MASTER'S THESIS

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Investigating Website Success in the Context of E-recruitment

An Analytic Network Process (ANP) Approach

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Investigating Website Success in the Context of E-recruitment: An Analytic Network Process (ANP) Approach

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Abstract

Objective of this thesis is to find out relative importance of website success factors in selecting the most preferred e-recruitment website by identifying different relative importance of each website success factors and priority of alternative websites across e-recruitment domains in Iran. This study is concerned with users of two e-recruitment websites in Iran, www.irantalent.com, and, www.agahjobs.com.

The mechanics of a website is based on a literature surrounding information system success and service success. Updated Delone and McLean IS Success Model is one of the highly cited models; which concerns both IS and Service quality as an antecedent of website success. Therefore, this model that can be adapted to measurement challenges of new e-commerce world is chosen as framework for investigating e-recruitment website success. There are feedback loops between IS success variables in Updated Delone and McLean IS success model, so that this model does not have specifying levels as in a hierarchy. Therefore to identify relative importance of different success variable and to rank alternative websites, Updated D&M IS Success Model is extended through Analytic Network Process (ANP) approach. A 9 scale internet mediated questionnaire was designed and sent to 383 individuals for pair-wise comparisons (http://www.irexpert.ir/webforms/quest/quest1.aspx). Results indicate that Irantalent.com is highly preferred to Agahjobs.com with respect to all success measures in the Updated Delone and McLean IS Success model. Moreover, relative importance of success measures based on their influence on interrelated measures was found. The findings of this thesis provide decision makers of e-recruitment companies with useful insights to enhance their website quality.

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Chapter 1: Introduction

If to do were as easy as to know what were good to do, chapels would be churches and poor men's cottages princes' palaces (William Shakespeare, The merchant of Venice).

The above statement of Shakespeare confirms the 80/20 principle (Koch 2004). 80/20 principle demonstrates the power of parsimonious positive action according to which, small minority of causes lead to a large majority of results. It is of crucial prominence to identify the factors that matter most to the success and add the greatest value. Focus on that golden 20 percent of resources, activities, factors, etc that are extremely creative and productive is the secret of all success (Koch 2004).

1.1 Importance of research area

E-commerce is not simply buying and selling through the organization's website, but e-commerce is much more than electronically mediated financial transactions between customers and organizations (Chaffey 2009). Kalakota and Whinston (1999) refer to a range of different perspectives for e-commerce:

- A communication perspective- the delivery of information, products/services or payment by electronic means.

- A business process perspective- the application of technology towards the automation of business transactions and workflows.

- A service perspective- enabling cost cutting at the same time as increasing the speed and quality of service delivery.

- An online perspective- the buying and selling of products and information online.

E-commerce is more than just another way to sustain or enhance existing business practices. Rather, e-commerce is a paradigm shift. It is a "disruptive" innovation that is radically changing the traditional way of doing business (Lee 2001).

E-commerce is facilitated through technologies that enable electronic communications. These technologies include internet communications through websites and e-mail as well as other digital media such as wireless or mobile media for delivering digital television such as cable and satellite. The Website is one of the most revolutionary technologies that changes the business environment and has a dramatic impact on the future of electronic commerce (Joseph et al. 2001).

Website is a primary user interface for internet enabled business (Watson 2001). A company's website can be viewed as the delivery mechanism for a collection of services that facilitate various tasks a customer needs to perform in the overall purchase cycle (Saeed 2002). Moreover, websites are a valuable channel for selling to, and interacting with, customers, and an important medium for communicating with the general public as well as potential customers (Bellizzi 2000).

Website as a new media changes the role of a consumer from a passive recipient to a proactive one (Chaffey 2009). Traditional media such as TV, Radio, Billboards and print are push media, a one way street where information is mainly unidirectional from company to customer. In contrast companies' website is a pull media, in which consumer is proactive in selection of the message through actively seeking out a website. Through the website, it is usually the customer who initiates contact with an organization, and because of information transparency on the internet, there is a huge competition between organizations in traffic building and customer retention campaigns. Hence, e-commerce is the shift of the power toward the

consumer, which contributes to fundamental changes in the way companies relate to their customers and compete with one another (Slywotzky 2000).

The intensity of online competition has lead to a simple mouse click to select a new provider (Singh 2002, pp.434-446). Disruptive internet technologies enforce organizations to focus on the factors which contribute to their success in the competitive environment.

Reicheld & Schefter (2000, pp. 105-113) remark that acquiring online customers is so expensive that startup companies may remain unprofitable for at least two or three years, meanwhile by retaining just 5 percent more customers, online companies can boost their profits by 25percent to 95percent.

Customers interface with sellers in cyberspace through sellers' website. Hence, website as one of the relationship channels between customers and organization has emerged as an issue of strategic importance for organizations to effectively communicate and transact with consumers. Websites require continuous assessment, careful management, and frequent updates (Albert 2004).

One of the main reasons for companies to provide high quality websites is the lack of human contact offered, given that interaction is accomplished purely through technology. The absence of direct human relation has to be replaced by better performance or excellence on specific
web factors (Zeithaml 2002; Palmer 2002; Iwaarden et al., 2003).

According to (Benbasat et al. 2004), e-commerce success is one of the important electronic commerce research issues.

E-recruitment websites as one of the highly used applications on the internet are designed as a powerful medium that brings employers and job seekers together and allows them to interact in a fast, efficient, and effective way. For job seekers, an e-recruitment website provides a unique opportunity to explore constantly updated employment opportunities through an extensive database of jobs. Job seekers can then post their resumes online and announce their availability to potential employers.

For employers, e-recruitment delivers a convenient, low cost, and efficient solution by providing direct access to a continuously expanding database of resumes.

In general, the recruitment service provided on these websites is free for the job seekers, who can enjoy the service once they have become members of that website. In contrast, employers typically have to pay a subscription fee in order to take advantage of the recruitment service. Because employers are required to pay for the service, their perceptions of the level of service are typically the concern of most recruitment websites and the recruitment service quality level for the job seekers is typically ignored. However, this is a concern because, if job seekers are unhappy with the service provided by the recruitment website, they may look for other websites that fulfill their expectations (Tong et al. 2005). If this continues to happen, the unsuccessful websites may experience a decrease in the number of active job seekers. This, in turn, may lead to a reduction in the number of employers who are willing to subscribe to the recruitment website.

1.2 research problem

A useful way to approach a research process is to start a basic dilemma that prompts the research and then try to develop other questions progressively breaking down the original question into more specific ones (Cooper 2003).

Websites are being widely deployed commercially (Liu and Arnett, 2000; Robbins et al., 2003). Ample anecdotal evidence suggests that internet is an effective tool for commercial purposes (Huizingh 2000). However, just doing online business does not guarantee competitive advantages. E-commerce firms depend on people visiting their sites, purchasing their products, and, more importantly, becoming repeat customers (Smith et al., 2001). At the same time, customers have many web sites that they can use as alternatives. There are almost no barriers to switching to other web sites if performance is unacceptable (Bhatti et al., 2000).

While sizable investments in developing websites is being made, there is no clear knowledge of what factors contribute to a successful e-commerce and researchers are struggling to measure the internet based e-commerce initiatives (Irani 2002; Thornton 2003).

Some preliminary studies (Marshall et al., 2000) indicate a wide gap between anticipated and actual achievements from e-commerce systems. Therefore, there is an urgent need to help decision makers gain a better understanding of online customers' perceptions of more desirable websites. This has motivated a number of studies to look for factors that inhibit or facilitate e-commerce success (Turban et al., 2000).

Online recruitment services are among the most popular applications on the internet (Smyth 2002). E-recruitment websites offer free job searches and resume posting. In recent years, job recruitment websites have undergone considerable growth and the number of job seekers who conduct job searching over the Internet has increased. This increase may be due to the added convenience provided by online recruitment websites. Job seekers are able to view multiple openings and post their resumes for businesses to view without leaving the comfort of their homes. Furthermore, the recruitment services provided to job seekers is free of charge. In case job seekers are not confidante of e-recruitment website, they can easily switch to other

recruitment websites. Therefore, employers who have to pay a subscription fee to take advantage of recruitment website; will churn such low traffic website. In general, there is a huge competitive environment between e-recruitment websites.

Iran's current working age population is broadly estimated to be about 37 million of which some 21 million or less than 32% of the total population, constitute the active labor force. This figure compares poorly with the 50-60% labor participation in other countries (Amuzegar 2004).

As dependency to e-commerce technology increases in Iran, so does the need to online recruitment services. Recently, online recruitment websites started working in Iran. These websites have to compete for traffic building that leads to more employer subscription. Hence, it is of crucial prominence to investigate the e-recruitment website success. Website assessment can significantly contribute to development of websites that serve user needs and meet the user expectations to the maximum possible extend.

The aim of this research is to investigate the website success and its contributing factors in the context of e-recruitment in Iran.

Thesis is organized as follows. Next chapter reviews literature on the website success. The research framework is proposed in chapter 3. The following chapter describes the research method and data collection techniques. Procedures of data analyses and results are then reported in chapter 5. Finally, implications and future research directions are suggested in the last chapter.

2. Literature review

2.1 Introduction

Based on research problem presented in chapter one, website success will be presented according to its conversion from information system to web based information system. After that, there is a definition about e-recruitment website.

2.2 Information System Success

Effective measurement of information system (IS) success is an important issue for both practitioners and researchers to understand the value of IS management activities and IS investments (Delone et al., 2003; 1992).

It appears that IS success is one of the controversial issues that has eluded IS researchers. The problem is compounded because success is a multidimensional concept that can be assessed at different levels (such as technical, individual, group, organizational) and using a number of not necessarily complementary criteria (such as economic, financial, behavioral and perceptual), even various stakeholders may have different opinions of the success of the same information system (Molla et al., 2001; Delone et al., 2003; 1992). For instance, Nidomolu (1995) believes that from developer's perspective, a successful IS may be one that is completed on time and under budget, with a complete set of features that are consistent with specifications and that function correctly. He further argues that from an innovator's perspective, a successful system is one that attracts a large, loyal, and growing community of users. More recently, Jiang et al. (2002) identified a set of critical success factors for system development including clearly defined goals, top management support, sufficient resources, competent team members, and adequate communication. So, from a management perspective, a successful system may be one

that reduces uncertainty of outcomes and thus lowers risks, and leverages scarce resources. From the end user's perspective, a successful system may be one that improves the user's job performance without inflicting undue annoyance (Chien et al., 2007).

From the 1980s, the explanation of information systems success has been called one of the main goals of IS research (Robert 1986).

The measurement of information systems (IS) success or effectiveness has been widely investigated by the IS research community (Counihan *et al*., 2002; Murphy et al., 2002; Shang et al., 2002). Theorists, however, are still grappling with the question of which constructs best measure IS success (Rai *et al*., 2002, Garrity et al., 1998).

2. 3 Information system conversion to web based information system

Huff et al. (1988), and Zisman (1978) describe the evolution of IS over time. They state that there is a pattern of organizational learning in applying new technology, and that organizations go through several distinct stages to exploit new technology.

According to the conversion in the role of information systems, many firms positioned and deployed systems to compete in the electronic marketplace. Web based information systems, represent a new frontier for businesses trying to establish an online presence where consumers are free to shop in more efficient "friction free markets" (Tenenbaum 1998).

Radical change in global marketplaces that is created by new application of information systems has redefined individuals' expectation in accessing the information or services. No longer people are willing to stand in long queues, hold on the line, or stick in a traffic to get something that could be available by a mouse click. People deal with an organization through electronically information exchange. Electronically information exchange could be either

financial transactions or non-financial transactions such as customer request for further information (Chaffey 2009).

"Moment of truth" between a company and a customer is the Web site (Iwaarden et al., 2002). This means customers interface with sellers in cyberspace through the seller's website and there is no human interaction between a company and customer.

2.4 E-commerce website success

The internet has made a new competitive environment for businesses rethink and adapt technology to increase effectiveness and efficiency of the business processes. Most of the brick and mortar organizations have changed their business operations to a partial or pure e-commerce by developing a website.

It is of crucial prominence for the businesses to evaluate their website success to sustain profitable in the competitive marketplace. If companies focus on the factors which contribute to their success in the competitive environment, they become more profitable. However, "Companies are making large investments in e-commerce applications but are hard pressed to evaluate the success of their e-commerce systems" (Delone and McLean 2003, p.24).

To evaluate the success of an e-commerce website, the mechanics of a website system should be defined. Sinnappan et al., (2004) imply that the mechanics of website development is based on the literature surrounding both the information system and service field. Literature surrounding information system success and service success will be discussed in the next sections.

2.5 Review of Information system success literature

Delone and McLean (1992) believe that, "the evaluation of IS practice, policies, and procedures requires an IS success measure against which various strategies can be tested".

There are so many different measures of IS success in the literature, depending upon which aspect of IS the researcher has focused his or her attention. Delone et al., (1992) fit previous conceptual and empirical studies into the category or categories of the model, which is shown in figure 1. So extensive body of IS research was organized on a retrospective basis, and many measures of previous studies fall into six major categories of Delone and Mclean IS Success Model (1992) as shown in figure 1.

Delone and McLean (1992), describe each category as follows:

- System Quality- the measure of information processing system itself
- Information quality-the measures of information system output
- Information use- the recipient consumption of the output of an information system
- User satisfaction- the recipient response to the use of the output of an information system
- Individual impact-the effect of information on the behaviour of the recipient
- Organizational impact -the effect of information on organizational performance

However, different researchers had different description of measures for each Information system success category. Delone and McLean (1992) suggest that, no single variable is intrinsically better than another; so the choice of a success variable is often a function of the objective of the study, the organizational context, the aspect of the information system which is addressed by the study, the independent variables under investigation, the research method, and the level of analysis, i.e., individual, organization, or society.

Delone and McLean IS Success Model (1992) remark that its different levels have causal and temporal influences on each other; hence the success model is a process construct. According to this process model, System Quality and Information Quality singularly and jointly affect both Use and User Satisfaction. Additionally, the amount of Use can affect the degree of User Satisfaction, Positively or negatively, as well as the reverse being true. Use and User Satisfaction are direct antecedents of Individual Impact, and lastly, this Impact on individual performance should eventually, have some Organizational Impact. Based on the impact of each category on the other one, all the variables are dependant, from which the future success of an IS can be predicted.

