Web 2.0 Artifacts in Healthcare Management Portals- State-of-the-Art in German Health Care Companies

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Abstract. The internet is increasingly used as a source for information and knowledge. Even in the field of healthcare, information is widely available in the internet. In the context of healthcare management, two general questions are of interest: which information or content is provided and how is provided by whom? As sickness funds play a highly relevant role in the German healthcare system, we conduct an exploratory survey to answer these questions. We perform a third party web assessment by doing a complete inventory count of the German sickness funds landscape. Our study provides a foundation for further research by raising first categories that can be used for a theoretical explanatory model.

Keywords: Web 2.0 artifacts, German healthcare system, complete inventory count.

1 Introduction

The Internet is increasingly used as a source of information and knowledge. Since people are more and more used to gather information about a wide variety of topics by electronic means, nearly all thematic aspects of daily life are covered. Hence, information that addresses the field of healthcare in general or specific health care aspects (e. g. specific diseases) is increasingly searched online [1] [2]. In the German health care system, sickness funds play a highly relevant role as they provide most of the publicly funded healthcare system on the national level. Because of recent developments in German health policy, sickness funds are under high cost pressure. Moreover, competition between today's 238 sickness funds is very high: as contributions of insurants in Germany were harmonized to a certain level, the differentiating factors for the companies are the services they provide. Consequently, German sickness funds have two main reasons to provide extensive and high quality information via Internet:

- Cost savings: the provision of detailed, structured and extensive information to the insurants aims at avoiding costs for personal, time-consuming consultation. Therefore providing information by websites is cheaper than providing telephone customer services or personal services in an agency.

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- Competitiveness: as the fee for health insurances in Germany was harmonized to a uniform level, sickness funds need other major differentiating factors from their competitors than costs. One possibility that can also be found as a major differentiating factor in other industries is "quality of services". Consequently, information services provided by electronic means with a wide availability and a certain quality level could be a factor.

Because of the increasing use of the Internet as a source of healthcare knowledge and information on the one hand and the special role and competitive situation of sickness funds in Germany on the other hand, we expect them to provide high quality websites that offer a wide variety of information. Therefore, we formulate two initial research questions: (1) by what amount do Germans sickness funds provide information to insurants and interested persons? (2) By which technologies are the services provided? The goal of this paper is to provide first exploratory findings concerning these two questions from a survey of websites provided by German health insurance companies. We conducted the survey according to the methodology "third party web assessment" [3] and performed a complete inventory count comprising websites of all German sickness funds. In order to get objective – or at least intersubjectively verifiable – measurements for the provided content as well as for the used technologies, we use two different benchmarks:

(1) For the contents, we use the so called "healthcare bulb" [4] a model comprising different layers with detailed criteria to cover all thematic clusters belonging to healthcare management.
(2) For the used technologies, we refer to a framework for Web 2.0 characteristics [5] [6] in order to structure the technological perspective.

The paper is structured as follows. In the second section, we depict the background of the German healthcare management system. We complement the basic principles of national healthcare system by an overview on related work. In the third section, we present our study. After having depicted the design and methodology of the study, we present and discuss the results in a detailed manner. The article closes with a summary and an outlook on further research.

2 Basic Principles

2.1 The Landscape of German Healthcare Management

The German health insurance reform of 2007 requires everyone living in Germany to be insured [7]. There are two main types of health insurance – the *public health insurance* ("Gesetzliche Krankenversicherung" or GKV), which is also known as *sickness funds*, and the *private health insurance* ("Private Krankenversicherung" or PKV). Approximately 85% of the population is member of the one of the public sickness funds, while the others usually have private health insurance. Consequently, most German residents (approx. 70 million people) are insured by the public system (except public officers, self-employed people and employees with a gross income above 48.600 EUR per year or 4,050 Euros per month [8].

As required by law within the fifth social statute book, (SGB V) members of the sickness funds have to pay an insurance fee which depends on the amount on their income as employees. Each insurant gets the same benefits, even though the individually paid fees might differ. All of the sickness funds must charge the same rate. Consequently, there is no longer any competition between sickness funds based on fees; competition only exists on services and possible refunds. Usually, the company of an insured employee pays half of the insurance contributions, the other half is provided out of the employee's salary. The fee for this public health insurance is currently 15.5% (from July 1, 2009: 14. 9%) of the eligible gross salary to a maximum monthly income limit of 3,675 EUR. The previously large number of public health insurances decreases every year: currently the Federal Ministry for Health officially counts 196 [8].

