Developing and Implementing a Web Portal Success Model

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ABSTRACT

The emergence and subsequent spreading of new technologies, such as Web portals, has changed the way people handle information, communicate, share knowledge, and perform tasks. The use of different information technologies and systems offers the potential for substantially improving performance not only at the organizational level, but also at the individual level. However, performance gains are often obstructed by users' unwillingness to accept and use available systems and technologies. This paper aims at examining the role of Web portals in improving the overall performance at the individual level in terms of task productivity and innovation, customer satisfaction, and management control. To this aim, the paper develops a Web portal success model and empirically validates it through the case of Aramex Company. The results support all formulated hypotheses, except two which are related to the relationships between "Service Quality" and both: "Intention to Use" and "Users' Satisfaction". The developed model explained about 72% of the variance in employees' performance. The study also shows its implications for theory and practice.

Keywords: Web Portal, IS Success Model, System Quality, Information Quality, Service Quality, Performance, User Satisfaction.

INTRODUCTION

Portals can bring benefits at both the individual and organizational levels. They can further enhance effectiveness by supporting communication between individuals and workgroups, allowing increased collaboration internally and with external business partners, such as customers and suppliers (Detlor, 2000; Dias, 2001; Benbya *et al.*, 2004). Besides, portals can reduce information overload and enhance employee productivity (Tojib *et al.*, 2006). Portals also benefit in streamlining business processes, increasing efficiency and productivity, and improving employee satisfaction due to increased convenience in accessing relevant applications and information, and due to greater collaboration and learning opportunities provided through the portal (Rahim and Singh, 2006).

Today, many companies, especially large ones, use portals in their businesses. Despite the restricted IT budgets of many companies, investments in portal solutions are still growing. Portal projects are usually considered as complex, time-consuming, costly, and associated with a high failure risk (Remus, 2006). Despite the complexity of such project, companies in general are still investing huge amounts of money in building, establishing and running portals, but mostly without assessing the actual benefits of their portal implementations (Brown *et al.*, 2007). In fact, information systems such as Web portals would not bring the intended benefits if users are not encouraged to adopt and use them. However, the intentions of individuals to use such a technology are influenced by many factors such as information quality, system

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quality, perceived usefulness and perceived ease of use.

Companies that do assess their portal benefits have often used monetary indicators, such as return on investment (ROI) or total cost of ownership (TCO) and other cost-benefit analysis methods (White, 2003). Yet, to establish a comprehensive measurement of portals' success, we need to consider both the tangible and intangible effects of a portal to detect potential improvements, and to justify present and future investments in portal solutions. For example, portals' success cannot be measured solely by its reach; as one should not purely rely on "hit counts" as a measure of success (Damsgaard and Scheepers, 1999).

Accordingly, the main aim of this research is to measure the effectiveness of Web portals in delivering benefits at the individual level by enhancing individual overall performance. This aim can be achieved by studying the factors that determine the quality of portals, which in turn result in the intention to continually use portals and increase the satisfaction with using portals, thus leading to improved employees' overall performance. The research describes the theoretical foundations of portals and offers a literature review of measuring IS success in general and portals' success in specific. Based on the theoretical foundation, a theoretical model is developed, based on the DeLone and McLean IS Success Model that describes the dimensions affecting portals' quality, leading to portals' success in delivering intended benefits at the individual level. The developed theoretical model is then empirically validated, in order to come up with useful conclusions and recommendations.

This research is deemed useful in that it can help decision makers (i.e. managers and executives) in companies to make appropriate decisions concerning the adoption of portals technology, by weighing its benefits of promoting knowledge sharing, collaboration and communication, and enhancing employees' performance, against the costs needed to establish and run portals. Managers should also be aware of the factors affecting the intention of their employees to use portals technology, in order to be able to provide them with whatever is needed to increase their usage level. Further, this research can help IT developers and designers in designing and establishing high quality portals with functions and features that are in line with users' needs and expectations. This is significant as IT designers should be able to translate users' expectations of the delivered quality of portals into appropriate quality specifications.

Theoretical Background

Web Portals: Functions and Features

A Web portal can be defined as a single point of access (SPOA) for the pooling, organizing, interacting, and distributing of organizational knowledge (Bock, 2001; Kendler, 2000; Schroeder, 2000). Portals can filter, target, and categorize information so that users will get only what they need (Eckel, 2000). Many studies have been conducted in an attempt to identify portals' functions and features, which are fairly difficult to define separately as they unite inter-related components (Raol *et al.*, 2003). Functions are the components that provide access to the range of disparate enterprise databases and information resources and the ease with which users can set up personalized access to enterprise and external information resources (White, 2000).

Based on synthesizing the related literature (e.g. Dias, 2001; Kotorov and Hsu, 2001; Collins, 2001; Raol *et al.*, 2003, Benbya *et al.*, 2004), the main functions and features of portals are defined as: (1) **Content Management and Tailorability** which provides users with the ability to adjust and tailor accessed data based on users' specific requirements and preferences, and this function encapsulates Customization/ Personalization/

Profiling/ Content Management/ Taxonomy/ Presentation**; (2) Integration** which aims at bringing, harmonizing, and synchronizing data existing in different formats in incompatible applications all together, and then presenting it on a unified interface (i.e. the portal); **(3) Security** which provide users with a secure access to diverse range of resources, by describing the levels of access each user or groups of users are allowed for each portal application and software function included in the portal; **(4) Searchability** which allow users to retrieve required information directly by using search engines, instead of browsing through the different information categories; **(5) Collaboration** which provide users with collaborative tools needed to enforce and optimize business and process collaboration inside and outside the organization; **(6) Scalability** which describes the capability of the system to cope and perform under an increased or expanding workload; and **(7) Accessibility** which describes the ability to access the system from anywhere at anytime.

Background Theory: IS Success Model

Web portals are considered as a type of information management systems that provide access to integrated applications and databases; they act as a business intelligence and knowledge management tool that supports the decision making process via acquisition, sharing and transfer of knowledge capabilities. Many models were used to measure the success of information and knowledge management systems, such as DeLone and McLean IS Success Model, which enjoys a proven validity in assessing the success of various information systems. Therefore, DeLone and McLean IS Success Model is used as a foundation to build a theoretical framework adequate for measuring portals' success in improving employees' performance.

Looking at portals as a type of information systems, it is not easy to define their success, since there are several definitions and measures of IS success provided in the IS literature. This is because there are different stakeholders who assess IS success in an organization (Grover *et al.,* 1996), and each group assesses success from its perspective. Furthermore, IS success also depends on the type of system being evaluated (Seddon *et al.,* 1999). In order to provide a more general and comprehensive definition of IS success, one that covers these different perspectives, DeLone and McLean (1992) reviewed the existing definitions of IS success and their corresponding measures, and classified them into six major variables: "System Quality", "Information Quality", "Use", "User Satisfaction", "Individual Impact", and "Organizational Impact". They then created a multidimensional measuring model with interdependencies between the different success variables, which became very popular.

Several studies have been conducted in an attempt to extend or re-specify DeLone and McLean original model (1992). For example, some researchers either suggested that further dimensions should be included in the model, or they presented alternative success models (Seddon, 1997; Seddon and Kiew, 1996). Others have focused on the model's application and validation (i.e. Rai *et al.,* 2002) since DeLone and McLean have called for that. Conducted research (i.e. Seddon, 1997; Pitt *et al.,* 1995) have raised some critics and weaknesses of the original model (1992), to which DeLone and McLean have responded and developed an updated model in (Delone and Mclean, 2003). The updated model consists of six interrelated dimensions of IS success: "Information Quality", "System Quality", "Service Quality", "Intention to Use", "Use", "User Satisfaction", and "Net Benefits". The model can be interpreted as follows: A system can be evaluated in terms of the information quality, system quality, and service quality. These characteristics affect subsequent use or

intention to use, and user satisfaction. As a result of using the system, certain benefits will be achieved. If "Net Benefits" are positive from the perspective of the owner or sponsor of the system, then the system will be re-used continually, thus influencing and reinforcing subsequent use and user satisfaction. These feedback loops are still valid, even if the "Net Benefits" are negative. The lack of positive benefits is likely to lead to decreased use and possible discontinuance of the system or of the IS department itself (e.g. outsourcing). The updated model is shown in Figure 1.