Delone et al., (1992) state that this IS success model clearly needs further development and validation before it could serve as an appropriate measure of IS success.
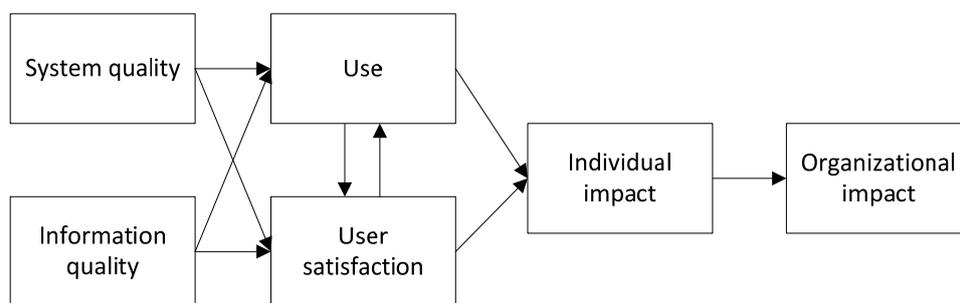
Figure1. D&M IS Success Model (DeLone and McLean, 1992)

In 1998, Garrity et al. extended the original DeLone and McLean model (1992) and proposed an alternative model in the context of organizational and socio-technical systems, which is shown in figure 2. The model identifies four sub dimensions of User Satisfaction, namely Interface Satisfaction, Decision Support Satisfaction, Task Support Satisfaction, and Quality of Work Life Satisfaction. According to Garrity et al. (1998), the four factors correspond

with three viewpoints of information systems, the organizational viewpoint, that views IS as a component of the larger organization system, the human machine viewpoint, which focuses on the computer interface and the user as components of a work system, and the socio-technical viewpoint, that considers humans as also having goals that are separate from the organization and whereby the IT or technical artifact impacts the human component in this realm.
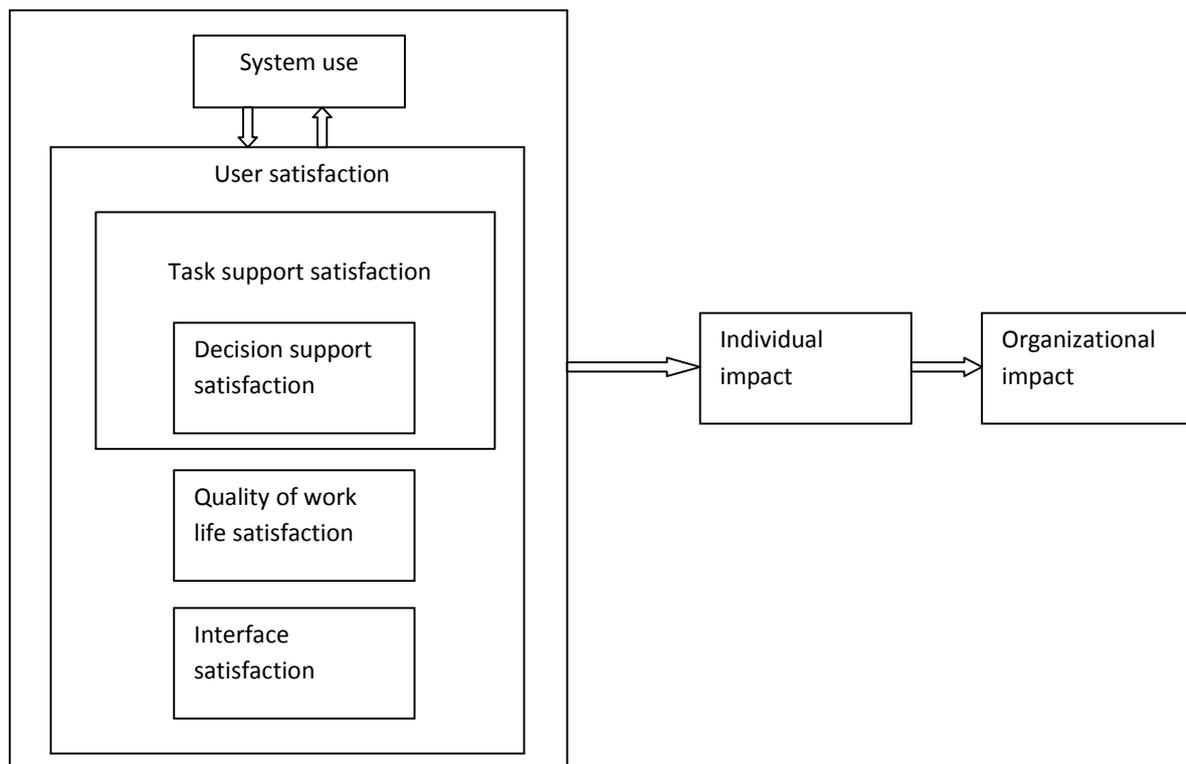
Figure2. Garrity and Sanders model of IS Success (1998)

Garrity and Sanders Model (1998) measures are consistent with the Technology Acceptance Model (TAM).

The Technology Acceptance Model (TAM) was conceived by Davis (1998) to explain and predict the individual's acceptance of information technology. Davis (1989) posits that the actual use of a technology can be predicted by user's behavioral intention and his or her attitude

towards its use, which in turn are influenced by a technology's perceived ease of use and perceived usefulness. Davis (1989) describes TAM variables as follow:

- Perceived usefulness-the degree to which a person believes that using a particular system would enhance his or her job performance

- Perceived ease of use-in contrast, refers to the degree to which a person believes that using a particular system would be free of effort

Davis (1989) indicate that perceived usefulness and perceived ease of use are influential in decisions to use information technology and are important in designing and implementing successful information systems.

Garity et al. (1998) measures the fit with the system, the user, and the task and is in consistent with the Technology Acceptance Model. Garrity et al. (1989) confirm that task support satisfaction and interface satisfaction are closely related to TAM's perceived usefulness dimension and perceived ease of use dimension.

This section was a review of the literature inclosing the information system success. However; for measuring the success of the website, another aspect of the website, service success, should be considered.

With the emergence of web based information technology, TAM model was validated with the Web as the user's application (Albert et al., 2000). The antecedents to Web ease of use and usefulness was identified in this study. Therefore, the features of the web that might contribute to its ease of use and usefulness were identified. Albert et al. (2000) acclaim that new model suggests that web site developers should provide ease of use and usefulness for their web sites to encourage people revisit their websites. By applying TAM the groundwork for understanding antecedents that might affect web usage is prepared.
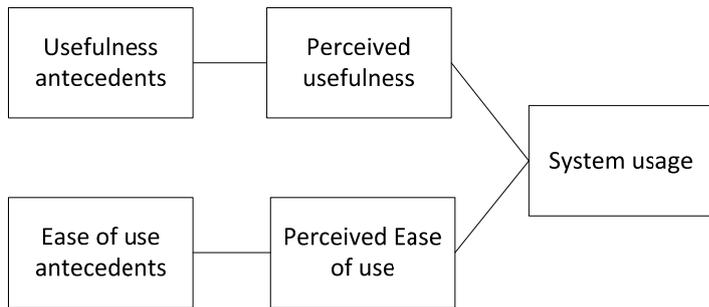
Figure3. The TAM and website usage (Albert et al. 2000)

In 2005, Garrity et al., proposed a new model which was drawn on the Delone and McLean (1992), TAM (2000), Garrity et al. (1998) models of IS success to examine web based information systems success, to discover important underlying factors that will help to explain web based information systems success. Garrity et al. (2005) believe that web based information system success deals with the reciprocal relationship between user satisfaction and system use.
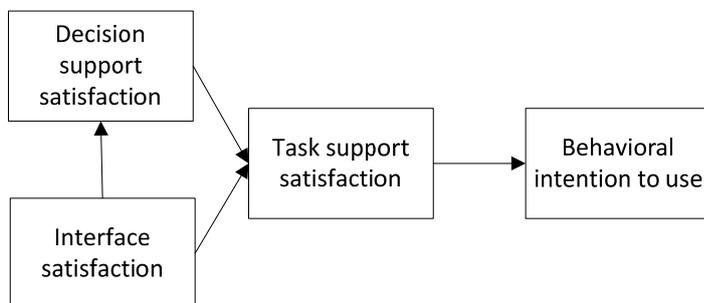
Figure4. Web based information system success model (Garrity et al. 2005)

According to Garrity et al. (2005) web based information system success model assesses user satisfaction with web based information systems in the context of consumer purchasing activities. The nature of a consumer purchasing web based system is closely tied to providing decision support capabilities to aid consumers in product and service purchase decisions (Keefe 1998).

Five dimensions of web based information system success model (2005) are illustrated as follow:

- Decision support satisfaction assesses the support provided by the Web based information system in the context of decision making tasks

- Task support satisfaction assesses the overall support for the purchasing task, which takes into account the overall design of the software and its usefulness.

- Behavioural intention to use a system effectively mediates the effect of user satisfaction on actual systems use

- The Interface Satisfaction dimension may be thought of in several ways. It provides an assessment of the design of the hardware and software interface and is closely related to Ease of Use dimension

Garrity et al. (2005) state that the construct used in web based information systems success model is more context based than Delone and McLean IS Success model (1992). Web based information systems success model is more goal oriented perspective that asserts a fact that a system of high quality should support users in performing their task related responsibilities.

In nut shell, the focus of web based information system success model is on how well the system supports workers in the accomplishment of their goals.

Garrity et al. (2005) explain that if systems are tools to help workers accomplish tasks, then a well designed tool should be made in such a way that it is easy and efficient to use. They add that the interface is also the focal point of interaction between humans and information systems.

Thus, Information Quality can also be explained by Interface Satisfaction, in the sense that the system for presenting the information cannot be separated from the information itself (Nielsen 2000)

2.6 Review of service success literature

As it was remarked previously in this chapter, mechanics of a website is based on a literature surrounding both information system and service fields. In the previous section, highly cited information system success models were reviewed; in this section literature of success will be reviewed from the aspect of service quality.

Although companies may try to emulate human behavior with technology on the websites, the interaction remains different because some aspects of human interaction cannot be replaced with technology (Cox & Dale 2001; 2002). The absence of face to face relationship's aspects of human interaction through which quality can be delivered to customers will have to be compensated by better performance on other quality factors.

One of the dominant theoretical models that have begun to emerge from the service success literature to assess the quality of the website is SERVQUAL model. According to Parasuraman (1988), in order to improve service quality, it must be reliably assessed and measured. According to the SERVQUAL model (Parasuraman et al., 1988), the most often used approach for measuring service quality is comparing customers' expectations before a service encounter and their perceptions of the actual service delivered (Parasuraman *et al.*, 1985). Service quality can be measured by identifying the gaps between customers' expectation of the service to be rendered and their perceptions of the actual performance of the service. Service quality can thus be defined as the difference between customer expectations of service and perceived service. If expectations are greater than performance, then perceived quality is less

than satisfactory and hence customer dissatisfaction occurs (Parasuraman *et al.*, 1985). The model of service quality gaps is clarified in figure 5 (Parasuraman 1988). Parasuraman (1988) state that 5 dimensions of Servqual model measure the difference between objective and perceived quality in:

- *Tangibles*-Physical facilities, equipment and appearance of personnel.

- *Reliability*-Ability to perform the promised service dependably and accurately.

- *Responsiveness*-Willingness to help customers and provide prompt service.

- *Assurance* (including competence, courtesy, credibility and security)-Knowledge and courtesy of employees and their ability to inspire trust and confidence.

- *Empathy* (including access, communication, understanding the customer)-Caring and individualized attention that the firm provides to its customers.

Parasuraman et al. (2000, p. 171) suggest that research is needed on whether the definitions and relative importance of the five service quality dimensions change when customers interact with technology rather than with service personnel.
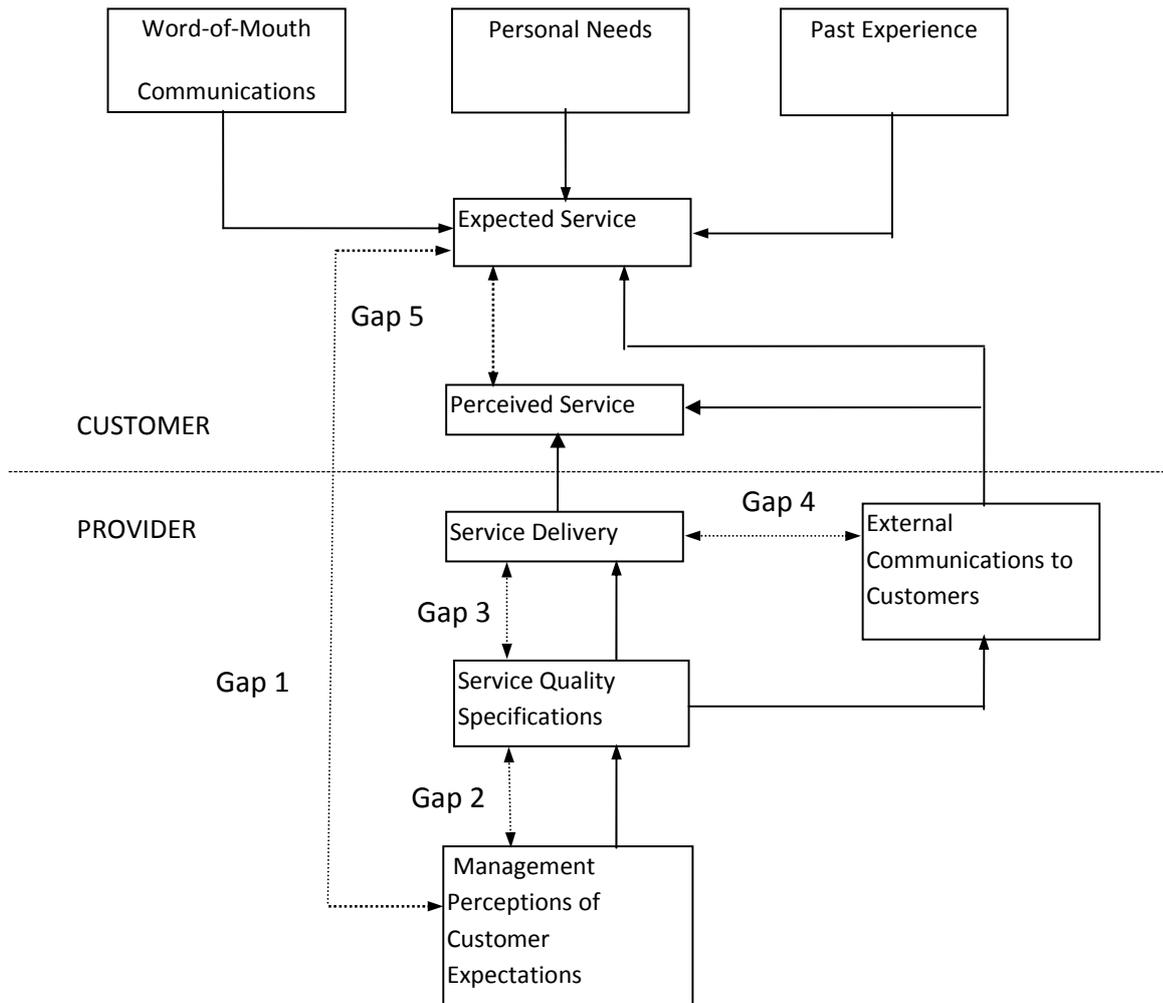
Figure5. Model of service quality gaps (Parasuraman et al., 1988)

In 2000, Zeithaml et al. developed e-Servqual for measuring service quality on the website.

Zeithaml et al. (2000) pinpoint that encouraging repeat purchases and building customer loyalty, needs a shift from focusing on e-commerce to e-service. They further illustrate that e-service quality can be defined as the extent to which a Web site facilitates efficient and effective shopping, purchasing, and delivery of products and services (Zeithaml et al., 2000).

E-Servqual (2000) has seven dimensions: efficiency, reliability, fulfillment, privacy, responsiveness, compensation, and contact. Four dimensions: efficiency, reliability, fulfillment, and privacy are used to measure the customers' perceptions of service quality delivered by online

retailers. These dimensions include the criteria customers use to evaluate routine online service when they experience no questions or problems in using the site. Zeithaml et al. (2002) also found that three dimensions of responsiveness, compensation, and contact become salient only when the online customers have questions or run into problems.

In comparing the dimensions of SERVQUAL (1988), and the dimensions of e-service quality (2000), Zithaml et al. (2000) found out that half of the dimensions of SERVQUAL are used by consumers when they evaluate e-service quality, however several new dimensions emerged as important in assessing e-service quality. Some of the perceptual attributes of reliability and access dealt with online attributes not present in SERVQUAL. Therefore, although some of e-service quality dimensions are similar to those of service quality, others are entirely new and unique to the context of websites.

Liu et al. (2000) identified service quality as an important measure of web site success and in their study service quality was measured as responsiveness, assurance, and empathy. These measures are the dimensions of SERVQUAL.

In 2002, Iwaarden et al. conducted a survey to identify the quality factors perceived to be most important on websites. Their questionnaire was utilized based on SERVQUAL instrument. The results indicate that the quality dimensions found applicable in service sector are also applicable on the website.

2.7 Review of information system and service arena literature

Delone and McLean (2003) justify the information system research progress as a result of the tremendous progress of the impacts of Information system on business and society. They further claim that as the role of information system has changed and progressed from 1992, academic inquiry into the measurement of information system success has progressed over the

same period. The Delone and McLean IS Success model (1992) has been updated in light of the dramatic changes in IS practice, especially the advent and explosive growth of e-commerce (Delone and McLean 2003).

Updated Delone and McLean IS Success model is a process and causal model, According to temporal or process model, lower levels of the model result in higher level categories of the model. In contrast to process model, causal or variance model, there is a causal relationship among different measures of the model. Unlike the Process model merely, which states that B follows A, a causal model postulates that A causes B; that is, increasing A will Cause B to increase (or decrease). According to Delone and McLean (2003), the process model has just three components: the creation of the system, the use of this system, and the consequence of this system use. They further argue that all of these dimensions are necessary, but not sufficient for the resultant outcome, and to achieve consequences, a variance model is also needed.

Some categories were added to the original Delone and McLean IS Success Model (1992). Delone and McLean (2003) added System use as an appropriate measure of success to the original Delone and McLean IS Success Model (1992). Delone and McLean (2003) claim that in the causal model, simply using this complex variable by saying that more use will yield more benefits, without considering the nature of use, is clearly insufficient and problematic, rather the nature, extent, quality, and appropriateness of the system use must be considered.

"The emergence of end user computing satisfaction in the mid-1980s placed IS organizations in the dual role of information provider and service provider" (Delone et al. 2003, P. 18).

From 1992 to 2003, researchers have argued that service quality be added to the success model. They have applied SERVQUAL measurement instrument in the field of marketing and IS success (Delone et al. 2003).