The private insurance system is based on an individual agreement between the insurance company and the customer. The fee depends on a range of individual characteristics, for example, the percentage of coverage, the amount of chosen services, the individual risk or the entrance age into the private system, and so forth. The private health insurance market is well served by about 50 German insurance companies [9]. Both the public health insurance and the private health insurance struggle with the increasing cost of medical treatment and the changing demography [10].

2.2 Related Work

In the research field of electronic health, several studies exist addressing how German health insurances use the Internet for their business' purposes or how Web 2.0 technologies and concepts are used in the context of healthcare [1; 11; 12; 13; 14] However, to our knowledge, none of these give a complete and detailed overview about which content is provided by sickness funds' websites or which technologies are applied for presenting the content.

3 Survey of German Health Insurance Companies Websites

3.1 Methodology and Design

The accomplishment of our study follows the method of "third-party web assessment" [3] whereas the "mystery user" approach is applied [15]. The principle of the "mystery user" approach indicates that an examiner puts her- or himself in the role of a client that requires the services provided by the website. This methodological approach is also known as "mystery shopping" [16]. In order to benchmark the examined websites, we apply the healthcare bulb on the one hand to evaluate the provided content and a framework for Web 2.0 characteristics on the other hand for measuring the technological perspective. As we conducted a complete inventory count, the database comprises all 46 German PKV[1] and 192[2] German GKV 238 data

[1] For an overview compare: http://www.pkv.de/verband/mitgliedsunternehmen/

[2] For an overview compare: *https://www.gkv-spitzenverband.de/publish/Alle_gesetzlichen_Krankenkassen.aspx?ActiveID=1028&gvAdressenOverview_PageIX=0* and *http://www.krankenkassen.de/gesetzliche-krankenkassen/krankenkassen-liste/*

sets are gathered in total. The criteria catalogue for the content consists of 21 criteria (cp. Section 3.1.1) and the catalogue for the technical perspective consists of five criteria (cp. Section 3.1.2). The evaluated 26 criteria are transformed to a binary scoring model, that is, if a criterion is fulfilled (information for a criterion according to the healthcare bulb is available), the portal gets one point and otherwise it gets zero points. By aggregating the points over all criteria, the maximum number of reachable points is 26.

3.1.1 Content Benchmark

In general, a common sense of what the term "health" means is intuitively given. While the World Health Organization defines health as "a state of complete physical, mental and social and well-being and not merely the absence of disease or infirmity" [17], the literature does not give a consistent definition [18]. Therefore, we cannot clearly determine the characteristics of "healthcare", or what "healthcare" really and objectively is [19]. The "healthcare bulb", a model consisting of four layers, provides a possibility to structure the components or stakeholders of healthcare management. The healthcare bulb exists in different variations [19][20][21]; however, all variations refer to the initial model of [4]. Accordingly, health care management comprises – comparable to a bulbs' layers – core areas as ambulatory and clinical healthcare treatment services. The core areas are complemented by pre-service industries and supplying industries as well as border area industries and other branches with strong relations to healthcare [4].

3.1.2 Technological Benchmark

The use of Web 2.0 applications in a medical context or in the context of healthcare is defined as "web-based services for health care consumers, caregivers, patients, health professionals, and biomedical researchers, that use Web 2.0 technologies and/or semantic web and virtual reality approaches to enable and facilitate specifically 1) social networking, 2) participation, 3) apomediation, 4) openness, and 5) collaboration, within and between these user groups [22]. This principle is also called "Medicine 2.0", "Health 2.0" or "e-health" [1] [14] [22]. Within our survey and according to our methodology, the patients' and health care consumers' view in their role as a user is focused. Consequently, the possibilities of Web 2.0 applications from the users' point of view can be distinguished according to [23] within: Authoring, Sharing, Collaboration, Networking, as well as Scoring. The corresponding applications and principles are Weblog, Wiki, Social Tagging/Social Bookmarking, Social Networking and Podcasts.

3.1.3 Overall Criteria Catalogue

According to the specifications in section 3.1.2 and 3.1.3, the criteria catalogue presented in Table 3 provides the categories which we use for our exploratory survey.

Table 3. Criteria Catalogue

Category	Healthcare Bulb Layer	Criteria
Content	**1** Ambulatory and clinical healthcare treatment services as well as care	Clinic / Hospital, Independent health practitioner, Alternative medicine, Rehabilitation, Care facility
	2 Healthcare administration	Administration, Pharmacy, Cure- and bath resorts, Self-help
	3 Pre-service and supplying industries	Medicine- and gerontology technology, Bio- and gene technology, Health products, Healthtrade, Pharma, Consulting (B2B)
	4 Boundary and neighbour area	Sport and leisure, Training and education. Wellness, Nutrition, Living, Tourism
Tech-nology		Blog, Wiki, Social Tagging, Social Networking, Podcast

3.2 Results

In the following section, we present the descriptive results, sectioned according to results for the GKV and PKV.

