

## Barriers to and advantages of e-health from the perspective of elderly people: A literature review

Muzawir Arief<sup>1,2</sup>, Nguyen Thi Thanh Hai<sup>1</sup>, Kaija Saranto<sup>1</sup>

<sup>1</sup> Department of Health and Social Management, University of Eastern Finland, Kuopio, Finland, <sup>2</sup> Universitas Negeri Makassar

**Muzawir Arief, Department of Health and Social Management, University of Eastern Finland, Kuopio, FINLAND.  
Email: muzawia@student.uef.fi.**

### Abstract

e-Health has created many opportunities to solve the problems of care services and to address the other emerging issues of aging society. This paper aims to understand the advantages of and barriers to e-Health for elderly people from their perspective. It applies SWOT analysis to categorize the findings in the literature review based on four criteria; Strengths, Weaknesses, Threats and Opportunities. This can be used as a framework for strategy formulation on e-Health for elderly people in future research. The great strengths of e-Health in the view of senior citizens lie in improved access to healthcare services and potential cost saving benefits. As a result, a positive attitude is found in most participants surveyed in previous studies. However, its significant weaknesses are the lack of evidence-based research to prove its benefits and physical limitations the elderly experience in using high technology. In addition, the quality of e-Health is still questionable compared to that of traditional services. The study shows that the main threats include data protection, privacy and the digital divide. Finally, the opportunity to implement e-Health for senior citizens is still promising since better economic growth, education, technological advancement, and improvement in evidence-based practices in health informatics can prove the effectiveness of e-Health. This paper emphasizes that the weaknesses and threats can be overcome by utilizing the strengths, and harnessing the potential of e-Health.

**Keywords:** e-Health strategy; barriers and benefits of e-Health applications, elderly people

## Introduction

According to WHO<sup>1</sup>, e-Health is the transfer of health resources and health care by electronic means. Another definition of e-Health states it is *“an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies”* [1]. It encompasses three main areas:

- The delivery of health information, for health professionals and health consumers, through the Internet and telecommunications.
- Using the power of IT and e-Commerce to improve public health services, e.g. through the education and training of health workers.
- The use of e-Commerce and e-Business practices in health systems management.

E-Health provides a new method for using health resources such as information, money, and medicines, and in time, it is helpful in improving the efficient use of these resources. The provision of EHRs (Electronic Health Records), EMRs (Electronic Medical Records), PHRs (Personal Health Records), Mobile Health and Telehealth are common applications of information communication technology in healthcare [2].

This paper uses a SWOT analysis (strengths, weaknesses, opportunities, threats), which is a recognized method for assisting the formulation of strategy because it is easy to use and to understand [3]. It has been used in health-related fields in the past successfully, for example for examining the application of telemedicine in underserved populations [4]. A SWOT analysis focuses on an internal appraisal (strengths and weaknesses) and identifying the external environment (opportunities and threats) of the subject. The internal appraisal examines all aspects of the organization covering, for example, personnel, facilities, location, products and services while the external appraisal scans the political, economic, social, technological and competitive environment [3].

## Research background

Human lifespans are expanding which has resulted in a larger elderly population globally. On the other hand it has also led to more complex health problems which can be solved by utilizing appropriate IT applications. However, according to Eurostat 2011, only 37 percent of people in the age group 55-65 was online once per week; that was almost one third that of the age group 16-23 and a half of the age group 25-54 [5]. The low number of internet users among the seniors is because technological innovation which was developed mostly by non-elderly people tended to ignore demands from senior users [6]. In this paper the following research questions are addressed: What are the constraints in the development of e-Health? And what are the advantages of implementing e-Health for elderly people? The assessment primarily deals with the perceived strengths, weaknesses, opportunities and threats (i.e. SWOT Analysis) that arise from the way in which the e-Health services are conducted. An appropriate e-Health strategy for aged care can then be formulated by deploying this method.

---

<sup>1</sup> See <http://www.who.int/trade/glossary/story021/en/index.html>

## Methodology

A review of the literature on e-Health and seniors was conducted by searching PubMed, Medline, CINAHL and the Cochrane Library, using as keywords e-Health, electronic health, health IT, health informatics, health information, health information technology, health information system, electronic health record (EHR), electronic medical record (EMR), personal medical record (PMR), personal health record (PHR), and online health, and paired with elderly people, senior citizens, seniors, old people, ageing people and aged people. These combinations were made to have a comprehensive database for literature review and SWOT analysis. Articles chosen from the search results were those that reported findings from the specific e-Health initiatives for seniors.

This review used the following inclusion criteria. Firstly, the language of the published articles is English. Secondly, the papers are based on empirical research findings related to e-Health applications for people aged 55 and over. Moreover, the papers concerned are electronically retrievable. This study excludes articles which are based on engineering approaches, technology assessment, conceptual papers, gender-related issues, editorials, magazines, and unpublished theses and dissertations.