The key modifications in the updated model (2003) are summarized in the following:

- The inclusion of "Service Quality" as an additional aspect of IS success
- The elimination of "Individual Impact" and "Organizational Impact" as separate variables, and their replacement with "Net Benefits".
- The clarification of the "Use" construct, by measuring "Intention to Use" (an attitude) rather than "Use" (a behavior)

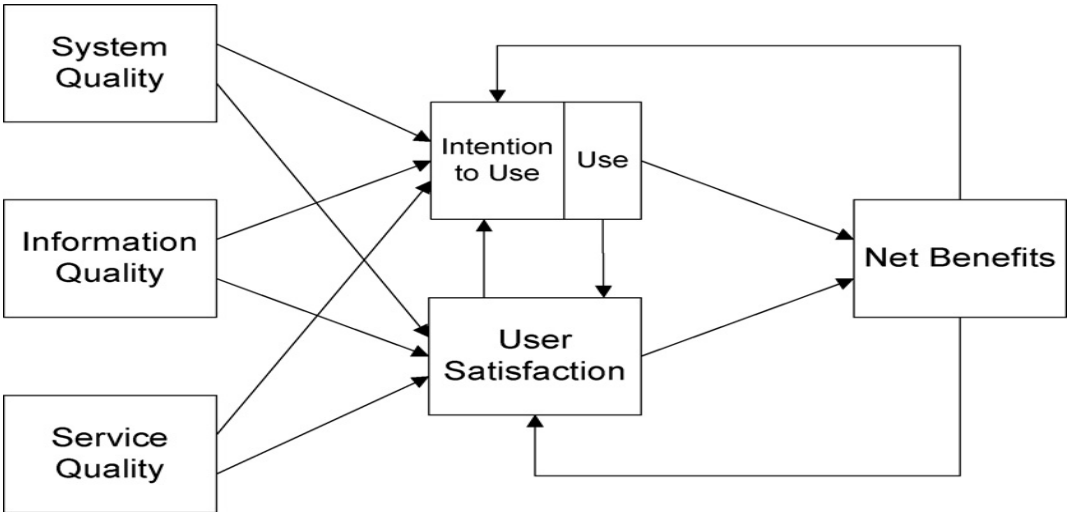

Figure 1. Updated D&M IS Success Model (Delone and Mclean, 2003)

Literature review

Measuring the Success of Web Portals

Successful and effective portals are those used repeatedly and frequently by their intended users for extended periods of time. Indeed, the success of portals cannot be achieved without users being satisfied about the overall quality of portals. Hence, if firms need to build successful portals, they have to take into account the dimensions that affect portals' quality. Moraga *et al.*, (2004) defined these dimensions in their model, known as the Portal Quality Model (PQM), that they built based on the SERVQUAL model that was proposed by Parasuraman *et al.*, (1998) and the GQM (Goal Question Metric) method that was proposed by Basili *et al.* (1994). In this model, the different dimensions of the SERVQUAL model to the portal context were adapted and some of them were split up into sub-dimensions in order to create a more specific model.

Focusing on the user-perceived service quality of Web portals, Yang *et al.*, (2005) developed and validated a five-dimension service quality instrument involving: "Usability", "Usefulness of Content", "Adequacy of

information", "Accessibility", and "Interaction". This scale provides a useful instrument for researchers aiming to measure the service quality of Web portals and for portal managers who wish to improve their service performance. In order to measure user satisfaction with employee portals, Sugianto and Tojib (2006) proposed a model using the B2E Portal User Satisfaction (B2EPUS) model, which is based on the End-User Computing Satisfaction measure (EUCS) that was developed by Doll and Torkzadeh (1988). They identified nine dimensions influencing the B2E portal user satisfaction: "Information Content", "Ease of Use", "Convenience of Access", "Timeliness", "Efficiency", "Security", "Confidentiality", "Communication", and "Layout". This scale can also be adapted or supplemented to fit specific needs. For example, in cases where an organization wishes to measure the extent to which the portal delivers the intended benefits, or when an organization plans to create a workplace that is conducive to and supports employees' satisfaction and productivity.

Masrek (2007) has proposed another approach to assessing user satisfaction with campus portals, which is based on an extract of the updated D&M IS Success Model (DeLone and McLean, 2003). Masrek (2007) aimed at evaluating the effectiveness or success of campus portal implementation from the perspective of students as users, and sought to investigate the influence of individual factors comprising attitudes towards the portal, personal innovativeness and Web self-efficacy on the effectiveness of the portal. The study found that of the three predictors investigated, only attitudes towards the portal were found to be significantly correlated with IS effectiveness dimensions. Urbach *et al.*, (2010) introduced a theoretical model to gain a better understanding of employee portal success that is based on the original DeLone and McLean IS Success Model (Delone and Mclean, 1992). They tested the associations between different models' success dimensions and found that besides the factors contributing to IS success in general, other success dimensions such as the quality of the collaboration and process support have to be considered when aiming for a successful employee portal. Based on related literature and mainly on the studies presented in this section, we in the following section, propose a theoretical framework for assessing the success of Web portals in improving employees' performance.

Proposed Theoretical Framework and Hypotheses Development

DeLone and McLean IS Success Model was used by many studies to evaluate the success of various types of information systems, such as government to citizen (G2C) eGovernment systems (Wang and Liao, 2008), E-Commerce (Molla and Licker, 2001), Knowledge management systems (Wu and Wang, 2006; Kulkarni *et al.*, 2006), Web-based applications (Kwan, 2006), and Portals (Al-Busaidi, 2010; Urbach *et al.*, 2010). Yet, there is little research on the use of DeLone and McLean IS Success Model to assess Portals' success in improving employees' performance. Hence, this paper is devoted to develop a theoretical framework based on DeLone and McLean IS Success Model (Delone and Mclean, 2003) to form the foundation for assessing the success of Web portals in improving employees' performance.

The updated DeLone and McLean IS Success Model (2003) accounted for benefits occurring at any level of analysis (i.e. individual or organizational). The choice of what kind of impact (individual or organizational impact) to be measured depends on the systems being evaluated and their purposes. Here, we are interested in examining the benefits that an individual can gain from the use of Web portals, mainly the benefit of improving employees' performance. Therefore, the construct "Net benefits" is replaced by "Performance" at the individual level. The proposed theoretical framework that is used to assess portals' success in improving employees' performance is the one shown in Figure 2.

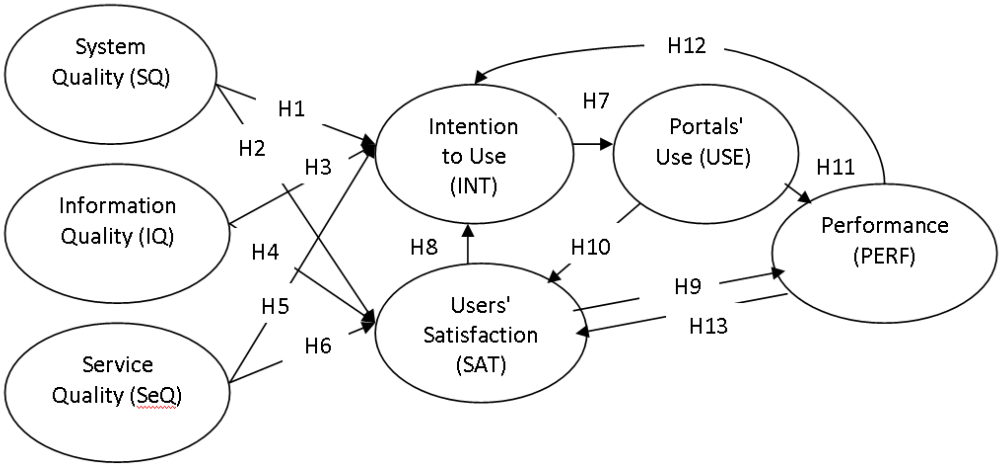

Figure 2. The Study Model

Constructs of Web Portals' Success (WPS) Theoretical Framework

The Quality of Web Portals

In this paper, we attempt to relate functions and features of portals to the quality dimensions to which they contribute. To achieve this objective, one should be able to relate each dimension of quality to their corresponding components within the information system under examination (i.e. portals in this case). For this purpose, a brief explanation would clarify the main components of Information Systems. Any information system depends on the resources of hardware (machines and media), software (programs and procedures), networks (communications media and network support), data (data, information, and knowledge), and people (end users and IS specialists), to perform input, processing, output, storage, and control activities that convert data and other resources into information and knowledge products.

Referring to IS Success Model, the "System Quality" construct represents the quality of the information system itself, and it is a measure of the extent to which the system is technically sound (Gorla *et al.,* 2010). In other words, the system quality can be determined by the quality of its hardware or software components that represent data and information capturing, processing, storage and retrieval capabilities. "Information Quality", on the other hand, refers to the quality of outputs the information system produces (DeLone and McLean, 1992) which can be in the form of reports or online screens. Finally, "Service Quality" refers to the degree of discrepancy between customers' normative expectations for service and their perceptions of service performance (Gorla *et al.,* 2010). It also includes measures of the overall support related to an employee portal and delivered by the service provider (Urbach *et al.,* 2010). Given that IS departments act as service providers for various users in the organization, we can say that service quality is dependent on the staff of IS departments.

