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ABSTRACT

This paper is designed to investigate physicians' opinions regarding an SMS professional medical news service in the Finnish health-care sector. A survey using SMS mobile technology was conducted on March 5, 2003. 259 out of 685 responded within 2 days, and 90% came within 6 hours after the survey was sent out. The response rate was 38%. Findings from this simple SMS survey showed that physicians had positive perceptions of the SMS news service. Nearly 60% of the respondents have used the service. Some of the answers included spontaneous feedback about the service, which revealed valuable comments and suggestions regarding the further improvement of the service. The SMS survey as a new data collection method needs academic attention. Future research is briefly discussed.

Keywords: SMS medical news service, physicians' acceptance, SMS survey, time-saving, cost-effective

1. INTRODUCTION

Mobile commerce (m-commerce) has been an important research focus in recent years. Generally, m-commerce is defined as the extension of electronic commerce (e-commerce) from wired to wireless computers and telecommunications, and from fixed locations to anytime, anywhere and anyone [17], i.e., the use of mobile technologies and devices to provide, sell and buy convenient, personalized, and location-based services.

Text-based technology or Short Messaging Service (SMS) is one of the underlying technology platforms for m-commerce. In a comparison with wireless web-based technologies, i.e., another m-commerce platform, SMS has a simple user interface and is supported by most mobile phones. Recent years have seen the adoption of SMS worldwide in many commerce sectors, e.g., news, weather forecasting, retail, entertainment etc. It is also considered to be the most convenient and cheap communication technology used by normal consumers [23].

The rapid diffusion of SMS has also inspired some applications in the health care industry, for example, SMS professional medical news service. Medical knowledge is changing constantly. It is not easy for physicians to keep their knowledge and information up to date to help in their patient care and patient management efficiently on the one hand, and to maintain the level of their professional competence on the other [16]. An SMS professional medical news service might help physicians keep their knowledge up to date and to provide some hints of recent medical development trends and new discoveries. The objective of this paper is to investigate physicians' acceptance of an available SMS professional medical news service that is currently implemented in the Finnish health care sector. First, we present the theoretical background underlying the study. We describe the mobile service in detail in section 3. In section 4, we present the study context and the method we used for data collection. In section 5, the results are reported. Discussions and conclusions are at the end.

2. PHYSICIANS ADOPTION OF TECHNOLOGY

Users' perceptions of and intentions to adopt information system (IS) and the rate of diffusion and penetration of technology within and across organizations are two important foci in IS research [e.g., 22]. They are understood to represent or stand for the essential aspect, property or value of the information technology [21]. It is generally accepted that the usage of information systems at work could increase employees' productivity in their working time, and improve individual and organization performance. System usage is an important dimension to measure IS success [9] [10]. In particular, physicians adoption of IS in the health care is aimed to improve the health quality of the human beings. In the past several decades, the conclusions of many studies based on different theoretical approaches and research methods, have approved and confirmed that usefulness of a supportive medical IS is very important in influencing a physician's decision making of using it. For examples, Chau and Hu [6] [7] based on classical IS adoption models [e.g., 8, 20] and collected data from a self-administered questionnaire to investigate physicians' adoption behavior of technology. They found that usefulness is a single factor determines a physician's adoption of telemedicine technology. They argued that

physicians are professionals and might exhibit considerable differences in general competence, adaptability to new technologies, intellectual and cognitive capacity and the nature of their work. Therefore, the ease of use of the technology might weaken as the competency of the user increases. Jayasuriya [15] conducted his research in a similar style. He indicated, health professionals were willing to use technology in their jobs when they perceived it to be useful for their performance. But the study results from Han et al., [14] presented that in the early stage of using mobile technology, ease of use still has strong effects on a physician's behavior intention towards the technology. Many studies were conducted by utilizing qualitative methodologies revealed similar results. For instances, Mayer and Piterman [18] studied the attitudes of Australian general practitioners to evidence-based medicine by using a focus group method. They concluded that physicians' acceptability was influenced by relevance (usefulness) to general practice, as well as the local contextual and patients factors. By using a prototype simulation study 1 week in a hospital in Germany, Ammenwerth et al. [1] successfully found out that in order to meet the diverse requirements of different professional groups, the developer needs to design "multi-device mobile computer architecture". Therefore, the usefulness of the mobile information and communication system in clinical routine is more likely to be improved.