## SWOT analysis

After the studying of the literature and the collecting of the data were completed, the analysis was conducted by referring to a worksheet<sup>2</sup> with categories based on research questions. The analysis was done by the first and the second authors by mapping the findings on barriers and advantages from 11 papers into 4 criteria as in Figure 1. The third author participated in the discussion to improve the analysis and the current paper's format and composition. The barriers and advantages were then classified into two categories, internal factors (strengths and weaknesses) and external factors (opportunities and threats) [7].

## Strengths

e-Health has gained in popularity over recent years because of several factors; for example, it is easy to learn for beginners [8,9,10]. The majority of elderly people were found familiar with the Internet [11,12,13]. Moreover, interest in studying how to use computers and the Internet was high [9]. Privacy issues were not the main concern for the elderly. Instead, they focused on good health value [4]. Cost-effectiveness was also a priority among the elderly in choosing e-Health applications [8,13]. The majority of patients had relevant ICT skills, visited websites regularly and used email [11]. Especially in modern countries, the percentage of elderly people accessing the Internet was quite high [14] and education was one of the strength factors in deploying e-Health effectively [15].

## Weaknesses

One of the greatest weaknesses was the lack of evidence supporting its relevance since the participants involved in the experiment did not represent the real condition of senior citizens [12,15]. Instead, this was only a pilot study. Physical limitations were a huge weakness factor [8,9]. In addition, lack of education, especially in ICT, and language barriers were a major issue [9,14,16]. What worsened thing was the reluctance to admit the lack of internet

---

<sup>2</sup> The worksheet can be obtained via e-mail from the first author

skills [13]. Another factor was that patients found the time for addressing health problem queries in e-Health insufficient [8,13]. Lastly, the complexity of technology and databases was unavoidable [8].

### Opportunities

There are opportunities to improve research in this field [8]. Economic growth and education levels play an important role in e-Health. The wealthier and better educated a population is, the greater the scope to implement e-Health applications among its senior citizens [15,16]. The rapid development of technology makes health informatics more accessible [8,11].

### Threats

The major threat was the digital divide between people with low and high levels of education, and also between people from poor and rich economies [11,14,16]. Besides, the complexity of rapid technology inventions poses potential problems for many hardware and software manufacturers of equipment for health-related services [17]. Last but not least, privacy and data protection are challenging aspects in deploying health informatics for the e-Service to be deemed more trustworthy and safe [16].

A concise SWOT Matrix is shown below.

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Positive attitude [8,9,10]</li> <li>• More value attached to good health [4]</li> <li>• Cost effective [8,13]</li> <li>• High penetration [11,15]</li> <li>• Better education [8,9,10,11,12,13]</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Lack of evidence-based research [12,15]</li> <li>• Physical disability of the elderly [8,9]</li> <li>• Quality of e-health [8,13]</li> <li>• Lack of education [9,14,16]</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Better education [2, 23]</li> <li>• Improvement of quality of study: more practical and evidence-based [24]</li> <li>• Economic growth ( wealth) [2, 23]</li> <li>• Rapid development of technology [12, 24]</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Digital divide [11,14,16,]</li> <li>• Complexity of rapid technology advances [16]</li> <li>• Data privacy and protection [16]</li> </ul>

Figure 1. SWOT Matrix in e-Health for the elderly.

### Discussion

Based on the SWOT analysis above, the strength factors (e.g positive attitude, more value attached to good health) offset the threat factors related to complexity of rapid technology and privacy and data protection. The potential to be cost-effective can bridge the digital divide because of the benefit in long-term investment. However, more evidence is needed to prove the benefits of e-Health applications. Further, it can be expected that improvement in e-Health research will produce more reliable evidence, with its theoretical and practical implications. By doing this,

e-Health development for senior citizens is not misled, and potentially great losses in the provision of services can be avoided.

Among others, the positive learning attitude of the elderly can assist in overcoming a weakness factor, viz. the lack of ICT skills, by better education for the present generation and the provision of alternative education for elderly. For example, community colleges can help to improve skills of the elderly in using health informatics services. The technical aspects in the weaknesses section, namely security and interoperability, are unavoidable. Similarly, the physical limitation aspect remains an unsolved problem. Therefore, e-Health applications should be customized and the accessibility enhanced. On the other hand, e-Health can offer higher flexibility to the elderly in terms of ease of access.

The opportunity to enhance e-Health services in order to accommodate more senior citizens is increasing because of the rapid development of technology, which broadens the access and reduces expenditure. In addition, the full support of the Government in the education sector and higher economic growth can promote e-Health education and aged people's interest in using ICT technology, especially in the healthcare sector.

## Conclusion

The strength factors can be used to overcome the weakness factors. A positive attitude is one strength that can trigger a motivation to improve ICT skills in the elderly, which is one of weakness factors. Another strength factor, better education provision, can tackle the problem of lack of education for those who have no or a very low education. In addition, several opportunities (improvement of e-health research, economy growth, and the development of the educational sector and technology) promise many advantages in e-Health applications. They can solve several weaknesses.