Based on the above discussion, all functions and features that are related to hardware and software components are considered to have an impact on "System Quality", and those functions that serve in managing data and information are considered to have an impact on "Information Quality". Based on this, "Content Management and Tailorability" is affecting Information Quality, since this function allows the user to be provided with an appealing, personalized and understandable visual

appearance. Other functions and features such as: "Integration", "Search Capabilities", "Collaboration", "Security", "Scalability", "Accessibility" and "Ease of use" are related to "System Quality", since they depend heavily on the software tools or applications used. Finally, administration tools are affecting "Service Quality" since administration and maintenance of the portal are carried out by the staff of IS department.

System Quality

Petter *et al.* (2008) defined "System Quality" as "the desirable characteristics of an information system". Seddon (1997) notes that system quality is concerned with whether there are bugs in the system or not, the consistency of user interface, ease of use, quality of documentation, and sometimes quality and maintainability of program code. Therefore, this paper measures "System Quality" by the following dimensions: "Ease of use", "Reliability", "Flexibility", "Interactivity", "Searchability", "Security", "Accessibility", and "Integration". There is mixed support for the relationship between "System Quality" and "Intention to Use" at the individual level within the literature. Some researchers have found that perceived ease of use is not significantly related to intention to use (Subramanian, 1994; Agarwal & Prasad, 1997; Lucas & Spitler, 1999; McGill *et al.*, 2003; Klein, 2007). On the other hand, many other studies that measure system quality as perceived ease of use have found positive relationships with behavioral intentions to use the system (Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Hong *et al.*, 2001/2002). Thus, it is assumed that higher portal's system quality leads to higher intention to use the portal.

H1: System Quality of Web portals positively influences Intention to Use portals

At the individual level, there is a strong support for the relationship between "System Quality" and "User Satisfaction" (Iivari, 2005). For knowledge management systems, system quality was found to be strongly related to user satisfaction (Kulkarni *et al.*, 2006; Wu & Wang, 2006; Halawi *et al.*, 2007). For Web sites, system quality measured as reliability and download time was found to be significantly related to user satisfaction in two different studies (Kim *et al.*, 2002; Palmer, 2002). Further, system quality measured in terms of perceived ease of use also was found to have a significant influence on user satisfaction (Devaraj *et al.*, 2002; Hsieh & Wang, 2007). Thus, it is assumed that higher system quality leads to higher user satisfaction.

H2: System Quality of Web portals positively influences Users' Satisfaction with portals

Information Quality

The "Information Quality" construct can be defined as the desirable characteristics of an information system's outputs (Petter *et al.*, 2008). "Information Quality" can be measured by the following dimensions: "Integrity", "Timeliness", "Usefulness", "Understandability" and "Customization". Few studies have examined the relationship between "Information Quality" and "Intention to use" at both the individual and organizational levels. One reason for this is that information quality tends to be measured as a component of user satisfaction measures, rather than being evaluated as a separate construct. Two studies found that information quality is not significantly related to intention to use (McGill *et al.*, 2003; Iivari, 2005), whereas another study of knowledge management systems found that information (or knowledge) quality was significantly related to intention to use (Halawi *et al.*, 2007). Thus, it is assumed that higher information quality leads to higher intention to use.

H3: Information Quality of Web portals positively influences Intention to Use

The relationship between "Information Quality" and "User Satisfaction" is strongly supported in the literature (Iivari, 2005; Wu & Wang, 2006). Studies have found a consistent relationship between information quality and

user satisfaction at the individual level (Seddon & Yip, 1992; Seddon & Kiew, 1996; McGill *et al.,* 2003; Almutairi & Subramanian, 2005; Wixom & Todd, 2005; Kulkarni *et al.,* 2006; Chiu *et al.,* 2007). Thus, it is assumed that higher information quality leads to higher users' satisfaction.

H4: Information Quality of Web portals positively influences Users' Satisfaction with portals

Service Quality

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-users), therefore Delone and McLean (2003) found it necessary to add "Service Quality" dimension to their model. Most work done for the purpose of measuring "Service Quality" is based on the SERVQUAL model, which was proposed by Parasuraman *et al.* (1998). SERVQUAL is a model of service quality measurement and management which explores the intangible aspects of providing services as well as tangible aspects. The model evaluates service quality using five dimensions: "Tangibles", "Reliability", "Responsiveness", "Assurance" and "Empathy". These elements evaluate both the expectations for agreed services and the perceptions of services previously provided. The five dimensions are defined as follows:

- **Tangibles**: The appearance of physical facilities, equipment, personnel and communication materials.
- **Reliability:** the ability to perform the promised service dependably and accurately. It is a measure of the extent to which the IS department strives to improve the information services provided to users.
- **Responsiveness:** The willingness to help customers and provide prompt services.
- **Assurance:** The knowledge and courtesy of employees and their ability to convey trust and confidence.
- **Empathy:** The firm provides care and individualized attention to its customers.

Chang and King (2005) and Pitt *et al.* (1995) measured service quality using responsiveness, reliability, empathy, and competence of the responsible service personnel. Also Urbach *et al.* (2010) used the same dimensions to assess the service quality of web portals. The 'tangibles' dimension is excluded from the dimensions of Service Quality since this dimension had low reliability in the study of Pitt *et al.* (1995). Further, previous studies such as Kettinger and Lee (1995) had also excluded "Tangibles" dimension in IS-adapted service quality measurement for similar reasons. As there are few studies that examine the relationship between "Service Quality" and "Intention to Use", it is really difficult to draw conclusions. Choe (1996) examined this relationship in Korean firms and found the number of years of experience of the IS support personnel was weakly related to willingness of use. A study of knowledge-management systems found that service quality did not predict intention to use (Halawi *et al.,* 2007). Thus, it is assumed that "Service Quality" is related to "Intention to use" so as to prove or disprove such a relationship in the context of Web portals.

H5: Service Quality of Web portals positively influences Intention to Use

Several studies have examined the relationship between "Service Quality" and "User Satisfaction". Findings of these studies suggest mixed support for this relationship as researchers have measured service quality using multiple methods which may account for the inconsistent findings. Chiu *et al.* (2007) examined the role of IS support on user satisfaction in an e-learning environment and found a non-significant relationship. Nonetheless, Choe (1996) found that the experience of IS personnel is correlated with user satisfaction of accounting IS in Korean firms. Technical performance and skills of the developers (based on their responsiveness to problems) were found to be positively

related to user satisfaction (Leonard-Barton & Sinha, 1993; Yoon *et al.,* 1995). Further, a case study performed by Leclercq (2007) found that the quality of support and services provided by the IS function had an impact on user satisfaction.

Even when examining service quality more broadly, rather than just in terms of personnel and training, one can find that there is still mixed support for its effect on user satisfaction. For example, using the SERVQUAL instrument, service quality was found to be positively and significantly related to user satisfaction of information services (Kettinger & Lee, 1995; Shaw *et al.,* 2002). Although the two studies (i.e. Kettinger & Lee, 1995; Shaw *et al.,* 2002) in university settings found support for this relationship, a study of 31 government organizations examining internal computing support and user satisfaction did not find a significant relationship (Aladwani, 2002). In a Web setting using the SERVQUAL measure, the empathy and assurance aspects of service quality were related to user satisfaction, but not to reliability or responsiveness (Devaraj *et al.,* 2002). Halawi *et al.,* (2007) found a significant relationship between service quality measured using SERVQUAL and user satisfaction in a knowledge-management context. These findings suggest the sensitivity of the construct of service quality to the manner in which it is measured. In this research, it is assumed that higher service quality leads to higher users' satisfaction.

H6: Service Quality of Web portals positively influences Users' Satisfaction with portals

Intention to Use

The "Intention to Use" construct is a measure of the likelihood a person will employ an application. It is a predictive variable for system use (Wu and Wang, 2006). Intention of people to adopt and use a specific technology can be explained by the technology acceptance model (TAM) that was developed by Fred Davis in 1985. TAM examines the mediating role of perceived ease of use and perceived usefulness in their relation between systems characteristics (external variables) and the probability of system use (an indicator of system success). Since "Intention to Use" predicts "System Use", it is assumed that higher intention to use portals leads to higher portals' use.

