

Chapter 2.15

Using Analytical Hierarchy Process (AHP) to Identify the Relative Importance of the Features Needed for Web-Based Systems Development

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ABSTRACT

Most of new information systems development is now being undertaken with Web-based architectures. The objective of this study is to identify and assess the relative importance of the required features for methodologies used to develop Critical success factors (CSFs) for the development of Web-based applications were identified from the literature and organized into a hierarchy consisting of their dimensions and sub-dimensions. The relative importance of the dimensions was

assessed through an analytical hierarchy process (AHP) method based on data obtained in Korea from IT professionals. Information properties and risk control were found to be the two main dimensions. Within information properties dimension, integrity of information was found to be the most important sub-dimension. The relative importance of the features was also found to vary for the three industry sectors investigated.

INTRODUCTION

In recent times, a majority of information systems are being developed for Web environments. Web-based systems are gaining popularity and becoming ubiquitous (Murugesan, Deshpande, Hansen, & Ginige, 2001), due to their advantages, such as user friendliness, convenience of access, and ease of administration. As a result, processes, methods, and techniques for information systems are being dramatically transformed to suit Web-based systems (Davies, 2000; Howcroft & Carrol, 2000). For Web-based systems, traditional methodologies may be a poor fit (Norton, 2001). However, in practice, the understanding of specific requirements for Web-based systems development is weak, and methodologies for Web-based applications are often ignored. On this issue, Murugesan and Ginige (2005) have observed that, “most Web application development still continues to be ad hoc, chaotic, failure prone, and unsatisfactory” (p.2). These problems may be further magnified, due to time pressures, whether the development is undertaken internally or externally through a vendor. There have been many efforts to identify critical success factors for information system development projects in the Web environment (e.g., Jiang & Klein, 2001; Hartman & Ashrafi, 2002). These efforts dealt with issues such as risk, cost, and time management in successful project management, rather than issues related to understanding Web-based systems development methodologies and/or software engineering. Based on the above discussion, we focus on the following research questions in the context of Web-based systems:

1. *What are the unique requirements and characteristics of Web-based systems development efforts?*
2. *What is the relative importance of these factors for Web-based systems development?*

Based on these research questions, this article aims to identify the unique critical success factors (CSFs) for Web-based systems development efforts through a review and synthesis of the current academic and practitioner research. The relative importance of the identified CSFs was computed, based on an analysis of data obtained from 33 IT professionals in six Korean firms. The analytical hierarchical process (AHP) developed by Saaty (2005) was used to rank the identified CSFs, which can help provide a better understanding of the requirements for Web-based systems development efforts. The main steps employed for ranking the CSFs for Web-based systems development are summarized in Figure 1.

Properties of Web-Based Systems

Web-based systems are defined as application programs that run on Internet or corporate intranets or extranets (Chen & Heath, 2005) and deliver content to users on a Web-browser. Web-based systems rely on the World Wide Web (WWW), a system composed of hypermedia content and Internet, which allows users to share information in different media, such as text, video, image, and voice (Bieber & Kacmar, 1995; Bieber & Vitali, 1997; Isakowitz, Stohr, & Balasubramanian, 1995). Web-based information systems have some unique requirements, compared to traditional information systems. For example, Bolchini and Paolini (2000) asserted that Web-based systems development methodologies need to focus on navigation, information architecture, and interface structures. Web-based systems development has to deal with rapid changes and new software tools for hypermedia applications, and to integrate them with existing information systems (Uden, 2002). According to Uden, Web engineering is “a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of hypermedia applications” (p.47). Web-based applications, unlike traditional applications, are implemented using advanced technologies and

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