3.2.1 Results for GKV (Content)

A remarkable finding is that none of the 192 analysed websites fulfils all the defined criteria. Three websites share the first place. They contain most of the content and were evaluated with 18 of 21 points (86%). The second place with 17 points (81%) is shared by the websites of eleven companies. The overall average is 10,3 points (49%) per company. Concerning the fulfilled content of a certain category, the categories *Administration* and *Consulting (b2b)* score the best with 98% and 95% (see Figure 3). The second ranked category is *Self-help* with 91%.The next major group is a bundle of six criteria with a strong focus on personal education, well-being and recreation. It starts with S*port and Leisure (86%)* and *Training and Education (79%).* In the range between 73% and 71% are located: *Rehabilitation, Alternative Medicine, Cure- and Bath Resorts* and *Wellness.* The categories focusing technological aspects such as *Healthtrade* as well as *Medicine- and Gerontology Techniques* are not fulfilled at all, and reach no points.

3.2.2 Results for GKV (Technology)

The results concerning the Web 2.0 artifacts are as allows: 34,38% of GKV have Web 2.0 technologies implemented on their web sites. The most used Web 2.0 artifact is *Wiki* (17,71%). 14,06 % of GKV websites offer a blog, and 12,5% offer podcasts to the users. 10,42 % of the GKV websites provide a social community. Only 1,04 % of the websites provide the possibility for social tagging. With regard to the sum of implemented artifacts per GKV, 54, 55 % implement one technology, 33,33 % use two artifacts and 13 % offer three or more to the users. None of the GKVs offer all five artifacts.

3.2.3 Results for PKV (Content)

None of the 46 analysed websites fulfils all the defined criteria (see Figure 5). The website, that contains most of the content, is evaluated with 16 of 21 points (76%). The second place with 14 points (67%) is shared by the websites of three compa-nies. The overall average is 7,7 points (36%) per company. The content of the categories *Administration* and *Consulting (b2b)* is represented by 98% of the websites. The second ranked category is *Training and Education* with 87%. *Sport and Leisure*, *Wellness* and *Cure- and Bath Resorts* are following with 54% to 57%. The categories focusing technological aspects such as *Healthtrade*, *Bio- and Gene Technology* as well as *Medicine- and Gerontology Technology* are underrepresented with a maximum of 4%. Moreover, the information concerning *Pharma* is very little for all websites.

3.2.4 Results for PKV (Technology)

A remarkable finding is that only 2 of the 46 PKV use Web 2.0 artifacts – one insurer provides a Blog and one insurer provides a wiki.

3.3 Discussion

In total, the websites of the public health insurance companies reached in total more points than the websites of the private health insurance companies. The public insurances contain in the first, second and fourth layer of the healthcare bulb more content than the private insurance companies. Moreover, the number of points of the public health insurance websites in the first layer is almost twice as high as the number of points of the private health insurance websites. Furthermore, the public websites contain 20% more content on the second layer. The third layer is almost similar – the private companies score 6% more points. In the fourth layer, the public companies cover with a total of 54% approximately 10% more content than the private companies. Overall, the websites of the public companies cover in 15 categories more content than the websites of the private companies. However, the private companies reached significantly more points in the category health products than the public companies. With regard to our initial research questions, healthcare insurance companies focus on content from categories such as Administration, Consultation and Self-help. Concerning the technological perspective, healthcare insurance companies employ various Web 2.0 artifacts. However, our findings also suggest that a significant difference exists (1) between the content provided by GKV and PKV, and (2) between the Web 2.0 artifacts applied by GKV and PKV respectively. Because of these results, we point to two very interesting open issues which remain for further research:

(1) How can the differences between PKV and GKV in the amount of content be explained? Which external factors might provide an explanation?
(2) Why do PKV hardly use Web 2.0 artifacts? Do they use other channels to provide information to their insurants?

Moreover, we are interested if we can use our exploratory results and the used categories as a first starting point in order to develop a theoretical explanatory model for this situation.

4 Summary and Outlook

In the presented paper, we aimed at answering two questions: (1) which information or content is provided by German sickness funds and (2) how is it provided? As sickness funds play a highly relevant role in the German healthcare system, we conducted an exploratory survey to answer these questions. Our findings show that the presented amount of content by public healthcare insurance companies (GKV) is higher than the presented amount of content by private healthcare insurance companies (PKV). The same applies to the implementation of Web 2.0 artifacts. There is a need for theory to be developed and further research is needed. Our categories might provide a foundation for a maturity model for health care management websites. Moreover, they provide the starting point for developing a rigorous explanatory model.

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