Delone and McLean (2003) agree that SERVQUAL metric needs continued development and validation, but if service quality properly measured, deserves to be added to system quality and information quality as components of IS success. Therefore, service quality measure was added to information quality and system quality measures as a crucial component of website success measurement.

Delone and McLean (2003) also updated the original information system success (1992) by grouping the consequence of system use, individual impact and organizational impact, into one category of net benefits. Delone and McLean (2003) believe that according to the choice of where the impacts should be measured will depend on the system or systems being evaluated and their purposes. Therefore, it is important from whose interest the IS impact is being measured. So Delone and McLean (2003) decided to rather than complicating the model with more success measures, grouping all the Impact measures into a single impact category called Net Benefits.
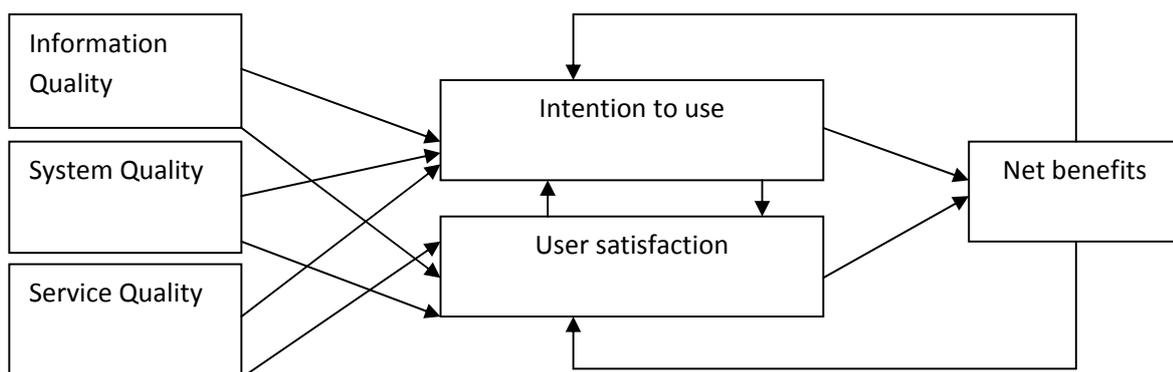
Figure6. Updated DeLone and McLean IS success model (DeLone and McLean, 2003)

In table 1, summary of researches on information system success and website success, including the success factors, instruments of measuring the success, and findings is illustrated.

Table1. summary of researches on IS and Website success

Author/date	Success factor	Context/instrument	findings
Liu, C et al. 2000	Information & service quality, system use, playfulness, system design quality	Questionnaire survey of webmasters from Fortune 1000 companies	Websites should be service oriented, Importance of successful website design in to system use, Cultivate pleasure in website by motivating customers
Sinnappan, S et al. 2007	WEBQUAL instrument: Usefulness, ease of use, entertainment and complementary relationship	Australian online commerce across three industries i.e. 1) airlines, 2) e-retail and 3) computers. Online questionnaire	Highlight items deemed crucial for each industry
Yi, C et al. 2007	DeLone and McLean IS Success model: Information scope, information relevance, information understandability, information reliability, presentation vividness, presentation interactivity, ease of use, navigability and organization	Written protocol analysis	Information quality and system quality affects perceived usefulness
Turban, E et al. 2000	Page loading speed, business content, navigation efficiency, security, and marketing/customer focus	Counting citations of exerts in trade journals and consumers' opinions	Customer view the importance the web design factors, completely differently than the experts in the field believe
Younghwa Lee a et al.2006	DeLone and McLean's IS success model extended through applying an analytic hierarchy process is used to assess information quality, service quality, system quality, vendor specific quality	questionnaire-based field survey was conducted to investigate the relative importance of website quality factors on online customers and managers/designers of e-business companies with respect to selecting the most preferred website online electronics and online travel	Several perceptual gaps existingbetween customersandmanagers, designers, website quality factors are relevant criteria in selecting the most proffered website, online customers perceive different importance of website quality factors in different business domains
De Wulf, K et al. 2006	Satisfaction, commitment, and trust	Online questionnaire	Pleasure influences the website success
Seock, YK et al. 2007	Product information, customer service, privacy, navigation, auditory experience	Among us university students, self-administrated online questionnaire	Customer's shopping orientation, and Internet channel usage affects web preference

2.8 E-recruitment websites

The terms online recruitment, e-recruiting, cyber recruiting, or Internet recruiting, imply the formal sourcing of job information online. The first references to online recruitment appear in articles of the mid-1980s (Gentner 1984; Casper 1985), while systematic reference to the online recruitment in the human resource journals begins almost a decade later, in the mid-1990s, when IT companies and universities begin to use the Internet extensively(Galanaki E, 2002).

When looking for a job, the Internet may be a source of help for some, as websites such as Irantalent.com and agahjobs.com in Iran offer free job searches and resume posting. In recent years, job recruitment websites have undergone considerable growth and the number of job seekers who conduct job searching over the Internet has increased (Tong 2002)

This increase may be due to the added convenience provided by e-recruitment websites. Job seekers are able to view multiple openings and post their resumes for businesses to view without leaving the comfort of their homes.

E-recruitment websites are designed as a powerful medium that brings employers and job seekers together and allows them to interact in a fast, efficient, and effective way. For job seekers, an e-recruitment website provides a unique opportunity to explore constantly updated employment opportunities through an extensive database of jobs. Job seekers can then post their resumes online and announce their availability to potential employers.

For employers, e-recruitment delivers a convenient, low cost, and efficient solution by providing direct access to a continuously expanding database of resumes.

In general, the recruitment service provided on these websites is free for the job seekers, who can enjoy the service once they have become members of that website. In contrast, employers typically have to pay a subscription fee in order to take advantage of the recruitment

service. Because employers are required to pay for the service, their perceptions of the level of service are typically the concern of most recruitment websites and the recruitment service quality level for the job seekers is typically ignored (Tong et al. 2005). Tong et al. (2005) believe that if job seekers are unhappy with a recruitment website, they may look for other websites that fulfill their expectations that leads to decrease in the number of active job seekers. This, in turn, may contribute to a reduction in the number of employers who are willing to subscribe to the recruitment website. Therefore, study of e-recruitment websites success from jobseekers' perception is of prominence for one e-recruitment website to stay profitable in competitive environment.

With over two-thirds of its seventy million citizens under the age of 30, Iran has a young and highly educated population. However, multinational companies competing for a foothold in this large and lucrative market have often been frustrated by the shortage of bilingual staff with professional experience, as well as the unavailability of effective channels for reaching such candidates. In a survey of multinationals conducted by Irantalent.com in 2005, recruiting qualified bilingual staff was ranked as the second greatest challenge of doing business in Iran, after regulation and government bureaucracy.

Given the huge difficulties of recruiting bilingual staff in Iran, the new service has already attracted significant interest from multinationals operating in the country. Despite tensions over the country's nuclear energy policy, the presence of multinational companies in Iran has grown dramatically over the last few years, driven by the more open regulatory environment which has made it less difficult for multinationals to invest. This in turn has increased the demand for qualified employees.

The primary factor determining the level of demand for Internet recruitment will be the number of educated unemployed population. Iran has a population of over 70 million, more than two-thirds of which is under the age of 30. Up to 750,000 people enter Iran's labor market each year (Press TV 2008). In this article it is further argued that mounting number of university graduates in Iran would lead to a sharp rise in the country's potential labor force in the future.

2.9 Problem discussion

The utilization of information technology and specifically internet has rapidly increased during the past half century (Martinsons et al., 1999). On the contrary, the rapid IT development is not followed by the success of IT utilities and IS implementation (Lim 1998); it has more failure and disappointment than success. Organizations are seriously questioning about the gains and benefits arising from IT investment (Myers et al., 1997). Many researchers are concerned about this issue. For example, DeLone and McLean (2003) pointed out that companies are making large investments in e-business applications but are hard-pressed to evaluate the success of their e-business systems. Researchers have turned their attention to developing, testing, and applying e-business success measures.

2.10 Research Problem

As it was mentioned in section 1.2, the aim of this research is to investigate the website success in the context of e-recruitment in Iran.

Finding out relative importance of website success factors in selecting the most preferred e-recruitment website by identifying different relative importance of each website success factors and priority of alternative websites across e-recruitment domains are the objectives of this research.

Discussion the problem area has formed as: "What is the relative importance of website success factors in selecting the most preferred e-recruitment website?"

More precise Research questions will be formulated after proposing a research framework in frame of reference chapter.

2.11 Summary of the chapter

The chapter's overall goal was to provide an overview of the literature in the areas covering this research: Information system success, service success, website success, and e-recruitment. First, a brief history of information system and its revolution over time to e-commerce website was reviewed and followed by a summary of the literature surrounding both information system success and service success, two components of website mechanics. Moreover, a brief introduction to e-recruitment websites and the importance of studying e-recruitment website success in Iran was reviewed. According to the literature review, the research problem was discussed and subsequently overall research question was formulated. Finally, a number of information system and service success models were presented which will eventually function as basis for the development of the frame of reference in the following chapter.

Chapter3. Frame of Reference

3.1 Introduction

In this chapter, based on the literature review and research question formulated in chapter 2, an appropriate frame of reference for investigating relative importance of website success factors in selecting the most preferred e-recruitment website will be built.

3.2 proposing a research framework

As it was mentioned in chapter 2, website success should be considered from two aspects, information system quality and service quality.

Several models have been developed from the 1980s for investigating information system success and the broader term website success. However, few studies considered the combination of information system quality and online service quality variables as components of website success. As it was illustrated in chapter 2, Delone and McLean (2003) updated their original information system success model (1992), according to the advent and dramatic changes in information system practices, especially because of the explosive growth of e-commerce.

The emergence of end user computing in the mid 1980s placed IS organizations in the dual role of information provider (producing an information product) and service provider (providing support for end user developers) (DeLone & McLean, 2003, 9-30).

Updated Delone and McLean IS Success Model (2003) (hereafter referred to as the "Updated D&M IS Success Model") is one of the highly cited models; which concerns both IS

and Service quality as an antecedent of website success. This model can be adapted to measurement challenges of new e-commerce world (Delone and McLean 2003).

Updated D&M IS Success model (2003) is utilized to measure e-commerce system success. This model consists of six success categories. Each of these success categories consists of different success measures. Delone and McLean (2003, p.26), organized various success measures, by reviewing different IS and e-commerce literature, to make the model a parsimonious framework. Delone and McLean (2004) classified newly developed measures in e-commerce environment, into six dimensions of updated Delone and McLean IS success model (2003).

As Pitt et al. (1995, P. 173) observed, "Commonly used measures of IS effectiveness focus on the products rather than the services of the IS function. Thus, there is a danger that IS researchers will mismeasure IS effectiveness if they do not include in their assessment package a measure of IS service quality". Delone and McLean (2003) claim that need to assess service quality has become even more apparent with the advent of e-commerce and the demand of customers for support from their Web providers. Thus, service quality is added to the original model of Delone and McLean IS Success Model (1992).

By adding the "Service quality" variable to the model, Delone and McLean (2003) suggest that the "Service quality" is the most important variable in measurement of the overall success of the e-commerce website. They further argue that that SERVQUAL (Parasuraman et al., 1988) metric needs continued development and validation, they nevertheless believe that "service quality," properly measured, deserves to be added to "system quality" and "information quality" as components of IS success.

According to Delone and McLean (2003), "Service quality," the overall support delivered by the service provider, applies regardless of whether this support is delivered by the IS department, a new organizational unit, or outsourced to an Internet service provider. Its importance is most likely greater than previously since the users are now our customers and poor user support will translate into lost customers and lost sales.

Although the original SERVQUAL instrument (Parasuraman *et al.*, 1985) comprises of Tangible, Reliability, Responsiveness, assurance, and empathy variables, Updated D&M IS Success Model only considers three variables of this instrument in the Service category, Assurance, Empathy, and responsiveness measures. Since Tangible measures physical facilities, equipment and appearance of service provider personnel; it is not considered in service category of Updated D&M IS Success Model. Reliability measure is also considered in System quality category of Updated D&M IS Success Model (Delone and McLean 2003, p.26).

Parasuraman et al. (1985) defined empathy as providing caring and individualized attention to customers. Zeithaml et al. (2002) state that while customers seek understanding, reassurance, courtesy, and other aspects of personal attention in offline contexts, these service requirements did not seem to be key issues on the website. They further argue that empathy dimension is not required except when customers experience problems.

Iwaarden et al. (2003) applied Servqual to website and asserted that empathy could be provided to website users with the use of virtual assistant. The virtual assistant can suggest products or services that might be of interest to a customer. The only purpose of technological gadgets is to add one of the Web's key missing ingredients: warmth (The Economist, 2001).

Responsiveness is the willingness to help customers and provide prompt service (Parasuraman et al. 1985).

Iwaarden et al. (2003) confirm that one of the aspects in the responsiveness factor on the website is "giving prompt service". He further argues that the amount of time it takes to download a Web page appears to be of great importance to the users of the Internet.

When web page download time delays exceed 12 seconds, a staggering 70 percent of users leave a Web site (Cox & Dale, 2001; 2002).

For organizations it is important to have a web site that is quick, but on the other hand users expect web sites to be visually appealing. As the number and size of animations, pictures and sounds increase to make a web page more visually appealing, the time it takes to download that web page will also increase, which is judged negatively by users. Hence, there is a trade-off between the looks of a web site and the speed of that site (Iwaarden et al., 2003).

Parasuraman et al. (1985) defined assurance as the knowledge and courtesy of employers and their ability to inspire trust and confidence.

However, as it was mentioned before, Zeithaml et al. (2002) stated that courtesy is not an online service success variable from website users' perception.

One Aspect in the assurance factor that could be very important in e-commerce website is Report of experience of other customers (Daughtrey 2001).

Meanwhile, Parasuraman *et al.* (1985) believe that to assess the success of an e-commerce website, it is not sufficient to consider website as one dimensional construct and use a SERVQUAL instrument. As it is apparent in Updated D&M IS Success Model (Figure 6), service quality is used for measuring website success beside system quality and information quality categories.

As it was mentioned in chapter 2, Updated D&M IS Success model is a process model which consists of three levels, the creation of a system, the use of the system, and the

consequence of this system use. A creation of the system consists of information quality, system quality beside service quality.

"System Quality", in the internet environment, measures the desired characteristics of an e-commerce system (Delone et al., 2003). One year later they differentiated the traditional Information system success measures and new measures that had been surfaced recently in e-commerce environment. Customization (Palmer 2002), Ease of navigation (Palmer 2002; Molla et al., 2001), privacy (Molla et al., 2001), and security (Molla et al., 2001) are the system quality measures that have been applied in e-commerce environment.

Privacy and security are key evaluative criteria in online services (Culnan 1999; Culnan et al., 1999; Hoffman et al., 1999; Montoya et al., 2000). These two related criteria have been distinguished from each other. Privacy involves the protection of personal information, not sharing personal information collected about consumers with other sites, protecting anonymity, and providing informed consent (Friedman et al., 2000).

Security, on the other hand, involves protecting users from the risk of fraud and financial loss from the use of their credit card or other financial information. Security risk perceptions have been shown to have a strong impact on attitude toward use of online financial services (Montoya et al. 2000). Since job seekers are not involved in monetary transactions on e-recruitment websites security measure is not considered as system quality measure.

Customization is a key website capability that successful websites take advantage of this opportunity for interaction with website users (Palmer 2002).

According to Delone and McLean (2003), "Information quality" captures the e-commerce content issue. Dynamic content (Pearson 1998), content personalization (Barua et al.

2001, Molla et al., 2001), and Variety of information (Palmer 2002) are remarked as e-commerce information quality measures (Delone et al., 2004).

The second level of the updated D&M IS Success model (2003) is the use of the system. This level consists of two categories of "use" and "user satisfaction".

Since the System use is completely voluntary in e-commerce systems (Molla et al. 2001), this variable is considered as an important indication of IS success. Delone and McLean (2003), recommend that this complex variable must be measured in respect to nature, extent, quality, and appropriateness, and it is not adequate to simply considering more use as a contribution to more benefits. According to Delone and McLean (2003), "Usage" measures everything from a visit to a Web site, to navigation within the site, to information retrieval, to execution of a transaction.

In E-commerce envir4onment system use is measured as number of e-commerce site visits, length of stay, and number of purchases completed (D'Ambra et al., 2001; Molla et al., 2001).

Given the low internet speed in Iran (Najibullah 2008), length of stay cannot be considered as an appropriate Use measure. Number of applications sent through the e-recruitment website is considered as a measure of use in this study.