H7: Intention to Use positively influences Portals' Use

Users' Satisfaction

Users' satisfaction can be defined as the extent to which users believe that the information system available to them meets their information requirement (Ives *et al.,* 1983). User satisfaction can also be described as the affective attitude of users those interacting directly with the information system (Doll and Torkzadeh, 1988; Tojib *et al.,* 2006). It refers to the feeling of pleasure or displeasure that results from aggregating all the benefits that a person hopes to receive from interaction with the IS (i.e. portals in this case) (Masrek *et al.,* 2007). User satisfaction reflects a user's perceptions of both quality of the system itself and the quality of the information that can be obtained from it (McGill *et al.,* 2003).

Previous literature suggests that there is a significant relationship between user satisfaction and intention to use (Wixom & Todd, 2005; Halawi *et al.,* 2007). Besides, satisfaction was found to be a major determinant of continued usage (Igbaria and Tan, 1997; Bokhari, 2005). Arguably, an individual being satisfied with a technology after the initial trial may have a high intention to continue using the technology. This is due to the positive reinforcement of the attitude toward the technology after using it. Thus, it is assumed that higher users' satisfaction leads to higher intention to use.

H8: Users' Satisfaction with Web portals positively influences Intention to Use

Although Yuthas & Young (1998) found that user satisfaction was only weakly correlated with decision making performance, most empirical results have shown a

strong association between user satisfaction and system benefits (Iivari, 2005). User satisfaction has been found to have a positive impact on a user's job (Yoon & Guimaraes, 1995; Guimaraes & Igbaria, 1997; Torkzadeh & Doll, 1998), performance (McGill *et al.,* 2003), productivity and effectiveness (Igbaria & Tan, 1997; Rai *et al.,* 2002; McGill & Klobas, 2005; Halawi *et al.,* 2007), decision making (Vlahos & Ferratt, 1995; Vlahos *et al.,* 2004), and job satisfaction (Morris *et al.,* 2002). Thus, it is assumed that higher users' satisfaction leads to higher performance at the individual level.

H9: Users' Satisfaction with Web portals positively influences employees' Performance

Portals' Use

"Portals' Use" construct measures the perceived actual use of the portal by an organization's staff. Petter *et al.* (2008) defined "System Use" as the degree and manner in which staff and customers utilize the capabilities of an information system. Burton-Jones and Straub (2006) defined individual-level system usage as an individual user's employment of one or more features of a system to perform tasks.

Little research has examined the relationship between use and user satisfaction, whilst the reverse relationship between user satisfaction and use is more examined in previous research. Hence, additional research is needed to evaluate the former relationship. Seddon & Kiew (1996) found that, in a mandatory context, use was not related to user satisfaction, whereas this relationship was found to be significant in other studies (i.e. Guimaraes *et al.,* 1996; Chiu *et al.,* 2007; Iivari, 2005). Thus, it is assumed that there is a positive relationship between use and user satisfaction to further prove or disprove such a relationship in the context of portals.

H10: Positive experience from the previous Use of Web portals positively influences Users' Satisfaction with portals.

As for the relationship between system use and benefits at the individual level, empirical studies provide moderate support. Some studies suggest that there is no relationship between use and net benefits (Lucas & Spitler, 1999; Iivari, 2005; Wu & Wang, 2006). On the other hand, many other studies have found that use is positively associated with improved decision making. Yuthas & Young (1998) found that the duration of system use is correlated with decision performance. Burton-Jones & Straub (2006) found a strong significant relationship between system usage and task performance. Many studies confirm significant relationships and/or correlations between system use and net benefits (Goodhue & Thompson, 1995; Yoon & Guimaraes, 1995; Seddon & Kiew, 1996; Abdul-Gader, 1997; Guimaraes & Igbaria, 1997; Igbaria & Tan, 1997; Torkzadeh & Doll, 1999; Weill & Vitale, 1999; D'Ambra & Rice, 2001; Rai *et al.,* 2002; Almutairi & Subramanian, 2005; Kositanurit *et al.,* 2006). Thus, it is assumed that there is a significant and positive relationship between use and employees' performance

H11: Use of Web portals positively influences employees' Performance

Individual Net Benefits: Overall Performance

As it was mentioned earlier, we are interested in examining the benefits that an individual can gain from the use of Web portals. Some of the individual benefits that can be gained by employees through the use of the portal are: task performance, job efficiency, and overall usefulness (Davis, 1989). Torkzadeh and Doll (1999) developed a four-factor, 12- item instrument for measuring the individual impact of IS. They identified the following individual impact dimensions:

- **Task Productivity**—the extent to which an application improves the user's output per unit of time;
- **Task Innovation**—the extent to which an application helps users create and try out new ideas in

their work;

- **Customer Satisfaction**—the extent to which an application helps the user create value for the firm's internal or external customers; and
- **Management Control**—the extent to which the application helps to regulate work processes and performance.

Performance in this study is measured by the four dimensions of individual impact of IS identified by Torkzadeh and Doll (1999) and described above. When measuring net benefits, using perceived usefulness as the metric, many studies have found a relationship between use of a system and behavioral intention (Subramanian, 1994; Agarwal & Prasad, 1999; Venkatesh & Morris, 2000; Hong *et al.,* 2001/2002; Chau & Hu, 2002; Malhotra & Galletta, 2005; Wixom & Todd, 2005; Klein, 2007). Halawi *et al.,* (2007) identified a significant relationship between intention to use and net benefits as measured by improvements in job performance. Thus, it is assumed that higher performance leads to greater intention to use.

H12: Higher individual performance as a result of Web portals' use positively influences Intention to Use

Several studies (Seddon & Kiew, 1996; Devaraj *et al.,* 2002; Rai *et al.,* 2002; Kulkarni *et al.,* 2006; Hsieh & Wang, 2007) have found a positive and significant relationship between perceived usefulness (i.e. net benefits in the context of this study) and user satisfaction. Three studies found that the impact an expert system has on a user's job directly affects user satisfaction (Yoon *et al.,* 1995; Guimaraes *et al.,* 1996; Wu & Wang, 2006). Abdul-Gader (1997) found a significant correlation between productivity and user satisfaction of computer-mediated communication systems in Saudi Arabia. Thus, it is assumed that higher performance leads to higher users' satisfaction.

H13: Higher performance of individuals as a result of Web portals' use positively influences Users' Satisfaction with portals

Research Methodology

The current research uses the two paradigms of positivism and interpretivism. First, this research starts with an interpretivism paradigm, focusing on a qualitative method (i.e., unstructured interviews) to gain more detailed information about Web portals, their functions and features, the dimensions that affect their perceived quality, and their benefits. Therefater, the current research used a positivist paradigm (i.e., a quantitative method) to test the proposed hypotheses and their causal relationships. The case study research method is employed in this research, as it is found the most appropriate one to collect and analyze data quantitatively to determine the impact of Web portals on employees' performance, since the investigation of the validity of the proposed theoretical framework and the examination of relationships between variables is done in the natural social organizational setting of the selected company (Aramex), where no manipulation is done to minimize the effect of other variables.

A survey questionnaire was designed for the purpose of data collection and analysis. The survey questionnaire was first developed after a review of the relevant literature, and then it was assessed by four professors (experts in IS domain) from the faculties of Business and King Abdullah II for Information Technology at the university of Jordan in order to assure content validity. The received comments were taken into consideration and the survey instrument was amended to reflect the comments. The final version of the survey instrument was then distributed to respondents.

As the purpose of this research is to answer the question: "How the use of Web portals influence employees' overall performance?", the research has

undergone four main phases, as described below:

1. **Phase I:** This is an exploration phase in which existing relevant literature and studies regarding Web portals and IS acceptance and success models were extensively reviewed. In this phase, the underpinning theoretical background, upon which the theoretical framework was based later on, was mainly defined as "Delone and Mclean IS Success Model".

2. **Phase II:** The main concern in this phase was to develop the theoretical framework and research hypotheses. In this phase, the theoretical model was proposed and the main constructs of the proposed model were discussed and defined. Also, relationships between the different constructs are hypothesized based on the reviewed relevant literature. The scales and measures, which were developed to operationalize the constructs, were also defined and then used to develop the research instrument, i.e. survey questionnaire.

3. **Phase III:** This is the data collection phase in which data is collected using two techniques: unstructured interviews and survey questionnaire in order to be used later on to evaluate and validate the research theoretical model and to test the proposed hypotheses.

4. **Phase IV:** This is the phase of data analysis and discussion in which regression analysis techniques were mainly used to analyze the collected data and to test the theoretical model along with its hypotheses so as to arrive at results and conclusions about whether the hypotheses are substantiated or not and whether the research question is answered, or not.

Research Context

The study was conducted at Aramex Company in Amman, Jordan. The section below gives an overview on Aramex Company and its Web portals.