## Limitation of study

This study is limited by the characteristics of the data, which at times include responses from biased participants. In some papers, the participants were both old and young but in general most participants were elderly people.

## Future research

E-Health implementation is one of the solutions to improve health treatment for the elderly. The application of e-Health to the elderly will benefit if the needs and real condition of elderly people are included as important aspects in building e-Health services. A SWOT analysis (strengths, weaknesses, opportunities, threats) was conducted on 11 articles identified in a literature review. E-Health applications for old people were analyzed to create a SWOT Matrix in e-Health for the elderly, which is the first step in formulating an e-Health strategy for them. Later, this SWOT Matrix should be supplemented by the views of e-Health experts [6,10,8,28]. A panel of experts should be invited to design the strategy by assessing and evaluating this SWOT analysis. The main factors considered when choosing the panel members should be the participants' knowledge and experience of e-Health and each panel member should be asked to produce his/her own evaluation report.

## References

- [1] Gibis B, Artiles J, Corabian P, Meiesaar K, Koppel A, Jacobs P, Serrano P, Menon D. Application of strengths, weaknesses, opportunities and threats analysis in the development of a health technology assessment program. *Health Policy* 2001;58:27–35.
- [2] Goldwater J, Harries Y. Using Technology to enhance the aging experience: A market analysis of existing technologies. *Ageing International* 2011;36:5–28.
- [3] Dyson RG. Strategic development and SWOT analysis at the University of Warwick. *European Journal of Operational Research* 2004;152:631–640.
- [4] Wilkowska W, Ziefle M. Privacy and data security in E-health: Requirements from the user's perspective. *Health Informatics Journal* 2012;18(3):191-201.
- [5] Neves BB, Amaro F. Too old for technology? How the elderly of Lisbon use and perceive ICT. *The Journal of Community Informatics* 2012;8(1).
- [6] Buchmuller S, Joost G, Bessing N, Stein S. Bridging the gender and generation gap by ICT applying a participatory design process. *Personal Ubiquitous Computing* 2011;15:743–758.
- [7] Pickton WD, Wright S. What's swot in strategic analysis? *Strategic Change* 1998;7(2):101-109.
- [8] Thompson HJ, Demiris G, Rue T, Shatil E, Wilamowska K, Zaslavsky O, Reeder B. A Holistic approach to assess older adults' wellness using e-health technologies. *TELEMEDICINE and e-HEALTH* 2011;17(10):794–800
- [9] Tse MM, Choi KC, Leung RS. E-health for older people: the use of technology in health promotion. *Cyberpsychol Behav.* 2008;11(4):475-479
- [10] Xie B. Effect of an eHealth Literacy Intervention for Older Adults. *Journal of Medical Internet Research* 2011;13(4):e.90.
- [11] Haase R, Schultheiss T, Kempcke R, Thomas K, Ziemssen T. Use and Acceptance of Electronic Communication by Patients with Multiple Sclerosis: A Multicenter Questionnaire Study. *Journal of Medical Internet Research* 2012;14:e.135.
- [12] Bryony S, Jones BR, Williamson RG, Chauhan R. Phase 1 pilot study of e-mail support for people with long-term conditions using the Internet. *BMC Medical Informatics and Decision Making* 2011;11:20.
- [13] Kerr C, Murray E, Noble L, Morris R, Bottomley C, Stevenson F, Patterson D, Peacock R, Turner I, Jackson K, Nazareth I. The Potential of Web-based Interventions for Heart Disease Self Management: A Mixed Methods Investigation. *Journal Medical Internet Research* 2010;12(4):e56.
- [14] Rogers NS, Rozek A, Aleyaasin N, Promod P, Lowe D. Internet Use among Head and Neck Cancer Survivors in the North West of England. *British Journal of Oral and Maxillofacial Surgery* 2012;50(3):208–214.
- [15] Botella C, Etchemendy E, Castilla D, Baños RM, García-Palacios A, Quero S, Alcañiz M, Lozano JA. An e-health system for the elderly (Butler Project): a pilot study on acceptance and satisfaction. *Cyberpsychol Behav* 2009;12(3):255-262
- [16] Takahashi Y, Ohura T, Ishizaki T, Okamoto S, Miki K, Naito M, Akamatsu R, Sugimori H, Yoshiike N, Miyaki K, Shimbo T, Nakayama T. Internet Use for Health Related Information via Personal Computers and Cell Phones in Japan: A Cross-Sectional Population-Based Survey. *Journal of Medical Internet Research* 2011;13(4).

[17] Stroetmann VN, Hüsing T, Kubitschke L, Stroetmann KA. The attitudes, expectations and needs of elderly people in relation to e-health applications: results from a European survey. *Journal of Telemedicine and Telecare*, 2002;8 Suppl 2:82-4.