"User satisfaction" remains an important means of measuring customers' opinions of e-commerce system and should cover the entire customer experience cycle from information retrieval through purchase, payment, receipt, and service (Delone and McLean 2003).

Reichheld and Schefter's (2000) "e-loyalty" represents a good surrogate measure of customer satisfaction in the e-commerce environment. Repeated visits to an e-recruitment website are representative of job seekers' e-loyalty.

According to the variance model, second level of the updated D&M IS Success model, which is the system use, has an impact on third level, which is the consequence of system use. In the original Delone and McLean IS Success model (1992), the consequence of system use was shown by Individual impact and Organizational impact. In Updated D&M IS Success Model, Individual impact and organizational impact have collapsed in one category of Net Benefits. Because of the continuum ever increasing entities from individuals to national economic accounts, which could be affected by IS activity (Delone and McLean 2003, p.19), it depends on the study to identify from whose interest the impacts are being evaluated. In this study, website success is going to be evaluated from e-recruitments' job seekers perception. This category of the model is the final success variable (Delone and McLean 2003).

"Net benefits" are the most important success measures as they capture the balance of positive and negative impacts of the e-commerce on website users (Delone and McLean 2003). They further argue that net benefits measure could be defined as whether the e-commerce website usage has saved individual consumers time and money. "Net benefits" measures must be determined by context and objectives for each e-commerce investment. In the context of e-recruitment and from the perception of jobseekers, real time marketing offer and better decision because of information on the web (D'Ambra et al. 2001) are considered as appropriate net benefits measures.

The collections of e-commerce measures identified in the journals are discussed in appendix (A) under the relevant Updated D&M IS Success model (2003). Traditional information systems success measures and new measures that have been surfaced recently in the e-commerce environment have been remarked separately.

The relation between different categories of the model is in compile with the variance or causal model as well as process model. According to arrows between different categories, one category precedes to other category as a result of process model. Moreover, increase or decrease in each category's lead to increase or decrease in other category which is interrelated to it. For instance, as shown in figure 6, Use precede to User satisfaction according to process model, but according to causal or variance model, positive (negative) experience in system Use will occur increased (decreased) user satisfaction. Similarly increased (decreased) User satisfaction leads to more (less) further system Use. Same feedback variance or causal relation is between Use and User satisfaction in second level of the model and Net benefit in third level of the model. As a result of certain Use and User satisfaction, certain Net benefit will occur. Similarly, positive (negative) net benefits will increase (decrease) use and user satisfaction.

As it was mentioned in section 2.1, finding out relative importance of website success factors in selecting the most preferred e-recruitment website by identifying different relative importance of each website success factors and priority of alternative websites across e-recruitment domains are the main objectives of this research.

Success variables in Updated D&M IS Success model (2003) will be compared from the e-recruitment job seekers' perception. Therefore, job seekers' have to make decision about the relative importance of different website success factors and relative preference of e-recruitment website alternatives.

Saaty (2008) states that, making complex decisions needs structures to represent demonstration of the flow of influences. The structure in doing this is an influence network of

clusters and nodes contained within the clusters of Analytic Network Process (ANP) and a hierarchy for the Analytic Hierarchy Process (AHP) (Saaty 2008).

Saaty states that many decisions cannot be structured hierarchically because of the interaction and feedbacks between different levels of the structure. According to the Updated Delone and McLean IS success model (2003), that is shown in figure 6 , there are feedback loops between IS success variables, so that this model does not have specifying levels as in a hierarchy. Therefore to identify relative importance of different success variable and to rank alternative websites, Updated D&M IS Success Model (2003) will be developed through Analytic Network Process (ANP) approach (Salehi et al., 2009). In the next section the Analytic Network Process (ANP) approach will be illustrated.

3.3 Analytic Network Process (ANP) approach

Decision making is a balancing act on a three-legged stool of intuition, analysis, and judgment (Tavana 2008).

Saaty (2008) believe that to make complex decisions, structures that represent flow of influences are needed. They further define the basic structure in making decisions as an influence network of clusters and nodes contained within the clusters for the ANP and a hierarchy for the AHP. In ANP and its particular case, AHP, pair-wise comparisons and judgments are used to establish priorities and relative importance of different variables (Saaty 2008). Many decision problems cannot be structured hierarchically because they involve the interaction and dependence of higher level elements on lower level elements. According to Saaty (2003), ANP is the first mathematical theory that makes it possible to deal systematically with all kinds of dependence and feedback.

The Analytic Network Process (ANP) is a new theory that extends the AHP to cases of dependence and feedback and generalizes on the supermatrix approach introduced in Thomas Saaty's 1980 book on the Analytic Hierarchy Process. The ANP provides a thorough framework to include clusters of elements connected in any desired way to investigate the process of deriving ratio scales priorities from the distribution of influence among elements and among clusters. The AHP becomes a special case of the ANP.

According to Saaty (2008), the feedback structure does not have the top to bottom form of a hierarchy but looks more like a network without specifying levels, with cycles connecting its components of elements. Feedback structure also has sources and sinks.

A source node is an origin of paths of influence and never a destination of such paths. A sink node is a destination of paths of influence and never an origin of such paths.

Eliciting preferences of various components and attributes requires a series of pair-wise comparisons where the decision maker will compare two components at a time with respect to source or parent criterion.

Nodes that are to be pair-wise compared are always all in the same cluster and are compared with respect to their parent (source) element, the node from which they are connected. This results in local priorities of the nodes with respect to the source node.

Saaty (1983) has suggested a scale of 1 to 9 when comparing two components, with a score of 1 representing indifference between the two components and 9 being overwhelming dominance of the component under consideration (row component in the matrix) over the comparison component (column component in the matrix).

The power of the Analytic Network Process (ANP) lies in its use of ratio scales to capture all kinds of interactions and make accurate predictions, and, even further, to make better

decisions (Saaty 2003).   Saaty further states that using measurement to derive ratio scales and eliciting judgments is the reason for ANP's success.

As it was illustrated in section 2.5, different success categories in the Updated D&M IS Success model (2003) have causal and process influence on each other; hence all the variables are dependant. Moreover, as it is apparent in figure 6, there are feedback loops between the success categories of the model.

Updated D&M IS Success Model (2003) does not have a linear top to bottom form of a hierarchy but looks more like a network with cycles connecting its cluster of elements which cannot be called levels.

The analytic network process (ANP) is our logical way to deal with finding out the relative importance of each variable in Updated Delone and McLean IS success model (2003) and then ranking alternative websites. Since, Saaty (2008) point out that ANP is the only tool which is capable to simplify and manage a complexity of a decision problem involving feedbacks. As shown in figure 7, Delone and McLean updated IS success model (2003) is extended through analytic network process (ANP) (2008) in this study.

Some of the most recent applications of the ANP to decision making problems are: prioritizing and designing rule changes for the game of soccer (Partovi et al., 2002), contractor selection (Cheng et al., 2004), acquisition of new machine tools in a company (Yurdakul 2004), financial crisis forecasting (Niemira et al., 2004), choice of best management alternative of the supply chain in a company (Agarwal et al., 2005), product mix planning (Chung et al., 2005) and evaluation of alternative fuels for residential heating (Erdogmu et al., 2006). Applications of the ANP to website success variables have not been reported yet, so this research tries to fill that gap in the literature.
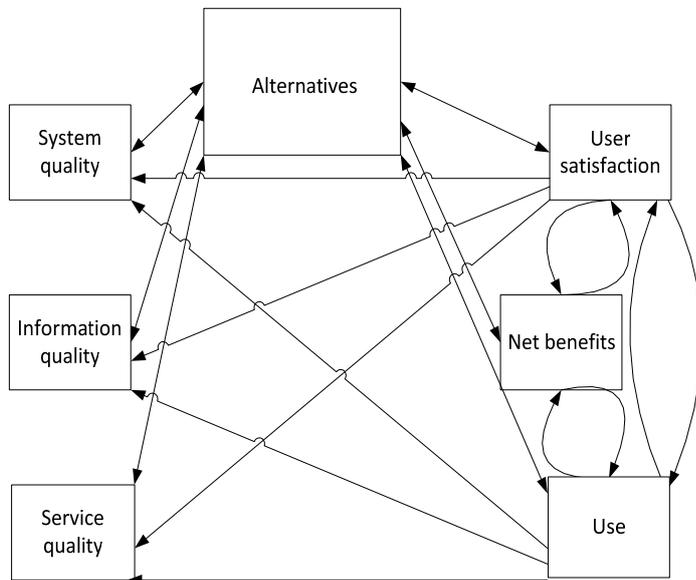
Figure7 proposed research framework

3.4 Research questions

As it was mentioned in section 2.11, overall research question is formulated as:" What is the relative importance of website success factors in selecting the most preferred e-recruitment website?"

In this section specific research questions are formulated according to ANP structure, in which elements in one cluster are pair-wise compared with respect to their source (parent) node.

According to proposed research framework in figure 7, research questions are as follow:

1. What is the relative preference of alternatives with respect to different success measures in Updated D&M IS Success model (2003)?

2. What is the relative preference of alternatives with respect to Information quality measures?

3. What is the relative preference of alternatives with respect to System quality measures?

4. What is the relative preference of alternatives with respect to the Service quality measures?

5. What is the relative preference of alternatives with respect to Use measures?

6. What is the relative preference of alternatives with respect to user satisfaction measures?

7. What is the relative preference of alternatives with respect to net benefits measures?

8. What is the relative importance of Information quality measures in selecting the most preferred website?

9. What is the relative importance of system quality measures in selecting the most preferred website?

10. What is the relative importance of Service quality measures in selecting the most preferred website?

11. What is the relative importance of use measures in selecting the most preferred website?

12. What is the relative importance of user satisfaction measures in selecting the most preferred website?

13. What is the relative importance of net benefits measures in selecting the most preferred website?

14. What is the relative importance of system quality measures on Use?

15. What is the relative importance of service quality measures on use?

16. What is the relative importance of information quality measures on use?

17. What is the relative importance of system quality measures on User satisfaction?

18. What is the relative importance of service quality measures on user satisfaction?

19. What is the relative importance of information quality measures on user satisfaction?

20. What is the relative importance of use on net benefits?

21. What is the relative importance of user satisfaction on net benefits?

22. What is the relative importance of net benefits on use measures?

23. What is the relative importance of net benefits on user satisfaction measures?

3.5 Conclusion

The goal of this chapter was to propose a framework to answer research questions. Moreover, specific research questions were formulated in compliance with the proposed research framework. The next chapter will outline the applied research methods in detail.

Chapter4. Research methodology

4.1 Introduction

In the previous chapter, research framework for reaching research objective was proposed. This chapter will cover the methodology used in this research. The first three chapters served the purpose of justifying the study and defining the research problem and research objectives. Research design is the general plan of how research questions will be answered, and is concerned with overall plan for research. Research tactics is about finer details of data collection and analysis (Saunders et al. 2007).

This chapter outlines the research methodology according to the research 'onion' defined by Saunders et al. (2003).

According to research 'onion', as approaches in the different layers have dependencies, research design should be developed from the top down, starting with the outside layer, adopting a research philosophy, and thereafter peeling away each layer until the fifth layer is reached, defining data collection methods (table 2). This approach, also suggested by Remenyi *et al.* (2000), is used here. In this chapter, five layers of research onion, as in table2, is covered.

First, Research philosophy is discussed. Consequently, research approach, research strategy, choice of research, and time horizons are illustrated. Finally, in the research methodology, data collection and data analysis are considered.

Layer	Approaches
1. Research philosophy	Positivism, Interpretivism (or Phenomenology), Realism
2. Research approaches	Deductive, Inductive
3. Research strategies	Experiment, Survey, Case study, action research, Grounded theory, Ethnography, Archival research
4. Time horizons	Cross Sectional, Longitudinal
5. Data collection methods	Sampling, Secondary data, Observation, Interviews, Questionnaires

According to Cooper et al. (2006), research can be defined as any organized inquiry out to provide information for solving problems. They further argue that business research is a systematic inquiry whose objective is to provide information to solve managerial problems or managerial dilemma: the problem or opportunity that requires a management decision.

4.2 Research Philosophy

In this part of the chapter research philosophy is argued. This overarching term relates to the development of knowledge and the nature of that knowledge (Saunders et al. 2007). In this discussion we examine three major ways of thinking about research philosophy: Positivism, Interpretivism, and Realism. Each contains differences which will influence the way in which the research process is formed.

A positivism philosophy aims at the derivation of laws or law like generalizations similar to those in the physical and natural sciences (Remenyi *et al.* 2000, p.32). Quantitative research allows researchers to familiarize themselves with the problem or concept to be studied. The emphasis is on facts and causes of behavior (Bogdan et al., 1988), with the information in the form of numbers that can be quantified, and summarized using a mathematical process for analyzing the numeric data and expressing the final result in statistical terminology (Charles 1995).

However, Saunders (2003) also argued that there is too much complexity in a business environment for a series of law like generalizations and therefore an interpretivist philosophy was highlighted as more suitable for certain researches. This philosophy challenges the issue of generalizations since quite often the business situations can be unique, and there is no possibility to generalize as they are an expression of a particular set of circumstances and as such not always applicable to different situations. Therefore, as Remenyi (1998) suggests, this philosophy can be regarded as collecting "The details of the situations to understand the reality or perhaps a reality working behind them."

The last approach is realism, which "is based on the belief that a reality exists that is independent of human thoughts and beliefs" (Saunders et al, 2003, p. 84). This suggests that there might be social forces and processes influencing individuals, and particularly without them being aware of this and hence having an influence on their interpretation of their behavior. Therefore this philosophy is quite often used when studying human subjects as it shows understanding for people's perceptions of socially constructed interpretations and meanings. The realistic philosophy shares two features with a positivism philosophy: a belief that the natural and the social sciences should apply the same kinds of approach to the collection of data and to explanation, and a commitment to the view that there is an external reality to which scientist direct their attention (Bryman 2001).

Having considered all the philosophies, for the purposes of this research an interpretivism philosophy has been selected as the most appropriate. Researcher critical of positivism argue that rich insight into the complex world are lost if such complexity is reduced entirely to a series of law like generalization. Since my research objective is sympathized with such a view, my research philosophy is nearer to that of the interpretivism.

Moreover, the business situation is unique and is a function of a particular set of circumstances that could not be generalized (Saunders et al., 2007). Interpretivism argues that generalisability is not of crucial importance. Investigation of website success in the context of online recruitment is not isolated from ever-changing world of business. Therefore, generalizing the results of this research to future and other organizations even in the same context is not considered.

4.3 Research Approach

Many researches of research methodology (Guba et al., 1994) discuss two general research approaches: quantitative and qualitative research approaches.

The terms qualitative and quantitative are used widely in business and management research to differentiate both data collection techniques and data analysis procedures (Saunders et al., 2007). Saunders (2007) distinguishes two approaches in the focus on numeric or non-numeric data. Consequently, quantitative approach is used for any data collection technique or any data analysis procedure that generates or uses numerical data. In contrast, qualitative is used for any data collection technique or any data analysis procedure that generates or uses non-numeric data. According to this definition, this research is a quantitative research in which data collection and data analysis is done numerically.

Other researchers (Saunders et al. 2003; 2007) consider research approaches as: deductive and inductive research approaches.

Deductive approach is used in researches in which a theory or hypothesis is built and research strategy is developed to test the hypothesis, mostly applicable in disciplines where agreed facts and established theories are available (Remenyi *et al.,* 2000, p.75). Opposed to

deductive approach is inductive approach that is used in researches in which data is collected and then theory is developed as a result of data analysis (Saunders et al., 2007).

From table 3, listing the main differences between deductive and inductive research approaches, although this research is not concerned with generalizing the conclusions, a deductive approach is considered the most appropriate for an interpretivism research philosophy.

Table3 Inductive and Deductive research approaches (Saunders et al. 2003, P. 89)

Deduction	Induction
• Scientific principles	• Gaining an understanding of the meanings humans attach to events
• Moving from theory to data	• Close understanding of the research context
	• Collection of qualitative data
• Need to explain causal relationships between Variables	
	• More flexible structure to permit changes of research emphasis as the research progresses
• Collection of quantitative data	
• Application of controls to ensure validity of data	• Realization that the researcher is part of the research process
	• Less concern with the need to generalize
• Operationalisation of concepts to ensure clarity of definition	
• Highly structured approach	
• Researcher independence of what is being Researched	
• Necessity to select samples of sufficient size in order to generalize conclusions	

4.4 Research Purpose

In this part of the chapter a brief review of the research purpose is commenced, subsequently possible research strategies are discussed. The classification of research purpose is the threefold one of exploratory, descriptive, and explanatory. This classification depends on the way in which research questions are asked (Saunders et al., 2007).