Aramex Profile

Aramex is a leading global provider of comprehensive logistics and transportation solutions. Established in 1982 as an express operator, the company rapidly evolved into a global brand recognized for its customized services and innovative multi-product offering. The company has expanded its presence in Europe by acquiring TwoWay Vanguard, a logistics and freight service provider that has offices in the Netherlands, Ireland and the United Kingdom. In January 1997, Aramex became the first Arab-based international company to trade its shares on the NASDAQ stock exchange. After five years of successful trading, Aramex returned to private ownership in February 2002 and continued to expand and excel as a privately owned company, establishing global alliances and gaining stronger brand recognition. In June 2005, Aramex went public on the Dubai Financial Market (DFM) as Arab International Logistics (Aramex) with its shares traded under ARMX. Today, Aramex employs more than 8,600 people in over 310 locations around the globe, and has a strong alliance network providing worldwide presence.

The range of services offered by Aramex includes international and domestic express delivery, freight forwarding, logistics and warehousing, records and information management solutions, e-business solutions, and online shopping services. The express service provides a global solution for moving time-sensitive documents and parcels door-to-door around the world and within a variety of transit time options that meets customers' need. The freight service enables customers to move heavy shipments by land, air and/or ocean.

Overview on Portal Technology at Aramex

Aramex Web portals are in use for about 10 years. The main portals that Aramex use are the following:

1. **Aramex.com:** This Web portal provides customers/clients with information about Aramex and the services it provides. Customers can also track their shipments from origin to destination by shipment number or by reference, and can calculate shipment rates through specifying the origin and the destination of the

shipment. Support services can be provided to customers through this portal.

2. Aramex.net: This portal is used internally by Aramex employees. Users authenticate themselves to the system via accounts: username and password. Then, they can access Web information systems and applications which they have authorizations for. Privileges are given to users based on their positions, job titles, and job descriptions. For example, accountants can only access financial data, calculate rates, and issue invoices to customers. Aramex.net includes many products such as the tracking system which is used to ship and track express and freight shipments. The users of this portal are about 250 employees of the Freight Department, Express Department, Operations Department, Calling Center, Quality department and Accounting Department.

The tracking system enjoys user-friendly Graphical User Interfaces (GUIs) to record shipment information for shipped products including label printing and shipment routing. The track and trace engine helps in tracking and tracing shipments from origin to destination, and it serves shipments' recovery purposes. There are other systems that feed the tracking system such as the Electronic Data Exchange (EDI) that retrieves information from the tracking system and transfers it directly at the customer side. This sort of information includes delivery status information and notifications upon delivery, in addition to an accounting module that is used for issuing invoices and keeping track of financial transactions.

Data Collection

Interviews were held with individuals working at the managerial and operational levels, to gain some background information on the implemented portals (Aramex.com and Aramex.net) regarding their main features and characteristics, and to understand who use Web portals and for what purposes. In addition to the interviews, the survey questionnaire was disseminated to the 250 users of the portal, by e-mail first. When the response rate was observed to be very low, the researcher has visited to company to distribute the questionnaires by hand to concerned employees, and to collect them filled on the spot. As a result, 153 questionnaires that are appropriate for data analysis were collected.

Sample Profile

The sample's descriptive statistics showed that 65.1% of the respondents were male and 34.9% were female. Respondents aged between 25 and 34 years formed the majority of the sample with a percentage of 49.7%, whilst the rest of respondents were aged between 18 and 24 years (34%), between 35 and 44 years (14.3%), and between 45 and 54 years (2%). The majority respondents (i.e. 71.4%) were employees, whilst only 23.8% were middle managers and 4.1% were supervisors. Most respondents have bachelor degrees with a percentage of 83%, whilst the rest have master degrees (3.8%) and diploma (10.2%). About 38.8% of respondents have an experience of 1 to 3 years with Web portals, 21.1% have an experience of less than a year, 15.6% have an experience of 3 to 5 years, 17% have an experience of 5 to 10 years, and only 7.5% have more than ten years of experience with Web portals. Finally, the majority of respondents (49.7%) have a very good IT knowledge and skills, whilst respondents with moderate and poor IT knowledge and skills were only (2.8%) of respondents. Detailed respondents' characteristics are shown in Table 1.

Table 1: Sample characteristics

Measure	Item	Frequency	Percentage
Experience with portals	<1	31	21.1%
	1-3	57	38.8%
	3-5	23	15.6%
	5-10	25	17%
	> 10	11	7.5%
	Total	**147**	**100%**
Gender	Male	97	65.1%
	Female	52	34.9%
	Total	**149**	**100%**
Age	18-24	50	34%
	25-34	73	49.7%
	35-44	21	14.3%
	45-54	3	2%
	Total	**147**	**100%**
Education	Masters	10	6.8%
	Bachelor	122	83%
	Diploma	15	10.2%
	Total	**147**	**100%**
Position in the Company	Top Management	1	0.7%
	Middle Management	35	23.8%
	Supervisor	6	4.1%
	Employee	105	71.4%
	Total	**147**	**100%**
IT Knowledge	Excellent	40	27.2%
	Very good	73	49.7%
	Good	30	20.4%
	Moderate	2	1.4%
	Poor	2	1.4%
	Total	**147**	**100%**

Results and Discussion

Descriptive Analysis

To gain more understanding of the nature and extent of Web portals' at Aramex, Table 2 below shows some descriptive analysis about the voluntariness, frequency, duration, and variety of use of Web portals. About (30.1%) of respondents disagree or strongly disagree that they use the portal voluntarily, whilst (35.3%) of respondents agree or strongly agree that they use the portal voluntarily. The majority of respondents (92.9%) use the Web portal on a daily basis. A percentage of (10.5%) of respondents use the Web portal less than one hour per day, (21.6%) use it from 1 to 3 hours per day, (30.1%) use it from 3 to 6 hours per day, and (37.9%) use it more than 6 hours per day. Concerning the variety of the Web portal's use, (81.0%) of respondents agree or strongly agree that the Web portal is used for retrieving information, (56.9%) agree or strongly agree that it is used for publishing information, (61.4%) agree or strongly agree that it is used for communicating with colleagues, (64.7%) agree or strongly agree that it is used for storing and sharing documents, and (73.8%) agree or strongly agree that it is used for executing business processes.

Table 2. Descriptive analysis for the "Use" variable

Measure	Item	Frequency	Percentage
Voluntariness of Web portal's use	Strongly disagree	32	20.9%
	Disagree	14	9.2%
	Neutral	53	34.6%
	Agree	35	22.9%
	Strongly agree	19	12.4%
	Total	**153**	**100%**
Frequency of Web portal's use	Few times a day	29	19.0%
	Many times a day	113	73.9%
	Few times a week	6	3.9%
	Many times a week	3	2.0%
	Few times a month	1	0.7%
	Many times a month	1	0.7%
	Total	**153**	**100%**
Hours of Web portals' use	Less than an hour	16	10.5%
	1-3 hrs	33	21.6%
	3-6 hrs	46	30.1%
Hours of Web portals' use	More than 6 hrs	58	37.9%
	Total	**153**	**100%**
Web portal is used to retrieve information	Strongly disagree	11	7.2%
	Disagree	7	4.6%
	Neutral	11	7.2%
	Agree	53	34.6%

Measure	Item	Frequency	Percentage
	Strongly agree	71	46.4%
	Total	**153**	**100%**
Web portal is used to publish information	Strongly disagree	17	11.1%
	Disagree	23	15.0%
	Neutral	26	17.0%
	Agree	37	24.2%
	Strongly agree	50	32.7%
	Total	**153**	**100%**
Web portal is used to communicate with colleagues	Strongly disagree	10	6.5%
	Disagree	16	10.5%
	Neutral	33	21.6%
	Agree	26	17.0%
	Strongly agree	68	44.4%
	Total	**153**	**100%**
Web portal is used to store and share documents	Strongly disagree	12	7.8%
	Disagree	15	9.8%
	Neutral	27	17.6%
	Agree	39	25.5%
	Strongly agree	60	39.2%
	Total	**153**	**100%**
Web portal is used to execute business processes	Strongly disagree	9	5.9%
	Disagree	11	7.2%
	Neutral	20	13.1%
	Agree	55	35.9%
	Strongly agree	58	37.9%
	Total	**153**	**100%**

The means and standard deviations of all "Use" dimensions are reported in Table 3 below. A mean of 2.97 for "Voluntariness of Web portal's use" indicates that the responses on this item were neutrally focused. A mean of 1.93 for "Frequency of Web portal's use" indicates that the majority of respondents use the portal at least daily. The Web portal at Aramex is used for the following reasons (listed in a descending order from the most to the least): (1) retrieving information (4.08); (2) executing business processes (3.93); (3) communication (3.82); (4) storing and sharing documents (3.78), and finally for (5) publishing information (3.52).