Obviously, researchers have adapted different methods to study physicians' adoption of technology. The selection of different research methods is incumbent of individual IS researcher depending on the problem he or she aims to solve. As suggested by Moody and Buist [19], the real question is not whether the research method is appropriate *per se*, but whether it is appropriate to answer the question being asked.

3. MOBILE SERVICES AND THE SMS PROFESSIONAL MEDIAL NEWS SERVICE

Carlsson and Walden [3, 4, and 5] provided a conceptual framework for mobile services from three perspectives: the customer, the producer and management. Mobile services viewed from different perspectives have different distinguishing elements. These embedded elements actually describe what the mobile services will be. Here we only focus on the customer perspective. From this perspective, mobile services are durable technological products and technology-based services where repeat purchases are sparked off by an increase in user-perceived functionality. Seen from the perspective, the necessary distinguishing elements of mobile services are:

1) Flexibility, mobile services should be available anywhere, at anytime and anyhow;
2) Value adding, mobile services should improve productivity, they should be adaptive

to localization and they should be sensitive to customer personalization ;
3) A mobile technology basis, mobile services should use innovative and distinguishing features of mobile technology to enhance the quality of life (e.g. messaging, entertainment, education, information, privacy, etc)

These elements are key factors to ensure the quality and possible success of mobile services.

Duodecim Publishers Ltd. owned by the Finnish Medical Society Duodecim, has developed and provided the SMS professional medical news service (interchangeably referred to as the SMS news service or the service in the paper) to physicians currently involved in the Finnish health care sector, including hospitals, health care centers and private doctors etc. The news team at Duodecim Publishers Ltd maintains the service. The physicians subscribe the service to a specific number. After the service is issued, the physicians will get one piece of news per day. Currently, they do not need to pay for the service because of the support of Pfizer Finland Ltd.

Due to the limitations of SMS technology, the service does not include any pictures. A strong message from the developer mentions that the adoption of Multi-Media-Message (MMS) is a must in the near future. The pictures might be included as well.

4. STUDY CONTEXT AND DATA COLLECTION

The Finnish Medical Society Duodecim is a leading medical knowledge and information provider in Finland. It has placed much effort into improving the quality of medical knowledge. It has also adapted new technologies to distribute that knowledge to physicians, for instance, CD-ROM, Intranet, the Internet and wireless technology [11, 12, and 13]. The SMS professional medical news service started in 2002.

In order to investigate the physicians' acceptance and their feedback of the service, a survey was conducted on March 5, 2003. The survey was sent to the target group (685 physicians, among those, 259 subscribers to the service) as an SMS message, and the answers were gathered via the same media.

Concerning the limitations of SMS technology, the survey had only one question, i.e., "how do you perceive the SMS medical news service by Duodecim?" with three pre-defined answer alternatives, they were:
a) "The service is really good and useful."
b) "It is ok, but needs to be improved."
c) "I haven't subscribed to the service."

The question was sent out on March 5, 2003 at 12:52. Totally 259 answers out of 685 were received within 2

days, a response rate of 38%. Two responses were excluded from the data analysis due to empty replies. In case of the 259 have subscribed to the service, the response rate from the subscribers was extremely good, over 50%. Some of the answers included spontaneous feedback about the service, which was very valuable. The majority of answers (>90%) were gathered within 6 hours of sending out the question. Before mid-night of March 5, we got 243 answers, only sixteen was sent back on March 6.

5. RESULTS

We did a basic summary report of our data. Since some answers provided feedback about the services other than our pre-defined alternatives, we consider those responses as D. Results are summarized in Figure 1.
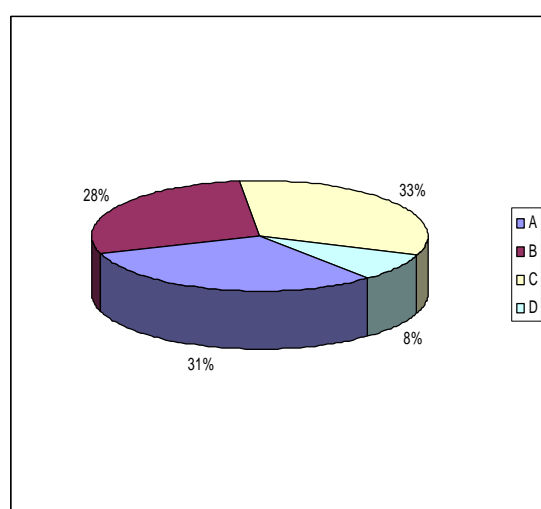