An Exploratory study is a valuable means of finding out 'what is happening; to seek new insights; to ask questions and to assess phenomena in a new light'(Robson 2002, p.59). The great advantage of exploratory research is that it is flexible and adaptable to change appears during the conduction of research (Saunders et al., 2007).

The object of Descriptive study is to portray an accurate profile of persons, events or situations (Robson 2005, P. 59).

According to Saunders et al. (2007) Studies that establish causal relationship between variables may be termed explanatory studies. The emphasis here is on studying a situation or a problem in order to explain the relationship between variables.

Moreover, Neuman (2003) pinpoints the differences between three research purposes based on what the researcher is trying to accomplish:

- Exploratory: become familiar with the basic facts, setting, and concerns, create a general mental picture of conditions, formulate and focus questions for further research. Generate new ideas, conjectures, or hypothesis, determine the feasibility of conducting research, and develop techniques for measuring and locating future data.

- Descriptive: provide a detailed, highly accurate picture, locate new data that contradict past data, create a set of categories or classify types, clarify a sequence of steps or stages,

document a causal process or mechanism and report on the background or context of a situation.

- Explanatory: test a theory's predictions or principle, elaborate and enrich a theory's explanation, extend a theory to new issues or topics, support or refute an explanation or prediction, link issues or topics with general principle and determine which of several explanations are best.

Descriptive study best maintains objectives of this research that is to find out the relative importance of each success variable in Updated Delone and McLean IS Success Model (2003), and relative preference of each alternative in the context of e-recruitment.

This research is describing existing issues on users' perception towards online recruitment websites' success.

4.5 Research Strategy

After defining the purpose of this research, it is time to peel away the third layer of the onion that is the research strategy.

An important step in the research design is the choice of research strategy for collecting data.

The choice of research strategy will be guided by research questions and objectives, the extent of existing knowledge, the amount of time, and other available resources, as well as researcher philosophical underpinning (Saunders et al. 2007). Saunders et al. (2007) identifies seven major research strategies: Experiment, survey, case study, action research, grounded theory, ethnography, and archival research. Each strategy can be used for exploratory, descriptive, and explanatory research (Yin 2003). Although no research strategy is inherently

superior to any other, whether it will enable researcher to answer research questions or achieve research objectives is the main focus (Saunders et al 2007).

The research strategy is chosen survey due to the fact that it gives the opportunity to collect quantitative data which can be analyzed using descriptive and inferential statistics. According to Saunders et al. (2007), survey strategy is associated with descriptive research approach. By answering 'What' question, survey allows finding out relative importance of each success variable in Updated Delone and Mclean IS Success Model (2003), and the relative preference of each alternative in the context of online recruitment.

Table 4 different research strategies (Yin 1994, P.6)

Research strategy	Form of research question	Control over Behavioural events?	Focuses on Contemporary events?
Experiment	how, why	yes	yes
Survey	**who, what, where, how many, how much**	**no**	**yes**
Archival Analysis	who, what, where, how many, how much	no	yes / no
History	how, why	no	no
Case Study	how, why	no	yes

4.6 Choice of research

According to Saunders et al. (2007), in choosing research methods, either a use of single data collection technique or corresponding analysis procedures (Mono method), or use of more than one data collection technique and analysis procedures (Multiple methods) is possible. When mono method is chosen, either a single quantitative data collection technique with quantitative data analysis procedure; or a single qualitative data collection technique with qualitative data

analysis procedure is used. In contrast, if data collection techniques and procedures are combined, some form of multiple methods is conducted.

A mono method is the choice of this research. Questionnaire is used as quantitative data collection method that proceeds to be analyzed numerically with Analytical Network Process (ANP) approach.

4.7 Time Horizon

According to Saunders et al. (2007), a study of a particular phenomenon at a particular time is a cross-sectional study. Cross-sectional studies often employ the survey strategy (Robson, 2002).

In contrast to cross-sectional study, longitudinal study takes place over time. The main strength of longitudinal study is the capacity that it has to study change and development (Saunders et al. 2007).

Investigation of website success in the context of online recruitment is conducted in a limited period of time; therefore this research is a cross-sectional study.

4.8 Data Collection and Data Analysis

4.8.1 Sampling technique

With Probability samples, the chance or probability of each case being selected from the population is known and is equal for all cases. For Non-probability samples, the probability of each case being selected from the total population is not known. Therefore, answering research questions and achieving research objectives that require statistical inference is possible with probability sampling from the population (Saunders et al. 2007). Consequently, Probability

sampling is often associated with survey-based research strategies where making inferences from sample about a population to answer research questions or to meet research objectives is needed (Saunders et al. 2007).

The sampling frame for any probability sample is a complete list of all the cases in the population from which sample will be drawn. Saunders et al. (2007) suggest that where no suitable list exists on the population, researcher has to compile his/her own sampling frame, perhaps upon existing lists. Saunders et al. (2007) adds that it is of crucial prominence to select an unbiased, current, and accurate sampling frame.

As it was mentioned earlier, the objective of this research is to investigate relative importance of each success variables in Updated Delone and McLean IS Success Model (2003), and to rank alternative websites in the context of e-recruitment with respect to success factors. Since the research objective is concerned with users of two e-recruitment websites, www.irantalent.com, and, www.agahjobs.com, sampling frame will be the overlap between the complete membership lists of two alternative websites. Since online recruitment websites do not reveal the list of their customers, it is impracticable to collect data from the entire population. Therefore, within probability sampling, by defining the sampling frame, the population about which the results will be generalized is defined.

Online recruitment websites are mainly perceived as suitable for younger graduates (Galanaki 2002). More than a quarter of the firms, which have a recruitment website, focus exclusively on their graduate intake (Lamb 2000). Moreover, according to the research conducted by Research Center of Islamic Republic of Iran (www.rcirib.ir), internet usage is more prevalent between young and educated generation.

To choose a sampling frame from e-recruitment users, an online academic union (www.irexpert.ir) consists of BSc, MSc and Ph.D graduates is used. This academic union is also specialized in selling lists of e-mail addresses of wide range of members in different provinces of Iran.

Therefore, sampling frame consists of 100,000 university graduated individuals in different majors with bachelors, masters or doctoral degrees in Iran.

From this sampling frame, a sample of common users of alternative e-recruitment websites, www.irantalent.com and www.agahjobs.com, is selected.

According to selecting a probability sample (Saunders et al. 2007, P. 216), since the research does not require face to face contact, and the sampling frame does not have relevant clusters or strata, and according to the fact that the sampling frame contains periodic patterns, simple random sampling is selected as the most appropriate sampling technique. Using the Survey System™ software, the minimum sample size required for the population of 100,000, with confidence level of 95%, and confidence interval of 5 has been calculated and found that is equal to 383.

According to Algina et al. (2001), the confidence level is the likelihood expressed as a percentage that the results of a test are real and repeatable and not just random. The idea is based on the concept of the "normal distribution curve," which shows that variation in almost any data tends to be clustered around an average value, with relatively few individual measurements at the extremes. A confidence interval shows the range within which the true value of a calculated statistic is likely to fall a certain percentage of the time.

According to random sampling numbers table (Morris C. 2003), each of 100,000 individual e-mail addresses in *irexpert* academic union is numbered a unique figure. The first e-mail is numbered 0, the second 1 and so on.

Then e-mail addresses are selected using random sampling numbers table (Morris C. 2003) until actual sample size of 383 is reached.

In order to achieve research objectives, Updated Delone and McLean IS Success Model's variables and two online recruitment websites have to be pair-wise compared from users' perception. Internet mediated questionnaire is designed and sent to respondents according to Saaty (1980) framework (Appendix B). Pair-wise comparisons in the questionnaire are demonstrated in appendix C.

Saaty (1980) has suggested a scale of 1 to 9 when comparing two components. A score of 1 indicates the two options have equal importance or indifference where a score of 9 indicates overwhelming dominance of the component under consideration over the comparison component in a pair-wise comparison matrix.

On cover page of the questionnaire it is mentioned that the objective of this research is comparing two e-recruitment websites. Therefore only the members of both websites are eligible to answer the questionnaire.

55 responses were received, from which 31 valid responses were obtained. Portion of the unanswered questionnaires were due to ineligibility of respondents. According to research objectives, only the common users of alternative e-recruitment websites, www.irantalent.com and www.agahjobs.com, are eligible to answer the questionnaire.

4.8.2 Data analysis

Data is analyzed using SuperDecisions™, an application implementing Analytic Network Process. SuperDecisions™ provides results including weights of variable with respect to variables being pair-wise compared to, priorities of alternatives, and sensitivity analysis. Results of questionnaire (Appendix B) will be analyzed, so that the weights of nodes in each cluster with respect to parent node with which they are compared to are reached. Furthermore, alternatives are ranked with respect to each success variable in the Updated D&M IS Success model (2003).

4.8.3 The credibility of research findings

In order to achieve credibility of the results several precautions were taken.

After establishing a questionnaire according to Saaty (2004), a review on the questionnaire was made by independent individuals. First, experts were consulted to ensure that the questions were properly phrased. The success variables were then defined briefly in a glossary section of the questionnaire (Table 17) to insure that the meaning of Updated D&M IS Success variables is not misunderstood by respondents.

After that, an ANP expert conducted a review on the questionnaire to make certain that pairwise comparisons are established properly. According to Saaty (2008), all nodes in one cluster are pair-wise compared with respect to their relative influence/ importance on parent or source node, from which they are connected. Therefore, the direction of arrows in figure 8 is conducted in compliance with the influence/importance of one cluster over another. For instance when the direction of arrow is from cluster A to cluster B, nodes in cluster B are pair-wise compared with respect to their relative importance/influence on nodes in cluster A, which is the parent or source node. Therefore, it is of crucial prominence to ensure the construct of pair-wise

comparisons in questionnaire is made properly, so that it meets the requirement of Updated D&M IS Success model (2003), and Saaty's scaling method (2004).

According to Saaty (2008), in decision making, pair-wise comparisons are made according to dominance of one element over another with respect to an attribute. In this research pairwise comparisons are made between different variables of Updated Delone and McLean IS Success Model (2003) with respect to website success.

Making tradeoffs between these variables cannot be made simply by words and logic, the judgments that are usually made in qualitative term must be expressed numerically. To do this rather than simply assigning score out of persons' memory, one must make comparisons in a designed scientific way. Saaty (2004) suggests a 9 scale questionnaire for pair-wise comparison between 2 variables with a score of 1 representing indifference between the two components and 9 being overwhelming dominance of the component under consideration over the comparison component. Due to inevitable inconsistency among the judgments, it is necessary to measure the inconsistency index to eliminate inconsistent judgments for each group of pair-wise comparisons for each respondent.

Inconsistency index is useful for identifying possible errors in judgments. For example, if in one judgment A is more important than B and B is more important than C and then C is more important than A this judgment is not consistent. Somewhat less inconsistent situation would arise if for example in one judgment A is 3 times more important than B, B is 2 times more important than C, and that C is 8 times more important than A. 'Thus, in decision making, dominance rather than closeness is the essential property and we need the topology of order and not the usual metric topology that is prevalent in the physical sciences' (Saaty 2008). Saaty (2008) adds that in accordance with metric topology, if A has 5 dollars more than B and B has 3

dollars more than C then A has 8 dollars more than C. Order measurement says 15 times more, whereas metric measurement says 8 dollars more. The first is dimensionless while the second requires a unit of measurement.

In general allowable consistency ratio should not be more than about 0.1 for a matrix larger than 5×5, 0.08 for a 4×4 matrix and 0.05 for a 3×3 matrix. This requirement cannot be made smaller such as 1% or 0.1% without trivializing the impact of inconsistency (Saaty 2004).

Therefore, prior to the analyzing phase of this study, inconsistency ratio for matrices bigger that 2×2 must be calculated for each respondent to ensure that ratio is an acceptable level of inconsistency. Inconsistent judgments for each group of elements in one cluster with respect to source node will be eliminated. Hence inconsistent judgments will not be included in overall result.

4.9 Summary and Conclusions

Each of the subsequent segments of this chapter dealt with part of the research design process outlined in figure 8. In this chapter the overall research design, and the underlying research philosophy, the research approach and the research strategy have been discussed as summarized in Figure 8. The study has characteristics of an interpretivistic research philosophy, and can probably best be classified following a deductive research approach. The research purpose is classified as quantitative, descriptive. The appropriate research strategy for investigating website success in a practical context is found to be a survey, with a cross-sectional time horizon and mono method of data collection and data analysis.
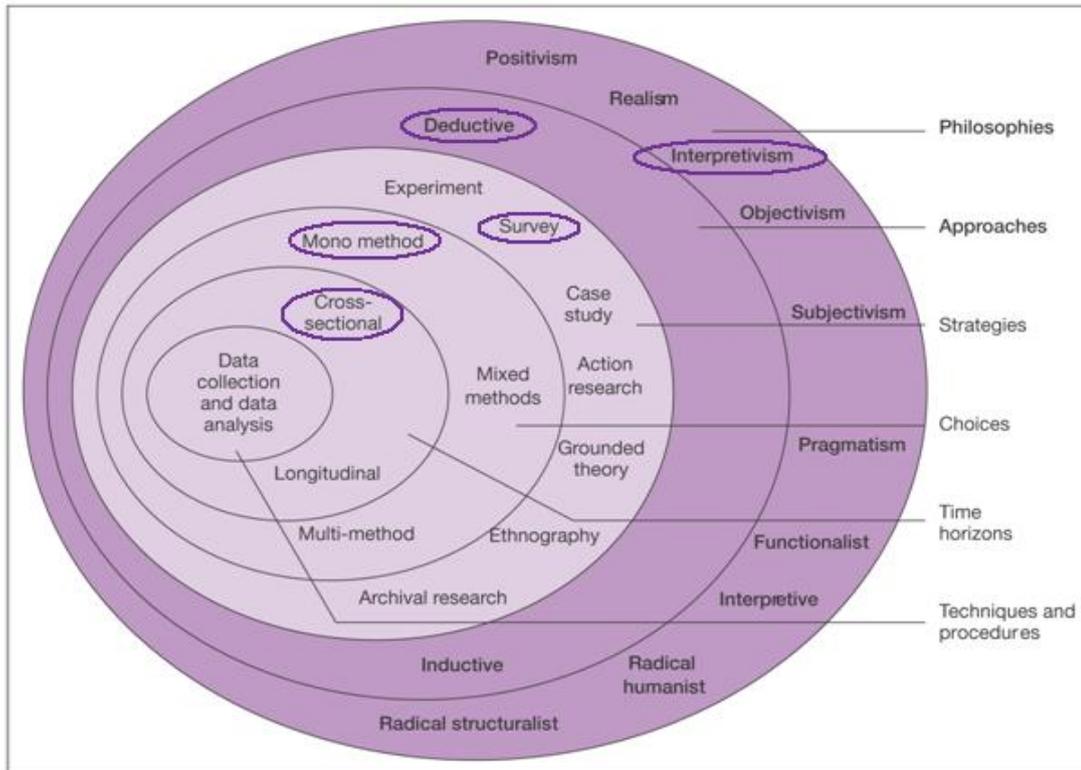
Figure8, The research onion (Saunders et al. 2006)

Chapter5. Data Analysis chapter

5.1 Introduction

The ANP approach is capable of handling interdependence among elements by obtaining the composite weights through the development of a supermatrix (Meade et al. 2002).

According to Meade et al. (2002), ANP uses the formation of a supermatrix to allow for the resolution of the effects of the interdependence that exists between the elements of the system. The supermatrix is a partitioned matrix, where each submatrix is composed of a set of relationships between two levels in the graphical model.

The influence of elements in the network on other elements in that network can be represented in a supermatrix. This new concept is a two dimensional matrix of elements by elements which adjusts the relative importance weights in individual pairwise comparison matrices to form a new overall supermatrix with the eigenvectors of the adjusted relative importance weights. According to Saaty (2004), the ANP comprises four main steps:

- Conducting pairwise comparisons on the elements

- Placing the resulting relative importance weights (eigenvectors) in pair-wise comparison matrices within the supermatrix (unweighted supermatrix)

- In the unweighted supermatrix, the columns may not be column stochastic. By multiplying the blocks of the unweighted supermatrix by the priority of corresponding influencing cluster, stochastic matrix is obtained, which consists of columns all add up to one. (Weighted supermatrix)

- Raising the weighted supermatrix to limiting powers until the weights have converged and remain stable (limit supermatrix)

5.2 Unweighted supermatrix

When all the influences in the network have been analyzed and all the relative importance weights have been assigned, the unweighted supermatrix can be built. As it was mentioned in section 4.8.1, there are 31 valid returned responses to questionnaire. In group decision making, Saaty et al. (2008) suggest constructing a group choice from individual choices.

