent on technical settings but also on business considerations including a thought-out business model that ensures the sustainability of a professional social network: Since social networking sites require a certain effort of their members, e.g. creating a member page, sharing content, or giving feedback, not only the offered features but also the sustainability of the network is of crucial importance. Otherwise potential members do not have a motivation to invest time and energy. Therefore, a professional social network should have a sound business model including adequate revenue mechanisms to ensure sustainable financing. Hence,

Design proposition 7: The business model and the respective revenue mechanisms should already be considered in the design phase to ensure a sustainable network.

Concerning the various revenue mechanisms the interview partners confirm what can also be found in business model literature: Business models that are solely based on advertising cannot guarantee reliable revenues. An advertising based business model usually has no steady revenue stream since these revenue mechanisms are often performance based [35], e.g. the website only gets paid when a potential customer clicks on an ad [36]. Research shows that business models for online applications should not solely rely on advertising since this mechanism seems to lose its impact as a revenue source [37].

Since the financing of a social network can be based on multiple revenue streams a combination of various financing options would also be possible. As the platform might integrate further functions in future, it would be possible to have different financing mechanisms for the various functions. For example, if the platform would integrate electronic journals, revenues for this function could be generated on a pay-per-use basis where members pay according to the number of articles they download.

Table 3 Expected benefits categorized according to Mirani and Lederer [22] and derived design propositions

<i>Expected benefits</i>	<i>Design propositions</i>
Strategic benefits through better alignment with other health organizations	1. Additional functions that provide the basis for cooperation need to be integrated. 2. Verification mechanisms should be in place to regulate the access to closed areas.
Informational benefits through information access and better information quality	3. Relevant information that already exists in the web should be easy to integrate. 4. Relevant services that already exist in the web should be easy to integrate. 5. A network should have a regional focus and provide a translation of the different terminologies used within that region.
Transactional benefits through increased communications and business efficiency	6. Besides additional functions that provide the basis for cooperation, a social network needs to include basic search and communication functions. 7. The business model and the respective revenue mechanisms should already be considered in the design phase of the network.

6. Implications and Outlook

This paper aimed at identifying benefit expectations of health professionals regarding professional social networks as well as at formulating corresponding design propositions in order to provide a basis for building a social network for health professionals that incorporates the benefits of a social technology while at the same time considering the requirements of its target group.

To have an overview of existing social networks in the healthcare domain and to understand their major drawbacks, these social networks were examined concerning their design features (especially with regard to their closeness (target group) and offered key features). Closeness, regional focus, and additional functions were identified as non-trivial design decisions and therefore defined as discussion points for in-depth interviews with health professionals.

Based on these discussion points, the interviews revealed expected strategic, informational and transactional benefits of a social network for health professionals which led to seven design propositions: Additional functions on the networking site that provide the basis for cooperation (proposition 1) as well as a verification mechanism to regulate the access to the network (proposition 2) could lead to better alignment with other health organizations. The integration of existing information (proposition 3) and services (proposition 4) as well as a regional focus (proposition 5) could ensure easy information access and enhanced information quality. Basic search and communication functions (proposition 6) and a sustainable business model (proposition 7) would foster communications and business efficiency.

Our paper has theoretical implications since it generates insights regarding the expected benefits of social networking sites for health professionals. Moreover, researchers might take the derived design propositions as a starting point and analyze similarities and differences to other social technologies in the healthcare domain or to professional social networks in other industries. Therefore, the generated

insights are not only the basis for our future research but also for other researchers involved in the field of social technologies.

In addition, this paper provides important practical implications as the derived propositions can be applied in the actual design of social networking sites for health professionals. Practical problems, e.g. how to build a professional social network, what features have to be integrated, or what functionalities are less important, can be approached subsequent to our research.

The benefits expected by the health professionals can also be used as a baseline for the evaluation of realized benefits of professional social networks. Hence, the framework provided by Mirani and Lederer [22] can serve as a controlling tool, whereas the expected benefits are the benchmark against which the benefits realized in future can be mapped.

However, our research has certain limitations since our design propositions need further validation through additional interviews, focus groups and workshops. Since the healthcare domain is highly context sensitive, e.g. due to different regulations, heterogeneous stakeholders with multidisciplinary backgrounds [38], it is hardly possible to consider all points of view regardless of the number of interviews conducted.

Nevertheless, broadening the interview base will be valuable as the integration of new perspectives will sharpen our insights regarding expected benefits and design propositions of a social network for health professionals. Moreover, further analysis and focus group discussions are especially needed with regard to financing options in order to find an optimal combination of revenue streams to ensure a sustainable business model.

The insights from this paper and from future research will be the basis to build a prototype of a social network for health professionals as a proof-of-concept. To proof the viability of the business model, the professional social network will be tested in the German speaking area.

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