Table 3: Means and Standard Deviations for measures of "Use" variable

Measure	Mean	Std. Deviation
Voluntariness of Web portal's use	2.97	1.290
Frequency of Web portal's use	1.93	.685
Hours of Web portals' use	2.95	1.009
Web portal is used to perform the following:		
Retrieve information	4.08	1.170
Publish information	3.52	1.372
Communicate with colleagues	3.82	1.283
Store and share documents	3.78	1.277
Execute business processes	3.93	1.153

Reliability and Validity

In this research, validity is first assured by conducting a thorough examination of the previous empirical and theoretical studies within the information systems field, upon which the operational definitions for each variable was made. Indeed, we used items and scales already validated in the previous related-literature to measure the constructs included in this study. Further, the content validity was achieved by checking the relevance and appropriateness of the research instrument with four academic professors and experts from the University of Jordan. To establish construct validity, correlational analysis (Pearson correlation analysis) is used. The Kaiser-Meyer-Olkin (KMO) was used to determine the adequacy of the study sample. As the value of KMO was 0.893, the study sample was considered adequate. Also, bartlett's test of sphericity indicates significance (p-value=0.000). Table 4 shows the results of KMO and Bartlett's tests.

Table 4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**0.893**
Bartlett's Test of Sphericity	Approx. Chi-Square	1.564
	df	2145
	Sig.	0.000

Moreover, Cronbach's alpha is also used to measure internal consistency (reliability) of the questionnaire items. A "high" value of alpha is often used as evidence that the items measure an underlying (or latent) construct. A reliability coefficient of .70 or higher is considered "acceptable" in most research situations. Here, the reliability for all questionnaire items was satisfactory as values for Cronbach's alpha were above the cut-off point, as it is shown below in Table 5. The means and standard deviations of all study variables are also reported in the table.

Table 5: Reliability and Descriptive Statistics

	Construct	No. of items	Cronbach's alpha	Mean	Standard Deviation
1	System Quality (SQ)	7	0.937	3.979	0.939
2	Information Quality (IQ)	9	0.961	3.988	0.950
3	Service Quality (SeQ)	12	0.971	3.775	0.996
3.1	Service Quality- reliability (SeQ-REL)	3	0.913	3.629	1.105
3.2	Service Quality- responsiveness (SeQ-RES)	3	0.932	3.801	1.096
3.3	Service Quality- empathy (SeQ-EMP)	3	0.908	3.623	1.019
3.4	Service Quality- assurance (SeQ-ASS)	3	0.930	4.049	1.025
4	Intention to use (INT)	5	0.946	4.088	0.940
5	User Satisfaction (SAT)	6	0.945	4.004	0.847
6	Use (USE)	8	0.854	3.375	0.825
		5	0.924	3.829	1.098
7	Perceived Employees' Performance (PERF)	19	0.971	3.641	0.900
7.1	Productivity (Prod)	4	0.948	3.929	1.002
7.2	Innovation (Innov)	5	0.954	3.534	1.014
7.3	Customer Satisfaction (CSAT)	5	0.961	3.582	1.036
7.4	Management Control (CONT)	5	0.94	3.578	1.031

Hypotheses Testing

The correlation analysis amongst all the study variables was conducted using Pearson correlation analysis as shown in Table 6. All variables showed significant correlations ($p \leq 0.01$).

Table 6: Correlation analysis amongst the variables

	SQ	IQ	SeQ	INT	SAT	USE
IQ	.841**					
SeQ	.769**	.822**				
INT	.786**	.775**	.705**			
SAT	.796**	.839**	.723**	.766**		
USE	.785**	.794**	.637**	.685**	.717**	
PERF	.765**	.818**	.799**	.751**	.800**	.775**

SQ: System Quality, IQ: Information Quality, SeQ: Service Quality, INT: Intention to use, SAT: User Satisfaction, USE: Portals' Use, PERF: Perceived Employee Performance

** $p \leq 0.01$

Before performing regression analysis, multicollinearity is tested by examining collinearity statistics; i.e. Variance Inflation Factor (VIF) and tolerance. This is significant given that variables with high collinearity pose a problem to regression analysis. The VIF value of a variable should not exceed 10; otherwise the variable is considered highly collinear (Hair *et al.,* 1998). Collinearity statistics showed that tolerance values of all variables ranged between 0.217 and 0.485 and VIF values ranged between 2.062 and 4.598; indicating that multicollinearity is not a likely threat to the parameter estimates in this study.

Moreover, regression analysis requires data to be normally distributed as a prerequisite so as to ensure the validity and reliability of the results. This research employs Jarque-Bera (skewness-kurtosis) test to make sure that all the variables are within the acceptable limit of the skewness-kurtosis ranges. This test provides a comparison of the distributions of the study data and the normal distribution. Skewness values indicate the symmetry of the distribution. If skweness value is positive, then data are clustered to the left of the distribution; otherwise data are clustered to the right of the distribution. Kurtosis value indicates the height of the distribution. Positive kurtosis values indicate a peaked distribution, while negative kurtosis values suggest a flatter distribution. Skewness-kurtosis acceptable values have been suggested by scholars such as Tabachnick and Fidell (2007) to be within the range of ± 2.58 at the 0.01 significance level. As in Table 7, the Skewness-kurtosis values of the study data are all within the recommended range and thus normality as a condition for successful regression analysis is assured in this study.

Table 7: Normality Test

Variable	Skewness	Kurtosis
System Quality (SQ)	-1.581-	2.321
Information Quality (IQ)	-1.647-	2.637
Service Quality (SeQ)	-0.913-	0.241
Intention to Use (INT)	-1.24-	0.879
User Satisfaction (SAT)	-1.201-	1.289
Portals' Use (USE)	-1.018-	0.478
Perceived Employee Performance (PERF)	-0.977-	0.797
Productivity (Prod)	-1.274-	1.409
Innovation (Innov)	-0.628-	0.041
Customer satisfaction (CSAT)	-0.777-	0.135
Management Control (CONT)	-0.539-	-0.508-

After guaranteeing that necessary conditions are all satisfactory met, the study hypotheses were tested using multiple regression analysis. **First,** "System Quality", "Information Quality" and "Service Quality" were regressed on "Intention to Use Portals". As in Figure 3, it was found that "System Quality (SQ)" ($\beta = 0.441$, $p < 0.001$) and “Information Quality (IQ)” ($\beta = 0.321$, $p < 0.001$) are significantly and positively related to

"Intention to use (INT)" (Adjusted $R^2 = 0.661$), and that the relation between "System Quality" and "Intention to Use" is stronger ($\beta = 0.440$, $p < 0.001$) than that between "Information Quality" and "Intention to Use". Thus, H1 and H3 are supported. Results concerning H1 stating that "*System Quality of Web portals positively influences Intention to Use*", were consistent with findings of other studies (Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Hong *et al.*, 2001/2002), and results concerning H3 stating that "*Information Quality of Web portals positively influences Intention to Use*" supported the finding of Halawi *et al.*, (2007), who found that information quality of knowledge management systems was significantly related to intention to use. However, results showed that "Service Quality (SeQ)" is not significant at $p < 0.001$ level ($\beta = 0.102$). Hence, H5 is not supported. This result is consistent with the findings of Wu and Wang (2006) and Halawi *et al.*, (2007) who found that service quality did not predict intention to use in the context of knowledge management systems. This can be explained by the argument that "Service Quality" affects the other two dimensions of quality: "System Quality" and "Information Quality", but it does not have a direct effect on "Intention to Use".

Second, "System Quality", "Information Quality" and "Service Quality" were regressed on "User Satisfaction (SAT)". As in Figure 3, it was found that "System Quality (SQ)" ($\beta = 0.303$, $p < 0.001$) and "Information Quality (IQ)" ($\beta = 0.559$, $p < 0.001$) are significantly and positively related to "User Satisfaction (SAT)" (Adjusted $R^2 = 0.726$), and that the relationship between "Information Quality" and "Users' Satisfaction" is found to be stronger ($\beta = 0.559$, $p < 0.001$) than that between "System Quality" and "Users' Satisfaction". Thus, H2 and H4 are supported. Results concerning H2 stating that "*System Quality of Web portals positively influences Users' Satisfaction with portals*", were consistent with findings of other studies (Iivari, 2005; Almutairi and Subramanian, 2005; Wu & Wang, 2006; Kulkarni *et al.*, 2006; Hsieh & Wang, 2007; Halawi *et al.*, 2007; Chiu *et al.*, 2007; Urbach *et al.*, 2010). Further, results concerning H4 stating that "*Information Quality of Web portals positively influences Users' Satisfaction with portals*" supported the findings of other studies (Seddon & Yip, 1992; Seddon & Kiew, 1996; Bharati, 2002; Rai *et al.*, 2002; McGill *et al.*, 2003; Almutairi & Subramanian, 2005; Wixom & Todd, 2005; Iivari, 2005; Wu & Wang, 2006; Kulkarni *et al.*, 2006; Chiu *et al.*, 2007; Halawi *et al.*, 2007). However, results showed that "Service Quality (SeQ)" is not significant at $p < 0.001$ level ($\beta = 0.029$). Hence, H6 is not supported, and this result is consistent with the findings of other previous studies (e.g. Aladwani, 2002; Chiu *et al.*, 2007).