The reciprocal property, according to which: $a_{ij} = \frac{1}{a_{ji}}$, plays an important role in combining the judgments of several individuals to obtain a judgment for a group. Judgments must be combined so that the reciprocal of the synthesized judgments must be equal to the syntheses of the reciprocals of these judgments. It has been proved that the geometric mean is the unique way to do that (Saaty 1994).

In order to construct group judgments from individual judgments, geometric mean of each pairwise comparison is computed. Inconsistent individuals' pairwise comparisons in matrices bigger than 2×2 are eliminated before calculating the geometric mean. The group judgment is the input of the SuperDecisions™ software.

The unweighted supermatrix corresponding to figure 7 is shown in Table 5. The matrix is broken into three parts because it is wider than the page I am writing on.

The priorities derived from the pairwise comparisons are entered in the Unweighted Supermatrix. All the nodes in each cluster are pair-wise compared with respect to their parent or source criterion, the element from which they are connected. A source node is an origin of paths of influences. This results in the local priorities of the children nodes with respect to the parent (Saaty 2008). The column of priorities for a node at the top of the supermatrix includes the priorities of the nodes on the left side of the matrix that have been pairwise compared as to their influence with respect to website success on that node.

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In Updated D&M IS Success Model (2003), Information quality, system quality, and service quality are influencing the Use and User satisfaction. Therefore, as in ANP structure use and user satisfaction categories are the parent nodes that are influenced by information quality, system quality, and service quality. Therefore, nodes in each information quality, system quality, and service quality clusters are compared with respect to their relative importance on Use and user satisfaction's nodes. To find out relative importance of each node in "Information Quality" cluster in using the online recruitment website, "Content personalization", "Variety of information", and "Dynamic content" are compared with respect to their relative importance in "Number of transactions executed". Likewise, three "Information quality" variables are compared with respect to their relative importance in "User satisfaction".

In a similar way, nodes in "System quality" cluster are compared with respect to their relative importance in "Use" and "User satisfaction" clusters. Hence, "Customization", "Ease of navigation", and "Privacy" are pairwise compared for their relative importance in each "Number of transactions executed" and "Repeat visits" nodes.

Correspondingly, "Assurance", "Empathy", and "Responsiveness" in "Service quality" cluster are pair-wise compared concerning their relative importance in each "Number of transactions executed" and "Repeat visits" nodes.

According to feedback loops between "Use", "User Satisfaction", and "Net benefits" categories in Updated Delone and McLean IS Success Model (2003), each cluster is taken in turn as a parent element and other interdependent nodes in other clusters are compared with respect to their influence on parent element. Therefore, "Time saving" and "Better decision because of

information on the web" are pair-wise compared with respect to their influence on each "Number of transactions executed" and "Repeat visits" nodes.

Since there is only one node in each "Use" and "User satisfaction" cluster, relative importance of these nodes with respect to their influence on each other and "Net benefits" cluster in unweighted supermatrix is equal to 1.

Considering the direction of arrows from each cluster to the alternatives in Network of figure 7, relative preference of alternatives are pairwise compared with respect to each interrelated node in other clusters. The results of all pairwise comparisons are entered in the unweighted supermatrix.

According to Saaty (2008), priorities derived from different pair-wise comparisons, construct the unweighted supermatrix. The nodes, grouped by the clusters they belong to, are the labels of the rows and columns of the supermatrix. The column of priorities for a node at the top of the supermatrix includes the priorities of the nodes on the left side of the matrix that have been pairwise compared as to their influence with respect to website success on that node. The sum of these priorities is equal to one.

The unweighted supermatrix contains the local priorities derived from the pairwise comparisons throughout the network as shown in figure 7. All the local priority information can be read directly from the unweighted Supermatrix.

It is clear that this matrix is not column stochastic and its blocks under each cluster at the top need to be weighted by the priorities of the influence with respect to website success of the clusters at the left on the cluster to which they fall under.

In this model there are actually seven supermatrices, one for each of the categories of the Updated Delone and McLean IS Success Model (2003), which need to be evaluated.

Each of the non-zero values in the columns in unweighted supermatrix, are the relative importance weights associated with the interdependent pairwise comparison matrices.

Table 5   **Unweighted supermatrix, displayed in three parts**

		Alternatives		Information Quality		
		Agahjobs	Irantalent	Content personalization	Dynamic content	Variety of information
Alternatives	Agahjobs	0	0	0.111111	0.125033	0.142882
	Irantalent	0	0	0.888889	0.874967	0.857118
Information Quality	Content personalization	0.350563	0.350128	0	0	0
	Dynamic content	0.340808	0.397621	0	0	0
	Variety of information	0.308629	0.252252	0	0	0
Service Quality	Assurance	0.322484	0.333207	0	0	0
	Empathy	0.368985	0.398448	0	0	0
	Responsiveness	0.308531	0.268344	0	0	0
System Quality	Customization	0.331608	0.39757	0	0	0
	Ease of navigation	0.317541	0.304392	0	0	0
	Privacy	0.35085	0.298038	0	0	0
Use	Number of transactions executed	1	1	0	0	0
User satisfaction	Repeat visits	1	1	0	0	0
Net benefits	Better decision	0.47171	0.099991	0	0	0
	Time saving	0.52829	0.900009	0	0	0

		Service quality			System quality		
		Assurance	Empathy	Responsiveness	Customization	Ease of navigation	Privacy
Alternatives	Agahjobs	0.099991	0.111111	0.166667	0.125033	0.125033	0.111111
	Irantalent	0.900009	0.888889	0.833333	0.874967	0.874967	0.888889
Information Quality	Content personalization	0	0	0	0	0	0
	Dynamic content	0	0	0	0	0	0
	Variety of information	0	0	0	0	0	0
Service Quality	Assurance	0	0	0	0	0	0
	Empathy	0	0	0	0	0	0
	Responsiveness	0	0	0	0	0	0
System Quality	Customization	0	0	0	0	0	0
	Ease of navigation	0	0	0	0	0	0
	Privacy	0	0	0	0	0	0
Use	Number of transactions executed	0	0	0	0	0	0
User satisfaction	Repeat visits	0	0	0	0	0	0
Net benefits	Better decision	0	0	0	0	0	0
	Time saving	0	0	0	0	0	0

Table 5   Unweighted supermatrix, displayed in three parts (Continued)

		Use	User satisfaction	Net benefits	
		Number of transactions executed	Repeat visits	Better Decision	Time Saving
Alternatives	Agahjobs	0.142882	0.099991	0.111111	0.125033
	Irantalent	0.857118	0.900009	0.888889	0.874967
Information Quality	Content personalization	0.324903	0.357665	0	0
	Dynamic content	0.462586	0.340909	0	0
	Variety of information	0.212511	0.301426	0	0
Service Quality	Assurance	0.385977	0.312454	0	0
	Empathy	0.27189	0.371748	0	0
	Responsiveness	0.342133	0.315798	0	0
System Quality	Customization	0.360821	0.298268	0	0
	Ease of navigation	0.314361	0.324368	0	0
	Privacy	0.324818	0.377364	0	0
Use	Number of transactions executed	0	1	1	1
User satisfaction	Repeat visits	1	0	1	1
Net benefits	Better decision	0.111111	0.142882	0	0
	Time saving	0.888889	0.857118	0	0

5.3 Cluster comparison matrix

Saaty (2003) believes that in real life problems it is crucial to know the importance of the groups or clusters to which the elements belong because the final priorities depend on that. According to Saaty (2003), a society of astronomers is not as important to immediate human survival as the society of farmers, although on the face of it an astronomer may seem more important than a farmer because there are a much smaller number of them.

The cluster themselves must be compared to establish their relative importance and use their priorities to weight the supermatrix to make it column stochastic (Saaty 2008). The values in the cluster matrix are used to weight the unweighted supermatrix by multiplying the value in the cell of the cluster matrix times the value in each cell in the component of the unweighted supermatrix to produce the weighted supermatrix. Every component is weighted with its corresponding Cluster Matrix weight in this way.

A cluster impacts another cluster with respect to website success when it is linked from it, that is, when at least one node in the source cluster is linked to nodes in the target cluster. The clusters linked from the source cluster are pairwise compared for the importance of their impact on it with respect to website success, resulting in the column of priorities for that cluster in the cluster matrix. The process is repeated for each cluster in the network to obtain the priorities shown in Table 6.

To compare clusters, each of "Alternatives", "Use", "User satisfaction", and "Net benefits" cluster in turn is taken as the parent element and all clusters it connects to, is pairwise compared for importance with respect to their influence on it. The overall goal here is website success.

Furthermore, Updated Delone and McLean IS Success Model (2003) consisted of three components, the first is production, the second is use, and the third is net benefits. In developing cluster comparison matrix, clusters in different components of Updated Delone and McLean IS Success Model (2003) are considered as equal importance.

If clusters are equally important it is not necessary to make cluster comparisons, and the cluster weights are set to 1/n in the cluster matrix. The value of n is equal to the number of non-zero components beneath each component across the top of the unweighted supermatrix (Saaty 2003). However, the clusters in the same component of Updated Delone and McLean IS Success Model (2003) are not equally important. Therefore, they need to be compared to establish the weights in the cluster matrix. Weighting all the elements in each unweighted supermatrix component by the corresponding cluster matrix cell, whether set by the default value of 1/n, or by comparing the clusters and using the derived values, causes the matrix to be column stochastic, that is, each column sums to one. In Table 5 for the unweighted supermatrix the first column sums to X. In Table 7 for the weighted supermatrix it sums to 1.

An interpretation of the priorities in the first column is that Information quality (0.179191) and service quality (0.178649) have the most impact on Alternatives, with respect to website success.

Table6	Cluster matrix						
	Alternatives	Information Quality	Service Quality	System Quality	Use	User Satisfaction	Net Benefits
Alternatives	0	1	1	1	0.157477	0.240917	0.352458
Information Quality	0.179191	0	0	0	0.16361	0.142995	0
Service Quality	0.178649	0	0	0	0.174215	0.154176	0
System Quality	0.144882	0	0	0	0.160881	0.159285	0
Use	0.169979	0	0	0	0	0.153832	0.356106
User Satisfaction	0.161679	0	0	0	0.172486	0	0.291435
Net Benefits	0.16562	0	0	0	0.171331	0.148796	0

5.4 Weighted supermatrix

The weighted supermatrix is obtained by multiplying all the elements in a component of the unweighted supermatrix by the corresponding cluster weight (Saaty 2008).

The weighted supermatrix shown in Table 7 is obtained by multiplying each entry in a block of the component at the top of the supermatrix by the priority of influence of the component on the left from the cluster matrix in Table 6. For example, the second entry in the first column of Table 6 is used to multiply each of the six entries in the block (information quality, Alternatives) in the unweighted supermatrix shown in Table 5. This gives the entries for the (Information quality, Alternatives) component in the weighted supermatrix of Table 7.

Each column in the weighted supermatrix has a sum equal to 1, and thus the matrix is column stochastic and converges to a single vector or is periodic in which case the average is usually used.

Table 7   Weighted Supermatrix, displayed in three parts

		Alternatives		Information Quality		
		Agahjobs	Irantalent	Content personalization	Dynamic content	Variety of information
Alternatives	Agahjobs	0	0	0.111111	0.125033	0.142882
	Irantalent	0	0	0.888889	0.874967	0.857118
Information Quality	Content personalization	0.062818	0.06274	0	0	0
	Dynamic content	0.06107	0.07125	0	0	0
	Variety of information	0.055304	0.045201	0	0	0
Service Quality	Assurance	0.057611	0.059527	0	0	0
	Empathy	0.065919	0.071182	0	0	0
	Responsiveness	0.055119	0.047939	0	0	0
System Quality	Customization	0.048044	0.057601	0	0	0
	Ease of navigation	0.046006	0.044101	0	0	0
	Privacy	0.050832	0.04318	0	0	0
Use	Number of transactions executed	0.169979	0.169979	0	0	0
User satisfaction	Repeat visits	0.161679	0.161679	0	0	0
Net benefits	Better decision	0.078125	0.016561	0	0	0
	Time saving	0.087495	0.14906	0	0	0

Table 7 Weighted Supermatrix, displayed in three parts (continued)

		Service quality			System quality		
		Assurance	Empathy	Responsiveness	Customization	Ease of navigation	Privacy
Alternatives	Agahjobs	0.099991	0.111111	0.166667	0.125033	0.125033	0.111111
	Irantalent	0.900009	0.888889	0.833333	0.874967	0.874967	0.888889
Information Quality	Content personalization	0	0	0	0	0	0
	Dynamic content	0	0	0	0	0	0
	Variety of information	0	0	0	0	0	0
Service Quality	Assurance	0	0	0	0	0	0
	Empathy	0	0	0	0	0	0
	Responsiveness	0	0	0	0	0	0
System Quality	Customization	0	0	0	0	0	0
	Ease of navigation	0	0	0	0	0	0
	Privacy	0	0	0	0	0	0
Use	Number of transactions executed	0	0	0	0	0	0
User satisfaction	Repeat visits	0	0	0	0	0	0
Net benefits	Better decision	0	0	0	0	0	0
	Time saving	0	0	0	0	0	0

Table7   Weighted supermatrix, displayed in three parts (continued)

		Use	User satisfaction	Net benefits	
		Number of transactions executed	Repeat visits	Better Decision	Time Saving
Alternatives	Agahjobs	0.022501	0.02409	0.039162	0.044069
	Irantalent	0.134976	0.216828	0.313296	0.308389
Information Quality	Content personalization	0.053157	0.051144	0	0
	Dynamic content	0.075684	0.048748	0	0
	Variety of information	0.034769	0.043102	0	0
Service Quality	Assurance	0.067243	0.048173	0	0
	Empathy	0.047367	0.057315	0	0
	Responsiveness	0.059605	0.048688	0	0
System Quality	Customization	0.058049	0.04751	0	0
	Ease of navigation	0.050575	0.051667	0	0
	Privacy	0.052257	0.060108	0	0
Use	Number of transactions executed	0	0.153832	0.356106	0.356106
User satisfaction	Repeat visits	0.172486	0	0.291435	0.291435
Net benefits	Better decision	0.019037	0.02126	0	0
	Time saving	0.152295	0.127536	0	0

5.5 Limit supermatrix

According to Saaty (2008, P. 59): "Limit supermatrix is obtained from the weighted supermatrix by raising it to powers until all columns are identical to within a certain decimal place". From the top part of the first column of the limit supermatrix, priorities for Alternatives are obtained.

The relative website success of the alternatives Irantalent and Agahjobs from the limit supermatrix are: 0.330928, and 0.046453 (Table 8). These figures are obtained by raising the weighted supermatrix to powers by multiplying it times itself. When the column of numbers is the same for every column, the limit matrix has been reached and the matrix multiplication process is halted. The columns of the limit supermatrix are all the same, so the priorities for all the nodes can be read from any column.