Figure 1 Survey results

Of 257 usable answers, thirty-one percent (n=79) perceived that the service was really good and useful. Seventy three, i.e., 28% thought improvement of the services was necessary. Thirty-three percent of the physicians had not yet subscribed to the service. We got 22 extra answers that were not covered by our pre-defined answers, which we counted as D. Below we present the details of the feedback spontaneously provided with the three alternatives and other comments categorized as D.

● Arguments with A

Physicians who replied with the A alternative really liked the service and thought it was very useful for their work. They also showed a positive future intention towards the service. Such as a physician wrote,

    "[The service] is very useful and I would like to receive the messages in the future…"

Besides acknowledging the usefulness of the SMS news service, physicians are still expecting information from traditional channels, a physician replied,

"The messages are excellence for me and I would be happy to receive other news letters as well."

● Arguments with B

Most of those who selected B did not specify very much about how to develop the system. Several physicians did give suggestions.   A physician mentioned that

"Occasionally one gets news from a short message. [It is] a different picture of the matter compared with the original text [e.g., newspapers]."

This message indicated that, as an emerging information distribution channel, mobile SMS was expected to be compatible with other traditional media, such as the texts published in newspapers or on the Internet. On the other hand, physicians also welcomed the SMS news, *"I have during weekdays several times had the time to read the same news on the Internet, but it's good to have repetitions".*

Three physicians suggested that the SMS news might include more extensive sources or specialized fields.
    "... [the news might come] along with Internet references or more extensive sources"
    "...Develop the messages for specialized fields, i.e. information to the correct address..."
    "... More accurate sources of references could make it easier to find the article (e.g., about the disadvantage of epilepsy medication)

Those suggestions shed light on how to improve the content of the services. The reference sources are quite demanding that help physicians go further to check the latest medical information. Physicians also need information from their specialized fields that are better suited to meet their personal requirements on specific knowledge they want to acquire.

Some physicians have pointed out that the SMS news should be longer, the shortness of SMS was considered a drawback. Comments came like,
    "The messages could be even longer".
    "Apparently the shortness of SMS causes limitations"

● Arguments with C

 The feedback came with alternative C provided our several reasons why physicians did not subscribe to the services. The first and obvious reason was they didn't need the SMS news service, e.g,
    "Not in use and not needed"
    "Not in use and I don't want it."

The second reason was some physicians still stick to other distribution channels, such as newspapers or the Internet
    "I haven't followed the text message news. I read newspapers."

"It is easier to read from the internet"

The third reason was that technical problems hindered physicians' usage of the SMS news service. Complaints came like,
"I have not received any news even though I have subscribed";
"I have tried to get the service without success..."
"Not in use since I don't know how..."

The fourth reason was due to the small screen of the mobile device, *"I would prefer to read them as emails due to the small screen of my mobile phone...probably better with the communicator."* The size of the screen is not comparable with PC-based media apparently.
Some physicians also lacked the time to subscribe to the service, *"I'm in principle interested, but haven't had time to pick up the instructions"*. Physicians are usually very busy. Lack of time is frequently cited as a reason for them not adopting new information systems [2].

Besides those negative comments, we also found positive intentions from some non-adopters. Such as,
"I will activate"
"I would like to have in use..."
"Reading news as SMS can in principle be feasible".

- Arguments collected from D
A deep analysis of the feedback we classed as D was conducted as well. We found out that there were three main strong suggestions from the physicians.
  1) The service still had some bugs, problems with receiving and opening the service were common complaints. For examples,
"None of the text message news that I ordered have been activated, so I have not received any news for the time beings";
"I have not received any news even though I got the confirmation of order";
"For some reason, I have not received news for a long time";
"I did according to instructions, didn't receive messages";
"How is it activated?"