Third, "Intention to use (INT)" was regressed on "Portals' Use (USE)" and found to be significantly and positively related ($\beta = 0.685$, $p < 0.001$) (Adjusted $R^2 = 0.466$). Thus, H7 is supported. Literature has examined these two constructs as one, but in this research they were examined as separate constructs and were found to be significantly related. **Fourth**, "Portals' Use (USE)" was regressed on "User Satisfaction (SAT)" and found to be significantly and positively related ($\beta = 0.717$, $p < 0.001$) (Adjusted $R^2 = 0.511$). Thus, H10 is supported, and this result is consistent with findings of other studies (Iivari, 2005; Chiu *et al.*, 2007; Wang and Liao, 2008; Urbach *et al.*, 2010). **Fifth**, "User Satisfaction (SAT)" was regressed on "Intention to use (INT)" and found to be significantly and positively related ($\beta = 0.766$, $p < 0.001$) (Adjusted $R^2 = 0.584$). Thus, H8 is supported.

Sixth, "User Satisfaction (SAT)" and "Portals' Use (USE)" were regressed on "Performance (PERF)", it was found that "User Satisfaction (SAT)" ($\beta = 0.504$, $p <$

0.001) and "Portals' Use (USE)" ($\beta = 0.413$, $p < 0.001$) are significantly and positively related to "Performance (PERF)" (Adjusted R2 = 0.719). However and although both of the constructs were found to be significant, the relation between "Users' Satisfaction" and "Perceived employees' performance" is found to be stronger ($\beta = 0.504$, $p < 0.001$). Thus, H9 and H11 are supported. Results concerning H9 are consistent with findings of other studies (Torkzadeh & Doll, 1999; Rai *et al.,* 2002; McGill *et al.,* 2003; McGill & Klobas, 2005; Halawi *et al.,* 2007; Wang and Liao, 2008; Urbach *et al.,* 2010), and the results concerning H11 are consistent with findings of other studies (Seddon & Kiew, 1996; Torkzadeh & Doll, 1999; Weill & Vitale, 1999; Rai *et al.,* 2002; Almutairi & Subramanian, 2005; Kositanurit *et al.,* 2006; Burton-Jones & Straub, 2006; Wang and Liao, 2008; Urbach *et al.,* 2010).

Seventh, "Performance (PERF)" was regressed on "Intention to use (INT)" and found to be significantly and positively related ($\beta = 0.751$, $p < 0.001$) (Adjusted $R^2 = 0.561$). Thus, H12 is supported, and this result is consistent with findings of many studies that have found a relationship between use of a system and behavioral intention when measuring net benefits using perceived usefulness as the metric (Malhotra & Galletta, 2005; Wixom & Todd, 2005; Klein, 2007). **Finally**, "Performance (PERF)" was regressed on "User Satisfaction (SAT)" and found to be significantly and positively related ($\beta = 0.800$, $p < 0.001$) (Adjusted $R^2 = 0.638$). Thus, H13 is supported, and this result is consistent with the findings of other studies (Seddon & Kiew, 1996; Kulkarni *et al.,* 2006; Wu & Wang, 2006; Hsieh & Wang, 2007) that have found a positive and significant relationship between perceived usefulness (i.e., net benefits) and user satisfaction.

Although "Service Quality" was not found to be significantly related to neither "Intention to Use" nor "User Satisfaction", it can be examined more broadly by decomposing into its four dimensions using the SERVQUAL instrument that are: "Reliability", "Responsiveness", "Empathy" and "Assurance" of IT staff. By examining each dimension alone, while ignoring the effect of "System Quality" and "Information Quality", one can get more insight concerning what dimension has the most significant effect on "Intention to Use" and "Users' Satisfaction". Our results showed that "Service Quality" decomposed into "Reliability", "Responsiveness", "Empathy" and "Assurance" explained 52.6% of the variance in "Intention to Use", and that "Assurance" explained the most part of the variance ($\beta = 0.507$, $p < 0.001$). This result appears to be rational since users will be more willing to use a portal if they feel that IT staff is highly knowledgeable that they can confidently answer technical questions and queries. In this case, users will feel that IT staff is dependable and trustworthy and can support them while using the portal to perform their job. In a similar manner, results also showed that "Service Quality" decomposed into "Reliability", "Responsiveness", "Empathy" and "Assurance" explained 64.8% of the variance in "Users' Satisfaction", and that "Assurance" explained the most part of the variance ($\beta = 0.79$, $p < 0.001$). This result supports the finding of Devaraj *et al.* (2002), who found that in a Web setting, the empathy and assurance aspects of service quality were related to user satisfaction, but not to reliability or responsiveness.

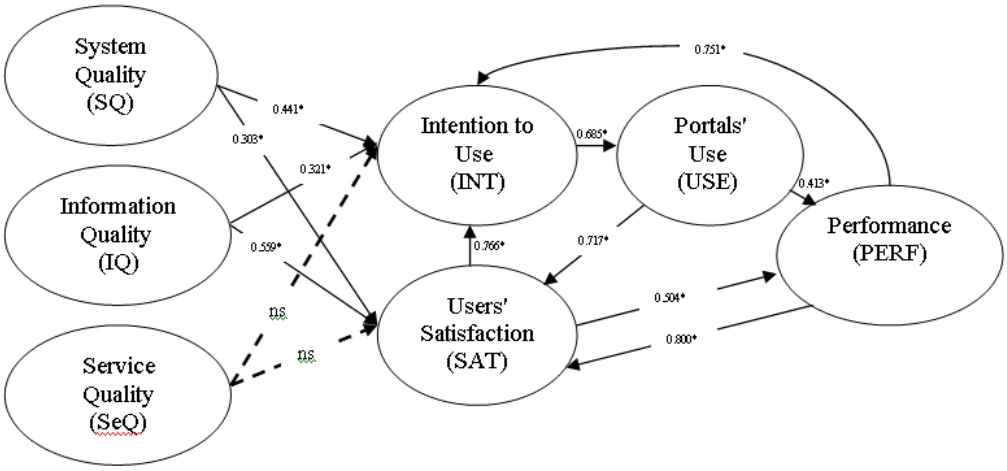

Figure 3. The Study Results

Note: * $P < 0.001$

ns = not significant

More insight is gained into the relationship between "Portals' Use" and "Performance" and the relationship between "Users' Satisfaction" and "Performance", by decomposing the construct "Performance" into its four dimensions proposed by Torkzadeh and Doll (1999) which are: Task productivity, Task innovation, Customer satisfaction, and Management control. Our results show that "Portals' Use" and "Users' Satisfaction" explained 76.8%, 65.7%, 50.3% and 38.7% of the variance in "Task productivity", "Task innovation", "Management Control", "Customer satisfaction" respectively. This means that "Portals' Use" and "Users' Satisfaction" exert the highest explanatory power and predictive ability concerning "Task productivity" (Adjusted $R^2 = 0.768$) compared to other components of "Performance".

The "Portals' Use" and "Users' Satisfaction" constructs exert nearly the same effect ($\beta = 0.503$ and 0.444 respectively) on "Task Productivity". Web portals at Aramex provide employees with tools, information and knowledge that save them time and help them in performing their job more quickly, thus leading to more productivity. The quality of information that employees can get from using the Web portal and the extent to which it can be tailored to the needs of employees may affect the degree of innovation. As the results of the company show a somewhat high perceived information quality (A mean of 3.988), the high impact of the Web portal on "Task Innovation" is predictable and logical. Also, the impact of the Web portal on "Management Control" is also logical since the Web portals are somewhat used mandatory to perform business processes; and this gives more ability to track the execution of tasks performed by employees. If there is a delay at one side, it will appear at another side, since there is a workflow that will be interrupted if delays exist. Finally, "Customer Satisfaction" appears to be the least affected component of "Performance", and the reason behind having such a result is that not all employees are using Web portals to serve customers given that help desk and customer support employees are the ones who are using portals in this context.