Table8	Limit supermatrix, displayed in three parts					
		Alternatives		Information Quality		
		Agahjobs	Irantalent	Content personalization	Dynamic content	Variety of information
Alternatives	Agahjobs	0.046204	0.046204	0.046204	0.046204	0.046204
	Irantalent	0.331177	0.331177	0.331177	0.331177	0.331177
Information Quality	Content personalization	0.035475	0.035475	0.035475	0.035475	0.035475
	Dynamic content	0.040568	0.040568	0.040568	0.040568	0.040568
	Variety of information	0.0263	0.0263	0.0263	0.0263	0.0263
Service Quality	Assurance	0.035482	0.035482	0.035482	0.035482	0.035482
	Empathy	0.03842	0.03842	0.03842	0.03842	0.03842
	Responsiveness	0.030698	0.030698	0.030698	0.030698	0.030698
System Quality	Customization	0.03326	0.03326	0.03326	0.03326	0.03326
	Ease of navigation	0.028283	0.028283	0.028283	0.028283	0.028283
	Privacy	0.029324	0.029324	0.029324	0.029324	0.029324
Use	Number of transactions executed	0.116212	0.116212	0.116212	0.116212	0.116212
User satisfaction	Repeat visits	0.109841	0.109841	0.109841	0.109841	0.109841
Net benefits	Better decision	0.013642	0.013642	0.013642	0.013642	0.013642
	Time saving	0.085115	0.085115	0.085115	0.085115	0.085115

Table8   Limit supermatrix, displayed in three parts

		Service quality			System quality		
		Assurance	Empathy	Responsiveness	Customization	Ease of navigation	Privacy
Alternatives	Agahjobs	0.046204	0.046204	0.046204	0.046204	0.046204	0.046204
	Irantalent	0.331177	0.331177	0.331177	0.331177	0.331177	0.331177
Information Quality	Content personalization	0.035475	0.035475	0.035475	0.035475	0.035475	0.035475
	Dynamic content	0.040568	0.040568	0.040568	0.040568	0.040568	0.040568
	Variety of information	0.0263	0.0263	0.0263	0.0263	0.0263	0.0263
Service Quality	Assurance	0.035482	0.035482	0.035482	0.035482	0.035482	0.035482
	Empathy	0.03842	0.03842	0.03842	0.03842	0.03842	0.03842
	Responsiveness	0.030698	0.030698	0.030698	0.030698	0.030698	0.030698
System Quality	Customization	0.03326	0.03326	0.03326	0.03326	0.03326	0.03326
	Ease of navigation	0.028283	0.028283	0.028283	0.028283	0.028283	0.028283
	Privacy	0.029324	0.029324	0.029324	0.029324	0.029324	0.029324
Use	Number of transactions executed	0.116212	0.116212	0.116212	0.116212	0.116212	0.116212
User satisfaction	Repeat visits	0.109841	0.109841	0.109841	0.109841	0.109841	0.109841
Net benefits	Better decision	0.013642	0.013642	0.013642	0.013642	0.013642	0.013642
	Time saving	0.085115	0.085115	0.085115	0.085115	0.085115	0.085115

Table8   **Limit supermatrix, displayed in three parts**

		Use	User satisfaction	Net benefits	
		Number of transactions executed	Repeat visits	Better Decision	Time Saving
Alternatives	Agahjobs	0.046204	0.046204	0.046204	0.046204
	Irantalent	0.331177	0.331177	0.331177	0.331177
Information Quality	Content personalization	0.035475	0.035475	0.035475	0.035475
	Dynamic content	0.040568	0.040568	0.040568	0.040568
	Variety of information	0.0263	0.0263	0.0263	0.0263
Service Quality	Assurance	0.035482	0.035482	0.035482	0.035482
	Empathy	0.03842	0.03842	0.03842	0.03842
	Responsiveness	0.030698	0.030698	0.030698	0.030698
System Quality	Customization	0.03326	0.03326	0.03326	0.03326
	Ease of navigation	0.028283	0.028283	0.028283	0.028283
	Privacy	0.029324	0.029324	0.029324	0.029324
Use	Number of transactions executed	0.116212	0.116212	0.116212	0.116212
User satisfaction	Repeat visits	0.109841	0.109841	0.109841	0.109841
Net benefits	Better decision	0.013642	0.013642	0.013642	0.013642
	Time saving	0.085115	0.085115	0.085115	0.085115

The synthesized priorities for each alternative are shown in table 9 below.

Table9	The Synthesized results for the alternatives		
Alternatives	Raw	Normals	Ideals
www.Agahjobs.com	0.046204	0.122433	0.139515
www.Irantalent.com	0.331177	0.877567	1.00000

The Raw column gives the priorities from the limiting supermatrix (which also appears in the column above), the Normals' column shows the results normalized for each component and the Ideals column shows the results obtained by dividing the values in either the normalized or limiting columns by the largest value in the column. Hence, Irantalent.com website has the 87.75% of website success, and Agahjobs.com website has 12.24%.

6. Conclusion and recommendation

6.1 Achievement of objectives

The major contribution of this study lies in the development of a frame of reference, which incorporates interrelated success factors in Updated D&M IS Success model, for the selection of a successful e-recruitment website and furthermore, for finding out relative importance of each success factor. By adopting Updated D&M IS Success Model (2003), and applying an Analytic Network Process (ANP) approach, this study investigated factors affecting website success, the factors' relative importance, and the priority of alternative websites. This study suggests that ANP is an effective tool to provide an accurate solution for interdependencies that are able to affect the decision to be made for network like models. This study presents the use of ANP in finding out relative importance of e-recruitment website success factors in selecting the most preferred website and in ranking alternative e-recruitment websites. ANP is argued to be able to solve all kinds of decision problems that we might encounter. It focuses on how to identify decision criteria (by structuring a decision model) and how to weight the criteria (by use of pair-wise comparison). The findings confirmed that ANP is a powerful tool if the decision model is substantially affected by interdependent relationships.

In a decision problem, decision makers might feel that some factors are more important than the others affecting final preference of the alternatives. If there are some feedback and interdependencies among the factors, an unimportant factor may turn out to be far more important than even the most important one. So, there need to be a methodology like ANP to capture more realistic results. The feedback pattern influences the weightings of criteria. On the other hand, emphasizing specific criteria would affect the preference of one website over

another. This dynamic situation is handled by running a supermatrix comprised by a set of pairwise comparisons.

Lee et al., (2006), investigated the effect to website quality on e-business success. They extended original Delone and McLean IS Success Model (1992) by applying an analytic hierarchy process approach. As it is apparent in figure 1, this model has a linear top to bottom form of a hierarchy. Meanwhile, Updated D&M IS Success Model's categories are interrelated with feedback loops. Hence, ANP bridges this gap by structuring decision problems that involve interaction and feedback.

It is illustrated that interdependencies among various criteria can be effectively captured using the ANP technique, which has rarely been applied in investigation of website success. Although several quantitative techniques have been applied including AHP, this study has presented the ANP as a decision analysis tool in investigating website success factors.

The ANP is a new methodology, which incorporates feedback and interdependent relationships among decision attributes and alternatives. According to feedback loops between "Use", "User Satisfaction", and "Net benefits" categories in Updated Delone and McLean IS Success Model (2003), this model does not have the specifying levels as in a hierarchy. Therefore, this model cannot be structured hierarchically.

Since the ANP is capable of dealing with all kinds of feedback and dependence in a decision system, it provides a more accurate approach when modeling a complex decision environment. ANP deals with uncertainty and complexity and provides insights that other traditional methods could miss. The power of the ANP lies on its use of ratio scales to capture all kinds of interactions and make accurate predictions, and, even further, to make better decisions.

The ANP approach, as a part of frame of reference, not only leads to a logical result but also enables the decision makers to visualize the impact of various criteria in the final result.

According to limit supermatrix (table 8) the priority and importance of each success factor is achieved with respect to their influence on website success.

As it was discussed in section 5.5, the findings support that Irantalent.com is chosen as the prior e-recruitment website with higher weighted score (0.877567) against Agahjobs.com (0.122433) (Synthesized results, Table 9).

Analyses showed several interesting results. It is apparent from the weighted supermatrix that Irantalent.com is preferred to Agahjobs.com with respect to all the success variables. Highest preference of Irantalent.com (0.900009) to Agahjobs.com (0.099991) is with respect to Assurance success variable. In contrast, preference of Irantalent.com (0.134976) to Agahjobs.com (0.022501) with respect to number of applications executed through the website was the lowest.

While the top ranked website information quality factor were similar, the ranking order was different. According to information quality-alternative submatrix in weighed supermatrix (table 7), content personalization (0.062818), and dynamic content (0.06107) measures are relatively better ability of Agahjobs.com. Likewise, dynamic content is considered as relatively more significant information quality measure in Irantalent.com, following content personalization (0.06274). Information quality becomes less significant with respect to providing variety of information (0.055304) in Agahjobs.com and Irantalent.com (0.045201).

Considering system quality-alternative submatrix in weighted supermatrix (table 7), Agahjobs.com website's ability in providing privacy (0.050832), which keeps users' identity

confidential during their interaction with website, is relatively more in comparison with other two system quality measures. In a different manner, Irantalent.com website's customization (0.057601) measure is relatively more significant in system quality category.

Regarding service quality-alternative submatrix in weighted supermatrix (table 7), empathy is mentioned as relatively most significant service quality measure in Irantalent.com (0.071182) and Agahjobs.com (0.065919). Unlike, responsiveness was regarded as the less significant service quality measure in both websites, Irantalent.com (0.047939) and Agahjobs.com (0.055119). Since responsiveness is regarded as the amount of time it takes to download a webpage, one reason could be the low internet speed in Iran.

According to net benefits-alternatives submatrix in weighted supermatrix (table 7), users believe that website's attribute of time saving is relatively more consequential in both Irantalent.com (0.14906) and Agahjobs.com (0.087495) than the attribute of better decision because of information on the website.

Regarding the relative importance of information quality measures in using the e-recruitment website, dynamic content (0.075684), that is the ability of website to provide interactive experience for customers, is remarked as relatively the most important factor. Content personalization (0.051144), which makes users capable of changing the look and feeling of the web page according to their needs, is considered as relatively more significant information quality measure that affects e-recruitment website' users satisfaction. Providing variety of information to website users is considered as the less significant contributor to using the e-recruitment website (0.034769) and users' satisfaction (0.043102).

While providing website's users with previous customers' experience, assurance (0.067243), is mentioned as relatively most important service quality measure which influences using the e-recruitment website, empathy is relatively less significant measure (0.047367). Unlike, Users believe that empathy (0.057315) affects their satisfaction relatively the most in comparison with assurance (0.048173) and responsiveness (0.048688).

While customization is considered as relatively more consequential system quality measure that affects using (0.058049) the alternatives e-recruitment website, this measure becomes less significant measure in user satisfaction (0.04751). Meanwhile, privacy (0.060108) measure affects users' satisfaction relatively the most.

E-recruitment websites' users consider time saving as relatively more beneficial factor which leads to using the e-recruitment website (0.152295) and also satisfaction from the website (0.127536).

The limit matrix shows the global relative weights for all the elements in the supermatrix. Priority of alternatives and importance of each success variable with respect to overall goal, that is the e-recruitment website success, is achieved from limit supermatrix.

Dynamic content (0.040568) has the highest influence on e-recruitment website success, whilst variety of information (0.0263) has the relative less contribution to e-recruitment website success. It is surprising that both of dynamic content and variety of information are the measures of information quality category in Updated D&M IS Success Model (2003).

With respect to System quality category, customization (0.03326) is highly ranked, indicating that companies should expend more effort to make a design that can be personalized

by the users so people can have their own version of the Web site. Meanwhile, ease of navigation (0.028283) influence is relatively less significant in e-recruitment website success.

Considering service quality category, empathy (0.03326) that could be provided to website users with the use of virtual assistant comparatively has got relatively most attention from online users noting that companies should deploy a virtual assistant on the website. The relative unimportance of ease of navigation (0.028283) in comparison to other system quality measures is apparent in the weighted supermatrix.

Time saving is found to be more beneficial success factor (0.085115) in comparison to better decisions because of information on the website (0.013642) that influences website success.

Number of applications sent through the e-recruitment website (0.116212) and repeat visits (0.116212) influence website success.

According to the empirical findings, it is recommended that Agahjobs.com further enhance its assurance success measure by providing previous customers' experience on the website. As it was discussed earlier, this measure was found to be far stronger in Irantalent.com in comparison to Agahjobs.com. Furthermore, this measure is the most important service quality measure that influences using the e-recruitment website. Also from the system quality point of view, it is suggested that Agahjobs.com improve ease of navigation by providing functions that helps customers find what they need without difficulty and possessing a good search engine.

Although, Irantalent.com was ranked higher in comparison to Agahjobs.com with respect to all success measures, it is highly suggested that this website improves privacy that makes

users' identity confidential. As it was mentioned in section 3.2, this measure is considered as key evaluative criteria in online services.

Moreover, with respect to information quality, it is recommended that both Irantalent.com and Agahjobs.com provide variety of information on their websites to increase the information quality.

This study does provide several theoretical and practical implications. From a theoretical perspective, Updated D&M IS success model was empirically validated and showed that it could successfully explain e-commerce website success. Therefore, the proposed model might be used as an alternative theoretical model for evaluating e-commerce website success in future studies. Second, this study applied ANP and found its appropriateness to resolve a complex website success factors selection and successful e-recruitment website ranking. ANP could be applied to future studies tackling various multi-criteria decision making problems in e-commerce areas.

Finally, the research model, criteria and their relative impact provide useful information for the decision makers of e-commerce companies to develop decision support systems to monitor the performance of the current websites and provide strategic suggestions to develop enhanced ones.

6.2 Research constraints

The ANP approach illustrated in this paper has a few limitations as well. Indeed, the formation of pairwise comparison matrices is a time-consuming and complex task.

Although the proposed research framework (figure7) provides a structure for investigating e-recruitment website success, there are some limitations of the model. One of

these limitations is that the ANP requires more comparisons than the AHP and it increases the effort. However, complex decisions may require complex methodology. Yet, clustering the factors helps lessening the number of pairwise comparisons.

This study does have limitations that should be revisited in future studies. First, the e-recruitment websites used in the study might not represent all e-commerce domains. Another limitation might exist in case that this model is tested in Iran and the results could not be generalized globally.

Asserting that customers' importance varies depending on the types of product, technology, or services (Burke 2002), the findings of this study are effective only for e-recruitment, not all e-commerce domains.

6.3 Further research implication

This study raises several important issues that warrant further research.

In future research it would be interesting to show how the proposed model can be used for website success in different contexts and environments. The model is also flexible enough to incorporate additional criteria with little difficulty, as required by the context.

Further study to reveal the relative importance of website quality factors in a particular e-commerce domain is recommended.

It is important to identify perceptual gaps existing between online customers, managers and designers.

The model can be used to compare the quality level of a company's website with that of competitors. By gauging website quality levels and comparing with competitors' websites, e-

commerce companies can make strategic and resource allocation decisions on how to improve current websites for e-business success.

Overall, the proposed model might be used as an alternative theoretical model for evaluating e-commerce website success in future studies.

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Table10 System quality measures

Traditional MIS success measures	Measurement criteria	Supportive article
Attractiveness	-	Liu & Arnett 2000
Download time	-	Spiller & Lohse 1998; Palmer 2002
System responsiveness, response time	The elapse time between a user-initiated request for service or action and a reply to that request. Response time generally refers to the elapsed time for terminal type request or entry (Bailey et al.1983) Turnaround time generally refers to the elapsed time for execution of a program submitted or requested by a user and the return of the output to that user.	Tiwana 1998; Molla & Licker 2001, Bailey et al.(1983), Delone and McLean (2003)
Dependability, reliability, availability	The consistency and dependability of the output information (Bailey et al. 1983) reliable system should have quick error recovery and ensure correct operation(Liu et al 2000)	Liu & Arnett 2000; Tiwana 1998; Ünal 2000; Molla & Licker 2001, Bailey et al.(1983), Seddon et al. (1994), Goodhue (1995), Etezadi-Amoli et al. (1996), Teo et al. (1998), Wixom et al. (2001), Delone and McLean (2003)
Adaptability, flexibility	The capacity of the information system to change or to adjust in response to new conditions, demands, or circumstances (Bailey et al. 1983)	Liu & Arnett 2000; Tiwana 1998; Ünal 2000; Molla & Licker 2001, Bailey et al.(1983), Seddon et al. (1994), Goodhue (1995), Etezadi-Amoli et al. (1996), Teo et al. (1998), Wixom et al. (2001), Delone and McLean (2003), Delone and Mclean (2003), ,
Ease of use/Usability	Intuitiveness, help features (Molla et al 2001) Clarity of description of the functions/command names- ease of remembering the function names/command names- adequacy of training provided- amount of support provided by vendor or other sources (Etezadi-Amoli et al. 1996)	Torkzadeh et al. (1988), Seddon et al. (1994), Goodhue (1995), Etezadi-Amoli et al. (1996), Teo et al. (1998), Gelderman (1988), Wixom et al. (2001), Delone and McLean (2003), Spiller & Lohse 1998, Molla & Licker 2001
Usefulness, functionality	Environmental scanning (Achrol et al. 1999), Transaction capability (Parsons et al. 1998), Customer feedback capability (Peppers et al. 1997; Palmer 2002), versionability(Reisenwitz et al.	Liu & Arnett 2000; Tiwana 1998; Ünal 2000; Molla & Licker 2001, Seddon et al. (1994), Goodhue (1995), Etezadi-Amoli et al. (1996), Teo et al. (1998), Wixom et al. (2001),

