

# Chapter 1

## Evaluating Health Information Services: A Patient Perspective Analysis<sup>1</sup>

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### ABSTRACT

*The objective of the chapter is to explore the factors that affect users' preferences in the health service selection process. In the study, 4 hypothetical health services were designed by randomly selecting levels of 16 attributes and these services were evaluated by the potential users. Analytical Hierarchy Process (AHP), one of the decision making methods, was used to assess and select the best alternative.*

### INTRODUCTION

Healthcare service providers benefit from different technologies so as to reduce cost and improve quality of the medical procedures (Gagnona, Godinb, Gagnéb, Fortina, Lamothe, Reinhartz, & Cloutierd, 2003). In particular, telemedicine resides on the center of these technologies. The American Telemedicine Association defines telemedicine as “the use of medical information exchanged from one site to another via electronic communications to improve patients' health status” (ATA, 2009). Telemedicine applications were used in a broad

range including consultation (Berghout, Eminovic, de Keizer, & Birnie, 2007), education and training (Chen, Yang, & Tang, 2008), and home care (Biermann, Dietrich, Rihl, & Standl, 2002).

Selecting the best telemedicine service among given ones is a complex task. The process needs considerations of trade-offs between cost and benefits of the service. Analytic Hierarchy Process (AHP) (Saaty, 1977; Saaty, 1996) is an outstanding method that can be used in multifactor decision-making environments. It presents a structured approach to determine individual weights of multiple attributes of a product or service so that

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they can be compared in a simple way. Then, it simplify decision-making in the selection process.

Recent technological developments enable advancements in delivery of medical services, appropriate healthcare at a reasonable cost, and access to quality healthcare in underserved areas in the medical sector. Telemedicine is one of these developments that “enable remote medical procedures and examinations between patients and medical providers via telecommunication technologies like the Internet, or telephone” (Al-Qirim, 2007). Moreover, many previous researches show that compared to traditional medical care, telemedicine services present many benefits to the patients and physicians (van den Brink, Moorman, de Boer, Pruyn, Verwoerd, & van Bommel, 2005; Chae, Lee, Ho, Kim, Jun, & Won, 2001).

Diffusion of intelligent monitoring systems in the medical industry has gather speed with the help of recent developments in the information and communication technologies. “Smart homes’ for telecare by means of movement detector, oxymeter, tansiometer and various other devices (Rialle, Lamy, Noury, & Bajolle, 2003), a ringsensor that monitors patient’s blood oxygen saturation (Yang & Rhee, 2000) and a web based electrocardiogram monitoring application facilitating collect, analyze and storage of patient data (Magrabi, Lovell, & Celle, 1999) were designed by researchers to follow-up of patients’ health status at home.

Evaluating health technologies is a complicated procedure because people face with some difficulties while evaluating trade-offs between alternatives. Analytic Hierarchy Process (AHP) is a potential decision making method to deal with complex decisions. The aim of AHP is to qualify relative priorities for a given set of alternatives on a ratio scale. In the literature, many applications of AHP have published in different fields including planning, resource allocations, and selecting a best alternative, etc. (Magrabi, Lovell, & Celle, 1999). AHP method also widely used in vendor selection problems (Nydick & Hill, 1992; Tam & Tummala, 2001).

There are many applications of AHP in the medical field. In one of the researches, AHP is used to develop an human resource planning model for hospital laboratory personnel (Kwak, McCarthy, & Parker, 1997). Turri applied AHP approach to select a magnetic resonance imaging vendor by using the criteria like price, service, and technology (Turri, 1988). Another application of AHP was designed by Kahen and Sayers for selection of medical expert systems (Kahen & Sayers, 1997). In the study, assessment of a health service prototype have done in the design phase of the service development so as to make clear the factors affects users attitude toward health services.

Usability tests of the health services (Kaufman, Patel, Hilliman, Morin, Pevzner, Weinstock, Goland, Shea, & Starrena, 2003), affects of ergonomics on the medical device development (Martin, J.L., Norris, Murphy, & Crowe, 2008) and self-measurement satisfaction of hypertension patients (Bobrie, Postel-Vinay, Delonca, & Corvol, 2007) are just some of them. These studies have applied different techniques in the analyses phase of the research. However, it is difficult to find a study that uses AHP method.

Topacan et al (2008) identified 37 different criteria for health information service (HIS) adoption including cost, time factor, content, language, security, customizability, output quality, menu items, input type, sound quality and availability of face-to-face communication. The studies of Karahanna et al (1999), Simon et al (2007), Chang et al (2007) identified a number of criteria with respect to triability, medical provider and vendor support that are applicable for selecting health information service.

Tung et al (2008) define financial cost as “the extent to which a person believes that using the electronic logistics information system will cost money”. It was found that financial cost has an influence on adoption of electronic logistic information system (Tung, Chang, & Chou, 2008). Chang et al also examined security protection and

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