The "Users' Satisfaction" construct exerts a stronger

effect ($\beta = 0.548$, $p < 0.001$) than "Portals' Use" on "Task Innovation". This result appears rational since users will be more able to innovate if they are satisfied with the quality of Web portals they are using. Innovation is more dependent on the level of satisfaction with portals than on the nature of portals' use. Further, the "Portals' Use" construct exerts a stronger effect ($\beta = 0.385$, $p < 0.001$) than "Users' Satisfaction" on "Customer Satisfaction". This result appears also rational since the impact of using Web portals on customer satisfaction is dependent on whether the Web portals is used to serve customers, solve their problems, answer their questions and satisfy their needs. "Users' Satisfaction" exerts a stronger effect ($\beta = 0.493$, $p < 0.001$) than "Portals' Use" on "Management Control". The reason behind such a result is that the Web portal of Aramex does not have the tools needed to track the achievement of tasks, but since the Web portal is needed to perform the job and there is some type of an integrated work flow, it helps managers to keep track of what is going on.

Implications for Theory and Practice

Implications for Theory

In the field of information systems, the studies examining the success of Web portals on the basis of Delone and Mclean IS Success model are very few (e.g. Urbach *et al.,* 2010; Al-Busaidi, 2010). This study has come up to further examine the validity of the D & M IS Success model in the context of Web portals, whilst focusing on examining the success of Web portals on the benefits gained at the individual level expressed in terms of performance. Most research has examined either "system use" or "intention to use" considering the two constructs as one. Therefore some relationships were not clear such as the relationships (system/ information/ service quality – intention to use, use – user satisfaction, user satisfaction – intention to use, and performance – intention to use). This research further delineates and validates these relationships by examining the two constructs ("Use" and "Intention to Use") separately. This enhances our understanding of the developed theoretical model. All developed hypotheses were supported except for those associated with service quality. This indicates that the effect of "service Quality" on "Intention to use" and "User Satisfaction" is not significant and can be ignored in future related studies. In addition, this research has delineated the benefits gained at the individual level expressed by "Performance". This is accomplished by decomposing performance into four components: Task productivity, Task innovation, Customer satisfaction, and Management control. The developed model explained most of the variance in "Task Productivity" (76.8%), followed by "Task innovation" (65.7%), "Management Control" (50.3%), and finally "Customer Satisfaction" (38.7%). Also, identifying and linking the functions and features of portals to the dimensions of quality is one of the main theoretical contributions of this study.

Implications for Practice

From a practical perspective, the present research provides implications for manager and decision maker, and IT and Web designers and developers. The study is deemed useful to Web designers and developers since it provides insights about the dimensions that are very influential as they significantly affect the quality of Web portals. Clarifying the most important functions and features of portals and linking them to the quality dimensions gives insights into what factors should be taken into consideration when developing a high quality Web portal that would be accepted and adopted by users. For decision makers and managers, the present research helps them in making decisions concerning developing and implementing portals' technology; by recognizing what benefits can be gained compared to the costs that

may be incurred due to implementing such a technology. It also helps them to develop plans to increase employees' acceptance and usage levels of such a technology. Examining how users perceive the quality of Web portals in terms of the three quality dimensions: System Quality, Information Quality and Service Quality, and how they perceive that using a Web portal affects their performance gives insight into what factors need to be further examined so as to increase users' intention to use Web portals and their satisfaction levels.

Limitations and Future Research

Although this research is one of few empirical studies that have examined the validity of D&M IS Success Model in explaining the success of Web portals in delivering benefits at the individual level expressed in terms of performance, this research has a number of limitations that may restrict the generalizability of its findings, and these could be addressed in future research. First, this research represents a case study of a company in Jordan. Therefore, the results cannot be generalized to other contexts without careful considerations. To overcome the problem of research bias and the inability of generalization, we recommend extending the study by conducting a study on a specific sector in Jordan (i.e. ICT industry) or conducting multiple case studies in Jordan or other developing countries in order to replicate and confirm the findings. Second, the sample from which data was collected was somewhat small; we need a larger sample to get more reliable results. Third, users' profile was not taken into consideration, although previous research has found that perceptions and intention to use is affected by factors other that quality, such as demographic factors. Position in the company may also affect perceptions and intention to use; for example managers may perceive things different from employees, since the nature of tasks performed using the portal is different. This calls for more research to be conducted to examine the effect of contextual factors (such as demographic characteristics of users) on the intention to use, since perceptions and behaviors may differ across gender, age, level of education, level of experience with Web portals and positions in the company. Results may also differ across culture, so it would be recommended to observe the effect of culture by examining companies that implement Web portals in different countries. Furthermore, it would be recommended to conduct a more in-depth qualitative research by conducting more interviews to gain more detailed information about the implemented Web portals, and the factors influencing the attitudes of users towards using Web portals.

Conclusions

This research aimed at developing and validating a theoretical framework that explains the success of Web portals in bringing benefits at the individual level in terms of improved performance. The D&M IS Success Model is slightly modified to fit the context of Web portals. The "Net benefits" construct is replaced by the "Performance" construct. This is because; we are in this study interested in examining the benefits at the individual level expressed in terms of improved performance. The "Performance" construct used in this study as a multi-dimensional one that includes the four dimensions of individual impact proposed by Torkzadeh and Doll (1999), which are: Task productivity, Task innovation, Customer satisfaction, and Management control.

The results show that the overall validity of the developed model is supported. The model asserts that "Performance" is affected by "Portals' Use" and "Users' Satisfaction". "Portals' Use" is determined by "Users' intention to use portals". Both "Users' intention to use portals" and "Users' Satisfaction" are determined by the three dimensions of perceived portals' quality: "System

Quality", "Information Quality" and "Service Quality". A positive experience of "Portals' Use" results in higher "Users' Satisfaction", which in turn results in higher "Users' intention to use portals". Also, higher "Performance" leads to more "Users' intention to use portals" and higher "Users' Satisfaction". The results supported all formulated hypotheses, except H5 and H6 concerning the hypotheses associated with "Service Quality" stating that "Service Quality" of portals positively influences "Intention to Use" and "Users' Satisfaction" with portals, respectively. The developed model explained about 72% of the variance in "Perceived employees' performance.

The results of this study also show that "System Quality" is more able to predict "Intention to Use" than "Information Quality", whilst "Information Quality" is more able to predict "Users' Satisfaction" than "System Quality". "Service Quality" is found not significantly related to "Intention to Use" and "Users' Satisfaction". By decomposing "Service Quality" was into its four components: "Reliability", "Responsiveness", "Empathy" and "Assurance" it was found that "Assurance" explained the most part of the variance in "Intention to use" and "Users' Satisfaction". Also, results showed that "Users' Satisfaction" is more able to predict "Performance" than "Portals' Use". Results showed that "Portals' Use" and "Users' Satisfaction" exert the highest explanatory power and predictive ability concerning "Task productivity" compared to other components of "Perceived employees' performance, followed by "Task innovation", "Management Control", and finally "Customer Satisfaction".

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تطوير نموذج للبوابات الإلكترونية الناجحة وتطبيقه

ديما جلال ، ومعتز الدبعي***

ملخــص

أدى ظهور الوسائل الإلكترونية وانتشارها، كالبوابات الإلكترونية إلى تغيير النمط السائد في التعاطي مع المعلومات، وطريقة التواصل والمشاركة في المعرفة وتنفيذ المهام. لقد أدى استخدام انظمة وتكنولوجيا المعلومات إلى تطوير الأداء بصورة جوهرية، لا على المستوى التنظيمي فقط، وإنما على المستوى الشخصي ايضا. وإن ما يعرقل هذه المكاسب هو عدم تقبل بعض الأشخاص لاستخدام سبل الأنظمة والتكنولوجيا المتاحة. يهدف هذا البحث إلى معرفة مدى اهمية الدور الذي تلعبه البوابات الإلكترونية في تطوير الأداء بصورة عمومية على المستوى الشخصي، بما يخص انتاجية الفرد والابتكار ورضا الزبائن والتنظيم الإداري. وبغية تحقيق هذا الهدف سعى هذا البحث نحو تطوير نموذج للبوابات الإلكترونية الناجحة وتقييمها فيما يخص تجربة شركة ارامكس. تبين أن النتائج تدعم جميع الفرضيات المطروحة عدا اثنتين منها وهما: جودة الخدمة المقدمة، ونية الاستخدام ودرجة رضا المستخدم. وقد فسر النموذج المطور ما نسبته ٧٢% من اسباب الاختلاف في الأداء لدى الموظفين.

الكلمات الدالة: البوابات الإلكترونية، النموذج لأنظمة المعلومات الناجحة، جودة النظام، جودة المعلومات، جودة الخدمة، الأداء الوظيفي، درجة رضا المستخدم.

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