These messages indicated that the developer and the service content provider have to pay much attention to the technical problems associated with the service. The growing complaints of the difficulties in activating and receiving the service might become a severe barrier for physicians to continue their adoption of it.

  2) The current length of the message (160-200 characters) was considered both a limitation and an advantage. We got free-form feedback like,

"160 characters is quite limited amount. But on the other hand, one doesn't bother to read too long stories" "During office hours short and concise..."

Obviously the limited length has made the news concise. Physicians might save their time for reading the news in a busy working day.

  3) The news service is quite general; more categories of specialties and more in-depth news are required. For example,
"Seems like a good idea, personally, I would like to choose those fields that interest me"
"I would wish for more information about urology..."

These messages revealed that physicians demand more services that meet their "personal" needs. The current service is targeted to all physicians as one uniform group. The developer has to take "personalization" into consideration for the further improvement of the service.

6. DISCUSSION AND CONCLUSION

This paper is intended to investigate physicians' acceptance and opinions regarding the SMS professional medial news service in the Finnish health-care sector. The findings from this simple SMS survey showed that physicians had positive perceptions of the service. Those responses located in the alternatives of A and B indicated that, generally, the ones (31%) who were happy with the service really liked it, and an almost equal amount, i.e., 28% thought the service should be improved. The total answers that went to A and B reached 59%, nearly 60%. In general, the SMS professional medical news service is useful. User adoption theories assert that usefulness is the main driver of individual adoption of a specific information technology. The perceptions of usefulness of the SMS medical news by physicians demonstrate strong possibilities of continuous usage in the future.

Arguments came with pre-defined alternatives and those categorized as D overlapped in some cases. In brief, they highlighted several important issues concerning the improvement of the service in the future. Firstly, technical problems have to be solved immediately. It constitutes a barrier to physicians' usage of the service continuously, or hinders their subscriptions. Possible guidance on how to open and use the service should be improved as well. Ease of use is always considered a crucial driver of the success of information system implementation. Mobile technology is not an exception [14]. Secondly, the length limitation of SMS technology has made not only the news concise, which considered a time-saving way to read it, but also made it impossible to include more information in one message. With the development and diffusion of MMS,

technically the news items could easily be made longer. Thirdly, "personalization" is demanded by the physicians. The general topics adapted in the current service did not take use of the advantages of mobile technology, i.e. personalized services to mobile users. Therefore, it might undermine the value added by the SMS medical news service. Personalized service for the physicians' news needs will enhance their knowledge what is highly relevant to their specialties, and provide the information that they desire most. Fourthly, as an emerging technology, SMS is competing with traditional channels of distributing medical news. The traditional channels, e.g., newspapers and the Internet, have dominated information delivery for a long time. Currently, SMS is a complementary channel, but far from the dominating one. A good thing is that it is warmly welcomed by most of the physicians. It has strong growth potentials in the future. It comparatively adds more value to physicians' work in terms of flexibility and personalization or localization.

Nearly one third of the respondents had not yet subscribed to the SMS professional news service. Attention has to be paid to the reasons why they did not subscribe to the services, in order to increase the diffusion speed. Compared with the aforementioned important issues for the improvement of the service, we find that strong effort of improvement might remove the negative "reasons" that impede some physicians' subscription to the service.

The results of the paper were from an SMS survey. It is a new data collection method which is time-saving and cost effective. We got 38% responses within 2 days, and 90% came within 6 hours after the survey was sent out. This new survey method needs our attention. It is a method welcomed by practitioners. The simple survey provided the answers in a very short time. The service developer and content providers received "instant" results that help them investigate the problems and find solutions almost at the same time. The SMS survey does not like traditional surveys that usually take months or years; it is a new attempt to do the survey in hours or days with aid from new mobile technology. It also reduces the cost of the survey. Mail surveys are usually very expensive, as are Internet surveys that have a monthly fee. The main weakness of the SMS survey is obviously its length limitation; we can not have many questions in the survey. But it helps us to concentrate on the most important message that the practitioners want to know immediately. Such instant feedback might represent high business value for practitioners.

In the future, as MMS is on its way to replacing the current SMS, technically, it is easy to overcome this limitation, and we might include more and longer questions in a MMS survey. With the support from Pfizer Finland Ltd., such a survey is planed to be conducted at the autumn in 2004.

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