	1998; Varian 1997) Functionality is measured by Reliability of the system- completeness of the features- speed of interacting with the system- ease of detecting possible errors- ease of correcting errors- Ease change of the output format (Etezadi-Amoli et al. 1996)	
Scalability	ability to change the scaling of an application; ability to expand the capabilities of a computer; ability to change the size of a font or picture	Gupta et al. 1998; Ünal 2000
Interactivity	-	Palmer 2002
Security	Safeguarding the computer system from physical loss or damage- Safeguarding the computer system from unauthorized access- safeguarding data from physical loss or damage- safeguarding data from unauthorized alteration (Etezadi-Amoli et al. 1996)	Bailey et al.(1983), Etezadi-Amoli et al. (1996) , Delone and McLean (2003), Gupta et al. 1998; Ünal 2000
Convenience of access	the ease or difficulty with which the user may act to utilize the capability of the computer system (Bailey et al. 1983)	Bailey et al.(1983)
New e-commerce success measures	**Measurement criteria**	**Supportive article**
customization	Have a design that can be personalized by the users so people can have their own version of the Web site. This kind of Web site design is aimed at giving users the experience of getting personal attention.	Palmer 2002
Ease of navigation	Ease of navigation, for example, involves having functions that help customers find what they need without difficulty and possessing a good search engine.	Palmer 2002; Molla et al. 2001
Privacy	Privacy refers to the ability of an individual to keep his/her identity confidential during the course of a transaction and the protection of various types of data that are collected (with or without the knowledge of customers) during customers' interaction with e –commerce systems (Molla et al. 2001)	Molla et al. 2001
security	Security relates to the protection of information or systems from unsanctioned intrusions or outflows (Lobel, 1999).	Molla & Licker 2001

Table11 Information quality measures

Traditional MIS success measures	Measurement criteria	Supportive article
Accuracy	The correctness of the information(Bailey et al. 1983) Reliable and dependable information (Torkzadeh et al. 1988)	Bailey et al.(1983), Mahmood (1987), Miller et al.(1987), Srinivasan (1985), Torkzadeh et al.(1988), Seddon et al. (1994), Etezadi-Amoli et al. (1996), Gelderman (1998), Teo et al. (1998), Wixom et al. (2001)Molla et al. (2001)
Relevance	Degree of congruence between what the user wants or requires and what is provided by the information products and services (Bailey et al. 1983) Customer preference information (Peppers et al. 1997; Molla & Licker 2001)	Bailey et al.(1983), Seddon et al. (1994), Etezadi-Amoli et al. (1996), Teo et al. (1998), Wixom et al. (2001) King et al.(1983), Srinivasan (1985), Miller et al. (1987),Molla & Licker 2001
Understandability	The degree of comprehension that a user possesses about the computer-based information or services that are provided (Bailey et al. 1983)	Bailey et al.(1983), Delone and McLean (2003),,Molla & Licker 2001
completeness	Comprehensiveness of the information content (Bailey et al. 1983)	Zwass 1996; *Palmer 2002*; Molla & Licker 2001, Bailey et al.(1983), Miller et al.(1987), Seddon et al. (1994), Etezadi-Amoli et al. (1996), Teo et al. (1998), Wixom et al. (2001) Delone and McLean (2003)
Customer information integration across multiple channels	-	Zwass 1996; *Palmer 2002*; Molla & Licker 2001
Currency/up to date	The age of the output information(Bailey et al. 1983)	Bailey et al.(1983), King et al.(1983), D'Ambra et al.(2001); Molla et al.(2001)
Timeliness	The availability of the information at a time suitable for its use (Bailey et al. 1983)	Bailey et al.(1983), King et al.(1983), Srinivasan (1985), Mahmood (1987), Miller et al. (1987), Torkzadeh et al. (1988), Gelderman (1988), Seddon et al. (1994), Etezadi-Amoli et al. (1996), Teo et al. (1998), Wixom et al. (2001)
precision	Availability of the output information from that which it purports to measure (Bailey et al. 1983)	Bailey et al.(1983)
format	The material design of the layout and display of output content (Bailey et al. 1983)	Bailey et al.(1983), Torkzadeh et al. (1988), Gelderman(1988)

	The recorded description of an information system that includes formal instructions for the utilization of the system (Bailey et al. 1983). Usefulness of the content of the user manual-usefulness of the index of user manual- currency of the user manual (up to date)- completeness of the user manual- ease of understanding and following the user manual (Etezadi-Amoli et al. 1996)	Bailey et al.(1983), Etezadi-Amoli et al. (1996)
Documentation of user manual/training		
Consistency	-	Seddon et al. (1994), Etezadi-Amoli et al. (1996), Teo et al. (1998), Wixom et al. (2001)
New e-commerce success measures	**Measurement criteria**	**Supportive article**
Dynamic content	To provide interactive experience to customers, a webpage can change in response to different conditions	Parsons et al. 1998
Content personalization	provide preference information to personalize the look and feel of the site for individual customers (Zithaml et al. 2002)	Barua et al. 2000; Molla & Licker 2001
Variety of information	-	Palmer 2002

Table12 Service quality measures

e-commerce Success measures	Measurement criteria	Supportive article
Assurance	Confidence in the systems, The user's feelings of assurance or certainty about the systems provided (Bailey et al.1983) The knowledge and courtesy of employees(web provider) and their ability to inspire trust and confidence (Jiang et al. 2002)	Bailey et al.(1983), Jiang et al. (2002), Delone and Mclean (2003)
Empathy	Providing caring and individualized attention to customers(Jiang et al. 2002)	Jiang et al. (2002), Delone and McLean (2003)
Responsiveness	The willingness to help customers and provide prompt service(Jiang et al. 2002) availability of information systems staff for consultation (Etezadi-Amoli et al. 1996),	Jiang et al. (2002), Delone and McLean (2003)

Table13 Use measures

Traditional MIS success measures	Measurement criteria	Supportive article
Frequency of use	-	Goodhue et al. (1995), Teng et al. (1996) , Guimaraes et al. (1997) , Igbaria et al. (1997), Torkzadeh et al. (1999), Wilkin et al. (1999), Yuthas et al (1999)
Time of use	-	Goodhue et al. (1995), Teng et al. (1996) , Guimaraes et al. (1997) , Igbaria et al. (1997), Torkzadeh et al. (1999), Wilkin et al. (1999), Yuthas et al (1999)
Number of accesses	-	Goodhue et al. (1995), Teng et al. (1996) , Guimaraes et al. (1997) , Igbaria et al. (1997), Torkzadeh et al. (1999), Wilkin et al. (1999), Yuthas et al (1999)
Usage pattern	-	Goodhue et al. (1995), Teng et al. (1996) , Guimaraes et al. (1997) , Igbaria et al. (1997), Torkzadeh et al. (1999), Wilkin et al. (1999), Yuthas et al (1999)
dependency	-	Goodhue et al. (1995), Teng et al. (1996) , Guimaraes et al. (1997) , Igbaria et al. (1997), Torkzadeh et al. (1999), Wilkin et al. (1999), Yuthas et al (1999)
Number of computerized applications used by user	Different type of software application	Igbaria et al. (1997)
Number of business tasks for which the system is used	The extent to which respondent use information system	Igbaria et al. (1997)
E-commerce success measures	**Measurement criteria**	**Supportive article**
Number of e-commerce site visits	-	D'Ambra & Rice 2001; Molla & Licker 2001
Length of stay	-	D'Ambra & Rice 2001; Molla & Licker 2001
Number of purchases completed	-	D'Ambra & Rice 2001; Molla & Licker 2001

Table14 User satisfaction measures

e-commerce success measures	Measurement criteria	Supportive article
Repeat purchases	-	Delone and McLean (2003)
Repeat visits	-	Delone and McLean (2003)

Table15 Individual Net benefits measures

Traditional MIS success measures	Measurement criteria	Supportive article
Enhanced customer support and services	-	Raghunathan & Madey 1999; Rapert & Brent 1998; Griffith & Krampf 1998
Improved customer knowledge	-	Loftus 1997
Reduced information search time	-	Hoque & Lohse 1999
E-commerce success measures	**Measurement criteria**	**Supportive article**
Reduced shopping cost	-	D'Ambra & Rice 2001
Real time marketing offer	-	D'Ambra & Rice 2001
Better decisions because of information on the web	-	D'Ambra & Rice 2001

Appendix (B)

Dear Respondent,

My name is Mona Salehi and I am a MSc student in e-commerce at Lulea university of technology and international university of Chabahar. I am writing to invite you to participate in research in the form of a questionnaire.

My thesis is entitled " Investigating Website Success in the Context of e-recruitment: An Analytic Network Process (ANP) Approach". Specifically it is focused on two e-recruitment websites in Iran: www.irantalent.com and www.agahjobs.com. For one thing, the aim is to compare relative importance of two websites' success factors. Moreover, this research is to find out relative preference of each website with respect to different success variables from your perception. Therefore, jobseekers who are the common users of both e-recruitment websites are eligible to answer this questionnaire.

A glossary of literature terms is included in this questionnaire for more information.

Scale of 1 to 9 is used for two components, with a score of 1 representing indifference between the two components and 9 being overwhelming dominance of the component under consideration (Table 16)

The questionnaire should take about 20 minutes to complete. If you were able to complete and submit the questionnaire within two weeks it would be greatly appreciated.

Completion of the questionnaire is voluntary, and the information supplied by participants will be treated as confidential and access to questionnaires is restricted to my supervisor and me. If you would like to obtain a summary of the results of this research, I am happy to send you copies of future publications.

Please feel free to contact me on monaasalehi@gmail.com in regard to any queries you may have.

Yours sincerely,

Mona Salehi

Table16 scale of relative importance for pair-wise comparison (Saaty 1994)

1	Equal
2	Between Equal and Moderate
3	Moderate
4	Between Moderate and Strong
5	Strong
6	Between Strong and Very Strong
7	Very Strong
8	Between Very Strong and Extreme
9	Extreme

1. Which website do you prefer based on customization?

customization	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

2. Which website do you prefer based on Ease of navigation?

Ease of navigation	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

3. Which website do you prefer based on Privacy?

privacy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

4. Which website do you prefer based on Dynamic content?

Dynamic content	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

5. Which website do you prefer based on content personalization?

Content	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	

personalization																		
Irantalent																		Agahjobs

6. Which website do you prefer based on variety of information?

Variety of information	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

7. Which website do you prefer based on Assurance?

Assurance	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

8. Which website do you prefer based on Empathy?

Empathy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

9. Which website do you prefer based on responsiveness?

Responsiveness	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

10. Through which website you sent more applications?

Number of applications sent through the website	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

11. Which website do you visit more regularly?

Repeat visits	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

12. Which website do you prefer based on better decisions because of information on the web?

better decisions because of	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	

information on the web																		
Irantalent																		Agahjobs

13. Which website helps you with saving your time more?

Time savings	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Irantalent																		Agahjobs

14. Which is the better ability of alternatives?

Agahjobs	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
customization																		Ease of navigation
customization																		Privacy
Ease of navigation																		privacy
Dynamic content																		Content personalization
Dynamic content																		Variety of information
Content personalization																		Variety of information
Assurance																		Empathy
Assurance																		Responsiveness
Responsiveness																		Empathy
Time savings																		Better decision

Irantalent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
customization																		Ease of navigation
customization																		Privacy
Ease of navigation																		privacy
Dynamic content																		Content personalization
Dynamic content																		Variety of information
Content personalization																		Variety of information
Assurance																		Empathy
Assurance																		Responsiveness
Responsiveness																		Empathy
Time savings																		Better decision

15. Enforcing which characteristic results in sending more application through the website?

Number of transactions executed	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
customization																		Ease of navigation
customization																		Privacy
Ease of navigation																		privacy
Dynamic content																		Content personalization
Dynamic content																		Variety of information
Content personalization																		Variety of information
Assurance																		Empathy
Assurance																		Responsiveness
Responsiveness																		Empathy
Time savings																		Better decision

16. Enforcing which characteristic results in more regular visits to website?

Repeat visits	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
customization																		Ease of navigation
customization																		Privacy
Ease of navigation																		privacy
Dynamic content																		Content personalization
Dynamic content																		Variety of information
Content personalization																		Variety of information
Assurance																		Empathy
Assurance																		Responsiveness
Responsiveness																		Empathy
Time savings																		Better decision

17. Compare the relative importance of these measures in selecting the most preferred alternative:

Alternatives	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
System quality																		Service quality
System																		Information

quality																		quality
Service quality																		Information quality

18. Compare the relative impact on using the e-recruitment website:

use	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
System quality																		Service quality
System quality																		Information quality
Service quality																		Information quality
Better performance in comparison with competitors																		Information quality
Better performance in comparison with competitors																		System quality
Better performance in comparison with competitors																		Service quality
Better performance in comparison with competitors																		Satisfaction with website
Better performance in comparison with competitors																		Benefits of using a website

19. Compare the relative impact on user satisfaction:

User	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	

satisfaction																		
System quality																	Service quality
System quality																	Information quality
Service quality																	Information quality
Better performance in comparison with competitors																	Information quality
Better performance in comparison with competitors																	System quality
Better performance in comparison with competitors																	Service quality
Better performance in comparison with competitors																	Using a website
Better performance in comparison with competitors																	Benefits of using a website

20. Compare the relative impact on net benefits:

Net benefit	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
use																		Satisfaction with website
Better performance																		Using a website

in comparison with competitors													
Better performance in comparison with competitors													Satisfaction with website

Table17 glossary of questionnaire's literature terms

Cluster	Criteria	Definition	Supportive article
Alternatives	www.Agahjobs.com	Job Recruitment website	-
	www.Irantalent.com	Job recruitment website	-
System Quality	customization	have a design that can be personalized by the users so people can have their own version of the Web site. This kind of Web site design is aimed at giving users the experience of getting personal attention.	Palmer 2002
	Ease of navigation	Ease of navigation, for example, involves having functions that help customers find what they need without difficulty and possessing a good search engine.	Palmer 2002, Molla and Licker 2001
	privacy	the ability of an individual to keep his/her identity confidential during the course of a transaction and the protection of various types of data that are collected(with or without the knowledge of customer) , Molla and Licker 2001 Privacy involves the protection of personal information—not sharing personal information collected about consumers with other sites, protecting anonymity, and providing informed consent (Friedman et al. 2000).	Molla et al. (2001) and Friedman et al (2000)
Information	Dynamic content	To provide interactive	Parsons et al. 1998

Quality		experience to customers, a webpage can change in response to different conditions	
	Content personalization	provide preference information to personalize the look and feel of the site for individual customers (Zithaml et al. 2002)	Barua et al. 2000; Molla & Licker 2001
	Variety of information		Palmer 2002
Service quality	Assurance	Previous experience	Daughtrey 2001
	Empathy	Virtual assistant	Iwaarden et al. (2003)
	Responsiveness	amount of time it takes to download a Web page	Daughtrey 2001
Use	Number of applications sent through the website (Number of transactions executed)		Molla and Licker 2001 Delone and mclean 2003
User satisfaction	Repeat visits (e-loyalty)		Reichheld and Schefter 2000, Delone and McLean 2003
Net benefits	Better decisions because of information on the web		D'Ambra & Rice 2001
	Time savings		D'Ambra & Rice 2001

According to figure 7, pair-wise comparisons between variables of the model in the questionnaire (Appendix B) are conducted as follow:

- Relative preference of alternatives with respect to nodes in system quality cluster through pair-wise comparisons in questions 1, 2, and 3

- Relative preference of alternatives with respect to nodes in information quality cluster through pair-wise comparisons in questions 4, 5, and 6

- Relative preference of alternatives with respect to nodes in service quality cluster through pair-wise comparisons in questions 7, 8, and 9

- Relative preference of alternatives with respect to nodes in use cluster through pair-wise comparison in question 10

- Relative preference of alternatives with respect to nodes in user satisfaction cluster through pair-wise comparison in question 11

- Relative preference of alternatives with respect to nodes in net benefits cluster through pair-wise comparisons in questions 12, and 13

- Relative importance of nodes in each system quality, information quality, service quality, and net benefits clusters on Alternatives through pair-wise comparisons in question 14

- Relative importance of nodes in each system quality, information quality, service quality, and net benefits clusters on use cluster through pair-wise comparisons in question 15

- Relative importance of nodes in each system quality, information quality, service quality, and net benefits clusters on user satisfaction cluster through pair-wise comparisons in question 16

- Relative influence of system quality, information quality and service quality clusters on alternative cluster trough pair-wise comparisons in question 17

- Relative influence of system quality, information quality, service quality, alternative, user satisfaction, and net benefits clusters on use cluster through pair-wise comparisons in question 18

- Relative influence of system quality, information quality, service quality, alternative, use, and net benefits clusters on user satisfaction cluster through pair-wise comparisons in question 19

- Relative influence of use, user satisfaction, and alternative clusters on net benefits cluster through pair-wise comparisons in question 20